September 2016

Submission to the Public Local Inquiry

into the

M4 corridor around Newport

cyfeillion y ddaear cymru

friends of the earth cymru

Summary

We contest the proposed development for the following principal reasons:

- The 'need' argument is based on flawed Transport Planning Objectives dating from 2007 which have been substantially unrevised since that date.
- The 'need' argument is unproven. Outside two hours a day for around 150 days per year, the current motorway copes well with existing traffic flows. Adding reasonable alternatives would suffice until at least 2037.
- The approach of the Welsh Government – 'predict and provide' – has long been discredited as a valid means of transport planning.
- The Welsh Government approach has failed to consider reasonable alternatives (including the 'Blue Route' via the Llanwern steelworks road, and alternatives relating to 'common/complementary measures', 'public transport measures', 'junction closures', and these measures in combination).
- The transport forecast is fundamentally unrealistic and this finding undermines entirely the Welsh Government's rationale for infrastructure development.
- The proposed benefit – a 4-9 minute saving for 6,000 vehicles per day, for 150 or so days per year – is not commensurate to any degree with either the proposed expenditure or the proposed environmental destruction.
- The proposed benefit accrues principally to wealthy white men and *worsens* outcomes for those living in poverty.
- The sustainable development report is not fit for purpose. To conclude that the proposed development is sustainable (principally on the basis of economic benefit) is contrary to the word and spirit of sustainability.
- The economic appraisal is not fit for purpose.
- The Welsh Government's approach of allocating 'medium' noise sensitivity to residential receptors is unique and unwarranted: the Planning Inspectorate, Highways Agency and Transport Scotland routinely classify residential receptors as being of 'high' sensitivity to noise.
- The water pollution analysis is deficient.
- The proposed development is shown by the developer to be unnecessary for the purpose of meeting air quality standards. Under the 'do minimum' scenario, air pollution is within legal limits at all human receptors by the defined opening year of the new highway. Air pollution *is* an ongoing problem in Newport – but it is largely unrelated to the existing M4.

Reasonable alternatives

Friends of the Earth Cymru proposes the following reasonable alternative for consideration by the Public Inquiry:

A package of measures including:

- A set of public transport improvement measures (reducing M4 traffic by 3%)
- Targeted marketing on active travel and sustainable transport (reducing M4 traffic by 11%)
- Electrification of the mainline plus the Metro (reducing M4 traffic by 3%)
- Partial closure of the junction leading to/from the Brynglas tunnels (reducing tunnel traffic by 5%)

This set of proposals would reduce traffic by as much as 22%.

See the 'reasonable alternatives' section for further details

Overview

1. The Welsh Government brushes aside any conception that there is no need for a new motorway with one sentence:
   "The transport related problems on the M4 around Newport are well established and proposed measures aiming to address the problems have been developed and assessed over a period of more than 25 years"[1].

2. However, Friends of the Earth Cymru has consistently challenged this assumption; our arguments have not apparently been rebutted by Welsh Government.

3. A fuller treatise of some of our historical concerns with the 'need' argument is appended at Appendix 1.

Chronology

4. The Welsh Government states that the National Transport Plan (2010):
   "accepted that there was a need urgently to address the transport problems on the M4 and a commitment to this effect was included in the published document"[2].

5. No such commitment is contained in the published document. Nor is urgency apparent in the National Transport Plan. The closest that we can find is:
   "We will… 91. Deliver a package of measures designed to improve the efficiency of the M4 in south-east Wales, including public transport enhancements, making the best possible use of the motorway and improving the resilience of the network"[3].

Transport Planning Objectives

6. One of our principal concerns is that the 'problems' and 'objectives' to be tackled by the proposed development date from 2007 and have not been substantively revisited[4]. The fact that they have not changed[5] is indicative of the Welsh Government's refusal to recognise the changing context of transport.

7. The Welsh Government notes:

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[1] http://gov.wales/docs/det/policy/160310-m4-es-c4-development-alternatives.pdf 4.3.1
[2] http://gov.wales/docs/det/policy/160310-m4-es-c4-development-alternatives.pdf 4.3.19
[3] http://gov.wales/docs/det/publications/100329ntpen.pdf
[4] Notwithstanding the Welsh Government's contention that "In developing the Transport Planning Objectives for this appraisal, the Welsh Government considered and reviewed the problems and objectives identified in earlier work. It was confirmed that the problems remained" and "As a part of this appraisal the Transport Planning Objectives agreed during earlier consultation and engagement exercises were again reviewed. It was considered that the objectives previously considered remained wholly relevant to the M4 around Newport and no changes were made to them" These reviews could not have been thorough or they would not have come to the conclusion that the problems were as they were in 2007 (see, for example, the 'safety' argument).
[5] http://gov.wales/docs/det/policy/160310-m4-es-c4-development-alternatives.pdf 4.3.43

"The Welsh Government, with the help of others, identified 15 goals for the M4 CEM Programme. These goals aim to address the identified transport related problems listed in section 3.2. For clarity goals are referred to as "Transport Planning Objectives" (TPOs) in WelTAG (see Glossary). The 15 goals (listed below) provide a framework in which to appraise the relative performance at a strategic level of the draft Plan, the reasonable alternatives and the Do Minimum scenario"[6].

8. It is important to note that Welsh Government guidance considers it a relevant consideration that: *"Each objective is genuinely needed and does not duplicate or overlap with other objectives"*[7].

9. The Transport Planning Objectives are listed below, along with our assessment of if they are genuinely needed or if they duplicate or overlap with other objectives. We submitted this table as part of our response to the Welsh Government consultation WG 19741 in December 2013.

Objective	**Genuinely needed?**
1. Safer, easier and more reliable travel east-west in South Wales.	Overlap or duplication with objectives 2, 5, 7 and 13
2. Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.	Total duplication with objective 1. By definition, if transport connections are made more reliable east-west in south Wales, the connections within Wales and internationally will be improved
3. More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and strategic journeys around Newport	Overlap with objective 4 (local road network and other transport)
4. Best possible use of the existing M4, local road network and other transport networks	Total overlap with objectives 3 (local road network and other transport) and 5 (existing M4)
5. More reliable journey times along the M4 Corridor	Total overlap with objective 1 (more reliable journey times)
6. Increased level of choice for all people making journeys within the transport Corridor by all modes between Magor and Castleton, commensurate with demand for alternatives	This objective seems unclear. Increased choice of modes? Increased frequency of trains/buses? Increased development of cycling infrastructure?
7. Improved safety on the M4 Corridor between Magor and Castleton.	
8. Improved air quality in areas next to the M4 around Newport	Should be expanded to simply "improved air quality". Seems to exclude air quality around new road infrastructure.
9. Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 Corridor	

[6] http://m4newport.com/assets/issue-m4-sea-environment-report---publication---c2.pdf page 11
[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf page 67

10. Reduced greenhouse gas emissions per vehicle and/or person kilometre.	False objective. The objective should be an absolute reduction in greenhouse gas emissions.
11. Improved travel experience into South Wales along the M4 Corridor.	What does 'travel experience' entail? Spurious and unnecessary.
12. An M4 attractive for strategic journeys that discourages local traffic use.	Some overlap with objective 4
13. Improved traffic management in and around Newport on the M4 Corridor.	Overlap with objective 1
14. Easier access to local key services and residential and commercial centres.	
15. A cultural shift in travel behaviour towards more sustainable choices.	

10. Friends of the Earth Cymru considers that the objectives selected by the Welsh Government are in several cases unclear, suffer from a high degree of overlap and duplication and are therefore unfit for purpose.

11. This overlap means that by providing a high score for one element (more reliable travel, for example), this score is magnified beyond all logical or rational degree. Reliable travel is elevated several-fold more important than greenhouse gas emissions, for example.

12. The outcome of this is that since the very outset, the odds have been stacked in favour of the least sustainable alternative. If the criterion "Best possible use of the existing M4, local road network and other transport networks" overlaps with others – as it clearly does – then highway interventions are at an advantage over non-highway interventions.

The 'need' argument is unproven

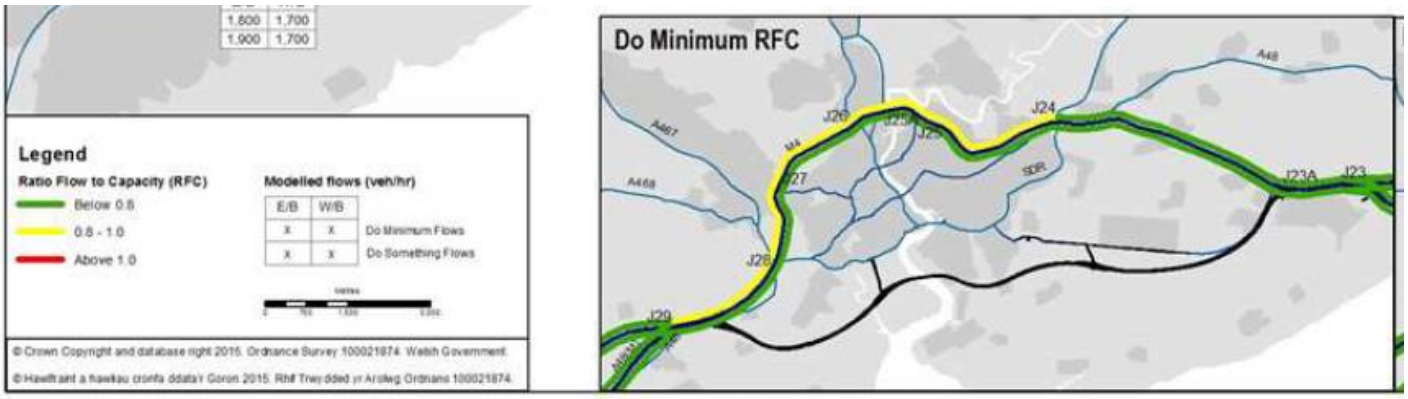


Figure 9.8: 2037 Forecast Inter-Peak Hour Traffic Flows, Core Scenario

13. The Welsh Government forecasts that some eastbound junctions of the M4 would be between 0.8 and 1.0 of capacity by 2037, given central traffic growth forecasts, during daytime non-peak hours (average hour between 10am and 4pm). All other directions and junctions are below 0.8 capacity[8].

