

**Roadchef**

**Magor Motorway Service Area**

**M4 Corridor Around Newport**

**Mike Axon  
Proof of Evidence  
Transport**

**February 2017**

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# 1 INTRODUCTION

- 1.1 My name is Mike Axon. I have a degree in Civil Engineering from City University, I am a Fellow of the Chartered Institution of Highways and Transportation, and a Member of the Transport Planning Society. I have over 29 years' experience in the design, implementation and assessment of transport schemes in the public and private sectors.
- 1.2 I am a founding Director of Vectos, consultants in traffic and transport, and a Built Environment Expert (BEE) at the Design Council. Prior to that I was a founding Director of Savell Bird & Axon from 1994, and a Director of Projects at Travers Morgan.
- 1.3 The evidence which I have prepared and provide for this Inquiry is true and has been prepared and is given in accordance with the guidance of my professional institution and I confirm that the opinions expressed are true and professional opinions.
- 1.4 My evidence is on behalf of Roadchef. Roadchef operates the Magor Services on the M4, west of the Second Severn Crossing. It objects to the design of the M4 works at their eastern end on grounds that, as a result, Magor Services will no longer be able to properly or effectively perform its role as a Motorway Service Area.
- 1.5 Motorway Service Areas perform an important road safety function. The reduction in the effectiveness of Magor Services will have serious road safety consequences, particularly in respect of accidents related to driver fatigue, which already account for about 20% of motorway accidents, and which have substantially more severe injury consequences than other types of accident.
- 1.6 My evidence is that it is not appropriate for a new modern motorway, designed in part to improve safety, to design in such a poor characteristic, particularly when it is avoidable. I explain that it is avoidable, and that the M4 Corridor design can be improved to incorporate better access to Magor Services.
- 1.7 I have had meetings and shared correspondence with the WG. The WG has chosen to withhold information and drawings that would have been helpful in preparing plans showing improvements to the Corridor design.
- 1.8 Section 2 sets out the purpose of Motorway Service Areas, Section 3 sets the Magor Services context. Section 4 explains the WG proposal. Section 5 describes the Roadchef Scheme, and Section 6 responds to WG comments. Section 7 provides a summary.

## 2 THE IMPORTANCE OF MOTORWAY SERVICE AREAS

### The Purpose of a Motorway

- 2.1 The primary purpose of the motorway network is to facilitate long distance transportation of people and goods.<sup>1</sup> It is to facilitate the safe and effective movement of goods and people in support of economic growth for the benefit of the wider economic needs of the country.<sup>2</sup>

### Driver Fatigue

- 2.2 Driver fatigue (falling asleep at the wheel) is a major cause of road accidents, accounting for up to 20% of serious accidents on motorways and monotonous roads<sup>3</sup>. Sleep related accidents tend to be more severe than other accidents. Research indicates that the number of casualties in sleep related accidents was 50% higher than in all accidents, and sleep accidents had three times as many fatalities and twice as many serious injuries as non sleep related accidents.<sup>4</sup>
- 2.3 Encouraging drivers to take breaks more frequently reduces the number of fatigue related accidents. Drinking caffeine together with taking a rest (or nap) are the only measures that help to reduce sleepiness.<sup>5</sup>

### The Purpose of Motorway Service Areas

- 2.4 Motorway Service Areas perform an essential service to road users.<sup>6</sup> They perform an important road safety function by providing opportunities for the travelling public to stop and take a break in the course of their journey. Government and RoSPA (The Royal Society for the Prevention of Accidents) advice is that motorists should stop and take a break of at least 15 minutes every two hours.<sup>7,8</sup>
- 2.5 The network of service areas has been developed on the premise that opportunities to stop are provided at intervals of approximately half an hour. Highways England in England has

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<sup>1</sup> DfT Circular 01/2008 (superseded) para 14 – **Appendix MA1**

<sup>2</sup> DfT Circular 02/2013 paras 37, 38 – Core Document 6.1.16

<sup>3</sup> Driver Fatigue and Road Accidents (Feb 2001) para 1.1; Driver Fatigue and Road Accidents (June 2011) – **Appendix MA1**

