Welsh Government

# M4 Corridor around Newport

## WelTAG Appraisal Report Stage 1 (Strategy Level)

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# 1 Introduction

## 1.1 WelTAG Appraisal Guidance[1]

WelTAG was formally published by the Welsh Assembly Government in June 2008. Paragraph 1.1.1 of WelTAG states that the guidance,

*"….has been developed by the Welsh Assembly Government with the intention that it is applied to all transport strategies, plans and schemes being promoted or requiring funding from the Welsh Assembly Government".*

WelTAG has two primary purposes:

- *"To assist in the development of proposals enabling the most appropriate scheme to be identified and progressed – one that is focused on objectives, maximises the benefits and minimises negative impacts; and*
- *To allow the comparison of competing schemes on a like-for-like basis, so that decision-makers can make funding decisions".*

WelTAG aims to ensure that transport proposals contribute to the wider policy objectives for Wales. Three pillars of sustainability, known as Welsh Impact Areas, underlie policy in Wales. These are:

- **Economy**: this reflects the importance of a strong and developing economy for Wales;
- **Environment**: this reflects both the legal requirements and desire to protect and enhance the condition of the built and natural environment; and
- **Society**: this reflects the desire to address issues of social exclusion and to promote social justice and a high quality of life for Welsh people.

This report provides a WelTAG Stage 1 appraisal at a strategy level for transport options in the M4 Corridor around Newport.

WelTAG sets out that strategies and schemes need to be appraised against Transport Planning Objectives (TPOs) and the Welsh Impact Areas. For strategies, only appraisal Stage 1 is applicable. At this level, it may only be possible to undertake appraisal qualitatively. Once individual schemes from strategies are put forward for appraisal, the guidance will need to be applied again for the scheme under consideration. For schemes, there is a formal and standardised two-stage appraisal process. Following Stage 1 appraisal, usually a small number of options will be further developed and then appraised at scheme level in considerable detail in Stage 2, so that a proper consideration of the alternatives can take place.

[1] Welsh Transport Planning and Appraisal Guidance, WelTAG, June 2008, The Welsh Assembly Government

## 1.2 Purpose of this Report

This report describes the results of the WelTAG Stage 1 Appraisal for the M4 Corridor around Newport. Appraisal Summary Tables (ASTs) are provided for each of the transport options assessed at Stage 1 and tables summarising the comparative performance of the options are also provided. The report concludes with a summary of the outcomes of the appraisal, which will inform decisions as to which transport options might be taken forward for inclusion in a draft Plan for the M4 Corridor around Newport.

## 1.3 Background

For many years, concerns have been raised regarding the potential for delays on the motorway and trunk road network in South Wales. In March 1989, the Secretary of State for Wales commissioned the South Wales Area Traffic Survey (SWATS) to review traffic patterns over part of the trunk road network in South Wales in order to identify problem areas and propose possible solutions. The SWATS Report (1990) identified the need for substantial improvement to the M4 to address a growing capacity issue on the motorway, in particular the section between Magor and Castleton. As a consequence, a proposal for a new dual 3-lane motorway (to be known as the M4 Relief Road) was included in the Welsh Trunk Road Forward Programme in 1991.

This proposal was the subject of public consultation during 1993 and 1994, following which the Preferred Route for the M4 Relief Road was announced in 1995. The Preferred Route was subsequently modified in 1997 to allow for development of the LG site at Duffryn.

As well as pursuing the new road proposal as a possible solution to predicted traffic problems on the M4, a more broadly-based study of solutions was undertaken, known as the Common Appraisal Framework Study (CAF). This study was undertaken between 1997 and 1999, and sought to assess the advantages and disadvantages of alternative solutions to the congestion problem against acceptable environmental, financial, economic and safety criteria.

The fundamental requirements used for the evaluation were whether:

- The solution could provide relief to the M4 around Newport; and
- The costs were commensurate with the likely benefits of the scheme.

The CAF study concluded that there were two main ways in which relief could be provided from the effects of increasing traffic on the M4 around Newport whilst minimising any disbenefits:

- The construction of the M4 Relief Road; and
- A hybrid strategy which combined some car restraint (ie tolling the existing M4) with significantly improved public transport.

The National Assembly for Wales Local Government and Environment (LGE) Committee considered the findings of the CAF study in February 2000. Given the LGE committee did not support the introduction of tolls, a second Hybrid scenario was developed (Hybrid 2). Hybrid 2 provided additional capacity at the Brynglas Tunnels (and associated widening of the motorway to the west of the Tunnels) replacing the tolling measure in the previous Hybrid scenario (Hybrid 1). The assessment of this Hybrid 2 scenario showed that it would provide a lesser degree of congestion relief compared to the M4 Relief Road.

In considering the overall conclusions of the CAF Study, the then Transport Directorate found that none of the alternatives investigated would relieve the M4 around Newport to the same degree as the M4 Relief Road. The conclusion was to:

- Discard Hybrid 2;

- Discard widening of the existing M4 around Newport as a means of increasing capacity; and
- Accept that the M4 Relief Road would be the appropriate scheme to implement if increased capacity is needed.

In 2002, the proposal for an M4 Relief Road was put "On Hold" in the Trunk Road Forward Programme, pending the conclusion of the Wales Spatial Plan.

In November 2004, "People, Places, Futures – The Wales Spatial Plan" was published. It included the intention to:

"…*increase the transport capacity of the corridors and gateways to Europe and beyond. This will include capacity enhancements on the M4 and A465 corridors through the Trunk Road Forward Programme as well as development of routes from Cardiff International Airport*".

In December 2004, the Minister for Economic Development and Transport reported on the outcome of his review of transport programmes, which he had undertaken to ensure a good strategic fit with 'Wales: A Better Country' and the Wales Spatial Plan. One of the conclusions of the review was that additional capacity was required on the M4 motorway in South East Wales, in order to reduce congestion, improve resilience and remove an obstacle to greater prosperity along the whole corridor through to Swansea and West Wales.

In addition to widening the motorway north of Cardiff, the Minister announced proposals to develop a New M4 south of Newport between Magor and Castleton.

Following the Ministerial Review in November 2004, the New M4 Project was the subject of a thorough re-examination in order to ensure fit with current policies and to take account of physical and legislative changes. Three key activities were undertaken:

- A re-examination of route corridors considering, in particular, the implications and consequences of legislative changes and physical developments within the original project study area;
- An holistic review of the previously published Preferred Route (published 1997); and
- A review of the junction strategy.

The conclusion of these studies confirmed the route to the south of Newport as the optimal solution.

Following the Preferred Route and Junction Strategy Review, a TR 111[2] (April 2006) was published to protect a revised route corridor. The modifications were:

- In the Duffryn area, where a route up to 200m further north was proposed. This was in response to the deletion of the Duffryn Link from the Newport Unitary Development Plan; and

[2] Once a preferred route is announced, Welsh Government serves a *statutory notice* (TR 111) on the local planning authorities requiring the line (land within 67m from the centre line of the proposed road) to be protected from development. The statutory blight rules come into play. This is enacted under Article 15 of the Town & Country Planning General Development Order 1995.

- South of the Corus Steelworks at Llanwern, where the route was moved some 400m further north. This was in response to the cessation of steelmaking activities at the steelworks and to minimise impacts on the Gwent Levels.

A series of public exhibitions were held in April and May 2006 to explain the changes to the public and other stakeholders.

However, a written statement in July 2009 by the then Deputy First Minister Ieuan Wyn Jones announced that the New M4 was not affordable. The statement, however, accepted *"the need to urgently address safety and capacity issues on the existing route"* through the introduction of *"a range of measures"*. The M4 Corridor Enhancement Measures (CEM) Programme was thus initiated and this aimed to create a package of measures to deal with resilience, safety and reliability issues within the M4 corridor between Magor and Castleton. A WelTAG Stage 1 Appraisal (Strategy Level) was undertaken for the M4 CEM Programme[3].

Under the M4 CEM Programme, a long list of possible solutions was explored. No single solution was seen to deliver all objectives set (see 2.3) for transport provision along the M4 Corridor. However, packages that combine public transport, highway and other travel solutions were identified for appraisal. These included on line widening of the M4 between Junctions 24 and 29 as well as improvement to the existing road network to the south of the city centre and a new dual carriageway all-purpose road to the south of Newport.

As part of the M4 CEM Programme, a comprehensive engagement process was launched in September 2010 culminating in a Consultation, open to all, held between March and July 2012. During the engagement process, the Welsh Government and its project team conducted dialogue and deliberative sessions both with internal and external specialists and expert stakeholders, encompassing a diverse range of views and interests relating to transport in South East Wales, as well as with people likely to be interested in and affected by any transport measures potentially adopted and implemented by Welsh Government. This has resulted in public support for the provision of an additional high quality road to the south of Newport.

The appraisal/engagement processes during 2012 have shown that there are additional measures to support the public transport and highway infrastructure measures in addressing travel related problems within the M4 Corridor between Magor and Castleton. These are referred to as Common Measures. They comprise a mix of network improvements/management, demand management, alternative modes and smarter sustainable choices. The common measures that attracted support are listed as follows:

- Provide cycle friendly infrastructure;
- Provide walking friendly infrastructure;
- Promote A465 Heads of the Valleys road as an alternative route to the M4;
- Junction 23a improvements; and
- Junction 27 safety improvements.

[3] Welsh Government, M4 Corridor Enhancement Measures (M4 CEM), WelTAG Appraisal Report Stage 1 (Strategy Level), Arup, March 2013

An M4 CEM WelTAG Stage 1 Appraisal concluded that the following measures are worthy of further consideration:

- a new dual carriageway route to the south of Newport;
- public transport enhancement; and
- common measures.

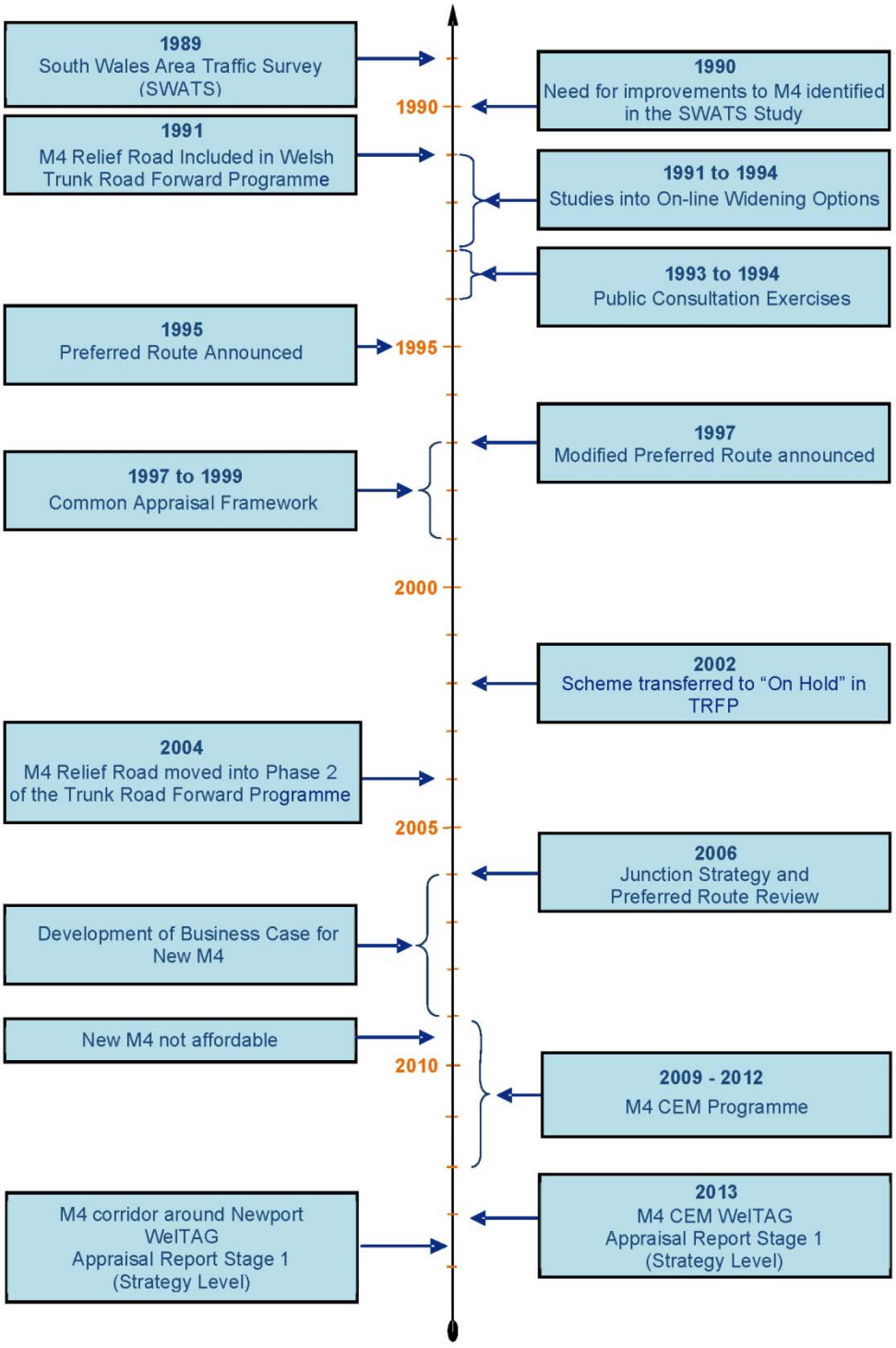
Recent initiatives including discussions between Welsh Government and HM Treasury/Department for Transport, as well as the work of the Silk Commission[4], have created potential funding opportunities for Welsh Government infrastructure projects. As a consequence, the decision was taken to further reconsider solutions to resolve capacity issues on the M4.

Thus, in order to inform the strategy for the M4 Corridor around Newport, a further WelTAG Stage 1 Appraisal has been undertaken of options that include M4 CEM short-listed measures, provision of new motorway capacity routed to the south of Newport which could potentially be unrestrained by funding, public transport and complementary measures.

The milestones and key activities described above are graphically illustrated in a time-line (see Figure 3.1).

[4] The Commission on Devolution in Wales which is reviewing the case for the devolution of fiscal powers and reviewing the powers of the National Assembly for Wales due to report in Spring 2014

## Figure 3.1: Time-line (1989-2013) for development of the options to relieve M4 around Newport



## 1.4 Preparing a draft Plan

Having established that there are problems with regard to transport operations on the M4 corridor around Newport and that there is a need to tackle these, the Welsh Government has involved others in exploring a very wide range of possible ways of solving these problems and of meeting the objectives set for the M4 Corridor around Newport. A long list of possible solutions has been explored.

As a result of this process, it has been acknowledged that, in addition to provision of additional east/west highway capacity on the strategic road network and more general network management / improvement, public transport enhancement will contribute to the objectives for the M4 Corridor around Newport.

A short-list of strategic transport options has been drawn up following previous appraisal work. These options are considered further and, as an outcome of this appraisal, preferred transport measures are identified as potential elements that might comprise a 'draft Plan' for the M4 corridor around Newport.

A draft Plan would present Welsh Government's preferred strategy alongside any reasonable alternatives to that preferred strategy, which would be subject to public consultation. A Strategic Environmental Assessment (SEA) Environment Report, Habitats Regulations Assessment (HRA), Health Impact Assessment (HIA) and Equality Impact Assessment (EqIA) for the draft Plan would also be subject to public consultation alongside a draft Plan Consultation Document, in accordance with the SEA Regulations[5], HRA Regulations[6] and WelTAG guidance.

[5] http://www.legislation.gov.uk/uksi/2004/1633/contents/made
[6] http://www.legislation.gov.uk/uksi/2010/490/contents/made

# 2 Planning Stage

## 2.1 Context

WelTAG requires that, at the Planning Stage, an objectives-led approach be adopted. This means that planning starts by identifying problems and opportunities and defining what is to be achieved – the ultimate outcomes expressed as transport planning objectives (TPOs). The starting point for objective identification is the **Wales Transport Strategy (WTS).**[7] The draft Plan for the M4 corridor around Newport thus needs to meet the Outcomes and Strategic Priorities of the WTS.

The National Transport Plan (March 2010) recognised that *"for a long time there have been concerns about the section of the motorway around Newport, which falls well short of modern design standards. These centre on peak-time capacity, safety and the resilience of the local network"*.

As part of the National Transport Plan, the Welsh Government aims to *"deliver a package of measures designed to improve the efficiency of the M4 in south east Wales, including public transport enhancements, making the best possible use of the motorway and improving the resilience of the network"*.

## 2.2 Transport Problems on the M4 Corridor

The Welsh Government has looked in detail at what travel related problems exist on the M4 Corridor Magor to Castleton, and asked people, stakeholders and those involved in managing transport in and around Newport what they thought the problems amount to. The problems have been defined as:

### 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.

[7] The Wales Transport Strategy was adopted on 8 May 2008

### 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.

## 2.3 Transport Planning Objectives

Having due regard for the WTS Outcomes and Strategic Priorities, the Welsh Government has identified the following Transport Planning Objectives (TPOs) for the M4 corridor around Newport between Magor and Castleton:

**TPO 1** Safer, easier and more reliable travel east-west in South Wales.

**TPO 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.

**TPO 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.

**TPO 4** Best possible use of the existing M4, local road network and other transport networks.

**TPO 5** More reliable journey times along the M4 Corridor.

**TPO 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.

**TPO 7** Improved safety on the M4 Corridor between Magor and Castleton.

**TPO 8** Improved air quality in areas next to the M4 around Newport.

**TPO 9** Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 Corridor.

**TPO 10** Reduced greenhouse gas emissions per vehicle and/or person kilometre.

**TPO 11** Improved travel experience into South Wales along the M4 Corridor.

**TPO 12** An M4 attractive for strategic journeys that discourages local traffic use.

**TPO 13** Improved traffic management in and around Newport on the M4 Corridor.

**TPO 14** Easier access to local key services and residential and commercial centres.

**TPO 15** A cultural shift in travel behaviour towards more sustainable choices.

As part of this appraisal, Arup has reviewed the objectives, which have been agreed as a result of various earlier analyses and consultation/engagement exercises during the New M4 Project and the M4 CEM Programme.