[8] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf Traffic forecasting report, page 66

14. During the night-time hours, all junctions in both directions are below 0.8 capacity at all times.

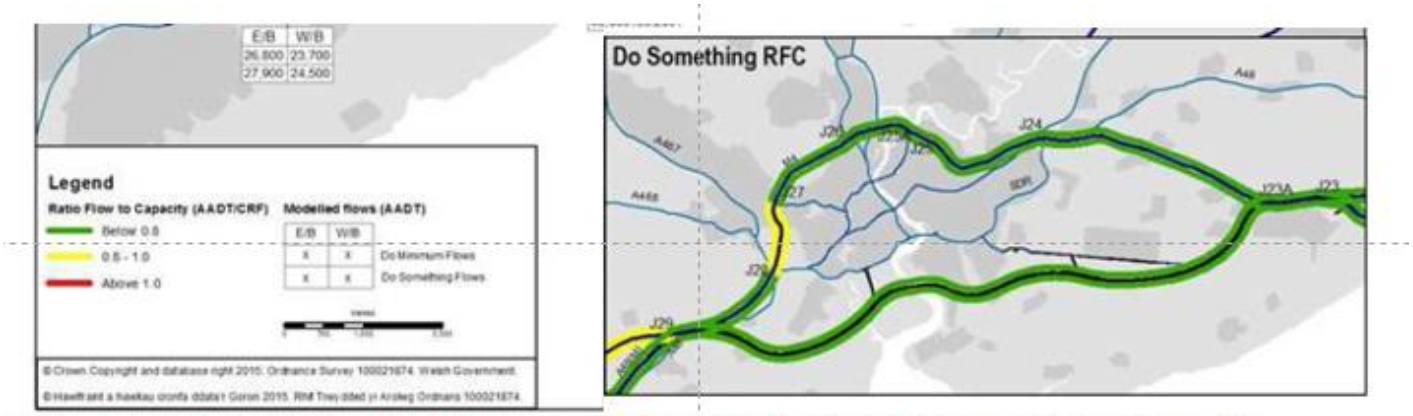
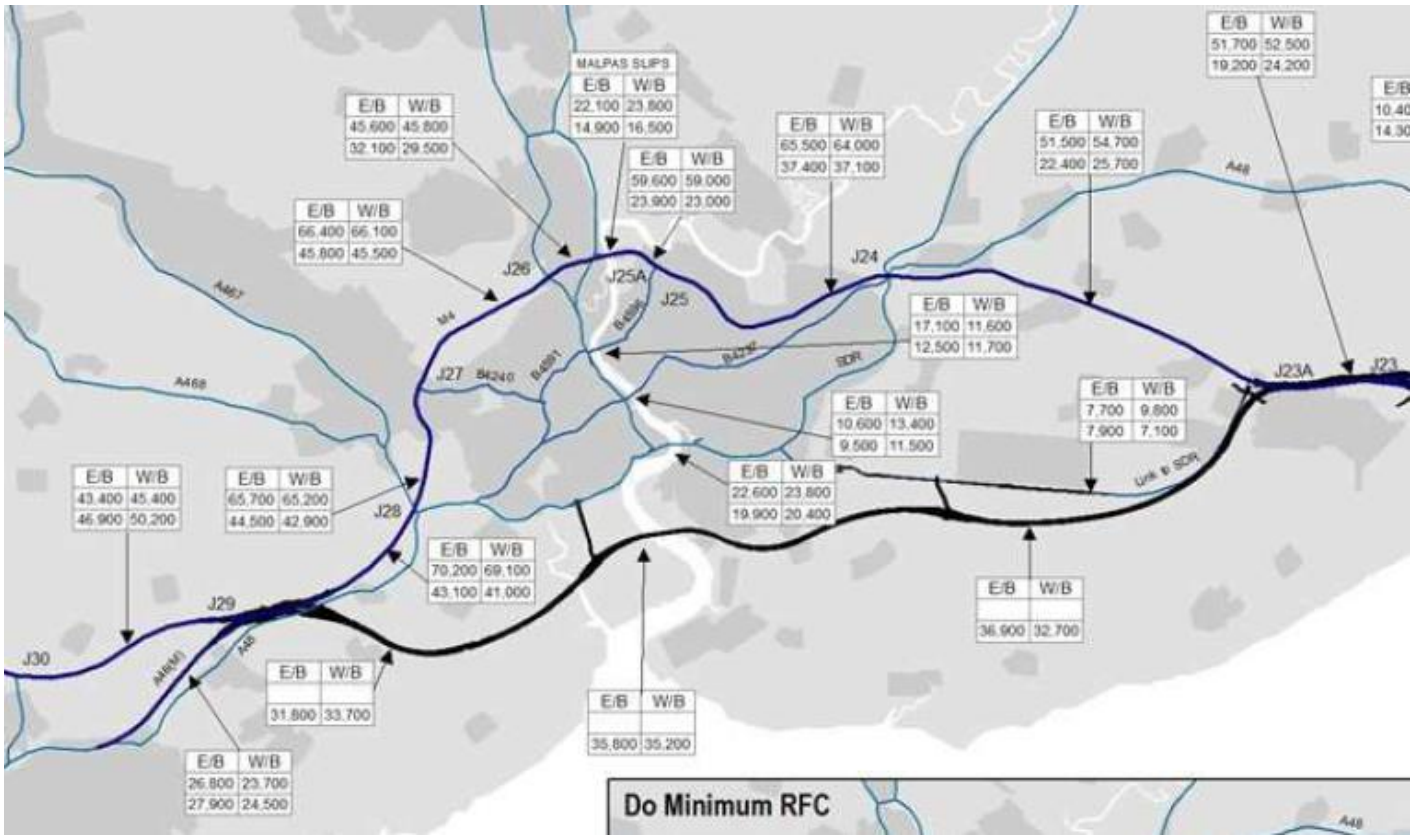


Figure 9.10: 2037 Forecast Annual Average Daily Traffic Flows, Core Scenario

15. But even *with* the new motorway, average annual traffic flows start to creep above 0.8 by 2037. That's because of the realities of 'predict and provide' (see below). Is the new M4 really a long-term solution?

The consequences of 'predict and provide'



16. One thing is certain. Building the new motorway will increase traffic.

Infrastructure option	Average vehicle numbers

Without new M4	60,600
Black Route	34,350
Existing M4 (with Black Route)	35,279
Total 'with Black Route'	69,629

17. In fact, there will be more than 9,000 extra vehicles using the new combined options (Black Route plus existing M4) by 2037 – a 15% increase in traffic over the 'do minimum' alternative.

18. This hardly takes us in the direction of sustainability – even if the route itself were entirely benign. Of course, the Black Route is far from environmentally benign: the route is proposed to take land of 5 SSSIs, with wide-ranging, permanent ecological impacts.

Reasonable alternatives

19. Friends of the Earth Cymru is concerned that the Welsh Government never genuinely explored a package of different measures. The information below was largely submitted to the Welsh Government in our response to the Welsh Government consultation WG 19741 in December 2013.

20. This is despite the Welsh Government guidance that:
"'up the hierarchy' thinking could suggest a wider, and more sustainable, range of alternatives than hitherto considered. Stakeholders may usefully be involved in the generation and assessment of both strategic and more detailed alternatives through consultation. Demonstrating that there are choices to be made is an effective way of engaging stakeholders in the process. The alternatives considered throughout the process must be documented and reasons given on why they are or are not taken forward"[9].

21. The Welsh Government's public transport assessment demonstrated that up to 3% traffic reductions could be realized on the M4 around Newport with a set of public transport improvement measures with a capital cost of £300 million[10].

22. The Welsh Government has also concluded that electrification of the southern Wales mainline and the introduction of the Metro[11] would have a reductive effect of up to 3%[12].

23. The Welsh Government also claimed that encouraging greater use of public transport by local residents could reduce M4 traffic by up to 5%. We find this to be a very low level of ambition. Evidence from WebTAG Unit 5.2 suggests that reductions in car trips for work and school through targeted marketing can range between 8% and 18%[13]. The Planning Inspectorate has previously

[9] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf page 69
[10] http://www.m4cem.com/downloads/reports/Issue%20Public%20Transport%20Overview%2012.03.12%20revised.pdf
[11] http://www.walesonline.co.uk/business/business-news/edwina-hart-gives-backing-south-6225251
[12] http://gov.wales/docs/det/policy/160310-m4-es-c4-development-alternatives.pdf 4.3.46
[13] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010015/TR010015-002708-Examining%20Authority%20Recommendation%20Report.pdf 4.64

indicated that 11% might be a reasonable assumption where local data on the impact of travel planning is limited.