<sup>4</sup> Driver Fatigue and Road Accidents (Feb 2001) para 4.6.3

<sup>5</sup> Driver Fatigue and Road Accidents (Feb 2001) para 10.4

<sup>6</sup> DfT Circular 01/2008 (superseded) para 14

<sup>7</sup> DfT Circular 02/2013 para B4

<sup>8</sup> Driver Fatigue and Road Accidents (Feb 2001) para 10.5

interpreted this to mean that the maximum distance between motorway service areas should be no more than 28 miles, and can be shorter.<sup>9</sup>

2.6 The DfT considers Motorway Service areas sufficiently important to require a minimum range of facilities, which include<sup>10</sup>:

- Open 24 hours a day, 365 days a year
- Free parking for up to two hours minimum
- Free toilets and hand washing facilities
- Fuel
- Hot drinks and hot food available at all opening hours

2.7 The DfT in England prefers on line service areas (service areas accessed directly by slip roads from the motorway) because they are more accessible and as a result are more attractive and conducive to encouraging drivers to stop and take a break.<sup>11</sup>

2.8 So, it is reasonable to conclude that making service areas attractive and conducive to encouraging drivers to stop and take a break is vital in managing the significant safety risks associated with driver fatigue.

2.9 Therefore, Motorway Service Areas perform an important role in protecting the safety of travellers on the long distance and strategic road network. To fulfil that function, it is important that they are practically and attractively accessible from that network.

## **The Psychology of Decision Making**

2.10 People make decisions based on their perception of how easy or how hard something is. Perceptions are relevant because the choice process depends on how attributes are filtered through the belief systems of each person<sup>12</sup>.

2.11 The perceptions are not mathematically accurate. Perceptions of, for instance, time, distance, reliability and interruptions, are often not the same as the actual.

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<sup>9</sup> DfT Circular 02/2013 para B6

<sup>10</sup> DfT Circular 02/2013 Table B1, page 17

<sup>11</sup> DfT Circular 02/2013 para B13

<sup>12</sup> A New Vision on European Mobility, MIND-SETS Deliverable 2.1a – **Appendix MA1**

- 2.12 Many contextual factors influence decision making. Habits, social aspects, past experiences, specific and life pressures, and many more all play a part.
- 2.13 A premise of behavioural economics is that, because the world is complex, people use rules of thumb to make decisions, rather than optimising each decision based on perfect information.
- 2.14 This is all reflected in the DfT's position on online vs direct junction motorway service areas, where despite times and distances associated with access and egress being relatively small in the context of the overall journey, the tendency to choose to stop is markedly different. It is why it is not just time and distance that matters when making forecasts about the propensity of drivers to be attracted to a motorway service area.