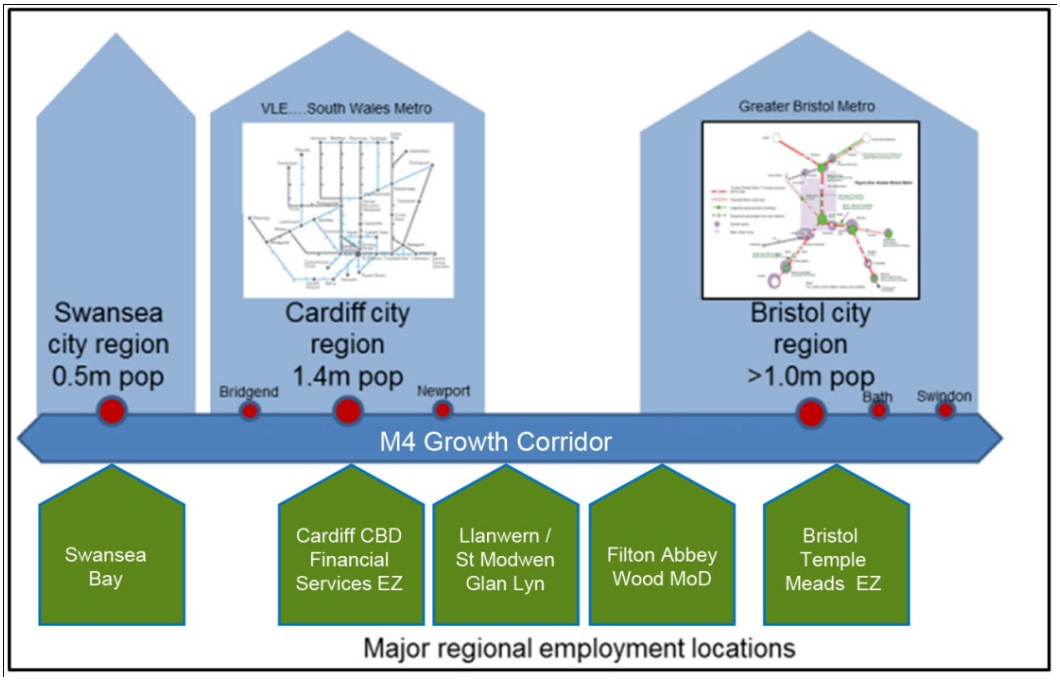
For the current circumstances, the objectives as previously proposed are considered to remain wholly relevant to the M4 transport corridor around Newport and, as such, represent a good framework within which to appraise the relative performance of strategic options for improvement of operating conditions/transport provision within the M4 Corridor around Newport.

During this WelTAG Stage 1 appraisal, the transport options are assessed against the Welsh Impact Areas, TPOs, public and stakeholder acceptability, technical and operational feasibility, financial affordability and deliverability and risks.

# 3 The Wider Strategic Contribution of the M4 Transport Corridor in South Wales and Beyond

## 3.1 Context

The main road network in South Wales experiences traffic congestion during peak periods. This is particularly the case on the M4 motorway and on the approaches to Swansea, Cardiff and Newport. This results in unreliable journey times, which impacts on the ability of individuals to take up job opportunities and discourages investment from high value businesses. Transport congestion also has environmental impacts affecting local communities.




The M4 in South Wales plays a key strategic role in connecting South Wales with the rest of Europe. It forms part of the Trans-European Transport Network (TEN-T). The M4 provides links to Ireland via the ports in South West Wales. It also provides the gateway link between South Wales and England and mainland Europe. It is one of the most heavily used roads in Wales.

The M4 provides a facility for transporting goods, linking people to jobs and employment sites as well as serving the Wales tourism industry. It thus plays a key role in both the local and national economies of Wales.

Cardiff, Newport and Swansea have ambitious regeneration strategies. Monmouthshire is developing areas around Junction 23a of the M4. Rhondda Cynon Taff has important gateways onto the motorway at Junctions 32 and 34. Bridgend is served by M4 Junctions 35 and 36. Neath Port Talbot straddles the motorway and gets important access from Junctions 38 to 43. Congestion on the M4 causing unreliable journey times and reduced service levels will thus inhibit economic development in South Wales.

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 levels, 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.

Improving transport links between South Wales and Bristol, Heathrow Airport, London and the South East of England is an important priority for wealth creation and investment, as is facilitating movement of goods and people between the industrialised Midlands/North of England and South Wales. The section of the M4 motorway around Newport is an important common link on both of these strategic routes as shown in Figure 3.1. Reliability and efficient operating conditions on this section of motorway are thus of extreme importance to the economy and to the perception of Wales as a place to do business.

The CBI recently commented that the motorway around Newport is critical for a number of economic and social reasons. Not only would there be clear benefits for businesses and commuters of a more efficient, effective and predictable entrance and exit to the South Wales economy, there would also be wider economic benefits for Wales and a significant benefit to the South West of England and beyond.

## 3.2 Strategic Policy Drivers

The Minister for Economy, Science and Transport in May 2013 stated that ***"priorities (for transport) are to ensure that we have a transport system that helps improve the economic competitiveness of Wales and that provides good access to jobs and services."***

**Welsh Government *(Infrastructure Investment Plan)*[8]**

***"Economic Infrastructure – physical networks that sustain and develop economic activity, such as roads, rail, airports, shipping ports, electricity, ITC, water supply and sanitation….provides key services to business and private customers by linking them through the transmission of goods, services and information. Particularly important are networks which perform the economic function of helping people to access employment. Effective investment in networks can help raise employment and promote economic growth in ways that go beyond the effects of other large scale capital investment.***

[8] Wales Infrastructure Investment Plan (WIIP) May 2012

***High Level Investment Priorities: Improving transport links, particularly East-West transport links in both North and South Wales – East-West links have already been prioritised in the National Transport Plan. In addition, larger projects are being examined for feasibility including strategic enhancement of the M4.***

***Aims and objectives of investment: Prioritising investments which contribute to economic growth – addressing urban congestion and improving access to key areas, and by monitoring the capacity and reliability of our key east-west routes.***

***UK Government: We are pleased that the Chancellor signalled his intent in the 2011 Autumn Statement to work closely with the Welsh Government on developing a solution to the bottleneck in South East Wales. The detailed options for releasing the pressure on this key strategic route are now being explored with the UK Government."***

Investing in sustainable transport infrastructure to support economic growth is a priority of both the Welsh Government and the Department for Transport:

**Welsh Government *(Economic Renewal Strategy)*[9]**

***"Investing in high quality sustainable infrastructure - Wales needs modern, sustainable infrastructure to underpin economic growth and the wellbeing of our people. Our people, businesses and communities need to be well-connected within and beyond Wales and have access to the right facilities and services where they live and work."***

**Department for Transport *(Business Plan 2011-2015)***

***"Our vision is for a transport system that is an engine for economic growth but one that is also greener and safer and improves quality of life in our communities. By improving the links that help to move goods and people around, and by targeting investment in new projects that promote green growth, we can help to build the balanced, dynamic and low-carbon economy that is essential for our future prosperity."***

By providing additional capacity on the motorway around Newport, there is significant potential to realise agglomeration effects through improved links between Swansea, Cardiff and Newport and through stimulating greater integration with Severnside and Greater Bristol.

**Strategic Policy Driver – Welsh Government *(Economic Renewal Programme)***

***"The absence of a major conurbation (by European standards) is associated with wages and productivity levels that are lower than would otherwise be the case (the "agglomeration effect"); however, there is a key opportunity in the medium term to build on the projected rapid population growth of Cardiff, our capital city."***

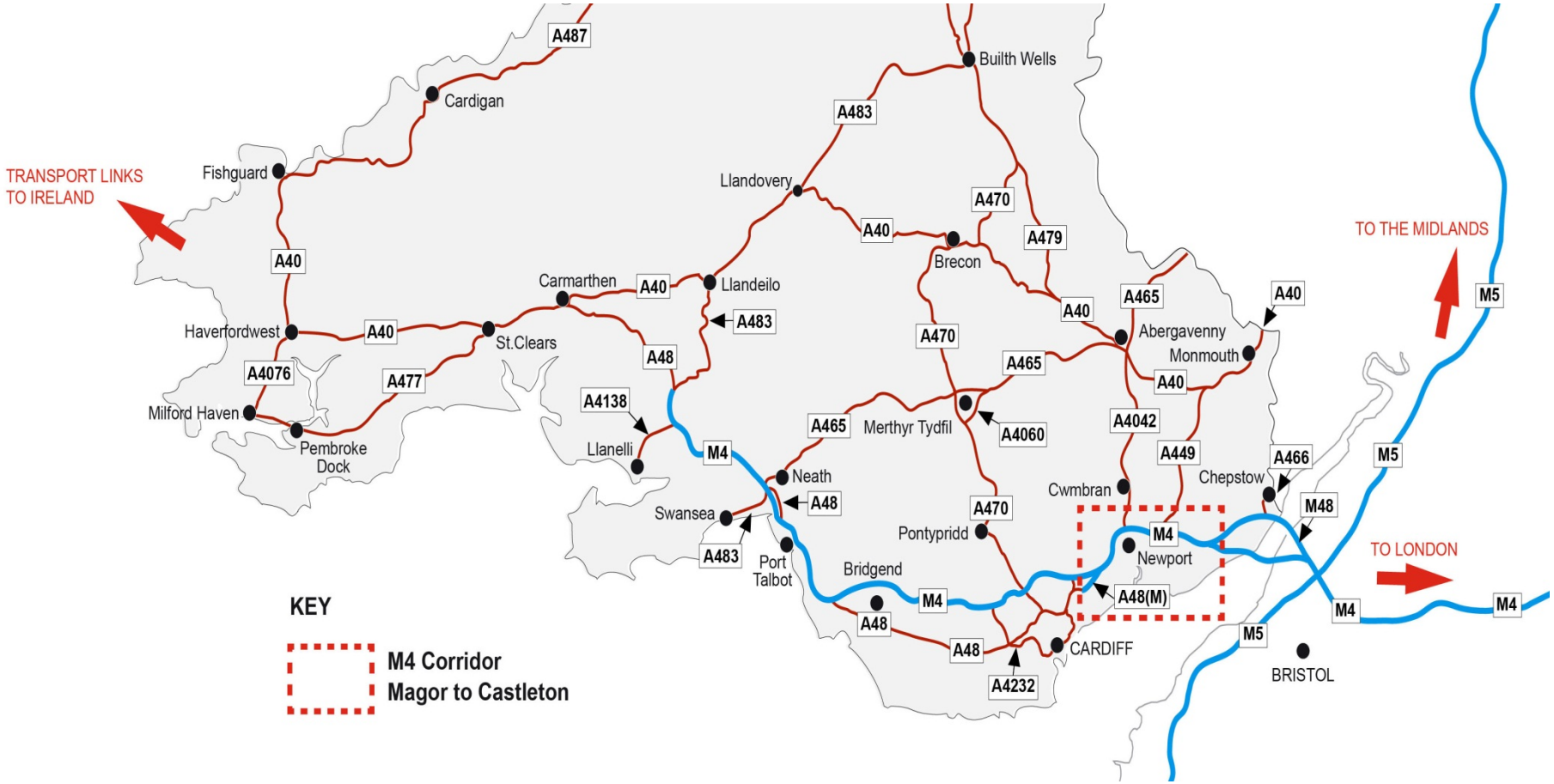
[9] Economic Renewal: A new direction (Welsh Government, July 2010) http://wales.gov.uk/topics/businessandeconomy/publications/economicrenewal/?lang=en

The Welsh economy has lagged behind other regions of the UK in recent years. The linear dispersal of centres of economic activity along the coast of South Wales is such that the economic and social wellbeing of South Wales is heavily dependent on efficient transport links between local and regional centres.

**Welsh Government (*One Wales: Connecting the Nation – The Wales Transport Strategy)***

***"Transport plays a key role in shaping our daily lives. The goal of One Wales: Connecting the nation is to promote sustainable transport networks that safeguard the environment while strengthening our country's economic and social life. Our transport strategy identifies a series of high-level outcomes and sets out the steps to their delivery."***

**Figure 3.1: The Location and Strategic Importance of the M4**



The Wales Transport Strategy sets out how Welsh Government intends to achieve its social, economic and environmental outcomes, and reflects a wide range of responses to earlier consultation. WTS also sets out the five key areas where the need to make substantial progress has been identified. These are:

- Reducing greenhouse gas emissions and other environmental impacts;
- Improving public transport and better integration between modes;
- Improving links and access between key settlements and sites across Wales and strategically important all-Wales links;
- Enhancing international connectivity; and
- Increasing safety and security.

The provision of additional capacity on the motorway around Newport would have a major positive impact on the last three of the five key areas listed above; whilst reducing traffic congestion on the motorway and elsewhere around Newport is likely to have a positive impact on the rate of greenhouse gas emissions. Improvement to public transport also needs to be considered, but this is likely to be achieved as a separate initiative.

The problems of traffic congestion on the motorway around Newport are recognised in the WTS as the following extract shows:

***"While much of the road network is congestion-free for most of the day, significant problems exist on strategic routes such as the M4 and in urban centres. Moreover, while traffic on rural roads tends to be lighter, overflow from congested major roads and slow moving vehicles can affect journey reliability. Unreliable journey times are especially difficult for people who rely on transport for their livelihood."***

The Welsh Government's National Transport Plan (NTP) reiterates the strategic importance of the east-west transport corridor in South Wales:

**Welsh Government** ***(National Transport Plan)***

***"East-west travel in south Wales by rail, road and public transport is dominated by movements in and between the key settlements of Cardiff, Swansea and Newport and their surrounding areas."***

Swansea, Cardiff and Newport are all important European cities in their own right, sitting on a designated Trans European Network (TEN-T) route. This route provides a strategic link to the important ports of Milford Haven and Fishguard in West Wales, the deep water port facilities at Port Talbot, as well as to the ports of Cardiff, Newport and Avonmouth.

## 3.3 Supporting Economic Growth in South Wales and Beyond

Provision of sufficient capacity within the transport network in South Wales is crucial for access to jobs, enabling the efficient distribution of freight and ensuring that barriers to future development, regeneration and growth are avoided. A key driver for the economy of South Wales is connectivity between Swansea,

Cardiff and Newport and, by extension, accessibility for South West Wales as well as links into Severnside and Greater Bristol.

The South East Wales Economic Forum produced a 10-year economic development strategy for the region in 2005. There is a strong transport theme running through the strategy. The strategy recognises the potential implications of increased traffic volumes in the future:

*'The key artery for the region, the M4, is already showing signs of 'furring up', to the detriment of the economy. Given continued economic growth and the accompanying increase in the movement of people and goods, unless there is a policy response the situation can only deteriorate, putting further pressure on the east-west axis'.*

The strategy concluded that *'improvements are needed – or a revival of plans for an M4 relief road to siphon off traffic'* in order that the motorway does not change from being *'a facilitator of economic growth to being a barrier'*.

## 3.4 Strategic Economic Priority

In April 2013, the CBI in Wales stated that the M4 Relief Road (ie improvement to the motorway around Newport) remains the number one priority. The Chancellor's public backing of the road in April was stated to be the latest step forward in a campaign that the CBI has spearheaded. In addition to the obvious infrastructure benefits, the CBI stated that no other project has the potential to transform the South Wales economy.

The Eddington Review[10], which was a comprehensive attempt to understand the relationship between transport and the economy in a UK context, concluded strongly that transport matters for economic performance of countries and regions. The review notes that, where the transport network is established, transport improvements are most likely to deliver economic benefit where the investment is a response to signals of transport demand exceeding capacity. This is very much the situation with regard to the motorway around Newport.

The Eddington Review concluded with three strategic economic priorities, namely:

- *The UK's congested and growing urban areas and their catchments;*
- *The UK's international gateways and supporting surface infrastructure; and*
- *A limited number of inter-urban corridors connecting urban areas and international gateways:* where the unreliability of the transport network is adding costs to business, threatening productivity and innovation in the freight and logistics industries and both inter-regional and international trade. From a passenger perspective these corridors connect urban areas with each other and with international airports, and from a freight perspective they connect ports with distribution hubs and distribution hubs with their eventual markets.

[10] The Eddington Transport Study, Summary Report, The Case for Action, December 2006

***These strategic economic priorities articulate the important, underlying strategic and economic reasons that support investment in the provision of additional capacity on the M4 corridor around Newport.***

# 4 Consequences of Doing Nothing

Analysis shows that, in 2012 during peak periods, traffic flows exceed 100% of capacity along sections of the M4 around Newport[11]. It is generally accepted that once hourly traffic flows reach about 80% of capacity, 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 100% of capacity, traffic can expect severe operational problems over longer periods. In the future, the situation is expected to deteriorate further. Forecasts of future traffic volumes show that, in the 'Do Minimum' situation[12], traffic volumes on most links would increase by 30-45% by 2035. This suggests that the motorway around Newport will be heavily congested, with all sections between J23a and J29 experiencing flows above 100% of capacity during weekday peak periods[13].