24. The Welsh Government concedes that its estimates are unsecure because there exists: *"Uncertainty as to the success in achieving behavioural changes to result in a modal shift to more sustainable modes of travel"*[14].

25. The Welsh Government has shown that the *partial* closure of just one motorway junction could result in a 5% reduction in peak traffic through the Brynglas Tunnels (widely regarded as the most restricted point on the M4 around Newport)[15].

26. Alternative options that relate to 'common measures', 'public transport measures' and 'junction closures' – particularly in combination – should have been considered but have never received comparable treatment with highway interventions.

27. This is despite these measures – public transport investment and partial closure of one motorway junction – being able to reduce traffic through the Newport area by as much as 22% (as per the combined impact of the above interventions).

28. The Welsh Government also states that in the 'do minimum' scenario, 13% of the traffic on the motorway would be both joining and leaving the M4 between junctions 23 and 29, with a further 36% either leaving or joining during this stretch[16]. There is undoubtedly a portion of this traffic that could be averted through improvements in public transport.

29. Through ignoring this package of sustainable alternatives which could – in the absence of either Blue Route or Black Route – have a traffic reductive effect of 22%, the Welsh Government has foreclosed any alternatives that are not (a) motorways south of Newport, or (b) 'do minimum'. In reality the infrastructure alternatives selected (Black, Red and Purple Routes) were so similar as to be analogous. In the latest iteration of this project there have been no effective choices for stakeholders other than to support or oppose a motorway south of Newport.

30. The Welsh Government's more detailed reasoning for selecting the alternatives was not open to consultation even though its conclusions[17] are based on a highly subjective set of assumptions related to performance of the options appraised, against a suite of transport planning objectives which were themselves not open to consultation.

31. It is the view of Friends of the Earth Cymru that the project is deficient through failing to consider reasonable alternatives (including the 'Blue Route' via the Llanwern steelworks road, and

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[14] http://m4newport.com/assets/issue-m4-sea-environment-report---publication---c2.pdf page 95
[15] http://www.m4cem.com/downloads/reports/M4%20CEM%20Stakeholder%20Workbook.pdf page 33
[16] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 9.5.1
[17] http://www.m4cem.com/downloads/reports/Issue%20M4%20Corridor%20Around%20Newport%20WelTAG%20Appraisal%20Report%20Stage%201%20(Strategy%20Level).pdf pages 49-75

alternatives relating to 'common/complementary measures', 'public transport measures', 'junction closures', and these measures in combination)

32. The Welsh Government's reasoning[18] for not progressing with the 'do minimum' scenario is fundamentally flawed (see Table).

Welsh Government's concerns	**Our response**
Existing problems relating to congestion and capacity on the M4 around Newport would deteriorate further, with flows predicted to exceed 100% of capacity in the future	Welsh Government has no means of measuring congestion. Lack of detail on when capacity would be exceeded. Given Welsh Government's forecasts, we might expect many roads in Wales to need a relief road to run in parallel. Approach runs counter to 'hierarchy of alternatives' (see Appendix 1)
The existing M4 Corridor around Newport has safety issues in some sections, including alignments that fall below current motorway standards, a lack of hard shoulder, frequent junctions and accidents resulting from stop-start conditions. The 'Do-Minimum' scenario results in a range of issues relating to resilience on the M4 Corridor around Newport due to reduced ability of the transport network to respond to incidents, including accidents and other causes of delays.	The existing M4 around Newport is safer than the UK average. We wrote the following in our December 2013 consultation response: "No evidence is provided that the M4 around Newport is unsafe, although the consultation document tries to infer that to be the case. This is despite our previous consultation response that pointed out: 'The Welsh Government's consultants have kindly provided Friends of the Earth Cymru with crash data from 2009 and 2010. These reveal that there were substantially fewer crashes in 2009 and 2010 than in any other year for which information is available (i.e. from 2002 to 2008)… Using the most recent crash statistics we have shown that the junctions under examination are substantially safer than the UK motorway average, and in some cases stunningly so. This is partially conceded in the Appendix to the consultation document. The safety case is therefore unproven'". The Welsh Government's use of crash data going back up to a decade is cause for concern[19].
Congestion is considered a barrier to economic growth, affecting business performance and the wider economy. Congestion also results in higher journey times for commuters, reducing the effective travel to work area. Therefore, increasing congestion resulting from capacity and resilience	The Welsh Government has no means of measuring congestion: "There is no absolute measure of 'congestion'"[20]. The best the Welsh Government can come up with is that the 'do minimum' scenario "could pose a constraint to the economy of South Wales". Equally, multi-billion pound expenditure on one unnecessary scheme could pose a constraint to the economy of South Wales.

[18] http://gov.wales/docs/det/policy/160310-m4-es-c4-development-alternatives.pdf 4.3.82 and Table 4.1
[19] http://www.foe.cymru/cy/m4-safety-stats
[20] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 9.4.2

problems mean that it performs poorly against economic criteria and could pose a constraint to the economy of South Wales.	
The option would not address existing noise and air quality concerns along the M4 (including existing Air Quality Management Areas). Higher traffic volumes on the M4 would contribute to poor air quality and to noise.	Noise: The Welsh Government concludes in the 'do minimum' scenario that a total of 38 residential properties would experience a minor increase in noise by 2037, with 20,628 properties experiencing either no impact or negligible impact. With the scheme, 1,203 receptors suffer a significant increase in noise. Air Quality Management Areas along the M4 in Newport cover a grand total of 8 residential properties. In every case, air quality is modelled to be superior to required standards in both 2022 and 2037 under the 'do minimum' scenario
There would be reduced resilience on the existing M4 due to increased traffic growth. This means that that there would be a reduced ability of the transport network to respond to incidents, including accidents and other causes of delays.	If – as Welsh Government contends – traffic is on an inexorable upwards trend, then the same holds true for every road in Wales.

33. The objective of the SEA Directive is:
"to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development"[21].

34. The Welsh Government's actions undermine this European legislation, because they facilitate significant damaging development by excluding reasonable alternatives that could meet the scheme's objectives without environmental damage of the same scale as the alternatives chosen by the decision-maker.

Transport forecast

35. The factors used:
"do not take account of the level of congestion or other factors (such as traffic restraint measures) which may limit the potential for all the demand to use the network…"[22].

36. This is an obvious flaw in the methodology. The Inspector is invited to ascertain the likely impact of the level of congestion and other factors that limit the potential for all the demand to use the network, and which therefore would have a reductive impact on the projected growth.

[21] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32001L0042:EN:HTML
[22] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 4.2.5

37. In relation to public transport, the Welsh Government claims that:
"There are other potential elements of the metro proposals which include bus rapid transit services, bus lanes and trams within Cardiff itself, but these will not impact on traffic numbers on the M4 to any significant extent and have therefore not been included in the model"[23].

38. However, this is clearly not the case. If improving transport infrastructure benefits econcomic development – which is indeed the whole premise for the benefit-cost analysis and sustainable development sections of the Draft Orders – then we would anticipate improved employment opportunities to arise in Cardiff as a result of these developments. That would mean that people living in and around Cardiff who would otherwise potentially use the M4 to access employment to the east could instead use public transport to access these new opportunities in Cardiff. This would lead to reduced traffic on the M4.

39. The Welsh Government's modelling claims that over the 23-year period from 2014, growth of rail transport will be 10-14%[24]. This appears to be understatement of a degree that is destabilising for the traffic forecast. Over an 18-year period from 1997, growth of station use in the south Wales metro area included:
    - Newport – 86%
    - Cardiff Central – 104%
    - Bridgend – 143%
    - Cathays – 296%
    - Ninian Park – 466%
    - Llanharan – 510%
    - Newbridge – 544%
    - Rogerstone – 855%
    - Trefforest – 945%
    - Cardiff Bay – 1,121%

    Most stations on the network showed a sumptuous increase in use[25].

40. These flaws in the transport modelling needs to be rectified.

41. The Welsh Government states that:
"It is generally accepted that once hourly flows reach about 80% of the theoretical capacity, operational problems can also be expected"[26].

42. We would be grateful for the evidence base for this: 'general acceptance' is not an empirical degree of reference.

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[23] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 7.2.2
[24] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 7.3.3
[25] http://www.bettertransport.org.uk/maps/rail-usage.html
[26] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 9.4.5

43. This is important, because 80% is subsequently used to determine the point at which journey time is negatively affected[27], and which presumably also feeds into the economic analysis.

44. We note that the potential to reduce traffic passing through the Brynglas tunnels by up to 5% through partial junction closure has been ignored in the Welsh Government's assessment:
"The restricted capacity of the Tunnels forms a regular bottleneck on the motorway at peak times, while traffic queuing to leave the motorway at Junctions 26 and 28 frequently extends onto the mainline"[28].

45. We also note that under the scenario of building a new motorway:
"some sections of the existing motorway corridor [would be] likely to experience some traffic congestion even with the new motorway to the south of Newport in place"[29].

46. It would appear that only limited relief is being offered by the provision of a relief road.

47. In 2007, when the WelTAG planning stage workshop took place, an assumption of increasing traffic would not have been irrational. However, data from recent years have shown the assumption of never-ending increases in road traffic to be a fallacy (Figure 1 in this document)[30].

