

Adran yr Economi a'r Seilwaith
Department for Economy and Infrastructure



Llywodraeth Cymru
Welsh Government

Issue Ref ISU0024

File Ref WG/RS/ISU0024 - Howe

Response to Evidence: Sophie Howe

(Future Generations Commissioner for Wales)

1. EVIDENCE

1.1. Details

1.1.1. Sophie Howe has submitted a Statement of Evidence dated February 2017 in relation to the draft statutory Orders associated with the Welsh Government's proposals for the M4 Corridor around Newport, which has been received via the Programme Officer.

1.1.2. The Welsh Government understands the evidence submitted within Sophie Howe's Statement to be based on the following:

1. States that the rationale for a new road was conceived over 25 years ago with the main purpose of addressing congestion in the area.
2. States that all evidence should be assessed to ensure that the Scheme would not lead to an increase in total emissions.
3. Concerns that the Scheme has not allowed for full engagement with the local community.
4. Concerns that there appears to be considerable lack of integration and collaboration with other regional initiatives which are being developed at the same time e.g. Metro. Attention should be given to how an integrated transport solution could encourage and support modal shift, encouraging people out of their cars and preventing traffic congestion.
5. Concerns that there is evidence to suggest that the M4 is likely to contribute to inequality as it will not benefit the quarter of mostly poorer households (in the south east of Wales) who do not even have access to a car.
6. States that the Scheme's commitment to local procurement is contingent upon the capacity of the local market to respond to this opportunity, but intervention to develop the market is required in order to facilitate this.
7. Concerns that the Scheme has failed to adequately engage local communities thus far.
8. States that reference should be made to The Wales Transport Strategy which has the following outcome "Greenhouse gas emissions – Reduce the impact of transport on greenhouse gas emissions".

9. Concerns that the WelTAG study doesn't appear to have been updated to reflect the current thinking that went into the Well-being of Future Generations Act such as wider impacts on health, culture and communities.
10. Concerns that there is little evidence within the Sustainable Development Report of whether there has been comprehensive consideration of alternative options to addressing the congestion problems. In meeting the Well-being of Future Generations Act there is an expectation that the Government should be able to demonstrate comprehensive consideration of alternative schemes.
11. States that using the Welsh Government's borrowing powers to finance one scheme will, at best, result in geographically, economically and socially disproportionate benefits to one part of Wales.
12. States that the Welsh Government could develop a package of transport-based solutions to address the issue of congestion on the M4 including:
 - a. Better use of technology to control traffic flows (especially at peak times) and improving / remodelling junctions,
 - b. Large scale investment in public transport including the Metro;
 - c. Better integration between rail and bus services including integrated ticketing;
 - d. Encouraging local traffic (approx. 40% of total) to use other roads or local public transport;
 - e. Create park-and-ride facilities on the outskirts of the city;
 - f. Development of a tram route to cross Cardiff and Newport.
13. States that Friends of the Earth Cymru has proposed a package of measures including public transport improvements which could reduce traffic by 22%.
14. States that given that around 40% of M4 traffic is due to 'local journeys' there is a clear rationale to focus on measures which will encourage these journeys to be made on alternative local routes or public transport to reduce traffic levels beyond 3% stated in the Public Transport Assessment.

15. Concerns over the lack of inclusion of 'softer' measures to influence people's travel behaviours, which seem to be missing from the assessment/evidence of the Scheme.
16. Suggests that the Welsh Government should pursue 'soft' transport measures helping people to choose to reduce their car use while enhancing the attractiveness of alternatives such as:
 - a. - Workplace and school travel plans;
 - b. - Personalised travel planning, travel awareness campaigns, and public transport information and marketing;
 - c. - Car clubs and car sharing schemes;
 - d. - Teleworking, teleconferencing and home shopping.
17. Suggests that the Welsh Government should undertake similar analysis to that of New Economics Foundation, which considered 88 costed alternatives to HS2.
18. Concerns that the Scheme is not consistent with Wales' commitment to future generations.
19. States that the basic premise that the Scheme is the "most sustainable, long-term solution to current social, environmental and economic problems associated with this route" is incorrect.
20. States that the Well-being of Future Generations Act arguably requires the Welsh Government to explore other ways to address the problem giving greater consideration to the aspirations contained within the National well-being goals, their own well-being objectives and the five sustainable development principles.
21. States that many progressive cities are taking action against vehicles. Financial (and spatial) investment in public transport, cycling and walking infrastructure has led to a modal shift of between 40 and 70% in many cities in the Netherlands. Flexible working will lead to productivity and efficiency savings, a reduced carbon footprint, and enhanced employee wellbeing. There is a developing trend in office hubs between home and the workplace. There is an opportunity for transport and its infrastructure to adapt to meet future flexible working needs. Sufficient evidence now exists to have confidence that soft factor interventions can have a

- significant effect on individual travel choices. For example, workplace travel plans can typically reduce commuter car driving by between 10% and 30%.
22. States that rail passenger numbers have increased more rapidly than envisaged, while the rate of growth in total car traffic had showed signs of slowing some time before the recession and oil price spike of the late 2000s. States that the rate of growth has slowed down considerably and to an extent where major new roads (and in particular motorways) cease to be justified on current traffic forecasting grounds.
 23. States that the evidence also indicates that impact of road infrastructure on business may not be as great suggested by many.
 24. States that capacity relevant to current projections, combined with potential reduction in demand for travel due to changing work patterns, along with modal shift to other modes of transport, risks the proposed M4 scheme being an out-dated solution. States that there are 6 key new technologies converging on the transport industry; autonomous vehicles, connected vehicles, collaborative consumption, electric vehicles, efficient multimodal networks and new materials and manufacturing technologies. Suggests that there has been a lack of consideration of future trends in technology and automation which indicates that this has only been considered after the decision to proceed has been taken.
 25. Concerns that the decision making process has not adequately taken into account the five ways of working, as required by the Sustainable Development principle within the Well-being of Future Generations Act.
 26. Suggests that whilst the Scheme has been developed in consultation with various interest groups, it does not amount to sufficient collaboration, nor does it adequately consider the long-term, or properly apply the principles of integration and involvement.
 27. Requires evidence that the five ways of working have been applied at the outset of the decision making process rather than being retrofitted to justify a decision already taken.
 28. States that further consideration should show how the Scheme is helping to address other long-term challenges such as climate change by reducing emissions and impacts.

29. Suggest that the Scheme should demonstrate how the Metro and other public transport measures would reduce demand and analyse how this could prevent or ease congestion on the M4.
30. Suggests that the Welsh Government should consider how community transport could be funded or improved to reduce the need to travel using the existing M4.
31. States that the Economics Assessments have not taken into account the wider definition of the goal 'a Prosperous Wales' to encourage a 'skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work'.
32. States that the Scheme fails to incorporate the Government's own objectives on Green Growth or the Decarbonisation agenda.
33. States that the Scheme does not appear likely to deliver well-being for future generations in Wales, when considered in relation to the goals and ways of working set out in the Act.
34. Concerns that there is insufficient evidence and inadequate analysis of the actual long term impact of the Scheme as proposed, particularly with regards to critical concerns such as: ecological resilience, economic growth, public health, resource use and ecological footprint and carbon emissions.
35. Concerns that the potential risks and harms of the Scheme have been understated, while the potential benefits are both narrower than the Act demands and are unlikely to be progressively distributed.
36. States that the Scheme's Economic Appraisal Report forecast that economic growth that will result from improved connectivity by lowering the costs of commuting and thus widening the potential pool of workers for employers can only be substantiated when you are connecting potential workers to existing or potential jobs, and not when there is a more general problem of a lack of available jobs in the area. States that the analysis regarding Objective 4 in the Sustainable Development Proof of Evidence (John Davies) is not supported with evidence; the argument that improved connectivity can resolve the economic difficulties currently facing Wales is incorrect when there is already reasonable provision.

37. Concerns that the route will not open up new employment opportunities; the employment sites that it connects to in South Wales are already accessible through the existing M4.
38. States that it is unclear how many of the 700 jobs per month over the course of construction are additional as a result of the Scheme, and how many are diffused through the supply chain.
39. States that the Scheme should be able to clearly articulate how it could support skills and jobs development in the Newport area, and work with Wales based suppliers to increase the economic impact.
40. Concerns that the Scheme has failed to show how it will support communities with opportunities for residents to connect with each other.
41. Concerns that the Scheme will disrupt existing relations by demolishing houses and commercial buildings and replacing land in community use.
42. States that it is unclear where replacement land will be, and whether it will offer the same or better opportunities for community life.
43. Concerns that the Scheme fails to support low carbon economic growth in Wales by actively discouraging people from low carbon lifestyles which, in transport terms, mean active and public transport.
44. States that increasing supply in transport induces demand: where it becomes easier to drive, people are more likely to drive.
45. States the Scheme's Economic Appraisal Report claims an unsubstantiated £4,431,000 of monetised greenhouse gas benefits but fails to provide an explanation of how this figure is derived, or where these benefits accrue.
46. States that the WelTAG assessment of alternative measures does not sufficiently reflect the current thinking that went into the Well-being of Future Generations Act such as wider impacts on health, culture and communities.
47. States that the Well-being of Future Generations Act creates an expectation that the Welsh Government should be working towards the creation of a low carbon transport strategy that matches the aspirations in leading cities and states across the world.

48. States that the Government should set out clearly how this investment will maximise the benefit across the social, economic, environmental and cultural well-being of Wales for current and future generations.
49. Suggests under the Well-being of Future Generations Act 2015 there is a clear expectation that proposals, including the decision-making process itself, will embed the five ways of working and maximise contribution to all of the seven well-being goals.
50. Suggests the Welsh Government should demonstrate that their proposal is the most sustainable solution in the long term and that it is the most effective way of maximising the contribution to tackling long term intergenerational challenges such as climate change and the shift to a low carbon economy, poverty and ill health.
51. Suggests that the proposed scheme does not appropriately apply the principle of taking decisions in a way which meets today's need without compromising the ability of future generations to meet their own needs.
52. Suggests the Scheme does not adequately take into account future trends, it is not a good example of how the five ways of working (sustainable development principle) should be applied and the case for investing in this scheme from the perspective of future generations has not been made.