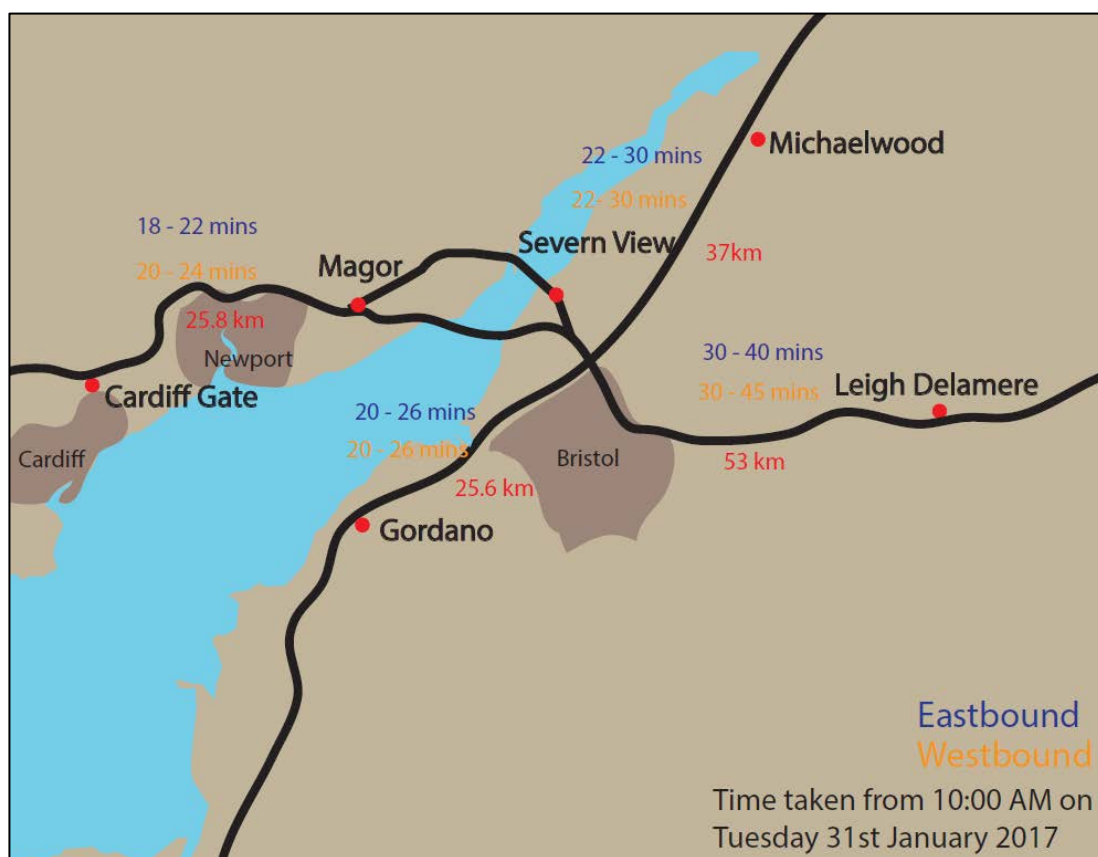
### 3 MAGOR SERVICES

- 3.1 Magor Services performs an essential role, providing necessary rest facilities as part of a network of motorway service areas designed to minimise driver fatigue and maintain a safe motorway environment. The photo below shows Magor Services, looking south east towards Magor, with the M4 Junction 23A on the right.