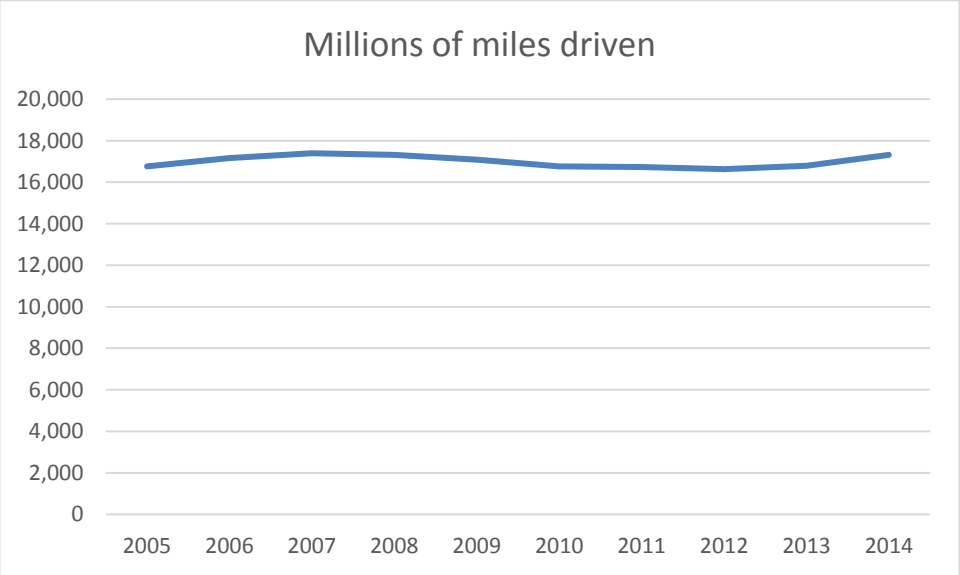

Figure 1. Traffic volumes in Wales, 2000-2014 (million vehicle miles)[31]

48. There was a sequential year-on-year decrease in traffic in Wales for the five years after the peak of traffic in 2007, although those decreases subsequently reversed. Traffic volumes in Wales in 2015 were 1% higher than they were in 2007.

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[27] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 9.4.6
[28] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 9.4.7
[29] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 9.4.10
[30] Department for Transport, 2012, *Motor vehicle traffic (vehicle kilometres) by local authority in Great Britain, annual from 1993*
[31] https://www.gov.uk/government/publications/road-traffic-estimates-in-great-britain-2012 TRA8901.xls

49. The forecast for growth in the Welsh Government's consultation document has already been shown to be in excess of actual flows for 2012 and 2013[32]. The only graph that has ever appeared to give information on year-on-year increases – figure 5 in the draft plan document[33] - suggests that traffic volumes in south-east Wales would be 6% greater in 2015 than they were in 2005.

50. No definition is provided of the south-east Wales local authorities, although the draft plan document refers to the National Transport Plan[34], in which no definition is provided. We are using the authorities that once comprised the South East Wales Transport Alliance: Blaenau Gwent, Bridgend, Caerffili, Cardiff, Merthyr Tudful, Monmouthshire, Newport, Rhondda Cynon Taf, Torfaen and the Vale of Glamorgan.

51. In 2005, total traffic in these authorities was 7,928 million vehicle miles[35]. In 2015, total traffic had increased to 8,319 million vehicle miles, an increase of 4.9%, **or 1.1% lower than the Welsh Government's forecast**. This demonstrates the overestimation inherent in the Welsh Government's forecasts.

52. So the Welsh Government is overestimating the likely road traffic, and severely underestimating growth in public transport use. The combination of both is likely to distort the findings of the transport appraisal.

53. By 2037, the new development offers a maximum journey time saving for travellers on the existing M4 of 4.5 minutes at peak rush hour. Most of this is a result of the more direct routing, rather than any saving from reduced congestion[36].

54. Time saving for travellers using the black route (i.e. travelling the entire distance between Magor and Dyffryn) is up to 9 minutes at peak rush hour in 2037, with the difference of 3 minutes at non-rush hour being essentially due to the shorter alignment of the route.

55. There will be around 35,000 traffic movements each day on the black route by 2037[37]. 65% of these journeys will be 'through trips'[38]. At peak hours, just under 3,000 or so people using the black route every hour[39] will save up to 9 minutes of travel time.

56. So the benefit of up to 9 minutes will be enjoyed by a shade over 6,000 vehicles per day. This is only during weekdays during normal working weeks. The Welsh Government does not include the

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[32] http://www.foe.co.uk/sites/default/files/downloads/m4-blue-route-45610.pdf page 03
[33] http://m4newport.com/assets/issue-m4-draft-plan-consultation-document.pdf page 11
[34] http://wales.gov.uk/docs/det/publications/100329ntpen.pdf
[35] https://www.gov.uk/government/publications/road-traffic-estimates-in-great-britain-2013 TRA8901.xls
[36] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf Traffic forecasting report, page 55
[37] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf Figure 9.10
[38] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 9.5.2
[39] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf Figures 9.7 and 9.9

months of January, February, July, August or December in its analysis[40], presumably because traffic is lighter during these months.

57. A 4-9 minute saving for 6,000 vehicles per day, for 150 or so days per year. This, for the equivalent cost of three brand new, state-of-the-art hospitals.

58. It appears that the Welsh Government is willing to commit massive expenditure and environmental degradation for travel time savings of 3 minutes for people (mainly middle-class employed white men – see below) using the motorway across 20 hours of the day, and of up to 9 minutes for a few thousand people at peak hours across 150 days of the year.

59. This is for the equivalent cost of three brand new, state-of-the-art hospitals[41].

Equality

60. Who benefits, principally, from the 4-9 minute saving? New road infrastructure provides a disproportionate benefit to employed rich white men:
    - Men drive nearly twice as many miles per year as women[42].
    - Poorer people drive much less than richer people[43] (see Table). The bottom 60% of earners drive less than 55% as much as the richest quintile, with the poorest quintile driving less than a quarter of the distance of the richest.
    - White people drive more than people from non-white backgrounds. 18% of people in the 'white' ethnic grouping do not have access to a car; this increases through 'non-white' ethnic groups to 44% of the 'black' ethnic grouping[44].
    - People who have never worked, and people who are long-term unemployed, drive an average of 903 miles per year. This is 16.3%[45] the distance driven by the richest quintile[46].

Income quintile	Distance driven per person per year (miles)	Distance driven as proportion of highest income quintile (%)
Poorest	1,296	23.5
Second level	2,220	40.2
Third level	3,028	54.8
Fourth level	4,355	78.8
Richest	5,526	100.0

[40] http://foe.cymru/news/m4-lies-finally-revealed
[41] http://www.uhb.nhs.uk/new-hospital-partnerships.htm
[42] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243957/nts2012-01.pdf p13
[43] https://www.gov.uk/government/statistical-data-sets/nts07-car-ownership-and-access Table NTS0705, Travel by household income quintile and main mode/mode: England 2013 (no such information is available for Wales)
[44] https://www.gov.uk/government/statistical-data-sets/nts07-car-ownership-and-access Table NTS0707, Adult personal car access and trip rates by ethnic group: England (no such information is available for Wales)
[45] https://www.gov.uk/government/statistical-data-sets/nts07-car-ownership-and-access Table NTS0708, Travel by National Statistics socio-economic classification and main mode or mode: England (no such information is available for Wales)
[46] Acknowledging a small proportion of double-counting because these terms are not mutually exclusive

61. This is hardly surprising: 22.9% of households in Wales have no access to a car or van, with lack of access strongly evident in areas of higher deprivation[47]. Areas within the south-east Wales area (as defined by Welsh Government) above this level of lack of access include:
    - Merthyr Tudful – 29.7%
    - Blaenau Gwent – 29.0%
    - Cardiff – 29.0%
    - Newport – 27.9%
    - Rhondda Cynon Taf – 27.0%
    - Caerffili – 24.4%
    - Torfaen – 23.6%

62. In Wales, economic inactivity is a striking predictor of lack of access to a car or van[48]. 72.3% of those with no access to a car or van are either economically inactive or unemployed.

63. Yet the Welsh Government claims that equality is maintained by investing heavily in new road infrastructure[49].

64. In fact, taking aside middle-class white men, just about every section of society benefits more from investment in public transport and provision for walking and cycling. That means that any plan that disproportionately focuses on road infrastructure is *de facto* promoting an increase in inequality.

65. These multiple failings are all the more puzzling given the Welsh Government's stated intention of establishing
    "stronger Welsh accountability for equality and human rights legislation"[50]

66. An aggravating factor is that the capital expenditure for the motorway – alongside revenue expenditure for maintenance – will erode public spending in other areas. Public expenditure is one of the principal tools available to Welsh Government for poverty reduction – indeed:
    "Tackling poverty is at the heart of our work as a Welsh Government. Tackling poverty is a priority for all Ministers and Welsh Government Departments… This is reflected in the range of targets and work to meet them being taken forward across the Welsh Government. I am pleased to see the breadth and depth of activity, as we can only make a significant impact with this whole-Government approach"[51].

67. Poverty reduction efforts – including expenditure indirectly affecting poverty (health, education and the like) – will be damaged by a significant diversion of funds from beneficial expenditure to expenditure that has not been demonstrated to reduce poverty.