2. RESPONSE**2.1. Points Raised**

2.1.1. Some of the above points have already been addressed in proofs of evidence. Others are dealt with by topic by the relevant witness in the following sections, in addition to their general proofs of evidence, to which readers should also make reference in their entirety for a full understanding of the Welsh Government's case. For ease of reference the places where the above points are addressed in this Response are listed in the table below:

Objector's point reference	Response paragraph reference	Objector's point reference	Response paragraph reference
1	2.1.2	27	2.3.3
2	2.1.2	28	2.3.4
3	2.2.1	29	2.4.4
4	2.1.2	30	2.4.5
5	2.2.2	31	2.5.2
6	2.2.3	32	2.3.5
7	2.2.1	33	2.3.6
8	2.1.2	34	2.3.6
9	2.1.2	35	2.3.6
10	2.1.2	36	2.5.3
11	2.1.2	37	2.5.4
12	2.1.2	38	2.5.5
13	2.2.4	39	2.5.6
14	2.1.2	40	2.6.1
15	2.1.2	41	2.6.2
16	2.1.2	42	2.6.3
17	2.1.2	43	2.3.7
18	2.3.1	44	2.4.6
19	2.3.1	45	2.5.7
20	2.3.1	46	2.3.8
21	2.4.1	47	2.3.7
22	2.4.2	48	2.3.9
23	2.5.1	49	2.3.10
24	2.4.3	50	2.3.11
25	2.3.2	51	2.3.12
26	2.3.2	52	2.3.12

2.1.2. The points that have already been covered in proofs of evidence are as follows:

1. **Point 1** (*States that the rationale for a new road was conceived over 25 years ago with the main purpose of addressing congestion in the area*) / The background and development of objectives and possible solutions is set in the Proof of Evidence of Matthew Jones (WG1.1.1) at sections 3 and 10 respectively.
2. **Points 2 and 8** (*States that all evidence should be assessed to ensure that the Scheme would not lead to an increase in total emissions*) and (*States that reference should be made to The Wales Transport Strategy which has an outcome to “reduce the impact of transport on greenhouse gas emissions”*) / The approach to carbon assessment is set out in Matthew Jones’s evidence (WG1.1.1) at section 15. The evidence of Tim Chapman (WG1.13.1) addresses the Whole Life Carbon emissions aspects for the Scheme and the associated impact on climate change. Tim Chapman’s evidence concludes that even with forecast traffic increases, the Scheme is effectively Whole Life Carbon neutral because of a combination of the new route being some 2.8km shorter and also it having significant congestion alleviation benefits over the “Do Minimum” scenario on the existing M4.
3. **Points 4 and 14** (*Concerns that there appears to be considerable lack of integration and collaboration with other regional initiatives which are being developed at the same time e.g. Metro. Analysis should be given to how an integrated transport solution could encourage and support modal shift, encouraging people out of their cars and preventing traffic congestion*) and (*States that given that around 40% of M4 traffic is due to ‘local journeys’ there is a clear rationale to focus on measures which will encourage these journeys to be made on alternative local routes or public transport to reduce traffic levels beyond 3% stated in the Public Transport Assessment*) / In combination with the Scheme, the Welsh Government is progressing with a Metro (Documents 6.1.6, 6.3.4 and 6.3.6). The Metro and public transport improvements have been taken into account as set out in section 9 of Matthew Jones’ Proof of Evidence (WG1.1.1) and further explained in the Proof of Evidence of Bryan Whittaker (WG1.2.1).

To summarise, the M4 Project transport model includes:

- Great Western Route Modernisation including the electrification of the Great Western Mainline from London Paddington to Cardiff by 2017;
- opening of new stations on the Valley Lines (Metro Phase 1); and
- Valley Lines electrification (Metro Phase 2).

In addition to this 'core' transport model, a further scenario has also been tested which assumes additional rail elements of Metro, a strategic Park and Ride site at Llanwern (Metro Phase 3) and a Newport Bus Rapid Transit system. However, even this analysis shows a maximum of 6% transfer of traffic from the M4, which would not alone address the problems. This is reported in detail in an 'Updated Public Transport Overview Report' and document PIQ073 available here: <http://m4-newport.persona-pi.com/>.

WG have liaised with Transport for Wales to verify the scope of Metro measures considered. Consultant's traffic modelling work was also independently reviewed by WG Head of Transport Evidence Professor Helen Bowkett (who also oversaw Metro). Welsh Government's position is that public transport enhancements and the M4 Project are complementary and are being developed collaboratively.

Regarding use of alternative routes for local trips, numerous options to reduce traffic on the M4 have been considered including workplace travel planning, junction closures and works to local roads. None have been appraised to perform well in meeting the objectives. This is explained further in the 'Alternatives Considered Workbook' available on www.m4cem.com. These alternatives were considered during a diverse stakeholder engagement exercise between 2010-2012, explained further in Para 5 below, and have been revisited accordingly since (as explained in my Proof of Evidence).

4. **Point 9** (*Concerns that the WelTAG study doesn't appear to have been updated to reflect the current thinking that went into the Well-being of Future Generations Act such as wider impacts on health, culture and communities*) / The history of the identification, consultation, review and assessment of the problems associated with the existing M4, and aims

and objectives of a solution is set out within the various WelTAG appraisals for the Scheme, its Plan and previous development work including health and equality impact assessments. This work showed that the Scheme would best address the identified problems and achieve the objectives. The relevant Welsh Transport Planning and Appraisal Guidance (WelTAG) background to the selection of the 2014 Plan and Preferred Route can be found in the following reports:

- a. The WelTAG Stage 1 Appraisal (Strategy Level) Report (Document 4.4.12)
- b. WelTAG Stage 1 & 2 Appraisal (Scheme Level) Report (Document 4.5.5)

Matthew Jones' Proof of Evidence (WG1.1.1) at section 16 addresses matters of sustainable development. In particular:

- WG1.1.1 Paragraph 16.3 explains that the M4 Corridor around Newport Plan, and the subsequent development of the Scheme, predated publication of the Welsh Government's Well-being objectives under the 2015 Act. Nonetheless, the three pillars of sustainable development policy at that time – the economy, the environment and society have been integral to the development of the Plan and Scheme, as demonstrated by the WelTAG appraisal process that helped inform Welsh Ministers in their decision making that led to the adoption the Plan and modified Preferred Route in July 2014.
- WG1.1.1 Paragraph 16.6 explains how the 2016 Integrated Health and Equalities Impact Assessment (Document 2.3.2, Appendix 5.4) considered how the Scheme could influence public health and wellbeing in the areas surrounding the proposed new section of motorway and the existing M4 around Newport through environmental and socio-economic pathways. It concluded that the Scheme would have small quantifiable net positive health impacts due to changes in environmental noise and air pollution exposure, together with likely health and wellbeing benefits from employment, training and investment associated with the Scheme. No significant permanent adverse health and wellbeing impacts due to changes in access to

services, recreation/physical activity or community severance or other relevant social pathways were identified.

- WG1.1.1 paragraph 16.10 explains how a Sustainable Development Report (Document 2.3.11) has been published, which describes how the proposed Scheme aligns to the goals of the 2015 Act. The Proof of Evidence of Mr John Davies MBE (1.23.1) considers the application of the Sustainable Development principle during development of the project and also alignment with the recently published Welsh Government objectives under the 2015 Act.

Points 10, 12, 15, 16 and 17 (*Concerns that there is little evidence within the Sustainable Development Report of whether there has been a comprehensive consideration of alternative options to addressing the congestion problems. In meeting the Well-being of Future Generations Act there is an expectation that the Government should be able to demonstrate comprehensive consideration of alternative schemes*), (*States that the Welsh Government could develop a package of transport-based solutions to address the issue of congestion on the M4*), (*Concerns over the lack of inclusion of 'softer' measures to influence people's travel behaviours, which seem to be missing from the assessment/evidence of the Scheme*), (*Suggests helping people to choose to reduce their car use while enhancing the attractiveness of alternatives*) and (*Suggests that the Welsh Government should undertake similar analysis to that of New Economics Foundation, which considered 88 costed alternatives to HS2*) / The evidence of Matthew Jones (WG1.1.1) at section 3 sets out the background to the Scheme and at section 3.7 clarifies how the 2010-2012 M4 Corridor Enhancement Measures (CEM) Programme considered more than 100 possible measures in packages including network improvements, travel planning, demand management and alternative modes of transport. This diverse assessment of alternatives involved a wide cross section of stakeholders including local authorities, environmental NGOs, health boards and protected groups representatives and was cited by Climate Change Wales as an exemplar engagement exercise¹.

¹ PIQ-78: Climate Change Commission in Wales (2012) - Position Paper for Transport and Climate Change for Wales

5. **Point 11** (*States that using the Welsh Government's borrowing powers to finance one scheme that will, at best, result in geographically, economically and socially disproportionate benefits to one part of Wales*) /

Matthew Jones in his Proof of Evidence (WG1.1.1) paragraphs 24.4 and 24.5 of WG1.1.1 considers that:

- a. There is a strong economic case for the Scheme. More broadly the Scheme is expected to improve perceptions of Wales as a place to visit and do business, stimulating new investment and a sustained economy.
- b. Aside from economic benefits, there is a social, cultural and environmental case for the Scheme:
- c. The reclassified M4 would serve local residents and tourists far more effectively, operating akin to the Newport ring road it was originally planned as.
- d. There would be accident savings through journeys taking place on a highway designed to modern standards.
- e. Air quality within four of Newport's Air Quality Management Areas (AQMAs) would improve significantly, and on a regional scale air quality would improve.
- f. There would be a net benefit in terms of noise.

Two-thirds of the population of Wales live within 20 miles of the M4. Therefore the Scheme is considered to provide benefits that will be felt more broadly than just one part of Wales. Aside from the direct user benefits, the published 'Revised Wider Economic Impact Assessment Report' sets out the benefits that would be felt further afield than just the local area.

Welsh Government has been clear that it will not use the full borrowing limit on the Scheme. The Project would be funded through a combination of UK Government borrowing and Welsh Government capital budgets. We would not be allocating the full amount of our borrowing capacity to this scheme, important though it is. The balance of the current borrowing limit, over £500m, will be available to fund schemes in other parts of Wales

from 2018/19 onwards when Stamp Duty & Landfill Tax are planned to be devolved to Welsh Government.

2.1.3. The other points are responded to by specialist topic in turn in the sections following.

2.2. Matthew Jones (Chief Witness)

2.2.1. Response to **Points 3 and 7**, (Concerns that the Scheme has not allowed for full engagement with the local community) (Concerns that the Scheme has failed to adequately engage local communities thus far):

1. Section 3 of my evidence (WG1.1.1) explains how significant engagement has been carried out with the local community, and a cross-section of other stakeholders, through various means. Numerous public consultations and information exhibitions have been held over many years both in the local area and across Wales. Furthermore, innovative workshops held between 2010 and 2012 brought together diverse stakeholders to take a fresh look at the problems and over 100 potential solutions. Attendees included the local authorities, environmental NGOs, public transport groups, protected characteristic groups, community groups and community councils. These workshops were commended as exemplar public engagement by the Climate Change Commission (PIQ-78 reference as provided above).
2. We also established a key stakeholder forum with representatives from each of the above groups with an interest in transport in South Wales, who had access to working documents via a secure online website. That group who fed directly into the development of the approach to identifying a preferred solution as a package of measures, as well as informing appraisals, consultation materials and assessment documents.
3. In 2013 specific health and equality impact workshops were held involving diverse health and protected characteristic representatives.
4. More recently, the 2015 Public Information Exhibitions (held both local to the Scheme and more widely at pop-up events the length and breadth of South Wales) were attended by more than 2,000 people and a survey of attendees recorded 90% 'tended to agree' or 'strongly agreed' that the exhibitions helped them to understand the proposals. Furthermore, 92%

selected 'YES' on a touchscreen computer which asked "Have you found all the information you wanted today?". The same exhibitions were attended by local school groups (children with a range of ages) who took part in engineering and environmental educational activities within them.

5. We also continue to have a designated Public Liaison Officer aims to help people contact the project team to help address any concerns or queries where possible.

2.2.2. Response to **Point 5** (Concerns that there is evidence to suggest that the M4 is likely to contribute to inequality as it will not benefit the quarter of mostly poorer households (in the south east of Wales) who do not even have access to a car):

1. The Scheme would improve accessibility for both car users and public transport users, and would also provide walking, cycling and equestrian improvements. The Scheme would also benefit the economy and help attract investment to Wales. Those economic benefits would be experienced by motorists and non-motorists alike and by those who do not personally use the Scheme (as to the latter point see page 32 of Transport Investment and Economic Performance (Document 6.1.23) which is addressed by Stephen Bussell in his main proof (WG1.3.1), various rebuttals² and below at 2.5.1)
2. Therefore the Scheme is expected to benefit social inclusion. A Health and Equality Impact Assessment has been undertaken and can be found at Environmental Statement Appendix 5.4 (Document 2.3.2).