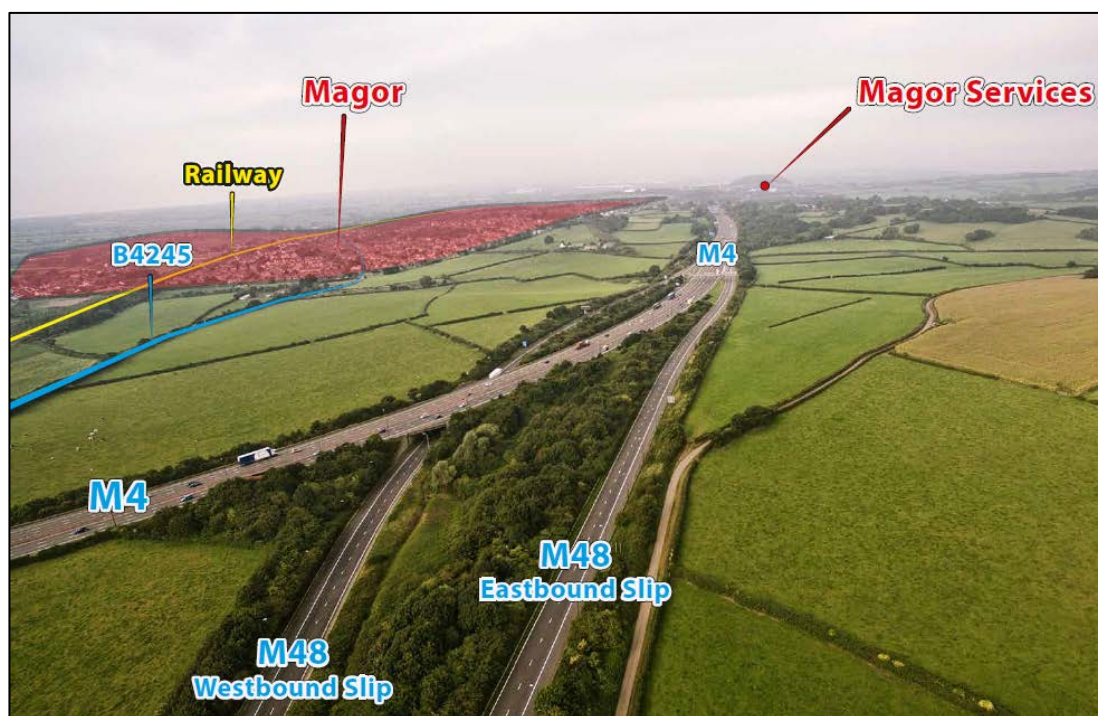


- 3.2 It is already right at the limit of the recommended temporal distribution of service areas, being between 30 minutes and 45 minutes' drive from Leigh Delamere Services in the east by car (and longer by HGV) at 10:00 on a weekday, and significantly further in terms of the Highways England's recommended maximum distance, at 53km (33 miles) from Leigh Delamere. In the other direction, Cardiff Gate Services is 26km (16 miles) away. Michaelwood Services on the M5 is 37km (23 miles) and Gordano Services on the M5 is 26km (16 miles). The journey times in the plan below have been sourced from Google Maps for a journey starting at 10:00 on a Tuesday morning, and reflect the potential range and fluctuations in journey times for car drivers on the network at this time. The data is included at **Appendix MA11**.





3.3 The setting of Magor Services in the context of the current motorway network and Magor is shown below and in **Appendix MA2**.



- 3.4 Magor Services is currently accessible from the roundabout at Junction 23A of the M4, shown below.

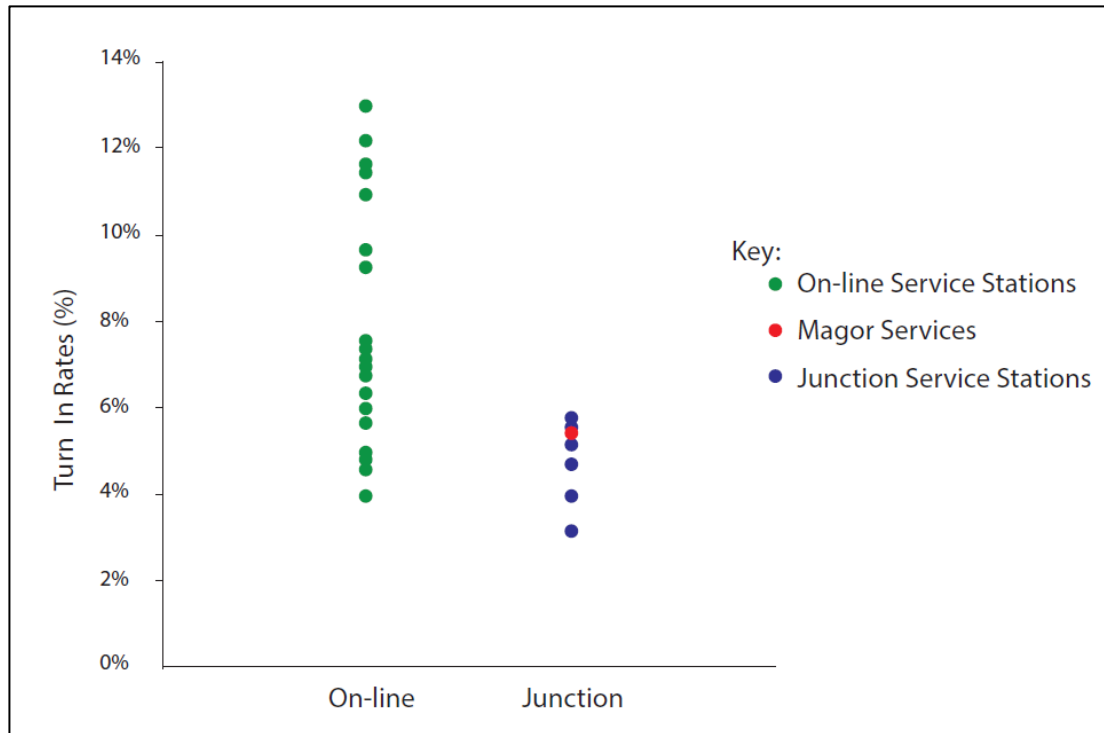


- 3.5 It is an offline service station, and so is a step down from the DfT's preferred arrangement. It is already less attractive and less conducive to drivers stopping compared with the DfT's preferred scenario.