Sustainable development

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[47] http://www.ons.gov.uk/ons/rel/census/2011-census/key-statistics-for-local-authorities-in-england-and-wales/rft-table-ks404ew.xls
[48] https://www.nomisweb.co.uk/census/2011/LC4609EW/view/2092957700?rows=economic_activity&cols=c_carsno
[49] http://wales.gov.uk/docs/det/consultation/ntp/141210-ntp-eia-1-2-en.pdf p8
[50] http://www.equalityhumanrights.com/sites/default/files/documents/Wales/wg_advice_final.pdf p5
[51] http://gov.wales/docs/dsjlg/publications/150701-tackling-poverty-action-plan-2015-en.pdf p2

68. The conclusions reached by the Sustainable Development report are a perversion of the word and spirit of sustainable development.

69. Most organisations define sustainable development through the Brundtland Report[52]:
"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:
    - *The concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and*
    - *The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs"*

70. The Welsh Government refers to the definition used in *One Planet: One Wales*, and to the vision, whereby Wales:
    - lives within its environmental limits, using only its fair share of the earth's resources so that our ecological footprint is reduced to the global average availability of resources, and we are resilient to the impacts of climate change;
    - has healthy, biologically diverse and productive ecosystems that are managed sustainably;
    - has a resilient and sustainable economy that is able to develop whilst stabilising, then reducing, its use of natural resources and reducing its contribution to climate change;
    - has communities which are safe, sustainable and attractive places for people to live and work, where people have access to services, and enjoy good health;
    - is a fair, just and bilingual nation, in which citizens of all ages and backgrounds are empowered to determine their own lives, shape their communities and achieve their full potential[53]

71. On none of these counts can the proposed development be seen to contribute to a greater degree than the 'do minimum' alternative.

72. The Welsh Government goes on to state that WelTAG appraisals:
"form an appraisal against sustainability criteria…"[54]

73. But the claim is made on the basis that WelTAG guidance states it to be so, not because it *is* so. WelTAG only assesses different options against the transport planning objectives – which are discredited in the section "Objectives" in Appendix 1 of this document.

74. So, for example, the sole measurement relating to climate change of the transport planning objectives is:
"reduced greenhouse gas emissions per vehicle and/or person kilometre"[55].

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[52] http://www.un-documents.net/our-common-future.pdf p41
[53] http://gov.wales/docs/det/report/160310-m4-sustainable-development-report.pdf 2.1.3
[54] http://gov.wales/docs/det/report/160310-m4-sustainable-development-report.pdf 3.4.1
[55] http://gov.wales/docs/det/report/160310-m4-sustainable-development-report.pdf 3.3.2

75. But as has been repeatedly pointed out by ourselves and others to the Welsh Government, the climate cares not about the relative efficiency of vehicles, nor miles travelled by people, but by the absolute emissions of greenhouse gases. In which case the transport planning objective should have been “reduced greenhouse gas emissions”.

76. This case alone renders redundant the claim that WelTAG is any form of effective sustainability appraisal.

77. Through separating out public transport measures for separate consideration[56], the Welsh Government also nullified any possibility that public transport measures (alone or in combination with other non-motorway options) could be viewed as an alternative. This, again, demonstrates the Welsh Government’s active exclusion of alternatives that could be genuinely sustainable.

78. The Wellbeing of Future Generations Act requires that decisions are taken in a way that accords with the sustainable development principle. In order to act in that manner, a public authority must take account of:
(a)the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long term effect;
(b)the need to take an integrated approach, by considering how—
(i)the body’s well-being objectives may impact upon each of the well-being goals;
(ii)the body’s well-being objectives impact upon each other or upon other public bodies’ objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another[57].

79. In this case:
    - Things done to meet short term needs will have a detrimental long-term impact (in greenhouse gas emissions and biodiversity loss, for example).
    - Steps taken by the body to secure economic growth are detrimental to meeting other well-being objectives.

80. The report then tries to demonstrate compliance with the Well-Being Goals.

Goal	**Welsh Government’s contention**	**Our response**
Innovative, productive and low carbon society	1. Economic appraisal – good value for money 2. Innovative design 3. Reduced carbon footprint	1. Economic appraisal is flawed – see above 2. ‘Innovative’ refers to the society. There is no way in which a new motorway provides an innovative approach to transport challenges. 3. Carbon emissions will ultimately be higher as a result of the scheme, than they would with the ‘do minimum’ option.

[56] http://gov.wales/docs/det/report/160310-m4-sustainable-development-report.pdf 3.4.3
[57] http://www.legislation.gov.uk/anaw/2015/2/section/5/enacted

Skilled and well-educated population	1. Construction employs people 2. Access created to new development sites	1. Any construction scheme, be it for a hospital, school or motorway, will employ people 2. No evidence that there is a shortage of development sites. Indeed, for sustainable development it is preferable to support struggling *existing* development sites in the valleys
Resilient Wales	1. Minimised environmental impact 2. Reducing greenhouse gas emissions "at the forefront of decision making" 3. Resilient to future climate change	1. Without this scheme, there would be no environmental impact on all the SSSIs, the SPA, the SINCs and other greenfield sites. 2. Reducing greenhouse gas emissions has never been anything other than an afterthought. The scheme will increase greenhouse gas emissions. 3. The scheme ignores sea level rise associated with future climate change (see above)
Healthier Wales	1. Improves air quality 2. Improves noise	1. Air quality improves significantly in the absence of the scheme (see above) 2. Without the scheme, 38 receptors receive minor increased noise. With the scheme, 1,203 receptors receive significantly increased noise 3. The road will induce traffic (i.e. people will drive more because of the extra road capacity). This will have a negative impact on people's health. By 2037, an additional 15,000 traffic movements per day will be induced by the new motorway[58], or a 23% increase in traffic.
More equal Wales	1. No clear pattern of adverse impacts	1. Empirical evidence demonstrates that it is white, male, employed middle-class car drivers who will benefit most from new highway infrastructure. Every marginalised and disadvantaged category will disbenefit because the expenditure will mean reduced public finance for social/health/education expenditure that principally benefits people suffering from disadvantage. The full treatise on this finding is from points 34 to 42 of http://foe.cymru/national-transport-plan-consultation-response
Attractive, safe, viable, well-connected communities	1. Financial compensation for destroyed property 2. Reduced journey times	1. Difficult to see how a new motorway contributes to attractive communities. 2. In the longer term, it is conceivable that the induced demand of the new highway will lead to

[58] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf Figure 9.10: adding the 'do something' flows and comparing to the 'do minimum' flows

		journey times that are the same as, or similar to, current times.
Vibrant culture, thriving Welsh language	1. By supporting tourism in west Wales, the Welsh language is supported	1. By reducing journey times to west Wales, it makes west Wales more desirable as a location for second/holiday homes. This is almost always damaging to communities, culture and the Welsh language.
Globally responsible Wales	1. Better connections to England and Ireland	1. Global responsibility is about taking responsibility for the impacts of activities in Wales on the world. This development, through increasing greenhouse gas emissions, has negative impacts on the world.

81. Many of these sustainability indicators are summed up by the Welsh Government, which describes many of the positive aspects of 'trip suppression' thus:
"…in a 'Do-Minimum' scenario where there is likely to be limited investment in new sections of highway capacity, the effects of forecast traffic growth and the subsequent increase in traffic congestion can lead to "trip suppression" which could manifest itself as peak spreading, modal switching to public transport, and/or a reduction in the number, length or frequency of journeys. These responses, as well as re-distribution, can lead to reduced vehicle kilometreage on the road network"[59].

82. If highly significant, permanent environmental damage can be rendered 'sustainable' via economic cost-benefit analysis then the provisions of sustainability policy and practice are fundamentally and fatally compromised.

Economic appraisal

83. Nowhere in the economic appraisal report is there mention of the discount rate used. Discount rates are absolutely critical in economic appraisal; it is impossible to assess or challenge the veracity of the conclusions reached in the absence of this information.

84. The published "total costs for economic appraisal" explicitly exclude VAT and inflation[60].

85. The published costs also apparently exclude inflation of construction costs. Assuming construction inflation to be 5% per year, and assuming 0% construction completed by end of 2016 and 20% in each of the following five years, we calculate that inflation adds £175 million to the costs presented by the Welsh Government.

86. A highway infrastructure scheme such as this is not exempt from VAT. This adds 20% to the cost.

[59] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 3.4.2
[60] http://gov.wales/docs/det/report/160310-m4-economic-assessment-report.pdf 5.1.2

87. The economic appraisal considers 60-year maintenance costs on the new motorway to be £247 million[61].

88. There is no explanation as to why the expected maintenance costs have reduced by 60% since the economic appraisal of July 2014, which put them at £613 million[62].

89. We have calculated the total cost of the scheme to be in the region of £1.84 billion[63].

90. Providing a realistic analysis of the cost also has profound implications for the Benefit:Cost Ratio. The Welsh Government claims this ratio to be 1.98[64]. However, substituting our costs of £1.84 billion for the Welsh Government's costs of £0.98 billion gives a ratio of 1.05.

91. We further note that the "values of time" consultation[65] referred to by the Welsh Government[66] is likely to recommend a reduction in the reported econcomic benefits of schemes such as this. It is disappointing that an analysis was not conducted by the Welsh Government using the updated values.

92. This is particularly the case given that the traffic forecast report splits 'employer's business' and 'commuting'[67] – one of the main new features of the UK Government's consultation.

93. The economic appraisal 'annualises' different categories of time use of the motorway[68]. However the total hours covered by the appraisal is 5,363. There are 8,760 hours per year – no explanation is given for eliminating these additional 3,397 hours from the appraisal.

94. So the calculation understates the costs (because of construction cost inflation, unexplained reduction in maintenance costs, VAT and the new 'values of time' measures), which has an impact on the conclusions reached.