2.2.3. Response to **Point 6** (States that the Scheme's commitment to local procurement is contingent upon the capacity of the local market to respond to this opportunity, but intervention to develop the market is required in order to facilitate this):

1. Welsh Government has considered the needs of delivery of the project and areas of skills shortage, with a need to minimise negative impacts on local communities and invest as much of the capital expenditure as possible in local people and business. If the Scheme were determined to proceed it would be a contract requirement to develop a full package of

² <http://m4-newport.persona-pi.com/rebuttals>

training and local supplier opportunities, working with stakeholder organisations like the construction industry training board (CiTB) to upskill the existing workforce. This would include opportunities for new entrants into construction such as apprenticeships and work experience placements. Welsh Government is currently targeting 200 apprenticeships for the Scheme. Skills opportunities are being collaboratively developed with a wide group of stakeholders from the supply chain and a skills alliance including local authorities, academia, the project development team and specialist industry bodies such as CITB and Construction Excellence.

2. It would be planned to source many of the workforce from current Welsh projects such as the A465 Heads of the Valley project and for our additional needs, recruitment would be carried out through local work agencies and wider schemes such as the LIFT programme, a Welsh Government initiative to provide employment opportunities for hard to reach groups. We are also liaising with the Local Authorities and industry groups such as the Construction Industry Training Board to align training and employment opportunities. Further links would also be forged to ensure continuity of employment beyond the M4 Project to others.
3. Investment and support of local SME businesses is also being considered to increase their opportunities to access opportunities including:
 - a) Key trades such as groundworks and earthworks;
 - b) Support services such as transportation and canteen services;
 - c) Discreet work packages of a scale ideally suited for delivery by SME local building companies, such as the new highway maintenance depot; and
 - d) Materials and Plant requirements such as locally quarried materials.

2.2.4. Response to **Point 13** (States that Friends of the Earth Cymru has proposed that a package of measures including public transport improvements which could reduce traffic by 22%):

1. As is explained in section 3 of my Proof of Evidence (WG1.1.1); as part of the M4 CEM Programme, a comprehensive engagement process was launched in September 2010 culminating in a public consultation being

held on different options and their associated transport, health, equality and environmental assessments, between March and July 2012 (Document 4.3.7). During this period more than 100 possible measures were considered including similar packages of network improvements, travel planning, demand management and alternative modes of transport as referred to by those such as Friends of the Earth Cymru. Appraisal concluded that the solution to the problems associated with the existing M4 around Newport cannot be sufficiently be resolved by a package not including a highway intervention. Therefore, Welsh Government is progressing both public transport improvements, i.e. the Cardiff Capital Region Metro, and the proposed new section of motorway and its complementary measures. Both are considered complementary in delivering a long-term, efficient and integrated transport system for Wales.

2. Friends of the Earth take closure of Junction 26 east facing slips as reducing traffic by up to 5%. This is sourced from Welsh Government assessment of options in 2011. However it must be noted that our same assessment explained that whilst the traffic would reduce through the Brynglas Tunnels it would divert onto adjacent junctions, causing both potential problems elsewhere on the M4 around Newport and on local roads joining it.
3. Friends of the Earth have then added the 5% to the estimated traffic reduction as a result of the Metro, which the Welsh Government has assessed, in detail and conservatively as a maximum of 6% (see section 9 of WG1.1.1 and the associated response to Points 4 and 14 at section 2.1.2 above). The balance of 11% relies upon what Mr Kells of Friends of the Earth refers to as marketing (OBJ0125). In evidence Mr Kells accepted that the 11% figure was ambitious. The Welsh Government does not accept that a reduction of that magnitude in respect of marketing is realistic – see Bryan Whittaker’s evidence at 2.3.1 of WG’s rebuttal of Gerald Kells’ evidence (WG/REB/OBJ0125) and Bryan Whittaker’s evidence at 2.4.1 of this response.

2.2.5. I confirm that the statement of truth and professional obligations to the inquiry from my main proof still applies.

2.3. John Davies (Sustainable Development)

2.3.1. Response to **Points 18, 19 and 20** (Concerns that the Scheme is not consistent with Wales' commitment to future generations), (States that the basic premise that the Scheme is the "most sustainable, long-term solution to current social, environmental and economic problems associated with this route" is incorrect) and (States that the Well-being of Future Generations Act arguably requires the Welsh Government to explore other ways to address the problem giving greater consideration to the aspirations contained within the National well-being goals, their own well-being objectives and the five sustainable development principles):

1. Successive Welsh Governments have demonstrated their commitment to sustainable development and future generations since the start of devolution, as set out in paragraph 26 of my proof of evidence. I fully accept that all options need to be explored in seeking to resolve the problems associated with the M4 around Newport, but the options must include the construction of a new road. It is correct that the proposal to construct an M4 Relief Road dates back to 1995 (see proof of Mr Matthew Jones, WG 1.1.1, para 3.4). But that of itself does not mean that a new road is no longer the correct solution.
2. As outlined by Mr Jones (WG 1.1.1, paras 37-8), the M4 Corridor Enhancement Measures (CEM) Programme considered more than 100 possible options to address the issues of capacity, safety and resilience along the M4 corridor, including network improvements, travel planning, demand management and alternative modes of transport. That process identified a new road south of Newport as the Welsh Ministers' preferred solution. Following the identification of funding opportunities for infrastructure projects in 2013, the options were appraised once more, including the M4 CEM options, motorway options, and complementary measures. This led to the identification by the Welsh Ministers of the Plan for the M4 around Newport as the solution to be progressed based on an evaluation that took account of environmental, economic and social considerations using the WeITAG process. Therefore, whilst identification of an M4 Relief Road dates back to 1995, the current proposal for a new motorway south of Newport has been arrived at following an up to date evaluation of a wide range of options in the context of the Welsh

Government's commitment and duties in respect of sustainable development, which were in force prior to the Well-being of Future Generations (Wales) Act 2015 (the WFG Act).

3. With regard to the WFG Act, this does not stipulate how a road scheme should be evaluated or how options to solve problems of road congestion should be identified. In paragraphs 33-44 of my evidence I analyse the sustainable development principle and explain how the process of identifying the option to build a new section of motorway was in accordance with this principle and hence with the requirements of the WFG Act. The Commissioner states that building a new road is not in the best interests of future generations but such a blanket assertion cannot be justified. The Commissioner refers to the Welsh Government's well-being objectives but these form the foundation for the present Government's 5 year programme, which includes as part of the *United and Connected* strategy, the delivery of "an M4 relief road". The Welsh Government's well-being objectives are published in accordance with Section (3)(2)(a) of the WFG Act and are intended to contribute to the well-being goals in Section 4 of that Act. The Scheme for the new section of motorway is hence in line with its well-being objectives, would fulfil the commitment in the 5 year programme and is in accordance with Section (3)(2)(b) of the WFG Act, which requires the Welsh Government to take all reasonable steps to meet its published well-being objectives.
4. The WFG Act is the most recent demonstration of the Welsh Government's commitment to future generations. The proposed Scheme, which is necessary to solve the existing problems on the M4 motorway around Newport, meets the requirements of that Act. It demonstrates the Welsh Government's determination to address current problems that affect the well-being of the people of Wales, but the work that has gone into the identification of the Scheme shows its commitment to think long-term, involve and work with others, and take an integrated and preventative approach, so as to protect future generations.
5. Moreover, the manner in which the Welsh Government is working with Associated British Ports (ABP) to develop mitigation measures to integrate the Scheme with Newport Docks demonstrates how it is applying the sustainable development principle. In formulating these

measures the Welsh Government has demonstrated long-term thinking and has taken an integrated approach by addressing both the need for the Scheme and the need to secure the long-term future of Newport Docks. It has acted in a collaborative manner by seeking to meet both its objective of addressing the problems on the motorway around Newport by delivering the Scheme, and ABP's objective to ensure the efficient operation of Newport Docks. These mitigation proposals, which are necessary to overcome the impact on Newport Docks, would also provide improved Dock facilities and encourage the sustainable movement of freight by sea. This is in line with the policies of the UK and Welsh Governments and would contribute to the Prosperous and Globally Responsible goals of the WFG Act (see also paragraph 2.3.12 below).

2.3.2. Response to **Points 25 and 26** (Concerns that the decision making process has not adequately taken into account the five ways of working, as required by the Sustainable Development principle within the Well-being of Future Generations Act), (Suggests that whilst the Scheme has been developed in consultation with various interest groups, it does not amount to sufficient collaboration, nor does it adequately consider the long-term, or properly apply the principles of integration and involvement):

1. I deal with the sustainable development principle and the five ways of working in paragraph 33-44 of my proof (WG 1.23.1), where I demonstrate that the process of selecting the Plan for the M4 Corridor around Newport and the subsequent development of the Scheme to deliver that Plan was in accordance with the five ways of working.
2. My additional comments are as follows:
 - i. **Long-term:** Mr Tim Chapman deals with carbon budgets and greenhouse gas emissions (WG 1.13.1), demonstrating that the Scheme has been properly and critically analysed and that his conclusion that the Scheme would be carbon neutral is robust. The Scheme has been subject to extensive analysis as required by the sustainable development principle enshrined in the 2015 Act, demonstrating that its long-term impact is fully understood as part of the decision process.

- ii. **Integration:** The evidence of Mr Matthew Jones (WG 1.1.1) explains how public transport solutions were explored and formed part of the decision process leading to the adoption of the Plan for the M4 around Newport. He also explains the role of the South Wales Metro, which was included in an Updated Public Transport Overview Report in December 2016 (Doc 2.4.19) to confirm the impact of public transport investment on the need for the Scheme. Mr Bryan Whittaker (WG 1.2.1) demonstrates how the impact of the South Wales Metro and the electrification of the main railway line have been taken into account in determining the need for and justification of the Scheme. The Commissioner refers to community transport services and I accept that these have an important role, but by their nature they would be unable to significantly reduce the need to travel on the M4, as evidenced by WG's assessments of options to influence local travel planning.
- iii. **Involvement:** The evidence of Mr Matthew Jones (WG 1.1.1) explains the extensive consultation and dialogue with the public and with organisations and communities as part of the process of developing the Plan for the M4 around Newport, leading to the adoption of the Scheme. The Commissioner feels that more could have been done to inform the development of solutions from the start. However, I would point to the M4 Corridor Enhancement Measures (M4CEM) dealt with by Mr Jones and described in Chapter 4 of the Environmental Statement (Doc 2.3.2), which began with a programme to identify measures in consultation with the public, stakeholders and councillors. Extensive consultation continued through the subsequent stages leading to the conclusion that a new high quality road to the south of Newport was the option that would best meet the objectives and address the identified problems associated with the M4. The Climate Change Commission for Wales in a report published in June 2012 entitled '*Position Paper on Transport & Climate Change in Wales*' cited the M4CEM process as a good example of stakeholder engagement. The objection from Magor and Undy Community Council (OBJ9314) makes a number of reasoned arguments but lack of involvement is

not one of them. A comprehensive response was sent by Mr Jones on behalf of the Welsh Government on 7 September 2016³. As I explain in my proof (WG 1.23.1, para 39), there will be opposing views on a major project such as this; there is both considerable opposition to and support for the Scheme. But opposition does not imply that the decision to adopt the Plan for the M4 around Newport failed to adhere to the sustainable development principle in terms of involving a diversity of the population.