## Turn in Rates

- 3.6 **Figure MA1** shows the turn in rates for all of the Roadchef Service Area sites within the UK. It shows the number of vehicles turning into each service area as a proportion of the traffic flow on the adjacent strategic road. For the service areas served from a junction with non motorway roads, the turn in rate is artificially high as it includes traffic turning into the service area from that 'non motorway' road, whilst not taking account of traffic travelling along those roads.

**Figure MA1 – Turn In Rate for all Roadchef Service Area Sites within the UK (2015)\***



**\*2016 data not yet available**

- 3.7 There is a notable difference in the range of turn rates between online and offline sites (junction sites), corroborating the DfT's judgement that online sites are more attractive and more conducive to traffic turning in.
- 3.8 For a motorway service area served by a junction, rather than direct via slip roads, the Magor turn in rate is at the upper end of the range.

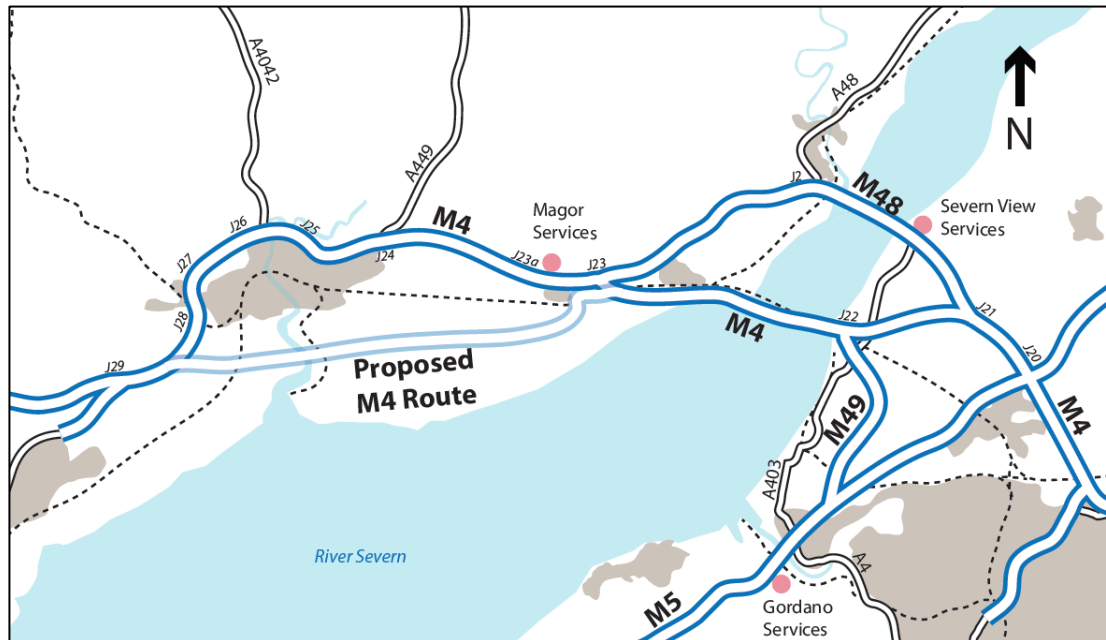
## Visitor Characteristics

- 3.9 Mr Turl describes the existing characteristics of visitors to Magor Service Area. This includes:
- **85%** of vehicle visits are car visits
  - Visitors to the service area are predominantly long distance travellers
  - **95%** of visitors are travelling more than 80km (50 miles), and 56% are travelling more than 240km (150 miles)
  - **75%** of visitors state that one of their reasons for stopping at Magor Services as 'needed a break'