95. Particularly in the 'low' growth scenario, this is likely to push the appraisal into costing more than purported benefits.

96. Both the economic appraisal and the traffic forecasting model should be re-run using the new proposed 'values of time' as determined by the consultation response[69]. This is because the current values for non-work travel date back to research from 2003, and the data supporting them date from over two decades ago[70].

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[61] http://gov.wales/docs/det/report/160310-m4-economic-assessment-report.pdf 5.2.4
[62] http://www.m4newport.com/assets/weltag-s1-2-report.pdf pp 94-95
[63] http://foe.cymru/sites/default/files/M4%20-%20Reasoning%20Against.pdf
[64] http://gov.wales/docs/det/report/160310-m4-economic-assessment-report.pdf Economic assessment report, page 24
[65] https://www.gov.uk/government/publications/values-of-travel-time-savings-and-reliability-final-reports
[66] http://gov.wales/docs/det/report/160310-m4-economic-assessment-report.pdf 6.1.3
[67] http://gov.wales/docs/det/report/160310-m4-traffic-forecasting.pdf 3.6.1
[68] http://gov.wales/docs/det/report/160310-m4-economic-assessment-report.pdf 6.3.1
[69] https://www.gov.uk/government/publications/values-of-travel-time-savings-and-reliability-final-reports
[70] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470229/vtts-phase-2-report-non-technical-summary-issue-august-2015.pdf p3

97. In addition, the economic appraisal uses figures from the central traffic growth forecast to infer benefits from the scheme. If traffic growth is lower than the central forecast (it is), then the purported benefits of the scheme will be less.

98. For all these reasons the economic appraisal is not fit for purpose.

99. The Inspector is invited to secure from Welsh Government a benefit-cost figure that takes account of both the missing costs and the lower-than-forecast traffic growth.

Noise - general

100. The Welsh Government acknowledges that noise from the existing motorway would be unlikely to increase appreciably in the 'do minimum' scenario:
"Growth on the existing M4 between 2014 and 2037 in the absence of the Scheme is expected to be between 1 and 2% per annum. In terms of the related increase in noise level, this would be minimal (approximately 1 dB) and the increase may also be mitigated, to some extent, by improvements in vehicle technology and legislative requirements, which will tend to reduce the sound contribution from each vehicle"[71].

101. DMRB states that:
"The effect of the speed of vehicles on noise level is one of the most fundamental in the noise prediction process. Above 40 km/hr, noise level increases with the speed of the vehicle and a reduction in speed will normally cause a reduction in noise level. In a similar way, the volume and composition of traffic has a direct influence on the noise level"[72].

102. Existing speed control measures on the M4 motorway around Newport are presumably having a reductive impact on noise.

103. With regards to low noise surfaces, the DMRB states that:
"The principal benefit of low-noise surfaces is the reduction in mid and higher frequencies of noise generated by tyres at speeds in excess of 75 km/hr. They are less effective in reducing noise at low speeds where engine noise particularly from heavy vehicles is more dominant. These surfaces also create a relatively smooth running surface that in some cases can help to eliminate ground borne vibration".

104. As part of the design, the proposed new section of motorway would include a thin surfacing system or similar (such as stone mastic asphalt (SMA)), having relatively good 'low-noise' properties. The principal benefit of low-noise surfaces is the reduction in mid and higher frequencies of noise generated by tyres at speeds in excess of 75 km/hr (approximately 47 mph). This would attain -3.5 dB attenuation of traffic noise as compared to hot rolled asphalt.

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[71] M4 Corridor around Newport Environmental Statement Volume 1: Chapter 13 Noise and Vibration 13.4.8
[72] M4 Corridor around Newport, Environmental Statement Volume 3: Appendix 13.4, Noise and Vibration. Operational Noise and Vibration Assessment 1.2.8

105. Presumably, in order to reduce noise on the existing M4 still further, this type of surfacing could be installed during the next resurfacing event.

106. DMRB states that mitigation measures:
"may include the construction of environmental barriers – the term 'barrier' means any object that interrupts the path of noise transmission between source and receiver/receptor, this includes a close-boarded wooden fence, brick wall, concrete parapet, earth bund, or combination (i.e. earth bund with a fence running along the top or motorway edge safety barriers if solid concrete)...
The potential benefits of mitigation measures vary widely according to circumstances. For example, environmental barriers can provide reductions of 10 dB or more for well-screened locations relatively close to the source"[73].

107. Again, the question arises as to whether or not environmental barriers have been fully utilised on the existing M4 to reduce the noise visited upon sensitive receptors.

Noise – residential receptors

108. We note that the noise sensitivity assessment denoted residential receptors as of 'medium' sensitivity:
"This balances their high importance against their low rarity"[74].

109. We find it difficult to understand the reasoning for this classification, which has significant ramifications. If residential receptors are 'highly important' then their 'low rarity' – whatever meaning that phrase has – is irrelevant to an objective assessment of their sensitivity.

110. It is also inconsistent with decisions on sensitivity made by other jurisdictions. For example, in the Highways Agency's treatment of the M4 junctions 3 to 12 project in March 2015, residential receptors repeatedly received the following acknowledgement:
*"The vast majority of potentially sensitive receptors are residential properties, which are classed as being of **high** sensitivity to road traffic noise"* [emphasis in original][75].

111. Transport Scotland classes residential receptors as follows:
"Residential properties are classed as of high sensitivity [to construction and operational noise of highways]"[76].

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[73] M4 Corridor around Newport, Environmental Statement Volume 3: Appendix 13.4, Noise and Vibration. Operational Noise and Vibration Assessment 1.2.12-13
[74] M4 Corridor around Newport Environmental Statement Volume 1: Chapter 13 Noise and Vibration 13.3.37
[75] http://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010019/2.%20Post-Submission/Application%20Documents/Environmental%20Statement/6-1-ES-Chapters_12-Noise-and-vibration.pdf 12.4.2, 12.7.2, 12.8.2, 12.9.2, 12.10.2, 12.11.2, 12.12.2, 12.13.2
[76] http://www.transport.gov.scot/system/files/uploaded_content/documents/reports/Chapter_12_-_Noise_and_Vibration.pdf 12.2.6

112. The Welsh Government concludes in the 'do minimum' scenario that a total of 38 receptors would experience a minor increase in noise by 2037, with 20,628 receptors experiencing either no impact or negligible impact:
"the magnitude of impact in the absence of the Scheme is considered to range between negligible beneficial and minor adverse, with the majority of receptors experiencing a negligible noise increase, due to general traffic growth in the area"[77].

113. In contrast, with the scheme, 1,203 receptors would experience a significant increase in noise (in some cases as much as 18 dB)[78].

114. Strangely, in the 'additional mitigation' scenario, nearly as many (1,138) receptors would experience a significant increase in noise, but with increases of up to 21 dB[79].

Noise – environmental receptors

115. The Environmental Statement draws the following conclusion in relation to internationally designated sites:
"Since there would be no further physical incursions into the sites, there would be no operational effects on the designated sites per se. *The magnitude of impact on internationally designated sites (International (Very high) value) would thus be No Change and the significance of effect would be Neutral"*[80].

116. However, there is overwhelming peer-reviewed scientific evidence exists that the proximity of traffic to habitats has a deleterious effect on wildlife[81].

117. The direct effect on animal populations of operational roads is described thus:

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[77] M4 Corridor around Newport Environmental Statement Volume 1: Chapter 13 Noise and Vibration 13.8.14-16
[78] M4 Corridor around Newport Environmental Statement Volume 1: Chapter 13 Noise and Vibration 13.8.28
[79] M4 Corridor around Newport Environmental Statement Volume 1: Chapter 13 Noise and Vibration 13.12.6
[80] http://gov.wales/docs/det/policy/160310-m4-es-c10-ecology.pdf 10.9.5
[81] See, for example: http://www.ecologyandsociety.org/vol14/iss1/art29/ "A range of evidence supports an important effect of traffic noise on birds in roadside habitats"
http://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(09)00261-4 "recent studies… document substantial changes in foraging and anti-predator behavior, reproductive success, density and community structure in response to noise"
http://onlinelibrary.wiley.com/doi/10.1111/j.1365-294X.2007.03487.x/abstract "Many bird species are less abundant near highways and studies are becoming available on reduced reproductive success in noisy territories".
http://rspb.royalsocietypublishing.org/content/280/1773/20132290 "We document over a one-quarter decline in bird abundance and almost complete avoidance by some species… suggesting that traffic noise is a major driver of effects of roads on populations of animals".
http://www.dtpli.vic.gov.au/__data/assets/pdf_file/0003/234372/435-Ecological-impacts-of-Road-noise-extract.pdf "Road noise has a variety of ecological impacts, including effects on the physiology, behaviour, communication, reproduction and survival of animals that live in or move through the noise-affected areas.
http://www.sciencedirect.com/science/article/pii/S0006320707003540 "the overall negative effect of traffic on anuran populations in northeastern North America is at least as great as the negative effect of deforestation"
http://www.jstor.org/stable/2404428?origin=crossref&seq=1#page_scan_tab_contents "noise load is probably the most important cause of the reduced densities [of birds]"
http://www.cell.com/current-biology/abstract/S0960-9822(09)01328-1 "noise alone reduces nesting species richness and leads to different avian communities".
http://www.sciencedirect.com/science/article/pii/S0006320708002024 "Because acoustic communication is involved in crucial behaviours, noise pollution can be particularly detrimental in affecting breeding success or survival… Traffic noise triggered a decrease of the males' calling activity, with males being more affected when noise amplitude increased".