- iv. **Collaboration:** The Commissioner refers to evidence submitted to the City Deal Growth and Competitiveness Commission to the effect that the Cardiff Capital Region lacks connectivity between places within its borders. The Welsh Government recognises the important role that the Metro will play in improving connectivity. Mr Matthew Jones refers (WG 1.1.1, para 9.3) to the Welsh Government report '*Rolling out our Metro*' in November 2015, which makes the complementary nature of the Metro and the M4 Scheme clear, but their roles are different. The former will improve internal connectivity within the City Region whereas the Scheme would improve access beyond the borders of Wales and internationally, whilst at the same time linking with the Metro to create an integrated transport system.
- v. **Prevention:** With regard to air pollution, the Scheme would significantly improve air quality for many people, as explained in the evidence on Dr Michael Bull (WG 1.12.1) and in my proof (WG 1.23.1, paras 119-121). I fully agree that land-use planning has a major role to play. Indeed I would argue that the planning system is potentially one of the most important tools available to the Welsh Government to tackle climate change and greenhouse gas emissions, which is fully recognised by the policies in Planning Policy Wales. The relationship of the Scheme to these policies is considered at length in paragraphs 61-216 of my proof (WG 1.23.1).

³ See <http://m4-newport.persona-pi.com/rebuttals>

3. As a consequence the evidence presented by the Welsh Government demonstrates that the process of selecting the Scheme is in line with the sustainable development principle. Paragraphs 213-216 of my proof consider the Scheme in the light of the sustainability objectives in Planning Policy Wales, concluding that it would meet all of these and hence would also contribute to the well-being goals of the WFG Act. The Welsh Government's evidence hence deals with all aspects of that Act and properly reflects the requirements of the WFG Act.

2.3.3. Response to **Point 27** (Requires evidence that the five ways of working have been applied at the outset of the decision making process rather than being retrofitted to justify a decision already taken):

1. The five ways of working make up the sustainable development principle in section 5(2) of the Well-being of Future Generations (Wales) Act 2015 (WFG Act). However, the consultation document on the draft Plan for the M4 Corridor around Newport (Doc 4.4.1) was published on 23 September 2013, whereas the WFG Act did not receive Royal Assent until 29 April 2015. It is therefore self-evident that the working practices and decision processes of the Welsh Government at the time of the development of the draft Plan were moulded by a different legislative and policy framework than that put in place by the WFG Act.
2. Nonetheless, as set out in paragraphs 26-32 of my proof (WG 1.23.1), the legislative duties imposed on the Welsh Ministers by the Government of Wales Act at the time of the development of the draft Plan included the promotion of sustainable development. Consequently, the working practices of the Welsh Government had evolved in accordance with sustainable development principles and, in the case of transport schemes, this manifested itself through the use of the Welsh Transport Planning Appraisal Guidance (WeITAG).
3. It would be fundamentally wrong to find fault with a decision making process simply on the basis that it failed to adhere to a legislative framework introduced at a later date that did not exist at the time of the original decision. In the event, such an allegation of the process followed by the Welsh Government in developing the Plan for M4 Corridor around Newport cannot be supported. I have examined that process against the

five ways of working in paragraphs 35-44 of my proof, demonstrating that the Welsh Government did act in accordance with the sustainable development principle. To describe that as 'retrofitting' is incorrect as I have simply considered the Welsh Government's actions in the light of the five ways of working that have now been defined in the WFG Act. It should not surprise anyone that the Government did act in accordance with the current definition of the sustainable development principle bearing in mind the duty imposed on the Welsh Ministers by the Government of Wales Act 2006.

2.3.4. Response to **Point 28** (States that further consideration should show how the scheme is helping to address other long-term challenges such as climate change by reducing emissions and impacts):

1. The evidence of Mr Tim Chapman (WG 1.13.1) demonstrates that a full and rigorous analysis of future carbon based on detailed traffic modelling, including the assessment of congestion effects, has been undertaken. The Scheme would not lead to an increase in total emissions but a small reduction in annual user carbon emissions in both the opening and design years, potentially achieving carbon neutrality by 2072.
2. This reduction in overall greenhouse gas emissions would be in accordance with the last well-being goal of the WFG Act: 'A Globally Responsible Wales'. See also the response to the next issue, Point 32.

2.3.5. Response to **Point 32** (States that the Scheme fails to incorporate the Government's own objectives on Green Growth or the Decarbonisation agenda):

1. The Welsh Government's well-being objectives form the foundation for its 5 year programme, which includes as part of the *United and Connected* strategy the delivery of "an M4 relief road". The Welsh Government's well-being objectives are published in accordance with Section (3)(2)(a) of the WFG Act and are intended to contribute to the well-being goals in Section 4 of that Act. The Scheme for the new section of motorway is hence in line with its well-being objectives, would fulfil the commitment in the 5 year programme and is in accordance with Section (3)(2)(b) of the WFG Act, which requires the Welsh Government to take all reasonable steps to meet its published well-being objectives.

2.3.6. The long-term carbon impacts of the Scheme have been discussed with those in the Welsh Government responsible for Transport Policy so that they can be taken into account in the on-going work on high level transport policy and the setting of carbon reduction targets for Wales. As explained in the evidence of Mr Tim Chapman and in my proof (paragraphs 49-55), the new section of motorway around Newport would be essentially Whole Life Carbon neutral. As such it is part of the necessary backdrop to wider action leading to the decarbonisation of all sectors across Wales, while guarding against the risk of displacement of industrial activity to other countries with less stringent climate policies⁴. By relieving congestion and improving the resilience of the road network, the Scheme would make South East Wales more attractive to industry and to investors. Without the Scheme there is always the risk that businesses and investment could move to other countries that may have less stringent policies on climate change. The Scheme is hence fully in accord with the Government's objectives. Response to **Points 33, 34 and 35** (States that the Scheme does not appear likely to deliver well-being for future generations in Wales, when considered in relation to the goals and ways of working set out in the Act), (Concerns that there is insufficient evidence and inadequate analysis of the actual long term impact of the Scheme as proposed, particularly with regards to critical concerns such as: ecological resilience, economic growth, public health, resource use and ecological footprint and carbon emissions) and (Concerns that the potential risks and harms of the Scheme have been understated, while the potential benefits are both narrower than the Act demands and are unlikely to be progressively distributed):

1. The Welsh Government has carried out detailed analysis of all aspects of the Scheme, including its impact on the economy, public health, ecology and carbon emissions. The degree of analysis carried out and presented to the inquiry in the Welsh Government's evidence is well beyond that usually required of a project of this scale, which reflects the seriousness with which the Welsh Government takes its statutory duties, particularly under the WFG Act. Unusually for a road project, this Scheme would achieve reduction of emissions compared with the Do-Minimum scenario,

⁴ See the report to the Welsh Government by the Committee on Climate Change *Advice on the Design of Welsh Carbon Targets* April 2017 (Inquiry Document ID72)

particularly because of the substantial congestion on the current M4 motorway.

2. These three issues relate to the report by the New Economics Foundation Consulting (NEF) referenced by Sophie Howe, which considers how the Scheme “*promotes the intentions of the WFG Act*”. In order to do this the authors have “*constructed a development framework...to help government bodies understand how to apply and make the Act a central tool for proactive sustainability decision-making*”. The report uses this framework to assess the Scheme against the sustainable development principle and the well-being goals.
3. This framework has been devised by NEF Consulting without any apparent input from or consultation with the Welsh Government, although the authors’ stated intention is that it should be of general application to infrastructure projects rather than simply to assess the proposed new section of motorway. It therefore has no formal status in relation to the WFG Act and is not part of the Welsh Government’s statutory guidance on the implementation of the Act, which is set out in SPSF1: Core Guidance (Doc 5.2.4).
4. The second of the key findings of the NEF report misinterprets my views regarding the relationship of the WFG Act to individual projects. I do not suggest that the requirements of the WFG Act should not be applied to individual infrastructure projects. My proof contains an examination of the Scheme against the sustainable development principle and the well-being goals set out in that Act. My point is that every project cannot be expected to contribute in equal measure to every well-being goal. The important consideration is to ensure that the actions of the Welsh Government when taken as a whole contribute across all the goals. This is clear from Section 3 of the WFG Act, which sets out the duties of public bodies; section 3(2)(a) refers to the setting of objectives by a public body, which are to be “*designed to maximise its contribution to achieving each of the well-being goals*”. The NEF report argues that my interpretation is contrary to the intention of the Act, but the relevant consideration is what the Act requires. I note that the third key finding of the NEF report agrees with my interpretation, stating that it would be “*impractical to expect all schemes to cover all aspects of the Act equally*”.

5. Moreover, section 3(2)(b), whilst imposing a duty on the relevant public body to meet the published objectives that are designed to maximise the body's contribution to each of the well-being goals, does not make this duty an absolute one. Instead, the obligation is to take **all reasonable steps** in exercising its functions to meet the objectives which it has set. This provision therefore leaves considerable scope for judgement to the public body as it goes about its work, rather than being prescriptive. Moreover, section 3(4) provides that a public body which exercises functions in relation to the whole of Wales may set objectives relating to Wales or any part of Wales and a similar degree of latitude is granted to more local bodies within Wales, which is not consistent with a reading which requires equal contribution across all objectives from all projects of Government. In this particular case, I note at para 45 of my Proof of Evidence that the WG's well-being objectives were published simultaneously with its Programme for Government, *Taking Wales Forward 2016-21*, the close links between the two being flagged by the Cabinet Secretary. However, the NEF report erroneously interprets the WFG Act in that way by seeking to determine the Scheme's contribution to each element of a detailed breakdown of the well-being goals. Further, the 'development framework' created by the authors of the report against which the Scheme is assessed is built from a series of descriptors derived from the well-being goals in the Act. Where the sustainable development principle and the well-being goals of the WFG Act require guidance regarding interpretation this is provided by the statutory guidance document series '*Shared Purpose: Shared Future*' issued by the Welsh Government. *Planning Policy Wales (PPW)*, which sets out the Welsh Government's national planning policies, contains a detailed breakdown of the sustainable development principle and the well-being goals to assist in planning decisions. There is hence no basis for the framework developed by the authors of the NEF report; the WFG Act should be applied on its merits with regard to the statutory guidance and the advice in PPW where appropriate. This is precisely what I have done in my proof in paragraphs 198-216, where I explain that the Scheme would contribute in some measure to all seven of the well-being goals of the WFG Act.

6. Moreover, the responsibility for developing and publishing well-being objectives is given to each relevant public body, not to NEF. The Welsh Government has, as I have said, developed and published its objectives and these have not been subject to legal challenge. They are therefore authoritative in this regard, as opposed to NEF's framework. Turning to the long-term impact of the Scheme, this is set out at length in the Environmental Statement and its Supplements. The short, medium and long-term impacts of the Scheme are carefully analysed and evaluated, with clear identification of the adverse impacts on the landscape, on cultural heritage, on ecology and on nature conservation. A considerable amount of work has been carried out to analyse the carbon emissions of the Scheme as set out in the Carbon Report in the March 2016 ES and in the subsequent evidence of Mr Tim Chapman. The economic impact of the Scheme is set out in the December 2016 Economic Appraisal and Wider Economic Impact Assessment Reports (Docs 2.4.12 & 2.4.11). Studies of the impact on air quality and noise have shown net benefits and the Health and Equalities Impact Assessment contained in Volume 3, Appendix 5.4 of the March 2016 ES (Doc 2.3.2) considers the influence of the Scheme on public health and well-being in the areas surrounding the new section of motorway (see my proof paragraphs 231-5). The long term impacts of the Scheme have therefore been fully analysed and set out in the ES and its Supplements. The potential risks and harms have not been understated in any way but are explicitly recognised and quantified with the adverse impacts clearly identified. It is argued that the NEF report concludes that potential benefits of the Scheme are narrower than the Act demands and unlikely to be progressively distributed. The WFG Act requires public bodies to take action in accordance with the sustainable development principle aimed at achieving the well-being goals. In my proof and in this rebuttal I have shown that the Welsh Government has followed the sustainable development principle and that the Scheme would contribute in some measure to each of the well-being goals.
7. In support of the argument that benefits would not be progressively distributed the NEF report talks of the Scheme "supporting private car use" but the new section of motorway would also be used by public

transport, by goods vehicles of all sizes, and by those travelling for business purposes. The report states that the travel and labour market benefits of road infrastructure “largely accrue to drivers who are disproportionately white, middle-class and male”. But the problems associated with the existing motorway impact on everyone using the road transport network in this part of Wales, whether directly or indirectly, since modern society depends upon transport infrastructure for the movement of goods and services.