Congestion on the M4, particularly around Cardiff and Newport, is sighted by the business community in South Wales as a barrier to economic growth. Where congestion increases, the cost of transport for businesses, commuters and consumers and economic performance can be affected. Issues of peak-time congestion and resilience are important in addition to average travel times. Business and stakeholder engagement has been undertaken to provide information on the perceived nature of the congestion problem on the current M4 and the ways in which this impacts on business performance and the wider economy[14].

For the CBI, economic infrastructure needs to be the key priority within the Welsh Government's Infrastructure Investment Plan, as only this type of project will deliver the growth and jobs that the Welsh economy urgently needs.

Of the businesses surveyed, a significant proportion (66%) of business users of the M4 between Magor and Castleton consider congestion to be a significant problem, with 45% reporting congestion to be a 'very big problem'. Congestion on the M4 between junctions 24 and 29 is already thought to be impacting on business performance and the level of congestion is perceived to be getting worse.

Increased congestion will result in higher journey times for commuters, reducing the effective travel to work area. Deterioration in travel times on the main road network (including the M4) in South East Wales and Severnside could result in significant decreases in employment opportunities in these areas.

[11] Source: Arup analysis 2012
[12] The Do Minimum, in this case, includes all recent network modifications (such as the Junction 24 improvement and the Variable Speed Limit system) and any committed interventions (such as the Junction 28/Bassaleg Roundabout/Pont Ebbw Roundabout improvement and the Steelworks Access Road).
[13] Source: Arup analysis 2012
[14] Source: Ipsos MORI

In terms of the environment, that the presence of the M4 has adverse impacts on the environment is evidenced by the fact that four out of Newport's seven Air Quality Management Areas (AQMAs) are associated with the M4. Higher traffic volumes along the M4 are likely to contribute not only to poor air quality but also noise pollution, compromising the aural amenity of neighbouring residential communities. Assuming no improvements to vehicle emissions technology, the increased flows and stop start conditions will give rise to more vehicle emissions along these routes.

Alongside the motorway at Newport, there are 'Noise Action Planning Areas' (NAPAs). These also need to be addressed.

# 5 Consulting on the Case for Change

A proposal for a new dual 3-lane motorway (to be known as the M4 Relief Road) was included in the Welsh Trunk Road Forward Programme in 1991. This proposal was the subject of public consultation during 1993 and 1994, following which the Preferred Route for the M4 Relief Road was announced in 1995. The Preferred Route was subsequently modified in 1997 to allow for development of the LG site at Duffryn.

In December 2004, the Minister for Economic Development and Transport reported on the outcome of his review of transport programmes. One of the conclusions of the review was that additional capacity was required on the M4 motorway in South East Wales, in order to reduce congestion, improve resilience and remove an obstacle to greater prosperity along the whole corridor through to Swansea and West Wales.

In addition to widening the motorway north of Cardiff, the Minister announced proposals to develop a New M4 south of Newport between Magor and Castleton. At the same time, it was announced that the existing route could include priority measures for public transport and multiple occupancy vehicles. This meant that the M4 Relief Road scheme was re-named as the New M4 Project.

Following the Ministerial Review in November 2004, the New M4 Project was the subject of a thorough re-examination in order to ensure fit with current policies and to take account of physical and legislative changes. Three key activities were undertaken:

- A re-examination of route corridors considering, in particular, the implications and consequences of legislative changes and physical developments within the original project study area;
- An holistic review of the previously published Preferred Route (published 1997); and
- A review of the junction strategy.

The conclusion of these studies confirmed the route to the south of Newport as the optimal solution.

Following a Preferred Route and Junction Strategy Review, a TR 111[15] (April 2006) was published to protect a revised route corridor. The modifications were:

- In the Duffryn area, where a route up to 200m further north was proposed. This was in response to the deletion of the Duffryn Link from the Newport Unitary Development Plan; and
- South of the Corus Steelworks at Llanwern, where the route was moved some 400m further north. This was in response to the cessation of steelmaking activities at the steelworks and to minimise impacts on the Gwent Levels.

A series of public exhibitions were held in April and May 2006 to explain the changes to the public and other stakeholders. When the National Transport Plan

[15] Once a preferred route is announced, the Welsh Government serves a *statutory notice* (TR 111) on the local planning authorities requiring the line (land within 67m from the centre line of the proposed road) to be protected from development. The statutory blight rules come into play. This was enacted under Article 15 of the Town & Country Planning General Development Order 1995.

was published in 2010, the New M4 was considered to be unaffordable and the M4 Corridor Enhancement Measures (M4 CEM) Programme had been put in place to urgently address safety and capacity issues on the existing M4 route.

As part of the M4 CEM Programme, a comprehensive engagement process was launched in September 2010 culminating in a Consultation, open to all, held between March and July 2012. During the engagement process, the Welsh Government and its project team conducted dialogue and deliberative sessions both with internal and external specialists and expert stakeholders, encompassing a diverse range of views and interests relating to transport in South East Wales, as well as with people likely to be interested in and affected by any transport measures potentially adopted and implemented by Welsh Government. This has resulted in public support for the provision of an additional high quality road to the south of Newport.

Some 694 consultation responses were received. Participants were asked, amongst other things, to what extent they think the Highway Infrastructure Option (an additional high quality road to the south of Newport) will address the problems and achieve the goals that they prioritised. There was a range of comments on the Highway Infrastructure Option. Generally, this option is supported by most key stakeholders and members of the public on its possible benefits to transport and the economy compared to other options, but with concerns over cost and on the potential adverse environmental impact of its construction on the Gwent Levels. Some respondents expressed their disappointment that the New M4 proposal was announced as being unaffordable in 2009. Comments included a desire for the proposed New M4 relief road to be reinstated.

# 6 Strategic Options for Stage 1 Appraisal

Paragraph 5.3.1 of the WelTAG guidance states that the Stage 1 appraisal is intended to screen and test options against transport planning objectives (TPOs) and the Welsh Impact Areas (i.e. Economy, Environment and Society), as well as more detailed tests for deliverability, risks and the degree of support from the public and other stakeholders.

During the M4 CEM Programme, a range of the following measures were assessed as part of a WelTAG Stage 1 appraisal:

- Public transport measures
- Highway infrastructure measures:
    - Highway Option A: additional high quality road to the south of Newport
    - Highway Option B: at grade junction improvements to the A48 Newport Southern Distributor Road (SDR)
    - Highway Option C: grade separated junction improvements to the A48 SDR
    - Highway Option D: online widening on the M4 between Junctions 24 and 29, including an additional tunnel at Brynglas
- 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 network improvements / management, demand management, alternative modes and smarter sustainable choices.

Of the M4 CEM highway infrastructure options appraised, Option A was shown to offer the best value for money and provide the most relief to the existing sections of the motorway around Newport.

The assessment indicated that environmental conditions on the motorway would be likely to deteriorate under Option B. For example, for Option B, it is forecast that the traffic volumes in 2035 on the motorway east of the Brynglas Tunnels will be greater than in the Do-Minimum scenario. West of the tunnels, the traffic volumes are forecast to be similar to the Do-Minimum. Thus no relief is likely to be provided to motorway congestion under Option B. It was thus recommended that Option B should not be taken forward for further appraisal.

Some respondents to the M4 CEM consultation challenged Option C as a solution or clearly stated that, in their opinion; Option C would not address the problems or achieve the goals chosen. This view has been borne out by the transport modelling, which indicated very little relief to motorway congestion as a result of Option C. Whilst Option C would be likely to result in benefits, these would not be focused on relief to the motorway. By the design year (2035), analysis has shown that the traffic levels through the Brynglas tunnels under Option C would be reduced by only some 4% compared to a do-minimum scenario.

It was thus recommended that Option C should not be taken forward for further appraisal.

The preliminary assessment of Option D indicated that it would have a significant impact on the local community and the users of the motorway during both construction and in use. Some 200 – 300 homes and businesses could be directly affected, including the cemetery at Christchurch. A number of properties will require demolition but the exact numbers will depend on the final layout selected.

During the construction phase local communities are likely to experience considerable disturbance over long periods due to additional noise and air pollution and periodic night-time working. Local accessibility would also be affected by road closures whilst existing overbridges were replaced to allow for the widened carriageways to be constructed.

For Option D, the feasibility of an additional tunnel was challenged by respondents to the M4 CEM consultation because of the problems experienced back in the 1960s when the original tunnels were constructed. Concerns were also expressed about the impact on nearby property and road users during construction. A local community group, the New Life Trust, which has been based at Christchurch since 1998, considers it would have serious adverse impact on local communities and facilities. There was also a Facebook page “Campaign Against Additional Tunnel” and a petition website “Newport Oppose £550m Plans of New Brynglas Tunnel and demolition of Homes”, which contained 165 names. Both were set up in opposition to Option D, on the grounds that it would require property demolition and/or would adversely impact on the quality of life for residents of Brynglas.

Alongside the motorway at Newport there are “Noise Action Planning Areas” (NAPAs) and “Air Quality Management Areas” (AQMAs) which need to be addressed. Widening the motorway would reduce congestion thereby giving a slight beneficial impact on vehicle pollution and emissions but this could be offset in the longer term as traffic volumes continue to increase. The widened motorway would also be closer to some properties which could have a detrimental impact on local air quality. For example for Option D, by 2035, daily traffic volumes between Junction 26 and Junction 27 on the motorway are forecast to increase to over 163,000 vehicles per day AADT. This is compared with less than 139,000 vehicles per day AADT in the Do-Minimum and 96,000 vehicles per day AADT for Option A.

Traffic forecasts for Option D have indicated that, by the design year (2035), the section of motorway between Junction 26 and Junction 27 is likely to be operating some 6% above capacity in the westbound direction during the weekday PM peak. This would be likely to result in severe operational problems. The lack of an alternative route will thus result in motorway capacity problems and network resilience issues.

Widening the existing sub-standard M4 would not provide long term resilience to the motorway and trunk road network in south east Wales. It would also not contribute towards addressing the existing NAPA and AQAMA issues alongside the motorway in Newport. It is therefore recommended that Option D Widening of the M4 between Junctions 24 and 29 and additional tunnel at Brynglas is discounted from any future M4 CEM draft Plans. The discounting of this option will also reduce the amount of uncertainty and anxiety for some residents and businesses in the Newport area.

It was thus recommended that Option D should not be taken forward for further appraisal.

On 1 May 2013, in response to a question at Plenary, the Minister stated that it is the intention to make a statement before the summer recess with regard to the M4 Relief Road. Earlier work has resulted in a TR 111 protected route for a new section of motorway to the south of Newport. This route is to be considered further along with a dual carriageway all-purpose road that has emerged as a result of the M4 CEM WelTAG Stage 1 appraisal. Given the potential for Welsh Government to fund major infrastructure works, consideration is also given to the provision of a 3-lane motorway along the alignment of the all-purpose road. The options that are now short-listed for appraisal are thus as follows:

- *New section of 3-lane motorway to the south of Newport following the protected (TR 111) route;*
- *New dual 2-lane all-purpose road to the south of Newport following the Red route alignment in the M4 CEM Programme;*
- *New section of 3-lane motorway to the south of Newport along a similar alignment to the all-purpose Red Route;*
- *Public transport measures; and*
- *Complementary network management and/or network improvement measures (see Section 6.5).*

Each option is briefly described below.

## 6.1 Motorway following TR 111 Protected Route – The Black Route

This option comprises the construction of a new 3-lane motorway mainly following the protected TR 111 route, between Junctions 23 and 29, including a new crossing of the River Usk south of Newport. The River Usk is designated as a Special Area of Conservation (SAC).

The TR 111 route to the south of Newport has remained protected for planning purposes since April 2006 up to the present time.

The alignment of this proposed new section of motorway has been developed following extensive consultation, investigation and analysis. The aim is to minimise the impact on the environment, whilst fully meeting current motorway design and safety standard. Minor changes to the alignment of the TR111 protected route could still be made, subject to further investigation if this option is taken forward. This motorway solution would be delivered as one scheme.

An all movements junction is proposed east of the River Usk and an east-facing partial junction is proposed to serve western areas, together with a west-facing partial junction to serve the Magor area. The option also includes a new junction on the M48 near Caldicot to relieve traffic on the B4245. However, the junction strategy will be further investigated if this option is taken forward for further appraisal.

The alignment of the new section of motorway is shown in Figure 6.1.

## 6.2 Dual 2-lane All-Purpose Road – The Red Route

This option involves the construction of an additional high quality road to the south of Newport, as a dual carriageway solution. The route aims to minimise negative impacts on local communities and the environment. As a dual carriageway on this corridor alignment, the road could be delivered in phases by tying into the existing road network in Newport. Delivery could thus be phased with availability of funding. However, the main benefits will only be realised when the route is complete.

This road will require a new crossing of the River Usk, which is designated as a Special Area of Conservation (SAC).

The alignment of the route is such that the impact on the Port of Newport is minimised. However, there could be significant impact upon the Newport Council's Docks Way landfill site. There are also on-going and potential further development sites along this route. There could also be some impact upon the Duffryn residential area, in terms of property demolition and increased noise and air pollution.

An east-facing partial junction is proposed to serve western areas, and a west-facing partial junction is proposed to the east of Queensway Meadows connecting directly to the Newport Steelworks Access Road, together with a west-facing partial junction to serve the Magor area. The option also includes a new junction on the M48 near Caldicot to relieve traffic on the B4245. However, the junction strategy will be further investigated if this option is taken forward for further appraisal.

The alignment of the road is shown in Figure 6.2.

## 6.3 Motorway along Alternative Alignment to the South of Newport – The Purple Route

In order to fully represent the highway options to the south of Newport, this option comprises a 3-lane motorway along a similar route to that proposed for the dual 2-lane all-purpose road.

This new motorway will require a new crossing of the River Usk, which is designated as a Special Area of Conservation (SAC). There are on-going developments and potential further development sites along the alignment of this route.

An all movements junction is proposed east of the River Usk and an east-facing partial junction is proposed to serve western areas, together with a west-facing partial junction to serve the Magor area. The option also includes a new junction on the M48 near Caldicot to relieve traffic on the B4245. However, the junction strategy will be further investigated if this option is taken forward for further appraisal.

The alignment of this route is shown in Figure 6.3.

## 6.4 Public Transport Measures

Studies have shown that new or improved public transport services are likely to have only minimal impact with respect to reducing traffic on the M4[16]. Generally, investment in public transport measures is more likely to be aimed at achieving wider benefits than relieving motorway traffic.

Public transport measures might include:

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

Specific public transport measures would be considered and appraised at a scheme level, depending on the highway infrastructure options being taken forward for further appraisal.

## 6.5 Complementary Measures

In addition to the highway infrastructure improvement options, there are additional complementary measures that could assist in alleviating travel related problems within the M4 Corridor between Magor and Castleton. These could comprise a mix of network improvements/management, demand management, alternative modes and smarter sustainable choices.

At the New M4 Project Public Information Exhibitions held at Magor in May 2006, members of the public expressed the desire for a highway connection between the B4245 Caldicot Road and the M48 corridor in the vicinity of east Magor / Rogiet. Such a connection is perceived publicly to be a solution to reported peak period delays affecting traffic wishing to join the M4 at junction 23A.

The provision of a new section of motorway to the south of Newport between Junction 23 and Junction 29 would enable consideration to be given to the re-classification of the existing M4 around Newport with a view to improvement of accessibility along the northern fringe of the City.

Between 2006 and 2009, a number of Associated Measures were considered as part of the New M4 Project in terms of their contribution to the delivery of the project objectives. The following were identified to be taken forward:

- To de-classify the existing M4 from motorway status between Junction 23 and Junction 29;
- The construction of a new junction between the B4245 and M48 east of Magor; and
- Cycleways and bridleways by making use of access routes provided as part of the new highway.

[16] M4 CEM Public Transport Overview (2012) [revised February 2013]

As referred to in the "Background" section (1.3) of this report, there were a number of Common Measures considered during the appraisal/engagement processes of the M4 CEM Programme during 2012. The Common Measures that attracted support are as follows:

- Provide cycle friendly infrastructure.
- Provide walking friendly infrastructure.
- Provide A465 Heads of the Valleys as an alternative route to the M4.
- Junction 23A improvements.
- Junction 27 safety improvements.

As stated in the WIIP, the A465 trunk road is a key element of Wales' strategic transport infrastructure serving local, national and international traffic. It passes through the Heads of the Valleys Strategic Regeneration Area, provides an alternative to the M4 and forms part of the Trams European Transport network.