"many wildlife species are less common or absent near roads… these road-avoidance zones can extend to more than 1,000m… effectively result[ing] in the loss of a population"[82].

118. The Environmental Statement casually disregards the impact of the new motorway on some existing Sites of Nature Conservation Interest[83]:
"A number of these [SINCs] are already close to the existing M4, A48(M) or M48, or are located within urban areas, and it is unlikely that the operation of the new section of motorway would result in additional disturbance at these sites"[84].

119. However the noise maps in the Orders indicate to the contrary. Although the Welsh Government has not published a single map comparing the operational noise with and without the scheme (2037), we can crudely assess the situation by comparing Figures 4 and 6/8/10, and by use of Figure 15[85].

120. For example, Figure 4 indicates a maximum noise level – in the absence of the scheme – of 60 dB (most likely 55 dB) in the vicinity of Pant-rhiw-goch wood and Coal Pit Lane pond. But *with* the scheme, we see maximum noise levels at these two SINCs of up to at least 75 dB (Figure 6).

121. Scrutiny of these figures clearly shows the expectation of increased noise of:
- Up to 12 dB at Pant-rhiw-goch wood (see Figure 10.3[86] (a, b and c) for location in relation to the proposed development
- Up to 12 dB at Coal Pit Lane pond
- Up to 3 dB at Wilcrick Fort West

122. This increased noise is in relation to the opening year (2022). Noise is anticipated to increase to 2037, worsening the situation for these SINCs.

123. Using the Welsh Government's own classification, the noise impacts at Pant-rhiw-goch and Coal Pit Lane would both be described as "major"[87].

124. These SINCs are ones which have been disregarded by the Welsh Government in cavalier manner as unlikely to suffer "additional disturbance".

125. The Welsh Government confesses:
"No mitigation for noise effects on wildlife is proposed with respect to the operation of the Scheme"[88].

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[82] Chapter 12 of http://link.springer.com/chapter/10.1007%2F1-4020-4504-2_12
[83] http://www.newport.gov.uk/documents/Planning-Documents/LDP-2011-2026/Sites-of-Importance-in-Nature-Conservation-(SINC)-January-2013.pdf
[84] http://gov.wales/docs/det/policy/160310-m4-es-c10-ecology.pdf 10.9.11
[85] M4 Corridor around Newport, Environmental Statement Volume 3: Appendix 13.4, Noise and Vibration. Operational Noise and Vibration Assessment Figures 4,6 and 15
[86] http://gov.wales/docs/det/policy/160310-m4-es-c10-figures.pdf
[87] M4 Corridor around Newport Environmental Statement Volume 1, Chapter 13: Noise and Vibration, 13.3.54
[88] http://gov.wales/docs/det/policy/160310-m4-es-c10-ecology.pdf 10.9.317

126. But even more serious is that for those SINCs which receive consideration of operational impact of the new motorway, noise is not even considered. This is despite the statements that:
"other impacts during operation which may affect ecological receptors include… effects of noise disturbance"[89]
"there are other SINCs within 1 km of the new section of motorway which could be subject to an increase in noise as a result of the operation of the new section of motorway"[90].

127. We should bear in mind that some of these sites will go from being quiet, undeveloped sites to being directly adjacent to, or underneath, the new motorway. These include Afon Ebwy and Marshall's SINC – noise levels projected to be 45-50 dB in 2037 in the absence of the scheme[91] - which are likely to be disrupted by noise levels of anything up to as much as 70 dB if the scheme is completed[92]. The Welsh Government notes:
"The survey showed that the saltmarsh beside the River Ebbw is of particular conservation importance"[93].

128. Otters – a protected species which is present in the Usk and Ebwy – are, according to Transport Scotland:
"likely to suffer disturbance from traffic noise as well as from road lighting during the operational phase"[94]

129. However, in relation to otters, the Welsh Government has concluded that:
"an area of scrub located to the east of the River Ebbw and north of the new section of motorway has previously been identified as a holt site and is of potential value for resting otters. Due to the extent and location of this habitat, the new road is not considered to be of concern with regard to noise or vibration disturbance, should otters chose to use the area during the operational phase"[95].

130. And the Welsh Government's approach of assuming nil importance to traffic noise should be compared with the treatment offered by the Highways Agency:
*"The AONB, four SSSIs and four Local Nature Reserves are classed as being of **high** sensitivity to road traffic noise"* [emphasis in original][96].

131. The Inspector will be advised that we have not had the opportunity to explore every single failure of the Welsh Government to account for operational noise impact on environmental receptors. Suffice to say that the approach is fundamentally flawed and fails to follow good practice already established by both Transport Scotland and the English Department for Transport.

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[89] http://gov.wales/docs/det/policy/160310-m4-es-c10-ecology.pdf 10.9.3
[90] http://gov.wales/docs/det/policy/160310-m4-es-c10-ecology.pdf 10.9.11
[91] See M4 Corridor around Newport, Environmental Statement Volume 3: Appendix 13.4, Noise and Vibration. Operational Noise and Vibration Assessment Figure 4
[92] See M4 Corridor around Newport, Environmental Statement Volume 3: Appendix 13.4, Noise and Vibration. Operational Noise and Vibration Assessment Figure 6
[93] M4 Corridor around Newport, Environmental Statement Volume 1, Chapter 19: Conclusions, 19.8.82
[94] http://www.transport.gov.scot/report/j11223-078.htm
[95] http://gov.wales/docs/det/policy/160310-m4-es-c10-ecology.pdf 10.9.128
[96] http://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010019/2.%20Post-Submission/Application%20Documents/Environmental%20Statement/6-1-ES-Chapters_12-Noise-and-vibration.pdf 12.4.5, 12.7.4, 12.8.4, 12.10.4

Water pollution

132. A number of pollutants are common from road traffic. We expect increased volumes of the following pollutants from increased road traffic: cadmium, chromium, copper, lead, mercury, nickel, oil and grease, PAHs and zinc[97].

133. We have received water chemical monitoring information from Natural Resources Wales covering the three year period 2013-2015.

134. The Ebbw Fawr below Cardiff Road Bridge demonstrates the problem with run-off from relatively busy roads. The exceedences of limit values over the three years 2013-2015 are as follows:

- Oil and grease (visible) – 12
- Copper (filtered) – 9
- Zinc (elemental) – 12
- Phenol odour – 12

135. This demonstrates that water pollution as a result of heavy metals and polyaromatic hydrocarbons – principally arising from vehicular pollution – is a notable problem where roads cross waterways.

136. Given these failures for a road that carries considerably fewer road movements than the proposed new motorway, it is difficult to see how the Welsh Government's assessment concluded that
"all discharges to the affected surface water bodies are predicted to represent acceptable discharges… therefore, no further assessment of operational impacts resulting from the new section of motorway, in terms of routine highway run-off, on WFD water bodies is required"[98].

137. This is particularly the case because the Welsh Government is prepared to deploy only minimal mitigation for operational pollution into the River Ebbw:
"Discharges to the Usk and Ebbw being tidal do not require flood compensation lagoons but will be provided with oil interceptors"[99].

138. It appears that the sole mitigation to the Ebbw for runoff from a motorway carrying 30,000 vehicles a day is oil interceptors.

139. The Water Framework Directive requires all water bodies to achieve good qualitative status by 2015, which includes a requirement for water bodies to be of good chemical quality. If one limit value is exceeded, good ecological status is unattainable.

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[97] https://www.sepa.org.uk/media/163244/vehicle_metals_polycyclic_aromatic_hydrocarbons.pdf
[98] http://gov.wales/docs/det/policy/160310-m4-es-a16-4-water-framework-directive-compliance.pdf 4.2.15
[99] http://gov.wales/docs/det/policy/160310-m4-es-c16-drainage-water-environment.pdf 16.5.8 and 16.8.8

140. Provision of oil interceptors alone is insufficient to secure no deterioration in water quality, or to protect compliance with the Water Framework Directive.

141. We furthermore raise the urgent concern that the report on compliance with the Water Framework Directive has erred and needs revision. Table 1 thereof lists the water bodies directly intersecting the new section of motorway[100]. However, the River Ebbw is only mentioned as being indirectly affected (and then only upstream of Maes-Glas), even though by any standard there is a direct intersection.

142. We note that the indirectly affected portion of the Ebbw is currently failing to meet good chemical status (see above). However, no examination is provided by Welsh Government of the lower Ebbw, until its confluence with the Usk[101]. Likewise, this stretch of river was not even considered from being screened in to the detailed assessment[102].

143. It is critical that the Welsh Government re-assess the construction and operational impacts of the new motorway on the portion of the River Ebbw directly intersecting with it.

144. A plan must be put in place to dispose of reed bed cuttings in the runoff ponds as contaminated waste because of the high level of contamination likely to be absorbed[103].

145. The monitoring proposed of 12 months' duration *"to demonstrate acceptable quality of the water treatment area discharges"* does not appear to be acceptable, since traffic volumes are predicted to increase through 2037.

Air pollution – human receptors

146. By 2020, Defra predicts that in the *absence* of the proposed development, just one part of the South Wales air quality zone will be above the EU's 40µg/m^3 limit value. That location is not substantively affected by the proposed development[104].