8. I recognise that a substantial number of people do not have access to a car but they also depend upon the road network, either directly for public transport or indirectly for example for the delivery of goods, both to their homes and to shopping centres. Congestion on the road network obstructs the operation of an efficient bus service that runs to time and an unreliable bus service will not persuade car drivers to use public transport. By addressing problems on both the existing M4 and on the local road network the new section of motorway would create the conditions for more reliable public transport, benefiting those without cars, and making it a realistic alternative to the private car. Modern society needs a resilient road network not just for cars but for all sectors to function normally. Roads do not simply perpetuate car dependency; they are not designed simply for cars. They are essential for the movement of people and goods, the delivery of services, and for communication. The Scheme would benefit all parts of society in view of the widespread problems associated with the existing M4 around Newport, particularly when the local network becomes gridlocked.

2.3.7. Response to **Points 43 and 47** (Concerns that the Scheme fails to support low carbon economic growth in Wales by actively discouraging people from low carbon lifestyles which, in transport terms, mean active and public transport), (States that the Well-being of Future Generations Act creates an expectation that the Welsh Government should be working towards the creation of a low carbon transport strategy that matches the aspirations in leading cities and states across the world):

1. The argument that low carbon lifestyles means active travel and public transport appears to preclude building new roads but, as set out in response to the previous issues (Points 33-35), roads are essential to the

proper functioning of all sectors and benefit everyone, not simply those with cars. The Scheme would relieve congestion on the motorway and the local road network, which is used by public transport. A free-flowing, fit for purpose road network contributes to the smooth running of public transport, encouraging people to use it. The National Transport Finance Plan (see my proof paragraph 23) identifies several road schemes, including a new section of motorway south of Newport, and the current 5 year Government programme includes as part of the *United and Connected* strategy the delivery of “an M4 relief road”.

2. There are many other measures that the Welsh Government can take to encourage low carbon lifestyles. It can legislate to encourage and create the conditions for changes to travel modes, such as the Active Travel (Wales) Act 2013, or invest in infrastructure projects such as the South Wales Metro, which is being progressed in parallel with the new section of motorway as part of a long term integrated transport strategy (see my proof paragraph 37).
3. The Scheme is a specific project designed to address the particular problems on the M4 around Newport. It is not the means by which the Welsh Government will deliver a low carbon transport strategy, although it does create the background for that strategy by virtue of the fact that it would be essentially carbon neutral. This Scheme is unusual, if not unique, for a road project because it would reduce carbon emissions. It is also singled out by the extensive analysis undertaken by the Welsh Government, in line with its duties under the WFG Act, in order to demonstrate that the Scheme does meet the requirements of that Act. For these reasons it should be seen as an exemplar for future road projects.
4. The Welsh Government requested the Climate Change Committee to provide independent advice on the setting of emissions targets as required by the Environment (Wales) Act 2016. The Committee’s report, *Advice on the design of Welsh carbon targets*, April 2017 (Inquiry Document ID72) has been presented to the Welsh Government as part of the wider work to set carbon reduction targets for Wales. The proposed Scheme should therefore be seen as part of the wider decarbonisation

strategy for Wales, which is proceeding separately in the full knowledge of the Scheme's implications.

2.3.8. The Welsh Government is working to achieve the well-being goals and deliver a low carbon society in accordance with the 'Prosperous Wales' goal. It has published its well-being objectives, which include '*6. Support the transition to a low carbon and climate resilient society*' and the 5 year Programme for Government is founded on these objectives, thus creating the conditions to achieve the well-being goals. Response to **Point 46** (States that the WelTAG assessment of alternative measures does not sufficiently reflect the current thinking that went into the Well-being of Future Generations Act such as wider impacts on health, culture and communities):

1. The WelTAG process assessed the various options in terms of Welsh Impact Areas corresponding to the three elements of sustainable development policy at the time – the economy, society and the environment. WelTAG was the correct and most appropriate tool to use for the assessment at the time. Whilst thinking may have developed subsequently, it would be wrong to re-visit past decisions simply on this basis, without some indication that these were in some way incorrect. The WelTAG assessment (see Doc 4.5.5) considered social and equality impacts, and included a health impact assessment. A further Health and Equalities Impact Assessment was carried out as part of the March 2016 ES (Doc 2.3.2: Vol 3, App 5.4). No evidence has been presented to suggest that the conclusions of these reports were incorrect.

2.3.9. Response to **Point 48** (States that the Government should set out clearly how this investment will maximise the benefit across the social, economic, environmental and cultural well-being of Wales for current and future generations):

1. See the proof of evidence of Mr Matthew Jones (WG1.1.1) on the general benefits of the Scheme; Mr Bryan Whittaker (WG1.2.1) regarding the traffic benefits; Mr Steve Bussell (WG1.3.1) regarding the economic benefits; and the proof of Mr John Davies (WG1.23.1), with specific reference to paragraphs 213-5 regarding the benefits in respect of the well-being objectives.

2.3.10. The Commissioner suggests that the Welsh Government should set out how investing in the Scheme would “maximise” the benefit, but such an exercise requires a comparison of investments in the different spending sectors for which it is responsible. Decisions on spending priorities and how borrowing capacity should be used are a matter for the Government, not for this Inquiry. Response to **Point 49** (Suggests under the Well-being of Future Generations Act 2015 there is a clear expectation that proposals, including the decision-making process itself, will embed the five ways of working and maximise contribution to all of the seven well-being goals):

1. I deal with the sustainable development principle and the five ways of working in paragraphs 33-44 of my proof (WG 1.23.1), where I demonstrate that the process of selecting the Plan for the M4 Corridor around Newport and the subsequent development of the Scheme to deliver that Plan was in accordance with the five ways of working.
2. With regard to the well-being goals, in paragraph 241 of my proof I point out that it would be impractical for every project or action for which the Welsh Government is responsible to contribute equally to each well-being goal. Section 3 of the Well-being of Future Generations Act 2015 (WFG Act) sets out the duties of public bodies; section 3(2)(a) refers to the setting of objectives by a public body, which are to be “*designed to maximise its contribution to achieving each of the well-being goals*” (my emphasis). It is clear that it is the actions of the public body across all of its functions that must contribute to the achievement of the well-being goals. The Commissioner’s statement appears to accept this in section 4 (page 9) which states that ‘*public bodies are required to maximise their contribution to all seven goals*’. The task of the Welsh Government is to ensure that the way in which it exercises its functions, when taken as a whole, contributes to the achievement of the well-being goals. The Welsh Government’s well-being objectives contribute individually to some, but in most cases not all, of the well-being goals.

2.3.11. Be that as it may, I have demonstrated in my proof (paras 213-216, 241) that the Scheme would contribute to the sustainability objectives in Planning Policy Wales and therefore would contribute to the 7 well-being goals in the 2015 Act. Response to **Point 50** (Suggests the Welsh Government should demonstrate that their proposal is the most sustainable solution in the long

term and that it is the most effective way of maximising the contribution to tackling long term intergenerational challenges such as climate change and the shift to a low carbon economy, poverty and ill health):

1. The issue as posed by the Commissioner does not acknowledge the wide responsibilities of the Welsh Government and the fact that no single project can be expected to address equally all the intergenerational challenges. The WFG Act requires each public body, as part of its actions in carrying out sustainable development, to set and publish objectives to maximise its contribution to the well-being goals and then to take “*all reasonable steps (in exercising its functions)*” to meet them. As I have explained above, the Act does not impose these requirements on individual projects. Other projects, policies and specific actions taken by the Welsh Government will be more effective than the construction of this new section of motorway in tackling ill health, for example. But this does not imply that this Scheme has any less merit since its main purpose is to address a current transport problem that is having an identifiable adverse impact on the well-being of Wales; it is not designed specifically to address public health. Nonetheless, the Scheme would have significant health benefits in terms of reduced air pollution and overall noise levels.
2. The Scheme would be the most effective way of tackling the problems associated with the M4 motorway around Newport, which if left unresolved would be an issue affecting future generations. The alternative solutions suggested by the Commissioner such as electric vehicles, autonomous vehicles, modal shift, or changes to working patterns will either have an insufficient impact or will take many years to have any meaningful effect. This issue is dealt with in more detail in the response of Mr Bryan Whittaker later in this response.
3. The Scheme is the most effective way of addressing the identified traffic problem and in a manner that contributes to the well-being goals in the WFG Act. As explained previously, the Scheme is unusual for a road scheme because it would reduce user emissions and achieve carbon neutrality. It should be seen as an exemplar for future road schemes in view of the extensive analysis undertaken by the Welsh Government to demonstrate that the Scheme meets the requirements of the WFG Act.

2.3.12. Response to **Points 51 and 52** (Suggests that the proposed scheme does not appropriately apply the principle of taking decisions in a way which meets today's need without compromising the ability of future generations to meet their own needs), (Suggests the Scheme does not adequately take into account future trends, it is not a good example of how the five ways of working (sustainable development principle) should be applied and the case for investing in this scheme from the perspective of future generations has not been made):

1. In order to deal with Point 51 it is necessary to look at the requirements of the WFG Act. Section 2 defines sustainable development as
the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals.
2. Section 3 of the WFG Act requires each public body to carry out sustainable development.
3. Sections 2 and 3 of the Act together stipulate that each public body must, first, take action in accordance with the sustainable development principle and, second, that such action must be aimed at achieving the well-being goals, which are defined in Section 4 of the Act.
4. Section 5(1) defines doing something in accordance with the sustainable development principle as acting -
in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs.
5. The Act hence recognises that development must take place in the present day to satisfy the needs of today's society, but that the form of that development should not preclude choices for future generations.
6. The tests to determine whether development is sustainable are therefore two-fold. First, has action been taken in accordance with the sustainable development principle and, second, does that action contribute to achievement of the well-being goals?

7. Section 5(2) sets out five ways of working that a public body must take account of in order to act in accordance with the sustainable development principle, which can be summarised as:
- Thinking long term
 - Taking an integrated approach
 - Involving a diversity of population
 - Working in a collaborative way
 - Understanding and prevention.
8. In paragraphs 33-44 of my proof I have analysed the Welsh Government's actions leading to its decision to adopt the Plan for the M4 Corridor around Newport and found that these did accord with the sustainable development principle. The Commissioner points out that the WFG Act is intended to change the way public bodies work, including the Welsh Government. Indeed, the Foreword to the Welsh Government's well-being objectives states that using the Act effectively means doing things differently. But it should come as no surprise that I have found the actions of the Welsh Government were in accord with the sustainable development principle bearing in mind the duty imposed on Welsh Ministers by the Government of Wales Act 2006. As well as defining sustainable development the WFG Act now imposes the duty that has moulded the actions of the Welsh Government since devolution on every other public body in Wales, requiring them also to promote and carry out sustainable development.
9. In paragraphs 213-5 of my proof of evidence I also explain how the new section of motorway would contribute to achievement of the well-being goals in the WFG Act. Examining the new section of motorway against the sustainable development principle and the well-being goals is described by the Commissioner as retrofitting, but this description is incorrect for two particular reasons. First, as the work was done prior to the WFG Act coming into force any examination against the Act must be retrospective. Second, I have simply examined the work that was done and compared it with the terms of the Act; I have not put a gloss on any of that work or made it 'fit' the duties and goals of the Act. I am therefore

satisfied that in developing the Scheme for the M4 Motorway around Newport the Welsh Government has acted in accordance with the letter and principle of the sustainable development principle in the WFG Act. The benefits of the Scheme provide a compelling case that outweighs the cumulative conflicts with planning policy (see my proof paragraphs 237-249).