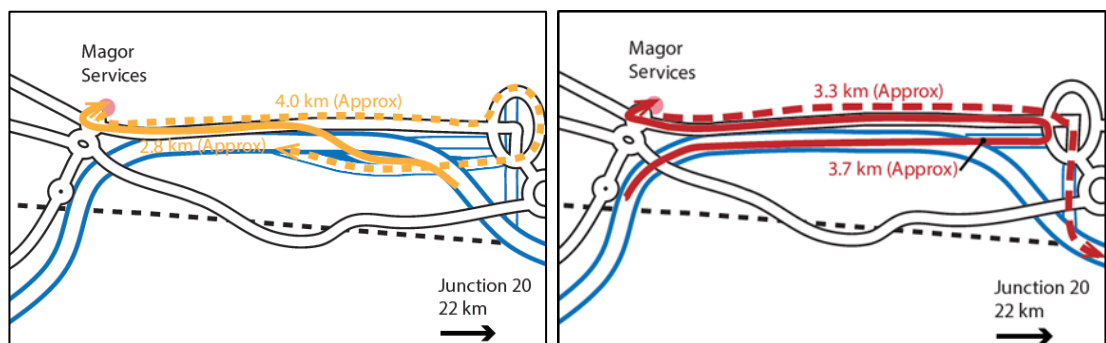
- Of those that already choose to stop at Magor Services, if it involved a round trip of 7.2km (4.5 miles), passing through two junctions, about **half** (51%) state that they would not stop here. A further 16% would try to avoid stopping here, and a further 15% would be less likely to stop here. Only 14% said that it would make no difference.

## 4 THE WELSH GOVERNMENT (WG) PROPOSAL

- 4.1 The WG proposal (“the WG Scheme”) is to realign the M4 south of Newport, shortening the motorway travel distance between the Severn and Cardiff by 2.8km.



- 4.2 The WG Scheme design unnecessarily makes access to Magor Services from the M4 difficult, convoluted and unattractive. The Service Area will no longer share a common boundary with the M4, and M4 drivers would need to make a detour from the motorway of 7.0 km (4.4 miles) eastbound and 6.8 km (4.2 miles) westbound to get there, travelling in the opposite direction to their desired direction of travel (see **Appendix MA3**). The yellow route is westbound traffic and the red route is eastbound traffic, with the solid line the access and the dashed line the egress.



- 4.3 Placing it in perspective, it is longer and further than diverting onto the M48 to visit Severn View Services at Aust, and involves the opposite direction of travel (see **Appendix MA3**).

- 4.4 This is to the severe detriment of the attractiveness of the Magor Service Area. It makes access to the Service Area substantially less attractive compared with what the travelling public is used to. Bearing in mind the DfT's efforts in England to make service areas as attractive as possible, by making them as easy as possible to get to by encouraging online service areas, it fails clearly, and potentially disastrously, in this context.
- 4.5 Therefore, the Welsh Government (WG) Scheme is not attractive for, and it is not conducive to, encouraging M4 drivers to stop and take a break. In terms of degree, Roadchef advises<sup>13</sup> an 80% drop in M4 turn in rate as a result.
- 4.6 The consequence is severe detriment in terms of driver fatigue related safety, compared with the norm, and the expectation, from a modern motorway.

### **WG Alternatives**

- 4.7 I have raised this issue with the WG. It has responded by explaining that there will be three route options for access to Magor Services, although only one of these will be signed from the M4. In my view the response demonstrates the lack of pragmatic thought and lack of priority that has been applied to access to Service Areas by the WG. WG has recently indicated that it is considering the inclusion of an additional eastbound slip road at Junction 23A.
- 4.8 The three options are:
- The WG Scheme (as set out above)<sup>14</sup>, and in **Appendix MA4**
  - Via the proposed Glan Lyn junction, using the A4810<sup>15</sup>, shown in **Appendix MA4**
  - For westbound traffic, continuing to use the reclassified M4 route (the old M4)<sup>16</sup>, shown in **Appendix MA4**
- 4.9 Driver decision making is based largely on perception, and those perceptions are significantly different from actual experiences. Perceived travel speeds seem to influence route choice more than perceived travel times.<sup>17</sup>