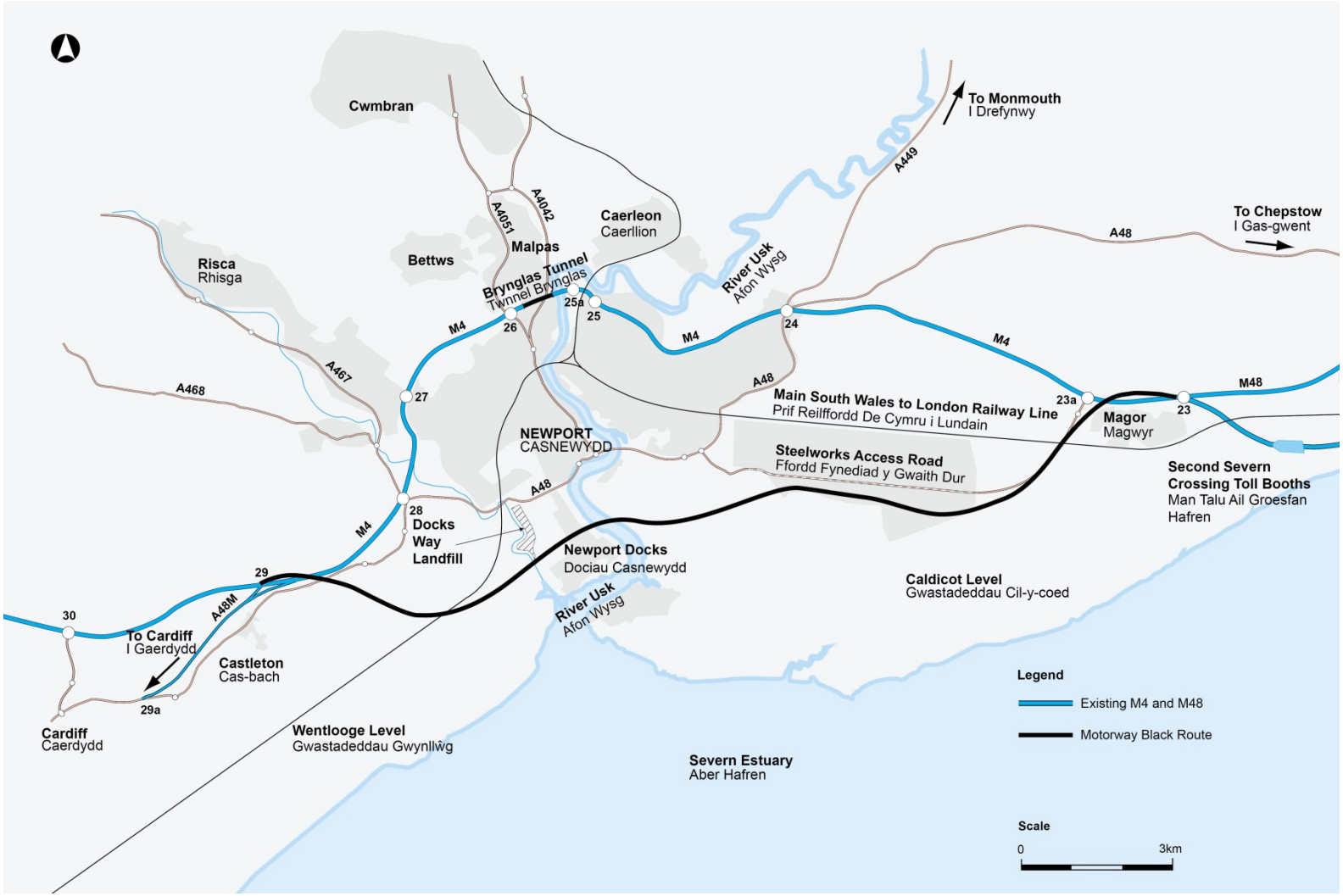
The potential for junction improvements along the existing M4 will be dependent upon the option taken forward.

Having due regard for the previous work, the complementary measures included in this appraisal are shown in Table 6.1.

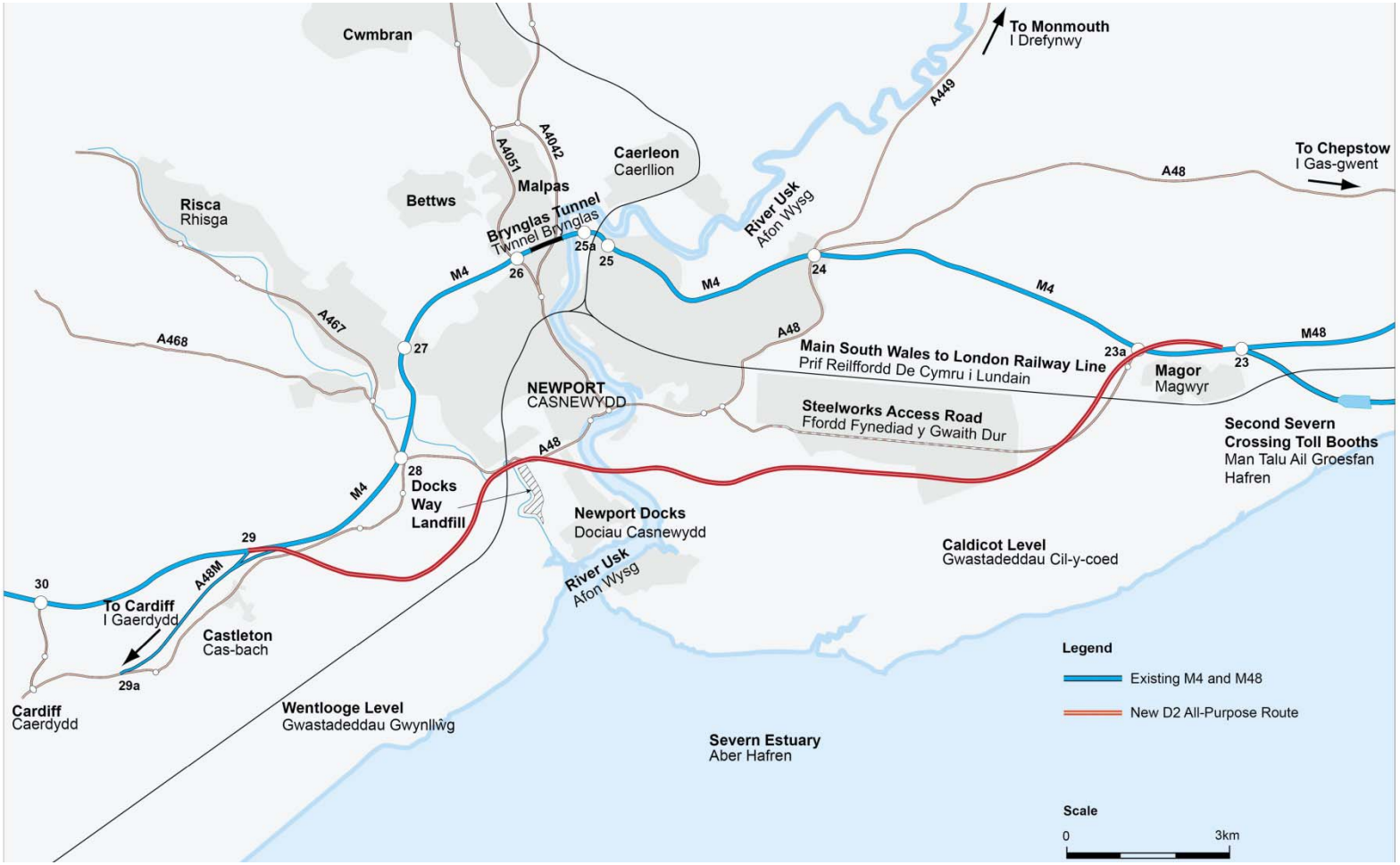
**Table 6.1: Complementary Measures**

| Complementary Measure | Description |
|---|---|
| **Re-classify existing M4 between Magor and Castleton (only applicable if a new motorway is provided)** | Re-classify the existing motorway as a trunk road, which could enable traffic management, safety and junction improvement measures. These will include value engineering of the proposed interchanges at Magor and Castleton. |
| **M48 – B4245 Link (common to all options)** | New single carriageway link between the M48 and B4245. This would potentially provide relief to Junction 23a and to the local road network. It may also facilitate the introduction of a park and ride facility at Severn Tunnel Junction. |
| **Provide cycle friendly infrastructure (common to all options)** | Promoting the use of cycling as an alternative to the car for journeys of up to three miles. This is likely to have a positive impact upon physical fitness and social inclusion. |
| **Provide walking friendly infrastructure (common to all options)** | Promoting the use of walking as a primary modal choice for car users undertaking journeys of up to two miles. This is likely to have a positive impact upon physical fitness and social inclusion. |

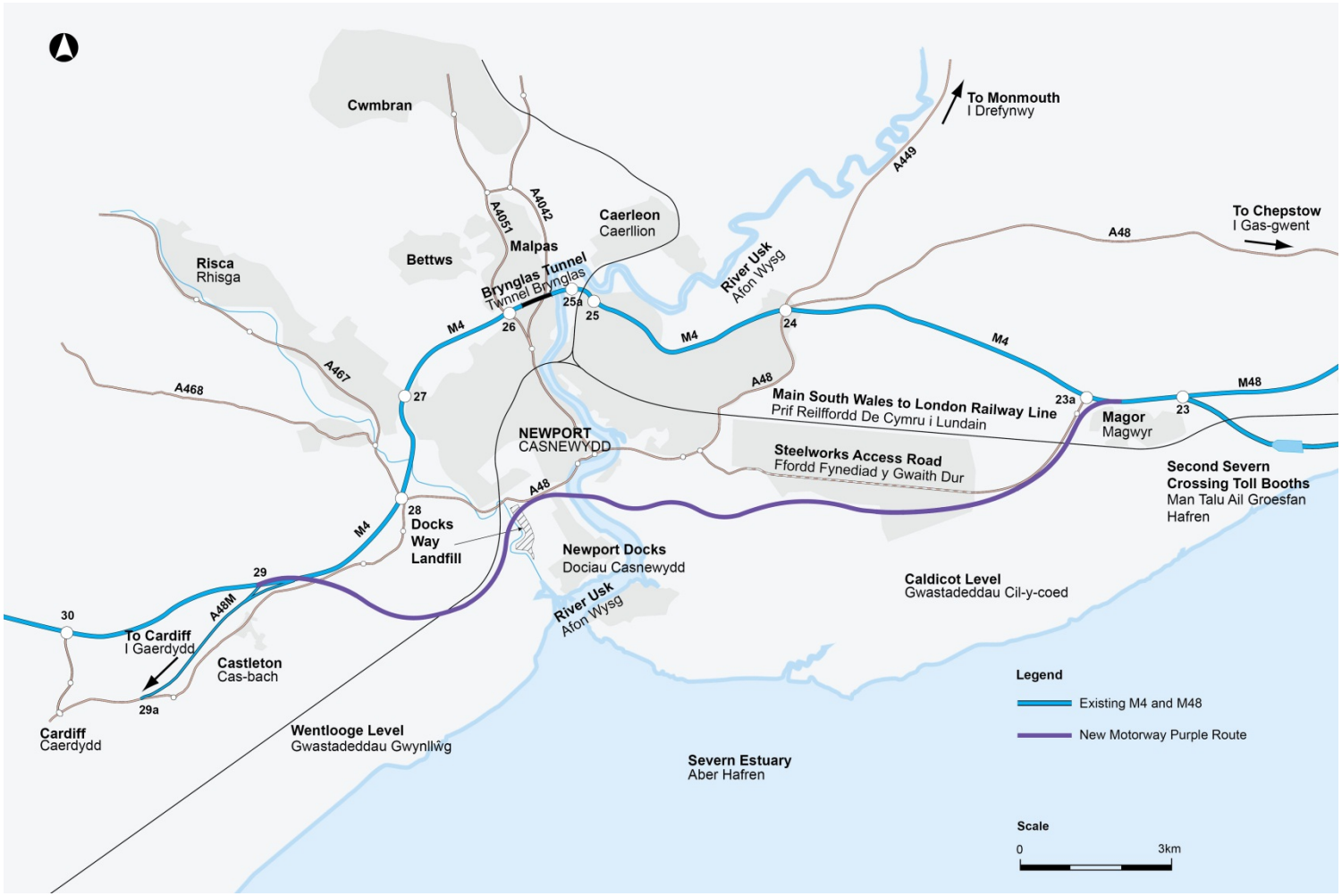
## Figure 6.1: Proposed Black Route for the New Motorway to the South of Newport



## Figure 6.2: Proposed Dual 2-lane All-Purpose Road to the South of Newport (The Red Route)



## Figure 6.3: Proposed New Motorway on the Purple Route to the South of Newport



# 7 Existing and Future Traffic

## 7.1 Overview

An existing SATURN traffic model that had been developed to support the New M4 project was based on traffic observations undertaken in 2005/2006. This model required updating, in order to continue to provide an adequate means of supporting the development of solutions in the M4 corridor around Newport. A specifically designed programme of traffic surveys was thus carried out between March and May 2012 in order to update the base year traffic model. The traffic model was then validated to a 2012 base year in accordance with the Department for Transport's WebTAG[17] guidance.

## 7.2 Traffic Surveys in 2012

For the purpose of the model update, a present-year validation required the projection of the 2005 base travel demand matrices to the current re-based validation year (2012), with the model outputs compared with 2012 traffic count data. Consequently, a programme of new traffic surveys was undertaken to provide the data for this comparison. These surveys comprised:

- Automatic Traffic Counts (ATCs) undertaken by the Welsh Government on the motorway and trunk road network. These comprised conventional ATCs and data derived from the MIDAS (Motorway Incident Detection Automatic Signalling) system. ATCs were also commissioned on a number of strategic routes in Newport.
- Classified turning counts over a 12-hour period at 52 key junctions, supplemented by counts at a further 11 junctions that had been undertaken in 2010.
- Classified link counts on each section of the motorway network (between the Severn crossings and Cardiff).
- Journey time surveys covering 11 routes through the study area. These included the whole of the motorway network in the area, together with key routes on the local highway network.

Full details of the surveys undertaken are given in the Local Model Validation Report[18].

Analysis of the traffic survey data has enabled comparisons to be drawn between traffic levels on the motorway around Newport in 2012 and in 2005 when a previous programme of traffic surveys was conducted. These are shown graphically in Figure 7.1

[17] WebTAG Department for Transport's web-based guidance for transport assessments see www.dft.gov.uk/webtag
[18] Welsh Government, M4 Corridor, Newport, Local Model Validation Report, Draft 1, Arup, November 2012

**Figure 7.1: Comparison of 2005 and 2012 Traffic Data**

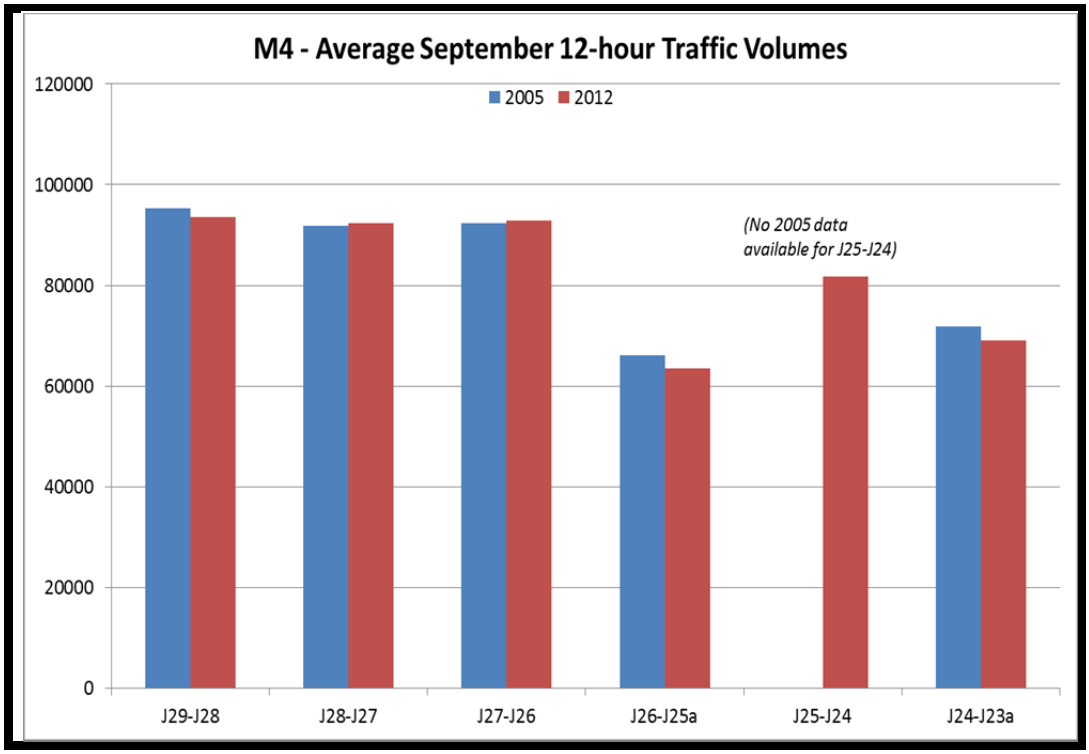



Figure 7.1 shows that traffic levels on the motorway have remained near constant on certain sections over the 7–year period, and on some sections they have marginally increased or declined.

The flows on the M4 sections to the east of the Brynglas Tunnels (Junction 25a) appear to have declined slightly more than those to the west of the tunnels. Due to bridgeworks there was no or very limited ATC data collected between Junctions 24 and 25 during 2005 and so no comparison on this section can be made.