10. The on-going development of the Scheme also demonstrates how the sustainable development principle as defined in the WFG Act is now being incorporated in the Welsh Government's ways of working. As explained in the response to Points 18, 19 and 20 (paragraph 2.3.1 above) the proposals to address the issues relating to Newport Docks demonstrate how the Welsh Government is thinking long-term, taking an integrated approach and acting in a collaborative manner by taking into account its objectives for the Scheme, ABP's objective to ensure the operation of the Docks, and UK and Welsh Government policies to secure the future of port facilities. The Welsh Government's actions demonstrate how it continues to work in accordance with the sustainable development principle to deliver projects necessary to the well-being of the people of Wales.
11. Turning to **Point 52**, the Commissioner has put forward a number of trends in technology and automation that will undoubtedly change the way we travel in the future. The evidence presented by Mr Bryan Whittaker (WG1.2.1) has confirmed that the assessment for and modelling of the Scheme has taken future trends into account to the appropriate and correct extent, as required by national policy for transport schemes of this nature. The changes in technology that in time will influence and change the way we travel will not address a problem that exists today; that problem will become even more intolerable by the time such changes have any meaningful effect. See also the evidence of Mr Whittaker later in this response.
12. The last part of the sustainable development principle is "*deploying resources to prevent problems occurring or getting worse*". Investing in the construction of the proposed new section of motorway is entirely in line with this fundamental sustainable development principle of acting today to solve the identified problem. Without such investment the Welsh

Government would simply be leaving the problems associated with the M4 motorway to be addressed by future generations, which would conflict with its duties and obligations under the WFG Act.

2.3.13. I confirm that the statement of truth and professional obligations to the inquiry from my main proof still applies.

2.4. Bryan Whittaker (Traffic)

2.4.1. Response to **Point 21** (States that many progressive cities are taking action against vehicles. Financial (and spatial) investment in public transport, cycling and walking infrastructure has led to a modal shift of between 40 and 70% in many cities in the Netherlands. Flexible working will lead to productivity and efficiency savings, a reduced carbon footprint, and employee wellbeing. There is a developing trend in office hubs between home and the workplace. There is an opportunity for transport and its infrastructure to adapt to meet future flexible working needs. Sufficient evidence now exists to have confidence that soft factor interventions can have a significant effect on individual travel choices. For example, workplace travel plans can typically reduce commuter car driving by between 10% and 30%):

1. Financial and spatial investment in public transport, cycling and walking infrastructure can and does in certain situations lead to mode shift, however the scale of effect is not transferable between cities and towns and counties. The scale of mode shift is dependent on how the barriers to alternatives to car travel can be removed or minimised and vary significantly between locations and individual cities. In relation to public transport there are a number of barriers perceived by the travelling public and there are three main factors to consider. Firstly, there are the 'hard factors', such as costs, time, reliability, car ownership, secondly the 'soft factors' such as information, comfort and effort required. Finally, there are the 'complementary factors' including non-transport influences, time budgets, need to convey others and the weather. It has generally been found that travel to and from work and education have more constraints than journeys for other reasons. This was mainly due to work times or the need to use a car for work purposes. In terms of identified barriers to the active modes of walking and cycling, these are generally related to distance and time, weather, capacity to undertake other tasks such as

carrying shopping, safety, infrastructure, end of trip facilities, personal factors such as health, socio-economics, status, household access to cars and bikes. In the Netherlands, people walk or cycle in almost half of all trips undertaken. In terms of the use of these 'active modes' collectively, the Netherlands rank second in the world, behind only Switzerland, where people walk very frequently. Compared to other countries, Dutch people walk infrequently, but the Dutch cycle much more than people in other countries. It is recognized in the Dutch Ministry of Infrastructure and the Environment Report on Cycling and Walking that whilst a significant portion of the Dutch population can indeed reach many local amenities by bicycle it is a stark contrast to the situation in Great Britain. Recent insights into the effectiveness of Dutch cycling policy reveal that while major successes have been achieved in many areas in the city, in order to fully promote bicycle use more must be done than merely constructing cycling infrastructure: the governance and implementation strategies are also important, as well as the necessary education programs and campaigns. Significant mode shift has been observed in cities in the Netherlands which primarily apply to cross city movements and cannot be related to strategic movements.

2. The two-way NTS table for Main Mode of Travel for England 2015 below shows that the bicycle main mode share across all ages is 1.9% and that the biggest mode share lies with the 1-2 mile trip length. Whilst there is no direct comparable evidence for Wales, it would be unreasonable to assume that there is any significant difference to that of England.

Two-Way NTS Table for Main Mode of Travel for England 2015

trip length	[A] cycle mode share (NTS)	[B] impact if cycling were doubled = $(1 - 2x[A]) / (1 - [A])$	[C] trip length distribution Brynglas tunnels	[D] share of current traffic if cycling were doubled = $[C] \times [B]$	reduction = $[C] - [D]$
Under 1 mile	1.72%	0.9825	0.00%	0.00%	0.00%
1 to under 2 miles	2.70%	0.9722	0.00%	0.00%	0.00%
2 to under 5 miles	2.45%	0.9749	1.12%	1.09%	0.03%
5 to under 10 miles	1.42%	0.9856	6.78%	6.69%	0.10%
10 to under 25 miles	0.85%	0.9914	16.26%	16.12%	0.14%
25 to under 50 miles	0.08%	0.9992	22.11%	22.10%	0.02%
more than 50 miles	0.02%	0.9998	53.72%	53.71%	0.01%

100.00%**99.70%****0.30%**

[In the Table above:

[A] This column provides the current cycle mode share in each trip length band

[B] If cycling was say 5% and doubled to 10%, then trips by each other mode would –other things being equal – reduce by a multiplicative factor of 90%/95%; this column has the impact on car trips of an across-the-board doubling of the cycling mode share from that in Column [A]

[C] A select link analysis from the traffic model gives a trip length distribution for trips through Brynglas Tunnels

[D] This column shows trips for each distance band reduced by the factor in Column [B]

The final column is the % reduction in total trips through Brynglas if cycling trips were doubled from a high starting point of cycle mode share.]

3. Application of the bicycle mode share above (which could be considered conservative) in the light of recent rapid increase in London for example and assuming that it could for instance somehow be doubled in combination with the trip distributions shown above and trip distances for origin – destination pairs corresponding to trips through Brynglas Tunnels in the AM Peak base year traffic would reduce by only 0.3%.
4. The transport model has been developed in accordance with WebTAG guidance which states that future year forecasts should be based on NTEM growth in demand, thereby allowing transport models to be developed on a fully consistent basis. The NTEM7.2 was published on the 1st March 2017 following a systematic review of the key drivers of road demand prompted by criticism of the previous versions of the Departments forecasts. The review concluded that the factors that are customarily highlighted as being key drivers of road demand- incomes, costs and population remain important drivers of recent trends in traffic. But the review also noted that other factors had recently become significant. These other factors include such issues as the increasing concentrations of people living in urban areas, increased costs such as

company car taxation and insurance, capacity constraints and technological developments which allow for homeworking and online shopping.

5. Whilst there is currently little evidence on the impact that certain issues, such as homeworking and online shopping may be having on travel decisions, it is known that most of the recent fall in per car mileage has risen through the decline in the number of trips people are making. The National Travel Survey (NTS) data has shown that the average number of trips has been falling and that there has been a downward trend in trip rates. The two most common journey purposes (shopping and commuting) exhibit a statistically downward trend with reductions of 6% and 10% respectively between 2003 and 2010. However, whilst homeworking has contributed to a reduction in commute trips, there are a number of secondary effects that could limit the overall impact as follows;
 - a) The employee may make other journeys by car during the day e.g. to take children to school or visit the shops, which previously might have been made as part of a linked trip, if he or she has been driving to work.
 - b) Another family member may take advantage of the fact that a car is available for example to drive to work when he or she would previously had taken public transport.
 - c) In the longer term, homeworking could encourage people to live further from their work. The benefit of reduced travel time on homeworking days would be offset (in part or even in whole) by increased travel on days when the employee travelled to work.
6. It is also reasonable to assume that the effect of homeworking would be greater with a small number of employees who homework most of the time than with a greater number of employees who only homework occasionally. In many organisations, however, whilst occasional homeworking may be feasible, the scope for employees to spend most of their time homeworking is likely to be limited.
7. WebTAG unit M5-2 “modelling Smarter Travel choices” does suggest a benchmark value of 18% reduction in car commuting trips from workplace travel plans. The source of this figure is a review carried out by Möser and

Bamberg, who “analysed all the Smarter Choice applications that were reviewed by Cairns et al (2004), along with some more recent cases up to 2005. They provided a critical review of the effects of Smarter Choice measures, using reports of 141 studies in 12 developed countries (of which 93 studies relate to the UK).” WebTAG however notes (in para 1.6, Appendix B of WebTAG unit M5-2) that “It is well known that meta-analysis is likely to overstate the effects because studies with no significant or negative effects are much less likely to be published or to become accessible for retrieval. The effects revealed by Möser and Bamberg are therefore likely to be close to the upper limit in the possible range of impacts.” WebTAG therefore says (para 1.4.3) that “the analyst is encouraged to study any other relevant sources of evaluation evidence”. The ITS Leeds KonSULT database gives some specific examples:

- a) Pharmaceutical company, Kent, 6500 staff, high-cost initiative including staff cash incentives for non-use of parking spaces (£1,000 per space per annum) and provision of £100,000 over five years for improved public bus services – result 9% reduction in car driver commuting.
 - b) Business Park near Heathrow, high-cost initiative (“Development costs for the Transport Plan to date amount to approximately £150,000”. Approximately £850,000 has been spent on two local bus services since 1989 and £2.3 million has been pledged for development of the Heathrow North Station, extensions to bus routes and development of new routes, and an east-west cycle route) – result 4.5% reduction in car commuting
 - c) Nottingham city hospital – measures including charging for parking and resulted in a 13% reduction in car driver commuting.
8. In the ‘Smarter Choices Report’ by UCL, Transport for Quality of Life, The Robert Gordon University and Eco-Logica to the Department of Transport, it was noted that while the individual case studies reported indicate that they have successfully influenced car use in the workplace, the impact on overall levels of commuting was estimated to be a reduction of between 0.7% and 3.3%. It would also be reasonable to assume that the impact of

such schemes would be greater in locations where public transport choices forming an alternative to the car are greater, that is, within the urban area, so that the impact on commuter traffic using the strategic road network is likely to be even lower. Considering that commuter traffic only makes up a proportion of the total traffic using the M4, then it can be concluded that the impact of workplace travel schemes on overall traffic levels on the M4 is likely to be negligible.