147. Welsh Government air pollution modelling shows that:
"pollutant concentrations are below the annual mean NO2 objective in the do-minimum scenario"[105]

148. In fact, in the 'do minimum' scenario, NO_2 pollution is below the mean 40µg/m^3 threshold in all areas other than on the highway itself and within existing Air Quality Management Areas on roads leading to the centre of Newport[106].

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[100] http://gov.wales/docs/det/policy/160310-m4-es-a16-4-water-framework-directive-compliance.pdf 4.1.6
[101] http://gov.wales/docs/det/policy/160310-m4-es-a16-4-water-framework-directive-compliance.pdf 4.3.1
[102] http://gov.wales/docs/det/policy/160310-m4-es-a16-4-water-framework-directive-compliance.pdf 4.4
[103] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291633/scho1209brnz-e-e.pdf p18
[104] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.2.4
[105] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.8.3
[106] Figure 7.12 Environmental Statement

149. The central Newport areas in excess of the pollution threshold are relatively unchanged under the 'do something' scenario.

"Do something"

"Do minimum"

150. Figure 7.12c demonstrates the change in this area to be a reduction of between 0.4 and 2µg/m^3.

151. Monitored air pollution is significantly greater than modelled air pollution[107]. Corrections made (see Appendix 7.1, Diagrams 7.3, 7.4, 7.5, 7.6) don't appear to rectify these sufficiently, particularly in the most polluted (monitored) sites.

152. Appendix 7.2 demonstrates that air quality (NO2) failures take place at the following locations (Table 1). Only two of these locations that exceed air quality standards are close to the M4, and only one of these is within an Air Quality Management Area (that designates protection for people), for one dwelling.

Location[108]	**Mean NO2 concentration (2014) (µg/m3)**	**Current M4 proximity?**	**AQMA?[109]**
Spytty Lane	40.0	No	No
Lamppost Badminton Road	46.6	Yes	No
M4 Junction 25 1	58		
M4 Junction 25 2	56		
High Street Caerleon	43	No	Yes
15 High Street Caerleon	54		
18 High Street Caerleon	49		
9 Castle Street Caerleon	40		
Montgomery Road	71	No	No
Montgomery Road 2	51		
48 Malpas Road	41	No	Yes

[107] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.3.74

[108] M4 Corridor around Newport Environmental Statement Volume 3: Appendix 7.2 Air Quality Baseline Environment

[109] http://www.newport.gov.uk/en/Transport-Streets/Pollution-and-noise-control/Air-quality.aspx

222 Corporation Road	42	No	No
Caerleon Road swift	40	No	Yes
Buckland College	43	Yes	Yes
148 Chepstow Road	46	No	Yes

153. This confirms that air pollution is a problem in urban areas in Newport and is largely unrelated to the M4.

154. Of every household monitored that stands to receive moderate or major benefit as a result of reduced air pollution from the proposed development, 'do minimum' scenario would lead to better air quality in 2022 and 2037 than current (2014) air quality in every single case[110].

155. In every case, the 'do minimum' scenario provides for air quality superior to air quality standards (annual NO_2 levels of 40µg/m^3):
"In 2022, the opening year, no exceedences of any of the air quality objectives for NO2 or PM10 are predicted with or without the Scheme"[111].

156. Finally, the Welsh Government claims that:
"in 2022, without the Scheme in place, annual mean NO2 concentrations along the existing M4 corridor would remain elevated and as such are at risk of exceeding the annual mean NO2 objective, given the uncertainty in modelling"[112].

157. But it is abundantly clear from scrutiny of the maps of Figure 7.12[113] that air quality on parts of the existing M4 corridor will remain elevated *even in the advent of the proposed new motorway*.

158. The conclusion reached – and confirmed by the Welsh Government – is that the proposed development is unnecessary for the purpose of meeting air quality standards.

Air pollution – regional load and environmental receptors

159. The Welsh Government makes great play of a reduction in NOx emissions as a result of the scheme. However, there will be a very significant reduction in regional emissions in the absence of the scheme: from 1,136 tonnes/year in 2014 to 599 tonnes/year in 2022 (a 47% reduction).

160. The total benefit from the scheme in the opening year (a reduction of 190 tonnes of NOx in total, when compared to the 'do minimum' option), is equivalent to 0.8% of Welsh transport emissions – or "not significant" in Welsh Government terms[114].

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[110] M4 Corridor around Newport Environmental Statement: Volume 3 Appendix 7.3 Construction Traffic and Operational Assessment Table 7.3.4
[111] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.8.22
[112] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.8.8
[113] http://gov.wales/docs/det/policy/160310-m4-es-c7-figures.pdf Figure 7.12
[114] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf Table 7.24

161. And the Welsh Government acknowledges the likely impact of the road on encouraging more vehicles onto the road, resulting in *greater* eventual greenhouse gas emissions than in the absence of the scheme:
"However, an increase in CO2 is predicted in the future year likely due to the increase in capacity leading to more vehicles on the road in the future year"[115].

162. Major adverse increases in air pollution (NOx) will result from the proposed development at the following designated sites[116]:
- St. Brides North
- St. Brides South
- Nash and Goldcliff North
- Nash and Goldcliff South
- Whitson North
- Whitson South
- Redwick and Llandevenny
- Redwick and Llandevenny South

163. The Gwent Levels St Brides SSSI will suffer from 30µg/m^3 NO_2 levels where it is at its closest point to the motorway[117].

164. This meets the "critical level" threshold for protection of vegetation as described by the Welsh Government:
"The United Nations Economic Commission for Europe (UNECE) and the World Health Organisation (WHO) have set a critical level for NOx, (30 µg/m^3) for the protection of vegetation. Therefore, the statutory nature conservation agency's (Natural Resources Wales) policy is to apply the 30 µg/m^3 criterion as a benchmark, on a precautionary basis, in internationally designated conservation sites and in nationally designated Sites of Special Scientific Interest (SSSIs) designated for the protection of vegetation"[118].

165. The Gwent Levels St Brides SSSI is so designated:
"The large number of hedgerows add to the diversity of the area and together with the main reen banks provide a habitat for nationally important assemblages of terrestrial invertebrates"[119].

Climate change

166. The consultation documents appear to ignore the potential impact of climate change on sea level rise. For example:
"With currently proposed improvements to the Gwent Levels sea defences, the proposed new section of motorway would not be at risk of tidal flooding up to the year 2030 notwithstanding sea

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[115] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.8.18
[116] M4 Corridor around Newport Environmental Statement: Volume 3 Appendix 7.3 Construction Traffic and Operational Assessment Table 7.3.6
[117] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.8.12
[118] http://gov.wales/docs/det/policy/160310-m4-es-c7-air-quality.pdf 7.2.9
[119] http://naturalresources.wales/media/640899/SSSI_0341_Citation_EN0014d9a.pdf

level rises due to climate change. Continued improvements to sea defences beyond 2030, in line with Welsh Government policy to 'Hold the Line' would ensure that the proposed new section of motorway would remain flood free into the future, notwithstanding sea level rises due to climate change"[120].

167. Serious questions must be asked as to whether or not the proposal is genuinely future-proofed for climate change, particularly in the light of recent studies suggesting both that sea level rise is taking place at a rate significantly more rapid than previously thought likely[121], and that sea level rise of a scale of metres is possible this century[122].

168. The approach taken by the Welsh Government is particularly surprising because elsewhere it appears to recognise the threat caused by climate change to infrastructure:
"From the results, the potentially most significant risks for Wales from climate change to the water environment appear to be… increases in flooding on the coast and inland, affecting people, property and infrastructure"[123].

169. From 2038 onwards, the 'do something' scenario produces more carbon emissions than the 'do minimum' alternative[124]. The climate is impacted by total emissions. This scheme is therefore ultimately more climate-damaging than the 'do minimum' alternative.

170. The carbon report assumes either expenditure of up to £2.3 billion, in order to achieve 'negligible' change in carbon emissions, or zero expenditure. However, climate and expenditure is not a zero-sum game. The £2.3 billion could be spent elsewhere. For example, at a cost of £20,000 per house[125], 115,000 houses in Wales could be made 'nearly zero carbon', saving £500 per year in fuel bills[126], making a £57.5 million cash injection into the Welsh economy annually and saving 286,000 tonnes of carbon dioxide each year[127].

171. The Welsh Government appears not to grasp the scale of the planetary emergency that is facing us in terms of climate change. Expenditure on a project that is carbon-intensive and locks in additional high-carbon modes of transport does not lead us on to the path to a 1.5°C future, nor does it align with our obligations towards future generations.

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120 M4 Corridor around Newport, Environmental Statement Volume 1, Chapter 19: Conclusions, 19.14.8
121 http://www.reuters.com/article/us-climatechange-seas-idUSKBN0KN25520150114
122 https://www.theguardian.com/science/2016/mar/22/sea-level-rise-james-hansen-climate-change-scientist
123 http://gov.wales/docs/det/policy/160310-m4-es-c16-drainage-water-environment.pdf 16.4.98
124 A statement on the carbon report for the proposed M4 scheme, Glynn and Anderson, April 2016
125 http://www.constructionproducts.org.uk/publications/sustainability/low-carbon-domestic-refurbishment-guide/ Assumed cost in 2014 was £25,000 per dwelling, but assuming a substantial saving from scheme roll-out
126 Assuming that £500 of the £700 average bill relates to space heating
127 UK Government assumes average 15,000 kWh gas use per year. Emissions are 0.18445 kgCO2/kWh; total carbon saving (assuming 90% reduction) therefore 286,359 tonnes CO2e.