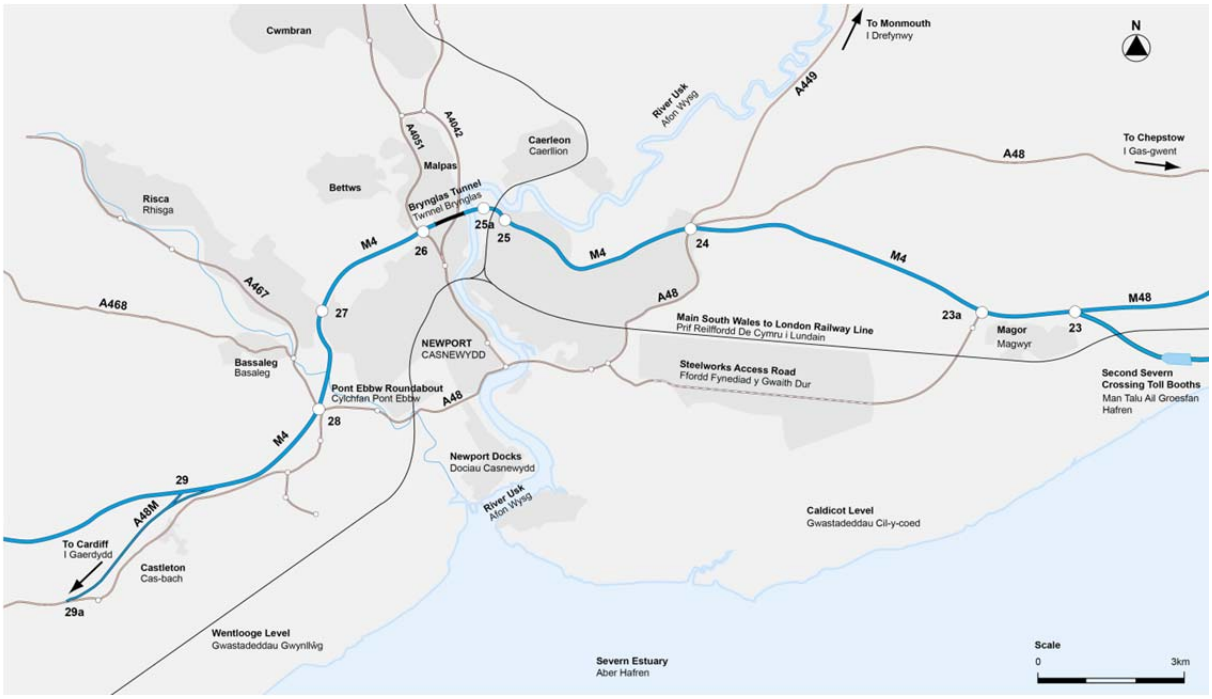
The lack of growth in traffic levels on the M4 around Newport is not unexpected, as traffic growth in the UK generally has been static over the same period as a result of the economic downturn.

Notwithstanding the above, traffic volumes on the motorway around Newport were observed to exceed theoretical capacity on some sections during weekday peak periods in September 2012, as Figure 7.2 shows.

## Figure 7.2: 2012 Traffic Flows and Urban Motorway Operating Conditions

| Location | 2012 AADT | DMRB Urban Motorway Capacity[19] Veh/hr | Sept 2012 ~ Highest Peak % Flow to Capacity | |
|---|---|---|---|---|
| | | | Average Weekday Peak | Maximum Weekday Peak |
| J23a to J24 | 79,300 | 5600 | 70.2% | 78.3% |
| J24 to J25 | 93,400 | 5600 | 80.2% | 87.2% |
| Brynglas Tunnels | 70,100 | 4000 | 85.7% | 95.6% |
| J26 to J27 | 104,400 | 5600 | 86.2% | 94.2% |
| J27 to J28 | 103,400 | 5600 | 96.6% | 103.3% |
| J28 to J29 | 104,200 | 5600 | 92.1% | 100.2% |

| Flow to Capacity | Operational Conditions |
|---|---|
| < 80% | Operating within capacity |
| 80% to 100% | Operational problems occurring |
| > 100% | Severe operational problems |




[19] Design Manual for Roads and Bridges Volume 5, Section 1, Part 3, TA 79/99 Amendment No.1, Traffic Capacity of Urban Roads, Table 2, May 1999

## 7.3 Traffic Model Validation

The 2005 base traffic model was updated to 2012 to incorporate subsequent changes to the highway network, including the signalisation of the Junction 24 roundabout at the Coldra together with the 'hamburger' layout; traffic management measures in the centre of Newport; and the revised junction layout at Cardiff Road / Commercial Street.

The base year travel demand was also updated to 2012, to incorporate revisions contained in the 2010 Newport traffic model developed by Capita, and additional traffic related to subsequent developments in the area.

The updated 2012 traffic model was validated in accordance with the procedures set out in the Design Manual for Roads and Bridges (DMRB) and the Department for Transport's Transport Analysis Guidance (WebTAG). Validation was carried out on the mainline motorway links between Junction 23a and 29, together with a screenline of links crossing the River Usk in the Newport area.

All of the motorway links, in both directions, met the validation criteria in each of the three modelled time periods. On the Usk screenline, the screenline totals met the validation criteria in both directions in each of the three time periods. All of the individual links also passed the criteria in the AM and interpeak periods, although in the PM peak two of the five links did not meet the criteria (even though the screenline total passed). Of the total number of individual links assessed (24), 100% met the criteria in the AM and Interpeak periods, while 92% passed in the PM period, compared with an acceptable pass rate as specified in DMRB as 85%.

The average times observed on the 11 journey time routes surveyed in 2012 were also validated in the base model. Each route met the required validation criteria in both directions in all three time periods.

## 7.4 Traffic Forecasting

Traffic forecasts were prepared for two future years, 2020 and 2035, which were assumed to correspond with the opening year and design year respectively for an option. The validated 2012 trip matrices were projected to the forecast years following the recommendations given in the Department for Transport's WebTAG.

Car trips were factored using the Department for Transport's National Trip End Model (NTEM), as set out in the TEMPRO version 6.2 program. The growth in goods vehicle trips, both light and heavy vehicles, was based on the forecasts contained in the National Transport Model produced by the Department for Transport.

The Do-Minimum network used for the traffic forecasts includes those highway schemes that are considered to be committed. These are:

- Steelworks Access Road (Phases 1 and 2);
- Tredegar Park Roundabout (Junction 28), and associated improvements;
- A465 Heads of the Valleys dualling (Abergavenny to Hirwaun); and

- Newport Eastern Expansion Area, link connecting the Steelworks Access Road to a signalised junction at A48 / Cot Hill (2035 forecast year only).

Variable demand modelling has been deployed using DIADEM (Dynamic Integrated Assignment and Demand Modelling) to produce the model forecasts, in accordance with WebTAG unit 3.10 advice.

## 7.5 Future Traffic Forecasts

The AM Peak, Interpeak and PM Peak hourly future year forecasts obtained from the traffic model are combined and factored to estimated Annual Average Daily Traffic (AADT) forecasts, using factors derived from observed ATCs on the M4. Table 7.1 shows preliminary predictions[20] of AADTs for each option on key links on the M4 and the A48 SDR, together with the crossings along the River Usk screenline.[21]

[20] It should be noted that traffic forecasts at this strategic stage of option assessment are based on a number of assumptions. More details of such assumptions are documented in the M4 CEM Forecasting and Economic Assessment Report and the New M4 Project, Magor to Castleton, traffic Forecasting Report, Arup, November 2012.

[21] The River Usk screenline is an imaginary line drawn along the centre line of the river between the boundaries of the city. This allows traffic flows on roads crossing the river to be compared.

## Table 7.1: Highway Options for M4 Corridor round Newport – AADT Forecasts (vehicles/day)

| | 2020 | | | | 2035 | | | |
|---|---|---|---|---|---|---|---|---|
| | Do-Min | Dual AP Red Route | Motorway Purple Route | Motorway Black Route | Do-Min | Dual AP Red Route | Motorway Purple Route | Motorway Black Route |
| ***New Route*** | | | | | | | | |
| East of Duffryn | - | 55200 | 60400 | 62500 | - | 69900 | 81400 | 83900 |
| West of Magor | - | 52300 | 58300 | 59100 | - | 63600 | 78000 | 78900 |
| ***M4*** | | | | | | | | |
| J23a to J24 | 92100 | 42400 | 39300 | 39000 | 115500 | 53700 | 45900 | 46100 |
| J24 to J25 | 109500 | 59500 | 57800 | 57400 | 134100 | 78100 | 71700 | 71500 |
| Brynglas Tunnel | 82400 | 33400 | 32200 | 31800 | 97200 | 47500 | 41600 | 41000 |
| J26 to J27 | 119900 | 71000 | 69300 | 68900 | 139800 | 87600 | 80900 | 80400 |
| J27 to J28 | 118600 | 70800 | 68700 | 68500 | 138600 | 89600 | 82000 | 81600 |
| J28 to J29 | 122300 | 73700 | 70400 | 70100 | 146600 | 93200 | 84600 | 84100 |
| ***A48 SDR*** | | | | | | | | |
| Beatty Rd to Cot Hill | 15500 | 15600 | 14000 | 14000 | 22900 | 22400 | 20300 | 20700 |
| Balfe Rd to Queensway | 30200 | 30000 | 29200 | 29300 | 34100 | 35100 | 32600 | 33000 |
| Usk Bridge | 40900 | 36500 | 35200 | 35000 | 47500 | 43900 | 42500 | 42100 |
| East of Docks Way | 31100 | 27000 | 25500 | 25300 | 37300 | 33200 | 31900 | 31700 |
| Pont Ebbw to J28 | 36400 | 34400 | 32300 | 32200 | 41300 | 38700 | 37100 | 37000 |
| ***Usk Screenline*** | | | | | | | | |
| Malpas Relief Rd slips | 38500 | 37200 | 37300 | 37300 | 46800 | 42500 | 42600 | 42700 |
| M4, J25a to J26 | 82400 | 33400 | 32200 | 31800 | 97200 | 47500 | 41600 | 41000 |
| Clarence Place Bridge | 28800 | 28900 | 28200 | 28200 | 33000 | 30500 | 30100 | 30100 |
| George St Bridge | 20600 | 20000 | 19700 | 19700 | 23900 | 21900 | 22000 | 21900 |
| A48 SDR | 40900 | 36500 | 35200 | 34900 | 47500 | 43900 | 42500 | 42100 |
| Route south of Newport | - | 55200 | 60400 | 62500 | - | 69900 | 81400 | 83900 |
| *Screenline Total* | *211200* | *211200* | *213000* | *214400* | *248400* | *256200* | *260200* | *261700* |

Note: An M48 – B4245 new link has been included for each option (red, purple and black routes)

# 8 Economic Assessment

## 8.1 Overview

A preliminary economic assessment of each of the highway options has been carried out in accordance with the advice given in DMRB and WebTAG[22]. Since the assessment of options is at a strategy level, there are limitations regarding the level of detail available. Thus, whilst the assessment includes estimates of user benefits and safety benefits, caution should be exercised in respect of the numeric values of the output of the economic assessment at this strategy level.

In accordance with HM treasury guidance, the assessments are undertaken for a 60-year period from the scheme opening year. For the purpose of this assessment, all options were assumed to be constructed in one 'hit' rather than phasing the construction. Each option was assumed to have an opening year of 2020.

## 8.2 Cost Estimates

There are three main elements of the cost estimate[23] for each option as follows:

- *The base cost* – this covers the basic costs of the option before allowing for risks;
- *Adjustment for risk* – which covers all the identified risks as assessed and quantified through a Quantified Risk Assessment (QRA) resulting in the risk adjusted cost estimate; and
- *Adjustment for Optimism Bias* – to reflect the well-established and continuing systematic bias for estimated scheme costs and delivery times to low and short respectively. This results in an uplift to the cost estimate.

High level cost estimates based on preliminary designs for each of the highway options have been prepared. These include allowance for risk and Optimism Bias but exclude VAT and are as follows:

Red Route: £830million

Purple Route: £947million

Black Route: £936million

[22] WebTAG Department for Transport's web-based guidance for transport assessments in particular units 3.1, 3.5, 3.10 and 3.15
[23] See the Estimation and Treatment of Scheme Costs, WebTAG unit 3.5.9, DfT, August 2012

## 8.3 Economic Indicators

In order to assess the costs and benefits that might be associated with each highway infrastructure option, traffic conditions in the assumed year of scheme opening (2020) and the design year (2035) are compared for each option with those in the Do-Minimum. The values of all costs and benefits are converted to the Present Value Year, defined in WebTAG as 2010. They are also discounted from the year in which they occur to 2010, using the discount rates defined in WebTAG, to give the Present Value of Costs (PVC) and the Present Value of Benefits (PVB). The Net Present Value (NPV) is calculated by subtracting the PVC from the PVB, while the Benefit-Cost Ratio (BCR) is calculated by dividing the PVB by the PVC.

The Black Route and the Purple Route motorway scenarios are likely to carry similar volumes of traffic, although the Black Route would attract slightly higher flows producing a marginally greater reduction in traffic on the existing M4 as shown in Table 7.1. This, together with the greater distance for traffic using the Purple Route, is expected to produce higher economic benefits for the Black Route.

The Red Route scenario has significantly reduced capacity compared with the two motorway scenarios and attracts less traffic. By 2035, the Red Route would be expected to be operating at or near capacity and, as such, would attract up to 20% less traffic than either the Black or Purple Routes.

# 9 Health Impact Assessment

A preliminary Health Impact Assessment (HIA)[24] for transport measures has been undertaken. The Wales Health Impact Assessment Support Unit (WHIASU) was consulted on the proposed scope of the HIA and provided comments and advice on the preparation of the HIA. The HIA has been prepared in accordance with new guidance on the HIA process that has recently been prepared by WHIASU in conjunction with Public Health Wales and Cardiff University entitled, "Health Impact Assessment: A Practical Guide."

WelTAG states that HIA is a mandatory requirement of transport appraisal. A scoping report for an HIA of the M4 corridor around Newport has been prepared and was issued to WHIASU for comment on 20 September 2012. WHIASU provided comments on the proposed scope for the HIA on 4 October 2012.

The HIA has been developed to be proportionate to a strategic level of appraisal. The geographical extent of the HIA specifically relates to the M4 corridor around Newport, between Magor and Castleton.

The impact of possible measures on health and well-being has been considered with reference to relevant WelTAG criteria.

In preparing the HIA, a consideration of the following potential impacts has been undertaken in accordance with WHIASU best practice:

- What do you consider to be the potential health impacts and will the impact be positive or negative?
- Is the likelihood of the impact of the proposal definite, probable or speculative?
- What do you consider to be the scale of the impact and what proportion of the population is likely to be affected?
- What do you consider to be the timing of these impacts and will the impact be in weeks, months or years?
- What will the distribution of the effects be and will the proposal affect different groups of people in different ways?
- Are there any opportunities to maximise the potential improvements in health and to minimise the potential risks to health?

During the engagement process, the Welsh Government and its project team has conducted dialogue and deliberative sessions both with internal and external specialists and expert stakeholders, encompassing local health boards, local authorities and other organisations with an interest in the likely health and community impacts of transport measures.

[24] Health Impact Assessment (2012) available at www.m4cem.com

A summary of stakeholder responses is provided below:

| Topic | Summary of responses |
|---|---|
| **Public Transport Measures** | Will create positive health impacts, encouraging physical activity, a potential reduction in emissions and social connectivity.<br>Getting people to use public transport is challenging. Changing people's behaviour is vital, which may take a long time and so there may need to be some sort of intervention to make people use public transport.<br>Benefits are likely to be long term but the impact limited and mainly to those without access to a car. Systematic promotion of public transport to increase awareness would increase the benefits.<br>Clean technology for buses would also help to reduce pollution. |
| **Additional high quality road to the south of Newport** | It would only impact on a small population, so it would be the least polluting option. It directs traffic away from the most populated areas of Newport; the winds blow from west to east and the pollution from this option will spread over the channel and not the local population. A sizable population (the Duffryn area) will experience positive benefits; the negative impacts will be experienced by the least number of people in comparison to the other options. There is the potential that it could bring congestion and pollution to new areas.<br>There may be negative impacts during construction (noise, air quality, visual impact).<br>Although the frequency of accidents may be reduced the increased road space may mean that accidents are more serious.<br>It may widen the gap in health inequality between the north and south of Newport.<br>The impact will be limited but long term and the most affected will be people with vehicles and people who will occupy the new housing at the steelworks. In the long term it could affect larger proportion if flood mitigation measures are not implemented.<br>This option has been designed in a positive way, it avoids nature reservations etc. but the damage to the landscape has to be managed; there is a lot that can be done to minimise the damage. |
| **Common Measures** | Common measures are supported.<br>Positive impacts could be realised from noise pollution reduction measures and improved incident management and event management.<br>In particular, walking and cycling infrastructure will potentially have a positive effect on physical activity levels, and alternative route promotion could be beneficial with regards to access to services. There is also potential for a reduction in noise and an improvement in local air quality.<br>Common measures would affect the general population and benefits would be realised over the long term. The measures might exclude young and elderly people as it may be more challenging for them to utilise public transport, walking and cycling options.<br>A well planned and tested series of interventions to encourage the use of alternative methods of transport would be needed. Changes should take into account local consultation to ensure limited disruption and maximum benefit of any measures that could be progressed further. |

Comments made by the stakeholders have been reflected in the Appraisal Summary Tables for each option.

For any options that are progressed as part of a draft Plan, further Health Impact Assessment and consultation with WHIASU (and other bodies identified by WHIASU) will be considered by the Welsh Government.

# 10 Equality Impact Assessment

WelTAG requires that the assessment of transport measures should include an appraisal of equality, diversity and human rights. The Equality and Human Rights Division of the Welsh Government has been consulted on the proposed scope of an Equality Impact Assessment (EqIA). As a result, the preliminary EqIA has been prepared with due regard to the guidance provided in WelTAG, the National Transport Plan Equality Impact Assessment (February 2010)[25], the Wales Transport Strategy Equality Impact Assessment (2008)[26] and Working for Equality in Wales (May 2010)[27].

Table 10.1 below provides an overview of potential actions that the Welsh Government may consider as part of a draft Plan. The actions suggested below aim to enhance the possible beneficial impacts and/or mitigate against the possible adverse impacts on equality areas.