2.4.2. Response to **Point 22** (States that rail passenger numbers have increased more rapidly than envisaged, while the rate of growth in total car traffic had showed signs of slowing some time before the recession and oil price spike of the late 2000s. States that the rate of growth has slowed down considerably and to an extent where major new roads (and in particular motorways) cease to be justified on current traffic forecasting grounds):

1. The National Travel Survey (NTS) shows that while, at the aggregate level, the total number of car/van miles driven per person in Great Britain fell by about 7% between 1995/97 and 2012, the mileage on motorways has risen in the same period by 22% after adjusting for the increase in the number of miles of motorway in use. According to recent figures published by the DfT, road traffic in Britain hit a record high in 2016. The estimate of 320.5 billion vehicle miles is 1.2% higher than 2015 and 2% higher than the pre-recession peak in the year ending September 2007. Car traffic increased by 0.7% to a record 249.5 billion vehicle miles, this being 1.3 billion miles more than the pre-recession peak in the year ending September 2007. Traffic levels on motorways and rural 'A' roads increased to new record levels, rising by 2.1% and 2.5% respectively. The latest NTEM 7.2 forecasts a 6.9% growth for motorways in Wales (effectively M4 together with the short section of M48) between 2010 and 2015, and a 4.8% growth on Trunk Roads.
2. The historic observed average daily two-way flows on the M4 together with the traffic growth rates around Newport between 2011 and 2016 are shown below;

MIDAS Traffic Count Location	2011	2012	2013	2014	2015	2016
	Both directions					
Magor - Coldra Jns. 23a-24	77,532	76,703	78,205	77,743	80,374	82,234

Coldra - Caerleon Jns. 24-25	92,766	92,412	94,104	97,030	99,638	101,255
Brynglas Tunnels Jns. 25-26	70,618	72,872	73,706	75,369	78,602	78,919
Malpas - High Cross Jns. 26-27	101,820	103,078	104,229	106,442	111,224	114,900
High Cross - Tredegar Park Jns. 27-28	99,367	101,237	102,454	105,333	109,229	111,569
Tredegar Park - Castleton Jns. 28-29	103,361	104,544	106,145	109,410	114,508	117,848

3. The traffic growth rates are also shown below;

MIDAS Traffic Count Location	2011-12	2012-13	2013-14	2014-15	2015-16	2011-16
	Both directions					
Magor - Coldra Jns. 23a-24	-1.1%	2.0%	-0.6%	3.4%	2.3%	6.1%
Coldra - Caerleon Jns. 24-25	-0.4%	1.8%	3.1%	2.7%	1.6%	9.2%
Brynglas Tunnels Jns. 25-26	3.2%	1.1%	2.3%	4.3%	0.4%	11.8%
Malpas - High Cross Jns. 26-27	1.2%	1.1%	2.1%	4.5%	3.3%	12.8%
High Cross - Tredegar Park Jns. 27-28	1.9%	1.2%	2.8%	3.7%	2.1%	12.3%
Tredegar Park - Castleton Jns. 28-29	1.1%	1.5%	3.1%	4.7%	2.9%	14.0%

4. It can be seen that the growth in traffic on the M4 between Junctions 23a and 29 has exceeded that of the NTEM 7.2 forecasts.

2.4.3. Response to **Point 24** (States that capacity relevant to current projections, combined with potential reduction in demand for travel due to changing work patterns, along with modal shift to other modes of transport, risks the proposed M4 scheme being an out-dated solution. States that there are 6 key new technologies converging on the transport industry; autonomous vehicles, connected vehicles, collaborative consumption, electric vehicles, efficient multimodal networks and new materials and manufacturing technologies. Suggests the lack of consideration of future trends in technology and automation which suggests that this has only been considered after the decision to proceed has been taken):

1. The potential for modal split and multi-modal networks is addressed further in the response to Point 29 below whilst the potential reduction in travel demand due to changing work patterns has been addressed in the response to Point 21 above.

2. The standard forecasts produced by DfT, as noted in my previous response, are revised from time to time as the need arises, using a broad range of evidence and data on travel behaviour and the factors that influence it. The forecasts include the predicted change in the relative cost of fuel (both petrol and diesel), together with the forecast proportions of such vehicles. They also include predictions of the increasing proportion of electric cars in future years.
3. Automated and Connected vehicles technologies are becoming some of the most heavily researched automotive technologies. Autonomous vehicles are those in which operation of the vehicle occurs without direct driver input to control the steering, acceleration, and braking and are designed so that the driver is not expected to constantly monitor the highway while operating in self driving mode. Connected vehicles are vehicles that use any number of different communications technologies with the driver, other drivers on the highway, roadside infrastructure. Connected vehicles have the potential to improve the information available to the driver on road conditions. Their main impact will be to warn of accidents or incidents effecting the chosen route, and the suggestion of alternative routes to bypass the problem (which could have the effect of increasing congestion on the surrounding network where the alternative routes lack the capacity to handle such diversions). The ability of connected vehicles to reduce average congestion conditions is likely to be much more limited.
4. With regard to Autonomous Vehicles (AVs), the DfT commissioned research into their impacts on traffic flow, which was published in May 2016. One of the key conclusions from that research was that there was great potential for substantial improvements in network performance, particularly in high speed, high flow situations.
5. However, there was strong evidence that at low penetrations, any assertive AVs are limited by the behaviour of others, so that vehicles are not able to make use of their enhanced capability. This leads to suggestion of a tipping point – the proportion of enhanced vehicles required before benefits are seen. The research suggests that that this may be between 50% and 75% penetration of AVs. Results for the Strategic Road Network (SRN) peak period indicate improvements in

delay of only 7% for a 50% penetration of AVs, increasing to as high as 40% for a fully automated vehicle fleet.

6. A paper was presented at the 2016 European Transport Conference which summarised the outcome of a 'Delphi' survey conducted amongst leading professionals in the area of autonomous vehicles. The Delphi method is a structured communication technique developed as a systematic, interactive forecasting method which relies on a panel of experts. Delphi is based on the principles that forecasts from a structured group of individuals are more accurate than those from unstructured groups. A total of 45 modelling experts took part. Ten of them were well known academics, 9 worked in Government Agencies and the rest worked in the private sector in different roles, mostly as consultants. They were grouped into 5 regions, the USA and Canada, Western Europe, Australasia, Latin America and the Rest of the World.

7. On the question of when AVs will be available, the mean for all regions was 2023. In response to the question of when AVs would be 10% of the fleet, the mean response was 2032 and 2040 when the percentage of AVs increase to 20%. The mean view arrived at in terms of improvement in capacity, was that a 10% improvement in capacity could be achieved when AV's are 20% of the fleet. Any effect on the M4 is likely to be so far in the future, it that it does not change the need for the scheme.
8. The term 'collaborative consumption' is taken to refer to car sharing, and the potential for such schemes to reduce the overall level of commuting traffic. The 'Smarter Choices Report' notes that data on the effectiveness of car share schemes is often limited, and that a recurring problem in interpretation of their impact is "the (often unknown) degree of car-sharing that has been taking place informally before a scheme is initiated", together with problems in determining the number of non-car drivers participating in such schemes. The relationship between car sharing and other modes is noted as an issue, and the report states that "promoting car sharing may undercut the market for more sustainable means of travel". For example, car sharing schemes may result in a transfer of some trips from bus to car, thus limiting their effect on overall car traffic levels.

2.4.4. Response to **Point 29** (Suggest that the Scheme should demonstrate how the Metro and other public transport measures would reduce demand and analysis of how this could prevent or ease congestion on the M4):

1. Multi-modal modelling has been undertaken, quantifying the journey times by each mode, including the time to get to the station or bus stop or tram stop, the time spent waiting, the time changing between services, the time to get from the station or stop that is the end of the public transport journey to the final destination. And comparing that time and the cost of the fare with the time by car and the perceived cost of petrol. The results of that comparison show that for many journeys, the private car offers a much higher level of service than public transport.

2. The Updated Public Transport Overview (Document 2.4.19) sets out the public transport schemes that have been included in the M4Can Transport Model which comprises of Great Western Route Modernisation Metro Phase 1 comprising of new stations and Valley Lines Electrification. The Overview also provides details of the alternative public transport modelling approach adopted to test the potential impact of upgrades to public transport on demand for travel on the M4 and hence how these changes might affect the case for the M4 Corridor around Newport. These potential upgrades to future public transport that provides a further uplift in the level of public transport investment and services incorporates Great Western Route Modernisation and Metro Phase 1 including new stations, but with Metro Phase 2 Valley Lines Modernisation superseding the Valley Lines Electrification offering a higher level of service provision in terms of journey frequency and times together with Metro Phase 3 comprising of improvements to the Welsh Marches Line in terms of additional services and improvements in journey times. Metro Phase 3 also incorporates proposed improvements in line speeds and the provision of new stations on the Great Western Main Line Relief Services to enable greater use to be made of these routes, together with a strategic Park and Ride site at Llanwern. Due consideration has also been given to the provision of a Newport Bus Rapid Transit, the details of which are contained in the Public Transport Note ID 73 submitted to the Public Inquiry..
3. The combined effect of all the public transport measures results in a mode transfer which represents a significant increase in public transport patronage and it is also recognised that the South Wales Metro will impact a wide range of movements in the region, many of which will be north-south rather than east-west. The results show that the combined effect of the public transport measures is to reduce M4 traffic by a maximum of 6% which does not resolve the problems on the M4 and is consistent with the Welsh Governments position that the M4 proposal and the Metro schemes should be viewed as complementary.

2.4.5. Response to **Point 30** (Suggests that the Welsh Government should consider how community transport could be funded or improved to reduce the need to travel using the existing M4):

1. As noted earlier in the response from Mr John Davies, the role of community transport is in the provision of local access, which is far removed from the role of the motorway network which is aimed at strategic travel. Any improvement in community transport provision will therefore have a negligible impact on the need to travel on the existing M4.

2.4.6. Response to **Point 44** (States that increasing supply in transport induces demand: where it becomes easier to drive, people are more likely to drive):

1. In principle, any change to journey times and costs of travel influences the level of demand for travel as a consequence. Providing new road capacity or service improvements to public transport can elicit a number of responses by travellers, including reassignment, redistribution and modal split. Such a change in behaviour response could result in additional trips and or additional vehicle mileage, which collectively are referred to as 'induced traffic' which recognises that when individuals move house or change jobs, they do so partly through changes in accessibility to the journeys they believe that they are going to make.
2. Conversely, in a 'Do-Minimum' scenario i.e. in the absence of a proposed scheme that provides additional capacity, the effects of forecast growth traffic growth and the subsequent increase in traffic congestion can lead to 'trip suppression' which could manifest itself as modal switching to public transport and or as a reduction in the number, length or frequency of journeys. These responses, as well as redistribution, can lead to reduced vehicle mileage on the road network.

3. Given the major change in the network resulting from the scheme and the re-classification of the existing M4, the transport model has been developed in such a way that it can capture a range of behavioural responses to these changes which include reassignment, the switching of trips between highways and public transport and changes in trip destination. Induced traffic has been accounted for both in the Do-Minimum situation arising from the reduction in Toll Charges across the Severn Crossing and the additional induced traffic arising from the construction of the proposed scheme in the Do-Something. As may be expected, the induced response is significantly higher as a result of the reduction in the toll charge than the induced effect of the proposed scheme.
4. New road capacity relieves congestion which, in turn, reduces travel costs which can result in more traffic. Some of the additional traffic will be reassigned from other roads so relieving them, but it is accepted that there may be some induced traffic. However, this does not simply fill up the additional capacity, but rather a new balance between supply and demand is formed in which there is more traffic than before, but less congestion and thereby making journeys quicker, safer and more reliable. Therefore, induced traffic should not necessarily be interpreted as a negative effect, as users will still benefit from easier access and journeys. The M4CaN model predicts the extent of induced traffic and traffic suppression quantitatively. The results show that average journey times experience a sustained improvement which persist even with higher volumes of traffic in 2037 and 2051 under the Do-Something scenario that is shown in Table 11.1 of my revised Proof of Evidence WG1.2.1 Rev A.
5. I confirm that the statement of truth and professional obligations to the inquiry from my main proof still applies.