**Table 10.1: Actions on Equality**

| Actions to be considered | Rationale | Who will benefit |
|---|---|---|
| **Ensure ergonomically designed public transport that facilitates use for all.** | The design of buses should cater for all needs and mobility issues. | Women with children<br>Older people |
| **Provide training for all bus/train operators to raise awareness of the special needs of passengers and appropriate behaviour.** | To encourage use of public transport by those who may be deterred by drivers' behaviour. | Older people<br>Disabled people |
| **Plan appropriate public transport routes and conveniently located bus stops, discussed in partnership with community groups and operators. Design-out crime at public transport interchanges.** | To improve personal security and encourage use of public transport. | Younger people<br>Older people<br>Ethnic groups<br>LGB/T |
| **Ensure clear and appropriate signage and information services are displayed at public transport interchanges and along road routes.** | Effective signage and information supports access to transport services and aids mobility. | Younger people<br>Older people<br>Ethnic groups |
| **Ensure inclusive design principles are incorporated into the design of new junctions to accommodate non-motorised users.** | To ensure inclusive access to those not travelling by car. | Older people<br>Disabled people |
| **Offer appropriate compensation for properties requiring demolition, including replacement of any community facilities.** | To ensure certain community groups are not disproportionately affected by demolition and/or construction works. | Lower socio-economic groups<br>Older people<br>Ethnic groups |

The preliminary EqIA results have been reflected in the Appraisal Summary Tables for each option.

[25] National Transport Plan Equality Impact Assessment and Equality Action Plan, February 2010
[26] Wales Transport Strategy Equality Impact Assessment, 2008
[27] Working for Equality in Wales. Inclusive Policy Making. Second Edition Guidance, May 2010, Welsh Assembly Government

For any options that are progressed as part of a draft Plan, further Equality Impact Assessment and consultation with the Equality and Human Rights Division of the Welsh Government will be considered by the Welsh Government.

# 11 Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) is a process that provides for the high level protection of the environment, by ensuring the integration of environmental considerations into the preparation of strategies and plans and by contributing to the promotion of sustainable development and environmental protection.

Under the SEA Directive (2001/42/EC), SEA is a legal requirement for certain plans and programmes. In Wales, this is implemented through the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (referred to as the SEA Regulations in this report). In order to proceed with a scheme to improve the M4 corridor around Newport, it is necessary in the first instance to prepare a draft Plan together with an accompanying Environmental Report in accordance with the SEA Regulations.

In order to decide upon a draft Plan for the M4 corridor around Newport, the SEA process requires the Welsh Government to:

- Scope and prepare an Environmental Report on the likely significant effects of the proposed draft Plan;
- Consult on the draft Plan and the Environmental Report;
- Take into account the findings of the Environmental Report and the consultation feedback in decision-making; and
- When the draft Plan is adopted, provide information to show how the results of the SEA have been taken into account.

A draft Plan would set out the proposed measures for the M4 corridor around Newport, and the consequential Environmental Report must identify, describe and evaluate the likely significant effects on the environment not only of implementing the draft Plan but also reasonable alternatives, taking into account the objectives and the geographical scope of the draft Plan.

Before finalising those documents for publication, there is a requirement to consult formally with Natural Resources Wales on the scoping of the Environmental Report. Once the scope of the Environmental Report has been finalised, the draft Plan and Environmental Report must be consulted upon in accordance with the SEA Regulations.

An Environmental Report will be published alongside the draft Plan and will be the subject of consultation with statutory and public consultees in accordance with the relevant regulations. Following any such consultation, the Welsh Ministers will determine whether or not to adopt the published draft Plan with or without amendment. An SEA Statement would be published to provide information to show how the results of the SEA have been taken into account in determining whether or not to adopt the published draft Plan with or without amendment.

# 12 Stage 1 Appraisal

In accordance with WelTAG, the Stage 1 appraisal at a strategy level comprises a qualitative review of the transport options outlined in Section 6.

## 12.1 Appraisal Summary Tables

The primary aim of the Stage 1 appraisal is to filter and reduce the number of options in order to allow a more detailed assessment of option(s) during Stage 2 appraisal. It should be noted that this strategy level Stage 1 appraisal has been undertaken on the basis of the qualitative information that is currently available.

Draft Appraisal Summary Tables (ASTs) for transport options have been prepared using the seven point scale of impact significance set out in Paragraph 3.7.1 of WelTAG (see 1.1.1 of this report). The ASTs for individual strategic options are presented in Tables 12.1 to 12.5.

### 12.1.1 Significance of Impact

Following each impact appraisal for both Stages 1 and 2, WelTAG recommends that the significance of impact for each criterion is assessed using a seven point scale detailed in Paragraph 3.7.1 of the WelTAG guidance. This scale includes the following assessment criteria:

- Large beneficial (+++);
- Moderate beneficial (++);
- Slight beneficial (+);
- Neutral (0);
- Slight adverse (-);
- Moderate adverse (--);
- Large adverse (---).

The assessment of impact on each of the Welsh Impact Areas is to be provided in Appraisal Summary Tables (ASTs).

### 12.1.2 Distribution

WelTAG also requires, in Paragraph 3.5.1, that the distribution of impacts is carefully considered. This part of the assessment refers to how impacts might be distributed geographically and how they might affect different groups in society.

## Table 12.1: Assessment of Doing Nothing against WelTAG Criteria and Transport Planning Objectives (TPOs)

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Transport Economic Efficiency (TEE)** | Congestion on the M4 between junctions 24 and 29 is already thought to be impacting on business performance and the level of congestion is expected to increase. Cardiff and Newport have ambitious regeneration strategies and Monmouthshire is developing areas around Junction 23a of the M4. Traffic congestion on the M4 could hamper these plans and impact negatively on regional economic development. | All | (---) |
| **Economic Activity and Location Impact (EALI)** | Congestion on the M4, particularly around Cardiff and Newport, is sighted by the business community in South Wales as a barrier to economic growth. Where congestion increases, the cost of transport for businesses, commuters and consumers and economic performance can be affected. Increased congestion will adversely impact on the movement of commuters. The M4 is heavily used by commuters and there are already significant movements of commuters between Wales and England over the Severn Crossings. Increased congestion will result in higher journey times for commuters, reducing the effective travel to work area. | All | (---) |
| **Noise** | High traffic volumes along the M4 contribute to noise pollution, compromising the aural amenity of neighbouring residential communities. | Properties along the M4 | (--) |
| **Local Air Quality** | High traffic volumes along the M4 contribute to poor air quality, compromising the aural amenity of neighbouring residential communities. This will affect the condition s of four out of Newport's seven Air Quality Management Areas (AQMAs) that are associated with the M4. | Properties along the M4 | (--) |
| **Greenhouse Gas Emissions** | Traffic conditions are expected to deteriorate and slow-moving, stop/start driving conditions can lead to higher CO2 emissions than free-flowing traffic. | No significant distributional impacts | (-) |
| **Landscape and townscape** | No change | No significant landscape impacts | (0) |
| **Biodiversity** | No change | No significant distributional impacts | (0) |
| **Heritage** | No change | No significant distributional impacts | (0) |
| **Water environment** | No change | No significant distributional impacts | (0) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Soils** | No change | No significant distributional impacts | (0) |
| **Transport safety** | The more congested road conditions become, the greater the risk of incidents and accidents occurring. The most common accidents on the M4 between junctions 25 and 28 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. | All road users | (--) |
| **Personal security** | No change | No significant distributional impacts | (0) |
| **Permeability** | No change | No significant distributional impacts | (-) |
| **Physical fitness** | No change | No significant distributional impacts | (0) |
| **Social inclusion** | No change | No significant distributional impacts | (-) |
| **Equality, Diversity & Human Rights** | No change | No significant distributional impacts | (0) |
| **TPOs** | | | |
| **1** | As congestion increases, safety conditions and journey time reliability will deteriorate. | All | (---) |
| **2** | Travel conditions on the M4 are forecast to worsen over time, reducing accessibility on the transport network. | All | (--) |
| **3** | No impact. | All | (0) |
| **4** | No impact. | All | (0) |
| **5** | Increased levels of congestion will reduce journey time reliability, particularly at peak travel times. | All | (--) |
| **6** | No impact. | All | (0) |
| **7** | Increased congestion will exacerbate the risk of incidents and accidents occurring. | All | (--) |
| **8** | Increased traffic volumes and stop/start conditions will exacerbate poor air quality, particularly in the AQMAs along the route of the M4 around Newport. | All | (--) |
| **9** | Higher traffic volumes along the M4 will contribute to noise pollution. | All | (--) |
| **10** | Traffic conditions are expected to deteriorate and stop/start driving conditions will lead to higher emissions. | All | (--) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **11** | Traffic conditions are expected to deteriorate and stop/start driving conditions will create an adverse travel experience, leading to higher levels of driver stress. | All | (---) |
| **12** | Increased congestion on the M4 may lead to severe disruption and congestion on the local and regional highway network, with significant delays and adverse effects on local roads being used as diversions. | All | (---) |
| **13** | No impact. | All | (0) |
| **14** | No impact. | All | (0) |
| **15** | No impact. | All | (0) |
| **Public acceptability** | Traffic congestion during peak periods results in unreliable journey times, which impacts on the ability of individuals to take up job opportunities and discourages investment from high value businesses. Transport congestion also has environmental impacts affecting local communities. Increasing levels of congestion are unlikely to be acceptable to the public. | | |
| **Acceptability to other stakeholders** | The M4 motorway plays the vital role in providing the east/west strategic road link that underpins the economy of South Wales and facilitates the mass movement of people and goods to stimulate economic and social activity within the region and beyond. Any disruption to the operation of the motorway in South Wales has a negative impact upon economic development, particularly around Cardiff, Newport and beyond. Congestion is sighted by the business community in South Wales as a barrier to economic growth and increasing levels of congestion are unlikely to be acceptable to stakeholders. | | |
| **Technical and operational feasibility** | N/A | | |
| **Financial affordability and deliverability** | N/A | | |
| **Risks** | N/A | | |

**Table 12.2: Assessment of Public Transport Measures against WelTAG Criteria and Transport Planning Objectives (TPOs)**

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Transport Economic Efficiency (TEE)** | Public transport measures aim to encourage modal shift to public transport and ultimately improve journey times and journey time reliability through reducing general traffic congestion levels. Whilst it is likely that the benefits may 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 on-going revenue cost. | Public transport users | (-) |
| **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. | Public transport users | (+) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Noise** | New or improved public transport services are likely to have only minimal impact with respect to reducing traffic on the M4; therefore the associated change in noise along the motorway is also likely to be minimal. | Properties along public transport routes | (0) |
| **Local Air Quality** | As modal shift trends are realised, air pollution could reduce along the M4 and local road network, leading to improvement in air quality in the Air Quality Management Areas in particular. | Properties along roads impacted by modal shift | (+) |
| **Greenhouse Gas Emissions** | The public transport measures may help to reduce congestion, which could have some benefit in reducing vehicle emissions, although the impact is likely to be negligible. | No significant distributional impacts | (0) |
| **Landscape and townscape** | As public transport measures are at a strategy level, the full extent of the impact is unclear. However, it is likely that the schemes may require limited land take and thus the impact may be negligible. | No significant landscape impacts | (0) |
| **Biodiversity** | Transport infrastructure, such as more stations with park and ride facilities, will require land take, although the extent of this is not known at this time. New infrastructure located close to the River Usk SAC and SSSI could have a negative impact and may therefore create adverse effects. | Potential impact on River Usk SAC and SSSI | (-) |
| **Heritage** | Transport infrastructure, such as more stations with park and ride facilities, may have a negative impact on cultural and historical assets. As new stations, however, are likely to require a limited land take, the impact will be minimal. | Distribution assessment not required (Para. 7.10.7 of WelTAG June 2008) | (0) |
| **Water environment** | Facilities can be designed to minimise impacts | Potential impact on River Usk SAC and SSSI | (0) |
| **Soils** | It is likely that the schemes may require limited land take and thus that the impact may be negligible. | No significant distributional impacts | (0) |
| **Transport safety** | The public transport measures could improve road safety should modal shift result in reduced general traffic levels. | Public transport users | (+) |
| **Personal security** | The public transport measures are not be expected to impact on personal security. | Public transport users | (0) |
| **Permeability** | Movement by walking and cycling could benefit. | Public transport users | (+) |
| **Physical fitness** | Public transport enhancements should encourage modal shift which could primarily have a positive effect on human health, as trips by public transport often include a walk or cycle to or from the public transport start and end points. | Public transport users | (+) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Social inclusion** | Minority LGB/T, low income, ethnic and faith communities are frequently dependent on public transport and will, therefore, benefit from improvements to modal integration, walking and cycling facilities – particularly in accessing key facilities and employment opportunities | Public transport users | (++) |
| **Equality, Diversity & Human Rights** | The public transport measures aim to meet the needs of all groups of people. | Public transport users | (+) |
| **TPOs** | | | |
| **1** | Additional and improved services by all modes will help to improve safer, easier and more reliable travel along east-west corridors. | Public transport users | (+) |
| **2** | Public transport measures specifically target journeys made between Magor and Castleton, and as such the impact is likely to be negligible. However, it is acknowledged that regional benefits to public transport use could be realised. | No significant impacts | (0) |
| **3** | Measures will provide more effective and integrated alternative modes of travel. | Public transport users | (+) |
| **4** | Measures will seek to enhance the existing public transport network. | Public transport users | (+) |
| **5** | The impact on travel along the M4 Corridor is likely to be negligible. | No significant impacts | (0) |
| **6** | Public transport measures will increase the level of choice. | Public transport users | (++) |
| **7** | The impact on travel safety is likely to be negligible. | No significant impacts | (0) |
| **8** | Increasing modal shift will benefit air quality around Newport. | Properties along roads impacted by modal shift | (+) |
| **9** | The impact on noise along the M4 Corridor is likely to be negligible | No significant impacts | (0) |
| **10** | The public transport measures could have some benefit in reducing vehicle emissions, although the impact is likely to be negligible. | No significant impacts | (0) |
| **11** | The impact on travel experience is likely to be negligible. | No significant impacts | (0) |
| **12** | Public transport could help to reduce local journeys made by car and help prioritise the M4 for strategic journeys. | All groups | (+) |
| **13** | No impact is expected on traffic management. | No significant impacts | (0) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **14** | Public transport improvements could benefit local access to key services and residential and commercial centres. | Public transport users | (+) |
| **15** | Measures will help to improve access to alternative modes and encourage modal shift, to help change travel behaviours. | Public transport users | (++) |
| **Public acceptability** | The promotion of public transport use is likely to be greeted positively by communities in Newport and surrounding areas. | | |
| **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 are considered at a strategy level and therefore the technical and operational feasibility risks are unknown. | | |
| **Financial affordability and deliverability** | A phased approach to delivery could improve affordability and deliverability. Delivery is likely to require partnership with Sewta and public transport operators. Revenue costs should be considered in addition to capital costs of projects. Subsidies for public transport may also require consideration by the Welsh Government as part of any future assessment of costs to benefits. | | |
| **Risks** | Significant investment in public transport could require political commitment at a local, regional and national level. Partnerships with other stakeholders could need to be effective in order to deliver public transport measures. | | |

**Table 12.3: Assessment of New Dual 2-Lane All-Purpose Road (Red Route) against WelTAG Criteria and Transport Planning Objectives**

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Transport Economic Efficiency (TEE)** | The new road could help reduce problems of congestion on the highway network, thus leading to journey time savings and improved journey time reliability. However, the new road would operate at or near capacity in the design year, which would reduce a level of relief. The new road could provide significant resilience to the network in times of maintenance on the existing M4. It could be delivered in phases that would achieve cumulative benefits and spread the investment costs. This measure is expected to deliver high value for money. | All road users | (++) |
| **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. However, future accessibility could be limited by capacity of the road. | All road users | (++) |
| **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, including properties in the Duffryn area. | Properties along the M4 and SDR | (0) |
| **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, although in an area where there are | Properties along the M4 and SDR | (+) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| | few receptors. | | |
| **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. | No significant distributional impacts | (0) |
| **Landscape and townscape** | A new high quality road to the south of Newport would cross the River Usk and the Gwent Levels and introduce significant new infrastructure into the landscape/townscape. | Local landscape impacts | (--) |
| **Biodiversity** | The new road to the south of Newport would cross the River Usk SAC and SSSI, which is an important wildlife corridor, an essential migration route and key breeding area for many nationally and internationally important species. The new road would also cross the Gwent Levels SSSIs. | Potential impact on River Usk SAC and SSSI | (---) |
| **Heritage** | A new high quality road to the south of Newport would cross the Gwent Levels Historic Landscape and affect land with significant archaeological sensitivity. | Distribution assessment not required (Para. 7.10.7 of WelTAG June 2008) | (--) |
| **Water environment** | A new high quality road to the south of Newport could lead to adverse effects on water quality, hydrological regimes, flood plains and areas of flood risk. Possible adverse effects on water resources could include changes to the water table, increase flood risk due to run off, pollution due to accidental spillages and changes to the existing hydrology of the catchments through which the road passes. | No significant distributional impacts | (--) |
| **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. In addition, the new road would cross the Docks Way landfill site. | No significant distributional impacts | (---) |
| **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 likely that the total number of accidents on major roads in Newport would fall. | All road users | (++) |
| **Personal security** | The new road would be of a high quality and is likely to benefit the perception of personal security. | All road users | (+) |
| **Permeability** | The new road would help reduce congestion on the existing motorway and local road network, to benefit severance issues around Newport. The facility may also provide scope for incorporation of pedestrian/cycling facilities. | All road users | (+) |
| **Physical fitness** | The new road to the south of Newport could reduce congestion on the existing M4 motorway, thereby helping to reduce noise nuisance and air pollution. The new road could also reduce severance along the existing route, which could encourage the use of alternative modes such as walking, cycling and public transport. The new facility may also provide scope for incorporation of pedestrian/cycling facilities, which will help promote healthy lifestyles. | Car users | (+) |
| **Social inclusion** | This option would be expected to have a negligible effect on social inclusion. | Distribution assessment not required | (0) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| | | (Para. 8.6.31 of WelTAG June 2008) | |
| **Equality, Diversity & Human Rights** | A new road could improve access to key facilities and employment opportunities for all groups. However, issues of safety and personal security will be considered at the detailed design stage. | All road users | (+) |
| **TPOs** | | | |
| **1** | An additional high quality road is likely to create a significantly safer, easier and more reliable transport link along the M4 between Magor and Castleton. However, the new route is expected to be close to capacity by 2035, which would make it less effective in relieving the existing M4. | All | (++) |
| **2** | The new road will provide additional capacity east/west. | All | (++) |
| **3** | The new road will provide an alternative route to the M4 with capacity to reduce congestion along the existing route and provide increased resilience on the network. | All | (++) |
| **4** | A new road could improve traffic conditions on the existing network. | All | (+) |
| **5** | A new road would provide increased network resilience and could significantly improve journey time reliability. However, the new route is expected to be close to capacity by 2035, which would make it less effective in relieving the existing M4. | All | (++) |
| **6** | The new road would provide an additional route between Magor and Castleton. | All | (+) |
| **7** | A new road could improve traffic conditions on the existing network and provide a safe alternative route. | All | (++) |
| **8** | 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. | All | (+) |
| **9** | Noise impacts would be reduced along the route of the existing M4, which would reduce the noise nuisance to nearby residential properties. | All | (+) |
| **10** | The new road will help to reduce congestion and vehicle emissions; however, the new route is expected to be close to capacity by 2035, which would make it less effective in relieving congestion. It is not clear whether the additional road capacity would lead to an overall increase in emissions in the longer term. | All | (0) |
| **11** | A new road could provide a high quality and free flowing highway route to the south of Newport. | All | (++) |
| **12** | A new road would result in a reduction of traffic flows on the M4 motorway and would thus improve operating conditions on the motorway. However, the new route is expected to be close to capacity by 2035, which would make it less effective in relieving the existing M4. | All | (++) |
| **13** | A new road could improve traffic conditions on the existing network. | All | (++) |
| **14** | A new road could improve access to key facilities and | All | (++) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| | employment opportunities. | | |
| **15** | A new road would not support a behavioural change towards more sustainable modes but may encourage additional car use on a free flowing route. | All | (--) |
| **Public acceptability** | The new road could create economic and social benefits. However, the environmental impact of the new road to the south of Newport is likely to attract opposition from those who prioritise a need to protect the environment over the possible economic benefits of the scheme. The new route would be in close proximity to properties in Duffryn, which may attract opposition in light of minor noise and air pollution increases in this area. | | |
| **Acceptability to other stakeholders** | The new road could 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, possible adverse impacts on the environment could attract opposition from environmental groups and the wider public who prioritise a need to protect the environment over the possible economic benefits of the scheme. The new road will impact upon the Docks Way landfill site. This could result in objection by Newport City Council and by Natural Resources Wales. | | |
| **Technical and operational feasibility** | The option is at a strategy level and therefore the technical and operational feasibility risks require further exploration. The new road will include a crossing of the River Usk and the Docks Way landfill site. This will require consideration of suitable structures and land contamination issues. | | |
| **Financial affordability and deliverability** | The construction of the new road would require public sector funding but could be delivered in phases, which could improve affordability. | | |
| **Risks** | The option is at a strategy level and therefore the risks require further exploration. The new route would impact upon a landfill site requiring legal/licencing processes to be successfully negotiated. Challenge from public and/or stakeholders who may oppose the scheme on grounds of likely environmental impact may also require consideration. | | |

**Table 12.4: Assessment of New Section of Motorway on Alternative Alignment (Purple Route) against WelTAG Criteria and Transport Planning Objectives**

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Transport Economic Efficiency (TEE)** | A motorway solution could help to significantly reduce problems of congestion on the highway network, thus leading to journey time savings and improved journey time reliability. The new motorway would also provide significant resilience to the network. This measure is expected to deliver high to very high value for money. | All road users | (+++) |
| **Economic Activity and Location Impact (EALI)** | The construction of a motorway 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. However, there are on-going developments and potential further development sites that might be affected along the alignment of this route. | All road users | (++) |
| **Noise** | Noise impacts would be reduced along the route of the existing M4, which would reduce the noise nuisance to nearby residential properties. However, any benefits would likely be offset by new noise impacts along the new route that would impact on properties in the Duffryn area. The | Properties along the M4 and SDR | (0) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| | majority of new noise impacts would be largely in areas where there are few receptors. | | |
| **Local Air Quality** | A new motorway along the alignment of M4 CEM Option A would help reduce air pollution along the route of the current M4, improving conditions in the Air Quality Management Areas. However, any benefits would be offset by air quality deterioration in the Duffryn area around the new road, in addition to the Gwent Levels, although in an area where there are few receptors. | Properties along the M4 and SDR | (+) |
| **Greenhouse Gas Emissions** | The new motorway 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. | No significant distributional impacts | (+) |
| **Landscape and townscape** | A new motorway along the alignment of M4 CEM Option A would cross the River Usk and the Gwent Levels and introduce significant new infrastructure into the landscape/townscape. | Local landscape impacts | (---) |
| **Biodiversity** | The new motorway along the alignment of M4 CEM Option A would cross the River Usk SAC and SSSI, which is an important wildlife corridor, an essential migration route and key breeding area for many nationally and internationally important species. The new road would also cross the Gwent Levels SSSIs. | Potential impact on River Usk SAC and SSSI | (---) |
| **Heritage** | A new motorway along the alignment of M4 CEM Option A would cross the Gwent Levels Historic Landscape and affect land with significant archaeological sensitivity. | Distribution assessment not required (Para. 7.10.7 of WelTAG June 2008) | (--) |
| **Water environment** | A new motorway along the alignment of M4 CEM Option A could lead to adverse effects on water quality, hydrological regimes, flood plains and areas of flood risk. Possible adverse effects on water resources could include changes to the water table, increase flood risk due to run off, pollution due to accidental spillages and changes to the existing hydrology of the catchments through which the road passes. | No significant distributional impacts | (--) |
| **Soils** | A new motorway along the alignment of M4 CEM Option A would run through three distinctive topographical, geological and hydrogeological environments, including potentially contaminated sites within the central area of the scheme. | No significant distributional impacts | (---) |
| **Transport safety** | A 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 likely that the total number of accidents on major roads in Newport would fall. | All road users | (+++) |
| **Personal security** | The new motorway would be of a high quality and is likely to benefit the perception of personal security. | All road users | (+) |
| **Permeability** | The new motorway would help reduce congestion on the existing motorway and local road network, to benefit severance issues around Newport. | All road users | (+) |
| **Physical** | The new road to the south of Newport could reduce | Car users | (0) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **fitness** | congestion on the existing M4 motorway, thereby helping to reduce noise nuisance and air pollution. However, a motorway along the alignment of M4 CEM Option A would increase noise and air pollution to residents of the Duffryn area – thus offsetting any benefits. | | |
| **Social inclusion** | Relieving congestion and improved traffic flows would lead to improvements in the reliability and journey times of strategic bus services, which use the motorway network, offering an opportunity to improve accessibility to key centres. Re-classification of the existing M4 around Newport could increase accessibility along the northern fringe of Newport. | Distribution assessment not required (Para. 8.6.31 of WelTAG June 2008) | (+) |
| **Equality, Diversity & Human Rights** | A new motorway could improve access to key facilities and employment opportunities for all groups. However, issues of safety and personal security will be considered at the detailed design stage. | All road users | (+) |
| **TPOs** | | | |
| **1** | A new section of motorway to the south of Newport is likely to create a significantly safer, easier and more reliable east/west transport link between Magor and Castleton. | All | (+++) |
| **2** | The new motorway will form part of the European transport network and provide increased accessibility along the M4. | All | (+++) |
| **3** | The new motorway will provide an alternative route to the M4 with capacity to reduce congestion along the existing route and provide increased resilience on the network. | All | (+++) |
| **4** | A new motorway could improve traffic conditions on the existing network. | All | (+++) |
| **5** | A new motorway would provide increased network resilience and could significantly improve journey time reliability. | All | (+++) |
| **6** | The new motorway would provide an additional route between Magor and Castleton. | All | (++) |
| **7** | A new motorway would provide a safe alternative route. | All | (+++) |
| **8** | 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. | All | (++) |
| **9** | Noise impacts would be reduced along the route of the existing M4, which would reduce the noise nuisance to nearby residential properties. | All | (+) |
| **10** | The new motorway will help to reduce congestion and vehicle emissions; however it is not clear whether the additional road capacity would lead to an overall increase in emissions in the longer term. | All | (+) |
| **11** | A new motorway would provide a high quality and free flowing highway route to the south of Newport. | All | (+++) |
| **12** | A new motorway would provide a high quality route for strategic journeys. | All | (+++) |
| **13** | A new motorway could improve traffic conditions on the existing network. | All | (+++) |
| **14** | A new motorway could improve access to key facilities and | All | (+++) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| | employment opportunities. | | |
| **15** | A new motorway would not support a behavioural change towards more sustainable modes but may encourage additional car use on a free flowing route. | All | (--) |
| **Public acceptability** | The new road could create economic and social benefits. However, the environmental impact of the new motorway along the alignment of M4 CEM Option A is likely to attract opposition from those who prioritise a need to protect the environment over the possible economic benefits of the scheme. The new route would be in close proximity to properties in Duffryn, which may attract opposition in light of noise and air pollution increases in this area. | | |
| **Acceptability to other stakeholders** | The new motorway would address the problems caused by congestion on the existing M4. However, possible adverse impacts on the environment could attract opposition from environmental groups and the wider public who prioritise a need to protect the environment over the possible economic benefits of the scheme. The alignment of this new motorway will impact upon the Docks Way landfill site. This could result in objection by Newport City Council and by Natural Resources Wales. | | |
| **Technical and operational feasibility** | The option is at a strategy level and therefore the technical and operational feasibility risks require further exploration. The new road will include a crossing of the River Usk and the Docks Way landfill site. This will require consideration of suitable structures and land contamination issues. | | |
| **Financial affordability and deliverability** | The implementation of a motorway will be dependent upon the availability of funding. Therefore, affordability is an important issue both in terms of timescale and the amount of capital required. | | |
| **Risks** | The option is at a strategy level and therefore the risks require further exploration. The new route would significantly impact on a landfill site requiring legal processes to be successfully considered. Challenge from public and/or stakeholders who may oppose the scheme on grounds of likely environmental or social impact may also require consideration. | | |

**Table 12.5: Assessment of New Motorway to the South of Newport (Black Route) against WelTAG Criteria and Transport Planning Objectives**

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Transport Economic Efficiency (TEE)** | A motorway solution could help to significantly reduce problems of congestion on the highway network, thus leading to journey time savings and improved journey time reliability. The new motorway would also provide significant resilience to the network and would be likely to result in lower accident rates. This measure is expected to deliver high to very high value for money. | All road users | (+++) |
| **Economic Activity and Location Impact (EALI)** | A new section of motorway to the south of Newport would deliver significant travel time savings and reliability benefits for businesses and commuters, leading to lower production costs and contributing to the competitiveness of transport dependent business in Wales. Improved accessibility within South Wales and to areas of England would lead to significant agglomeration benefits and higher productivity and/or employment in some sectors.<br>The new motorway could significantly improve perceptions of access to South Wales, potentially making Wales a more attractive place to do business. Additional junctions to the south of Newport would increase the | All road users | (+++) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| | potential of employment sites. Improved network resilience would greatly reduce the economic costs of incidents of congestion or maintenance on the existing M4. | | |
| **Noise** | Noise impacts would be reduced along the route of the existing M4, which would reduce the noise nuisance to nearby residential properties. The majority of new noise impacts would be largely in areas where there are few receptors. | Properties along the M4 | (+) |
| **Local Air Quality** | The new motorway would provide reductions in the levels of atmospheric pollution to a large number of local receptors alongside the existing M4 through Newport, by removing traffic from areas where the existing motorway is frequently congested.<br>There would, however, be increased emissions and deterioration in air quality near the new motorway. The effects of this, however, would be of limited significance given the low number of properties affected. National Air Quality Standards would not be exceeded. | Properties along the M4 | (++) |
| **Greenhouse Gas Emissions** | The new motorway 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. | No significant distributional impacts | (+) |
| **Landscape and townscape** | The new motorway is predominantly located within the low lying Gwent Levels. The major part of the route would be constructed on low embankment, cutting across the current grain of the landscape and disturbing the visual experience. Proposed planting can only partially mitigate the adverse visual impact.<br>Taking into account the historic importance of the landscape and its ecological value, the significance of the impact, at opening year, would be large adverse. However, this would moderate over time when proposed planting matures.<br>At either end of the route, the hillier topography is more capable of screening the road and planting schemes are likely to be more effective. In these areas, the significance of the impact of landscape and visual amenity would be moderate adverse. The line of the new motorway is protected in the adopted Newport UDP and the route is illustrated on the Proposals Map (Policy SP14). The new motorway would also run through a number of other land use designations including the Newport Dock Employment Zone (Policy ED1) and the Eastern Expansion Area (Policy SP26). | Local landscape impacts | (---) |
| **Biodiversity** | The new motorway would cross approximately 8.5km of Sites of Special Scientific Interest (SSSI) resulting in the loss of up to 60ha (less than 1.5%) of the total SSSI. The principal ecological interest of the Gwent Levels SSSI lies in the reen drainage system.<br>Other designated sites along or within the vicinity of the route include the River Usk (SAC) and (SSSI), the River Severn (SPA), the River Severn Ramsar Site, and Local Nature Reserves (LNR). | Potential impact on River Usk SAC and SSSI | (---) |
| **Heritage** | The new motorway crosses a number of distinct topographic zones, the cultural heritage of which is | Distribution assessment | (--) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| | characterised by particular attributes related to landform and historic land use. Much of the motorway would cross the marginal wetlands of the Gwent Levels, which is identified as an Historic Landscape of Outstanding Historic Interest. The area is also designated as being archaeologically sensitive in the adopted Newport UDP.<br>The built heritage of the area includes the historic Newport Docks, a number of individual listed buildings and structures and a range of buildings characteristic of the vernacular architecture of the area.<br>A Grade II listed building, Magor Vicarage, would need to be demolished and a standing stone Scheduled Ancient Monument (SAM) at Llanfihangel would have to be relocated in order to accommodate the scheme. | not required (Para. 7.10.7 of WelTAG June 2008) | |
| **Water environment** | A new motorway could lead to adverse effects on water quality, hydrological regimes, flood plains and areas of flood risk. Possible adverse effects on water resources could include changes to the water table, increase flood risk due to run off, pollution due to accidental spillages and changes to the existing hydrology of the catchments through which the road passes. Although the New M4 would be constructed on the floodplain of the Severn Estuary, the Gwent Levels are protected by a sea wall from inundation. The presence of the Usk Bridge would lead to a slight increase in flood levels upstream, particularly during construction, but these would be of negligible significance. | No significant distributional impacts | (--) |
| **Soils** | A major cutting would be required at Castleton to accommodate the new interchange. The overall effect on surface geological features is of negligible significance. However, the proposed development would result in permanent loss of approximately 60ha of Best and Most Versatile Agricultural Land (i.e. land within Grade 1, 2 or 3a). There are some areas of contamination along the route. | No significant distributional impacts | (--) |
| **Transport safety** | The new motorway which would be designed to current standards, would provide a significant improvement in transport safety for users of the new route, located south of the urban area of Newport. Reduced congestion and delays on the existing M4 route would also provide benefits to transport safety. | All road users | (+++) |
| **Personal security** | Improved traffic flow and less congestion would reduce the potential for delays, which may reduce travellers' perceptions of vulnerability to crime. | All road users | (+) |
| **Permeability** | The new motorway would affect a number of existing public rights of way and local routes, which cross or adjoin the route, to which continuity of access should be maintained by means of footpath diversions and appropriate crossing facilities. However, the new motorway would help reduce congestion on the existing motorway and local road network, to benefit severance issues around Newport. | All road users | (+) |
| **Physical fitness** | The new motorway is unlikely to lead to any changes in travel by active modes. | Car users | (0) |
| **Social** | Relieving congestion and improved traffic flows would lead to improvements in the reliability and journey times of | Distribution | (+) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **inclusion** | strategic bus services, which use the motorway network, offering an opportunity to improve accessibility to key centres. Re-classification of the existing M4 around Newport could increase accessibility along the northern fringe of Newport. | assessment not required (Para. 8.6.31 of WelTAG June 2008) | |
| **Equality, Diversity & Human Rights** | A new motorway could improve access to key facilities and employment opportunities for all groups. However, issues of safety and personal security will be considered at the detailed design stage. | All road users | (+) |
| **TPOs** | | | |
| **1** | An additional high quality road is likely to create a significantly safer, easier and more reliable transport link along the M4 between Magor and Castleton. | All | (+++) |
| **2** | The new motorway will form part of the European transport network and provide increased accessibility along the M4. | All | (+++) |
| **3** | The new motorway will provide an alternative route to the existing M4 around Newport with capacity to reduce congestion along the existing route and provide increased resilience on the network. | All | (+++) |
| **4** | A new motorway could improve traffic conditions on the existing network. | All | (+++) |
| **5** | A new motorway would provide increased network resilience and could significantly improve journey time reliability. | All | (+++) |
| **6** | The new motorway would provide an additional route between Magor and Castleton. | All | (++) |
| **7** | A new section of motorway would provide a safe alternative route. | All | (+++) |
| **8** | 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. | All | (++) |
| **9** | Noise impacts would be reduced along the route of the existing M4, which would reduce the noise nuisance to nearby residential properties. | All | (+) |
| **10** | The new motorway will help to reduce congestion and vehicle emissions; however it is not clear whether the additional road capacity would lead to an overall increase in emissions in the longer term. | All | (+) |
| **11** | A new motorway would provide a high quality and free flowing highway to the south of Newport. | All | (+++) |
| **12** | A new motorway would provide a high quality route for strategic journeys. | All | (+++) |
| **13** | A new motorway could improve traffic conditions on the existing network. | All | (+++) |
| **14** | A new motorway could improve access to key facilities and employment opportunities. | All | (+++) |
| **15** | A new motorway would not support a behavioural change towards more sustainable modes but may encourage additional car use on a free flowing route. | All | (--) |