2.5. Stephen Bussell (Economics)

2.5.1. Response to **Point 23** (States that the evidence also indicates that impact of road infrastructure on business may not be as great as suggested by many):

1. In 2014, the Department for Transport commissioned a comprehensive review into the issue of transport and its impact on the economy (Transport Investment and Economic Performance: Implications for Project Appraisal, document 6.1.23)⁵. In line with similar reviews undertaken in the past (such as Eddington 2006⁶ and SACTRA 1999⁷) it concluded that transport investment can deliver wider economic benefits beyond the direct benefits accruing to transport users. The review considered empirical evidence on the impact of transport on the economy.
2. TIEP concludes that, *'[studies which look at the effects of specific projects] generally find positive effects of large transport projects on measures of economic performance such as local area employment or GDP, although effects for smaller projects are harder to tease out'*.
3. A number of econometric studies have been successful in identifying a causal relationship between transport and economic performance. For example, the Spatial Economic Research Centre (SERC) in 2012⁸. The SERC study finds 'strong effects' of transport improvements on area employment and on plant counts with a 10% improvement in accessibility leading to an approximately 3% increase in the number of business and employment. SERC conclude that increases in employment are a result of firm entry rather than an increase in the size of existing firms.

⁵ Venables et al (2014). *Transport Investment and economic performance: Implications for project appraisal*

⁶ Eddington (2006). *The Eddington Transport Study*

⁷ Standing Advisory Committee on Trunk Road Assessment (1999). *Transport and the economy*

⁸ Gibbons et al. Spatial Economics Research Centre (2012) *New Road Infrastructure: the Effects on Firms*

4. Other studies have focussed specifically on the linkages between transport and firm location and investment decisions. For example, McQuaid et al (2004) consider the influence of transport on business location decisions⁹. They find that transport improvements are unlikely to cause firms to move but, for firms who are looking for new premises, accessibility is one of the key factors influencing their choice of a new location. Research for the US by Strauss-Kahn and Vives (2009)¹⁰ find that good transport links are one of the main factors attracting office head-quarters to second-tier US cities.
 5. There is also specific evidence linking the performance of the Welsh economy to transport and accessibility. A series of studies which have examined the factors which explain Wales' productivity performance have identified transport and accessibility as contributory factors. Most recently, echoing previous findings, research undertaken by the University of the West of England (UWE) in 2016¹¹ concluded that *'inaccessibility clearly has major impacts on levels of productivity in Wales, including possible remoteness from major markets, specialist suppliers and services, larger pools of skilled labour or contact with other businesses and information sources.'*
- 2.5.2. Response to **Point 31** (States that the Economics Assessments have not taken the wider definition of the goal 'a Prosperous Wales' to encourage a 'skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work' into consideration):
1. Road transport is a means through which people access employment. Home working and use of public transport is not feasible or desirable for everyone. This is reflected in the fact that – according to the 2011 Census – 75% of people in Wales travel to work by car, van or motorbike, and a further 5% travel to work by bus. Modelling of the impact of the scheme on the labour market set out in Section 8.4 of the Revised Wider Economic Impact Assessment Report. This demonstrates that residents of South Wales will be afforded improved access to employment as measured by

⁹ McQuaid et al (2004). *The Importance of transport in business' location decisions.*

¹⁰ Strauss-Khan and Vives (2009). *Why and where do headquarters move?*

¹¹ UWE (2016). *Understanding productivity variations between Wales and England*

the number of jobs that can be accessed by car. Improving labour market access in this way facilitates better matching between skills and jobs.

2. More generally, by improving economic performance and increasing the attractiveness of Wales as a place to do business, the Scheme will generate wealth and help to attract and retain skilled jobs in South Wales.

2.5.3. Response to **Point 36** (States that the Scheme's Economic Appraisal Report forecast that economic growth that will result from improved connectivity by lowering the costs of commuting and thus widening the potential pool of workers for employer can only be substantiated when you are connecting potential workers to existing or potential jobs, and not when there is a more general problem of a lack of available jobs in the area. States that the analysis regarding Objective 4 in the Sustainable Development Proof of Evidence (John Davies) is not supported with evidence; the argument that improved connectivity can resolve the economic difficulties currently facing Wales is incorrect when there is already reasonable provision):

1. As noted above, there is substantial evidence relating to the linkages between transport investments and economic growth and such evidence relates specifically to Wales. The benefits of the Scheme that have been quantified in the Revised Economic Appraisal Report and which are included in the benefit-cost ratio for the Scheme are based on an assumption of fixed land use. In other words, they do not rely on any changes in the level of employment in South Wales. They derive from the fact that existing firms and workers will be more productive as a result of the improvement in traffic conditions and accessibility.
2. However, there is evidence (SERC 2012) which demonstrates that improvements in the road network tend to attract a higher density of employment. In the context of the M4CaN, the creation of two new motorway junctions is likely to attract new business investment to the area and, given the strategic importance of the Scheme, it is reasonable to expect that the new road would improve perceptions of South Wales as a location for investment more generally. In this regard, the Scheme will both improve access to existing jobs and attract new employment.

2.5.4. Response to **Point 37** (Concerns that the route will not open up new employment opportunities; the employment sites that it connects to in South Wales are already accessible through the existing M4):

1. Evidence suggests that businesses place importance on the quality of the transport network when making business decisions (CBI Infrastructure Survey, Strauss-Kahn). Evidence also suggests that new roads lead to higher levels of business formation (SERC 2012). It is also demonstrated from current land use patterns that access to the motorway is important. Evidence presented in the Revised Wider Economic Impact Assessment showed that employment tends to cluster around motorway junctions with eight of the 12 junctions around Cardiff and Newport having over 3,000 jobs within a 1km radius.
2. The Scheme will create two new junctions to the south of Newport and afford greatly improved access to this area by reducing journey times and improving journey time reliability. Already allocated employment sites have the capacity for in the region of 15,000 jobs. It is reasonable to conclude from this that the effect of the Scheme will be to increase demand for these sites regardless of the fact that they can already be physically accessed via the existing trunk road network. Furthermore, it would also be expected that these sites would attract higher quality employment than would otherwise be the case without the Scheme. Sites with good access to the motorway network are more likely to attract firms engaged in trade across the UK or further afield. Such firms tend to be associated with higher productivity and therefore higher wages.

2.5.5. Response to **Point 38** (States that it is unclear how many of the 700 jobs per month over the course of construction are additional as a result of the Scheme, and how many are diffused through the supply chain):

1. The estimate of 700 jobs relates to those people directly employed in the delivery of the Scheme. Further employment effects would be expected as a result of expenditures through the supply chain albeit such effects are more difficult to quantify.

2.5.6. Response to **Point 39** (States that the Scheme should be able to clearly articulate how it could support skills and jobs development in the Newport area, and work with Wales based suppliers to increase the economic impact):

1. Measures are in place which will maximise the potential of the Scheme to support local employment and skills. Targeted recruitment and training requirements have been identified within the works information for the Scheme. As a minimum, the contractor is required to ensure that 12% of the total labour costs related to the employment of new entrant trainees who have an apprenticeship, trainee or employment contract with the contractor or a sub-contractor, and are engaged in a training programme that it accepted by the Welsh Government as being appropriate. The Construction Joint Venture has committed to achieving 20% of labour costs from new entrant trainees. The Construction Joint Venture has also expressed a commitment (so far as it is can according to legislation) to local purchasing policies when possible and appropriate. Barry Woodman provides further information about impacts during construction (WG1.6.1).

2.5.7. Response to **Point 45** (States the Scheme's Economic Appraisal Report claims an unsubstantiated £4,431,000 of monetised greenhouse gas benefits but fails to provide an explanation of how this figure is derived, or where these benefits accrue):

1. Monetised Greenhouse Gas benefits are calculated using the TUBA (Transport User Benefits Assessment) software package. Fuel consumption and carbon emissions are calculated in TUBA based on outputs from the traffic model. Vehicle emissions are calculated based on outputs from the traffic model in relation to vehicle kilometres travelled and average speeds. The parameters applied to calculate changes in fuel consumption and emissions are governed by WebTAG guidance. Similarly, the cost of CO₂e applied is provided in WebTAG and based on values derived by DECC. The result of this assessment is a very slight overall reduction in emissions. More detailed work (set out in the Proof of Evidence of Mr Tim Chapman) provides further evidence that the Scheme will reduce vehicular CO₂ emissions. The monetised greenhouse gas benefits are based outputs of the M4CaN Transport Model (a SATURN model) in respect of changes in vehicle mileage and average speeds. Tim Chapman's analysis of the more sensitive VISSIM modelling – which

takes into account the effect of stop-start traffic conditions, suggests that the monetised assessment of the savings in user carbon are conservative.

2.5.8. I confirm that the statement of truth and professional obligations to the inquiry from my main proof still applies.

2.6. Julia Tindale (Land Use, Community and Recreation)

2.6.1. Response to **Point 40** (Concerns that the Scheme has failed to show how it will support communities with opportunities for residents to connect with each other):

1. Matthew Jones's Proof of Evidence (WG1.1.1) at paragraph 10.14 sets out how measures have been incorporated into the design of the Scheme to help ensure that there would be no significant adverse effects on all travellers, whilst some new lengths of cycleways, bridleways and footpaths seek to encourage non-motorised modes of transport for local journeys. For example, five new public bridleways and one new public footpath would be created, including one providing an off-road link between National Cycle Network Route 4 and Magor. Further information relating to all travellers is provided in the Proof of Evidence of Julia Tindale (WG 1.10.1).

2.6.2. Response to **Point 41** (Concerns that the Scheme will disrupt existing relations by demolishing houses and commercial buildings and replacing land in community use):

1. The effects of the Scheme on settlements and residential properties are assessed in the March 2016 Environmental Statement (Document 2.3.2) Chapter 15 at paragraphs 15.6.15 to 15.6.17. The land used by the community affected by the Scheme includes a strip of Common land on the east bank of the River Ebbw, together with land used for allotments situated to the north of Greenmoor Lane, Magor. Exchange land for the common land affected has been identified in consultation with the Open Spaces Society and included in the Scheme proposals. No objections have been received in regards to the location of the proposed exchange land for the area of Common land affected. Exchange land for the allotments affected by the Scheme has also been identified, in

consultation with Magor and Undy Community Council who confirmed that they were content with the setting for the proposed site.

2.6.3. Response to **Point 42** (States that it is unclear where replacement land will be, and whether it will offer the same or better opportunities for community life):

1. The land used by the community affected by the Scheme includes a strip of Common land on the east bank of the River Ebbw, together with land used for allotments situated to the north of Greenmoor Lane, Magor. Exchange land for the common land affected has been identified in consultation with the Open Spaces Society and included in the Scheme proposals. No objections have been received in regards to the location of the proposed exchange land for the area of Common land affected. Exchange land for the allotments affected by the Scheme has also been identified, in consultation with Magor and Undy Community council who confirmed that they were quite happy with the setting for the proposed site.

2.6.4. I confirm that the statement of truth and professional obligations to the inquiry from my main proof still applies.