| Criteria | Assessment | Distribution | Significance |
|---|---|---|---|
| **Public acceptability** | There is a co-ordinated opposition largely from local interest groups and Friends of the Earth. Most comments arising from the 2006 series of public exhibitions were made on the topic of the environment, with a third of these concerning noise. The location receiving the most comments was Magor/Undy. The acceptability of the new motorway will be tested at public inquiry. | | |
| **Acceptability to other stakeholders** | Newport City Council and Newport Unlimited are supportive of the provision of a new motorway. Business interests are generally supportive, while environmental groups generally oppose the scheme. The CBI strongly promotes the scheme which is included in SEWTA's Regional Transport Plan. Further engagement is likely to be needed with specific land owners who may be affected directly by the scheme, including ABP. The acceptability of the new motorway will be tested at public inquiry. | | |
| **Technical and operational feasibility** | The new motorway is a challenging scheme with a large estuarial crossing, major earthworks, soft ground, contamination, two motorway interchanges and intermediate junctions. It would considerably improve network resilience by providing a new strategic route to the south of Newport. | | |
| **Financial affordability and deliverability** | The implementation of the new motorway will be dependent upon the availability of funding. Therefore, affordability is an important issue both in terms of timescale and the amount of capital required. | | |
| **Risks** | There is a risk of a protracted public inquiry for this scheme. A quantified risk assessment has been undertaken for the scheme. | | |

## 12.2 Comparative Performance of Options

The comparative performance of transport options for the M4 corridor around Newport are summarised against WelTAG criteria in Table 12.6 and against TPOs and acceptability/feasibility/deliverability criteria in Table 12.7.

**Table 12.6: Comparative Performance of M4 Corridor Options against WelTAG Criteria**

| Criteria | Doing Nothing | Red Route All-Purpose Road | Purple Route Motorway | Black Route Motorway | Public Transport |
|---|---|---|---|---|---|
| **Economy** | | | | | |
| Transport Economic Efficiency (TEE) | **(---)** | (++) | (+++) | (+++) | **(-)** |
| Economic Activity and Location Impact (EALI) | **(---)** | (++) | (++) | (+++) | **(+)** |
| **Environment** | | | | | |
| Noise | (--) | (0) | (0) | (+) | (0) |
| Local Air Quality | (--) | (+) | (+) | (++) | (+) |
| Greenhouse Gas Emissions | (-) | (0) | (+) | (+) | (0) |
| Landscape and townscape | (0) | (---) | (---) | (---) | (0) |
| Biodiversity | (0) | (---) | (---) | (---) | (-) |
| Heritage | (0) | (--) | (--) | (--) | (0) |
| Water environment | () | (--) | (--) | (--) | (0) |
| Soils | (0) | (---) | (---) | (--) | (0) |
| **Social** | | | | | |
| Transport safety | (--) | (++) | (+++) | (+++) | (+) |
| Personal security | (0) | (+) | (+) | (+) | (0) |
| Permeability | (-) | (+) | (+) | (+) | (+) |
| Physical fitness | (0) | (+) | (0) | (0) | (+) |
| Social inclusion | (-) | (0) | (+) | (+) | (++) |
| Equality, Diversity & Human Rights | (0) | (+) | (+) | (+) | (+) |

**Table 12.7: Comparative Performance of Options against Objectives, Acceptability, Feasibility, Deliverability and Risk**

| Transport Planning Objectives | Doing Nothing | Red Route All-Purpose Road | Purple Route Motorway | Black Route Motorway | Public Transport |
|---|---|---|---|---|---|
| 1 | (---) | (++) | (+++) | (+++) | (+) |
| 2 | (--) | (++) | (+++) | (+++) | (0) |
| 3 | (0) | (++) | (+++) | (+++) | (+) |
| 4 | (0) | (+) | (+++) | (+++) | (+) |
| 5 | (--) | (++) | (+++) | (+++) | (0) |
| 6 | (0) | (+) | (++) | (++) | (++) |
| 7 | (--) | (++) | (+++) | (+++) | (0) |
| 8 | (--) | (+) | (++) | (++) | (+) |
| 9 | (--) | (+) | (+) | (+) | (0) |
| 10 | (--) | (0) | (+) | (+) | (0) |
| 11 | (---) | (++) | (+++) | (+++) | (0) |
| 12 | (---) | (++) | (+++) | (+++) | (+) |
| 13 | (0) | (++) | (+++) | (+++) | (0) |
| 14 | (0) | (++) | (+++) | (+++) | (+) |
| 15 | (0) | (--) | (--) | (--) | (++) |

| Criteria | Doing Nothing | Black Route Motorway | Red Route Dual 2-lane | Purple Route Motorway | Public Transport |
|---|---|---|---|---|---|
| **Public acceptability** | Traffic congestion during peak periods results in unreliable journey times, which impacts on the ability of individuals to take up job opportunities and discourages investment from high value businesses. Transport congestion also has environmental impacts affecting local communities. Increasing levels of congestion are unlikely to be acceptable to the public. | The new road could create economic and social benefits. There is a co-ordinated opposition largely from local interest groups and Friends of the Earth. Most comments arising from the 2006 series of public exhibitions were made on the topic of the environment, with a third of these concerning noise. The location receiving the most comments was Magor/Undy. The acceptability of the project will be tested at public inquiry. | The new road could create economic and social benefits. However, the environmental impact of the new road to the south of Newport is likely to attract opposition from those who prioritise a need to protect the environment over the possible economic benefits of the scheme. The new route would be in close proximity to properties in Duffryn, which may attract opposition in light of minor noise and air pollution increases in this area. | The new road could create economic and social benefits. However, the environmental impact of the new motorway along the alignment of M4 CEM Option A is likely to attract opposition from those who prioritise a need to protect the environment over the possible economic benefits of the scheme. The new route would be in close proximity to properties in Duffryn, which may attract opposition in light of noise and air pollution increases in this area. | The promotion of public transport use is likely to be greeted positively by communities in Newport and surrounding areas. |
| **Acceptability to other stakeholders** | The M4 motorway plays the vital role in providing the east/west strategic road link that underpins the economy of South Wales and facilitates the mass movement of people and goods to stimulate economic and social activity within the region. Any disruption to the operation of the motorway in South Wales has a negative impact upon economic development, particularly around Cardiff and Newport. Congestion is sighted by the business community in South Wales as a barrier to economic growth | Newport City Council and Newport Unlimited are supportive of the New M4 project. Business interests are generally supportive, while environmental groups generally oppose the scheme. The CBI strongly promote the scheme and it is included in SEWTA's Regional Transport Plan. Further engagement is likely to be needed with specific land owners who may be affected directly by the scheme, including ABP. The acceptability of the project will be tested at public inquiry. | The new road could 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, possible adverse impacts on the environment could attract opposition from environmental groups and the wider public who prioritise a need to protect the environment over the possible economic benefits of the scheme. Further | The new road could help address many of the problems caused by congestion on the M4 and thus could attract support and be acceptable to other stakeholders, particularly business groups. However, possible adverse impacts on the environment could attract opposition from environmental groups and the wider public who prioritise a need to protect the environment over the possible economic benefits of the scheme. Further engagement is likely to be needed with specific land owners who may be affected | Investment in public transport is likely to be supported by environmental, business and mobility groups in particular. |

| Criteria | Doing Nothing | Black Route Motorway | Red Route Dual 2-lane | Purple Route Motorway | Public Transport |
|---|---|---|---|---|---|
| | and increasing levels of congestion are unlikely to be acceptable to stakeholders. | | engagement is likely to be needed with specific land owners who may be affected directly by the scheme, including ABP. | directly by the scheme, including ABP. | |
| **Technical and operational feasibility** | N/A | The New M4 is a challenging scheme with a large estuarial crossing, major earthworks, soft ground, contamination, two motorway interchanges and two intermediate junction. It would considerably improve network resilience by providing a new strategic route to the south of Newport. | The option is at a strategy level and therefore the technical and operational feasibility risks require further exploration. The new road could include a crossing of the River Usk and could also pass through the Docks Way landfill site. This will require consideration of suitable structures and land contamination issues. | The option is at a strategy level and therefore the technical and operational feasibility risks require further exploration. The new road could include a crossing of the River Usk and could also pass through the Docks Way landfill site. This will require consideration of suitable structures and land contamination issues. | The measures are considered at a strategy level and therefore the technical and operational feasibility risks are unknown. |
| **Financial affordability and deliverability** | N/A | The implementation of the New M4 will be dependent upon the availability of funding. Therefore, affordability is an important issue both in terms of timescale and the amount of capital required. | The construction of the new road would require public sector funding but could be delivered in phases, which could improve affordability. | The implementation of a motorway will be dependent upon the availability of funding. Therefore, affordability is an important issue both in terms of timescale and the amount of capital required. | Revenue costs should be considered in addition to capital costs of projects. Subsidies for public transport may also require consideration by the Welsh Government as part of any future assessment of costs to benefits. |
| **Risks** | N/A | There is a risk of a protracted public inquiry for this scheme. A quantified risk assessment has been undertaken for the scheme. | The option is at a strategy level and therefore the risks require further exploration. The new route could need to negotiate a landfill site requiring legal processes to be successfully considered. | The option is at a strategy level and therefore the risks require further exploration. The new route could need to negotiate a landfill site requiring legal processes to be successfully considered. | Significant investment in public transport could require political commitment at a local, regional and national level. Partnerships with other |

| Criteria | Doing Nothing | Black Route Motorway | Red Route Dual 2-lane | Purple Route Motorway | Public Transport |
|---|---|---|---|---|---|
| | | | Challenge from public and/or stakeholders who may oppose the scheme on grounds of likely environmental impact may also require consideration. | Challenge from public and/or stakeholders who may oppose the scheme on grounds of likely environmental or social impact may also require consideration. | stakeholders could need to be effective in order to deliver public transport measures. The South East Wales Integrated Transport Task Force might offer a useful delivery body for public transport measures in South Wales. |

The Black Route motorway alignment scores strongly against the TPOs as does the Purple Route motorway alignment to the south of Newport. The dual 2-lane all-purpose road performs positively against the majority of objectives, but less strongly than the new motorway options.

The motorway options perform very positively against 10 of the 15 objectives resulting in large beneficial impacts. There is an adverse impact against only one objective; achieving a cultural shift in travel behaviour towards more sustainable choices.

However, the Black Route scores more strongly overall against the WelTAG assessment criteria. All of the highway improvement options result in large beneficial impacts against economic criteria, with the Black Route new motorway performing more attractively with less distance to be travelled and hence lower journey times. All highway options result in moderate to large adverse impacts on the environment (biodiversity, landscape and townscape in particular).

The public transport measures perform strongly against the cultural shift objective as well as against increased level of choice. This option gives rise to few adverse impacts, with the majority of impacts either neutral or slightly positive against the objectives.

All options perform positively against the social criteria.

# 13 Summary of Assessment of Options

## 13.1 Highway Infrastructure

### 13.1.1 Dual 2 All Purpose Road: Red Route

The dual 2-lane all-purpose road on the Red Route alignment does not perform as strongly as the motorway options, scoring less well than the motorway options against 13 out of 15 Transport Planning Objectives.

The Red Route option has significantly reduced capacity compared with the two motorway scenarios and attracts less traffic. By 2035, the Red Route would be expected to be operating at or near capacity and, as such, would attract up to 20% less traffic than both motorway options.

Provided that funding can be made available to deliver the new road as a single project, then a motorway solution will offer greater value for money and better meet the objectives for the project.

**The Red Route should not be taken forward for further appraisal.**

### 13.1.2 Motorway Options: Purple and Black Routes

Of the highway infrastructure options appraised at this strategy level, a new section of motorway on the Black Route alignment offers the strongest case. Whilst costs are similar, the Black Route would be expected to produce higher economic benefits compared to the Purple Route.

When assessed at a strategic level, both Purple and Black perform the same against the TPOs, although when assessed against the WelTAG criteria, the Black Route out-performs the Purple. This is principally due to the proximity of the Purple Route to the residential area of Duffryn including Duffryn High School and other potential development areas.

It is worth noting that the Black Route has benefited from planning protection as a result of the publication of the TR111 in 2006 whereas the Purple Route represents a new line of investigation. The Purple Route therefore has an increased delivery risk when compared to Black. These risks are mainly associated with crossing the Docks Way landfill site, through Newport Docks and across the River Usk. There are also on-going developments and potential further development sites along the alignment of the Purple Route.

The Docks Way landfill also represents a significant threat to the development of the Purple Route. To construct a road through the historic landfill site would require the Welsh Government to take on the responsibilities of the ongoing management of the site or to enter into a legal contract with the current site owner for the current owner to continue to manage the facility (with new road on top). New Environmental Permits would have to be obtained for those parts of the sites for which responsibility was to be transferred and the original permits modified accordingly (or those parts of the sites which Welsh Government was to take over to be remediated such that a new Permit was not required). Whilst modifying permit boundaries is possible it would require the agreement of the current permit holders to the modification and agreement of Natural Resources Wales (NRW) to

the technical proposals. Effectively a new Environmental Permit Application would need to be progressed. Whilst this is likely to be achievable it introduces another major risk in the development of the Purple Route alignment and indeed was one of the principal reasons the original M4 Relief Road was developed along the line of the Black Route.

Through the Docks and across the River Usk, it is likely that, with the Purple Route, it would be more difficult to accommodate the operational requirements of businesses that are reliant on using the Docks and River Usk for trade, resulting in possible substantial claims for compensation and threatening jobs.

Whilst some early dialogue with key stakeholders has taken place, it is clear that both options will impact on affected interests and operations in different ways, depending on the horizontal and vertical alignment of the road and the viaduct span arrangement. These are not considerations for a strategy level assessment but will need to be developed in more detail at the next stage of assessment.

Further engagement is therefore required with key stakeholders to understand better the environmental, social and economic impacts to develop an acceptable solution. These are areas of significant risk to acceptability / deliverability / affordability.

**On the basis of this assessment the Black Route should be taken forward as part of the preferred strategy.**

## 13.2 Public Transport

Studies have shown that new or improved public transport services are likely to have only minimal impact in terms of 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. Public transport investment could encourage modal shift by increasing choice.

This appraisal has shown that public transport enhancement will contribute to some transport planning objectives for the M4 corridor around Newport. Outline appraisal demonstrates that public transport improvements should continue to be developed and/or promoted, as supported by the public and stakeholder engagement process.

The electrification of the South Wales Main Line railway from Paddington to Swansea and the electrification of the Valley Lines railway will be a catalyst for increased use of public transport. Provision of new and improved interchange and park and ride facilities would reinforce this trend.

These initiatives are already being progressed by Welsh Government and Network Rail.

**It is thus recommended that any further public transport enhancements should be considered by the delivery team(s) set up for the purpose by the Welsh Government.**

## 13.3 Common and Complementary Measures

The provision of a new section of motorway to the south of Newport would provide the opportunity to change the function of the current M4 route around

Newport to better integrate it into Newport's road network. This would enable better access to/from the west (west Newport, Cardiff etc.) from residential areas such as Caerleon/St Julians by potentially re-opening the western approaches to Junction 25.

Re-classification of the M48/M4 from east of Magor to Tredegar Park/Castleton to trunk road would possibly create the potential to simplify the proposed interchanges at Magor and Castleton as part of a value engineering exercise.

Provision of a road link between the M48 and the B4245 would result in benefits to users of the local road network and relief to Junction 23a.

Provision of additional cycling and walking infrastructure within the M4 corridor around Newport will encourage healthy lifestyle choices and social interaction as well as assisting in scene setting and place making.

**Complementary measures should therefore be considered further as part of scheme level appraisal.**

# 14 Concluding Remarks

This WelTAG Stage 1 Appraisal has shown that, should the Welsh Government progress the preparation of a draft Plan for the M4 corridor around Newport, then, subject to the availability of adequate funding, the following strategic options are worthy of further consideration in terms of schemes that might be brought forward for inclusion in the draft Plan:

- New section of 3-lane motorway between Magor and Castleton to the south of Newport along the line of the Black Route; and
- Complementary Measures.

It is assumed that public transport enhancement will be separately progressed by a delivery taskforce set up by the Welsh Government in liaison with other interested parties.