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<sup>13</sup> Simon Turl's Proof of Evidence, Page 8, Para 5.14

<sup>14</sup> WG Letter of May 2016, Para 11.8 (my **Appendix MA9**)

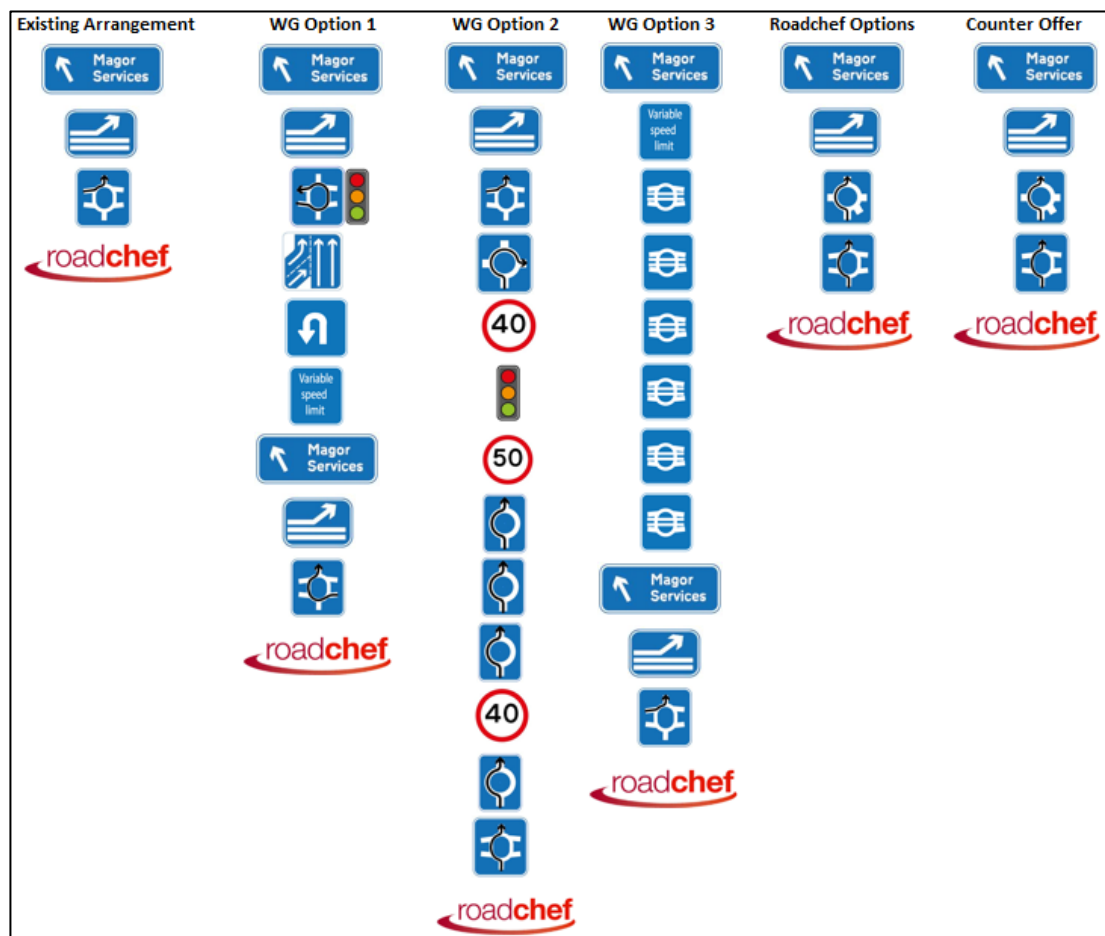
<sup>15</sup> WG Letter of May 2016, Para 11.8 (my **Appendix MA9**)

<sup>16</sup> WG Letter of May 2016, Para 11.7 (my **Appendix MA9**)



- 4.10 Attractiveness will be influenced by the perception of the convoluted nature of the process. At one end of the scale is the DfT's preferred on line (direct slips) access to a Service Area. Then there is the less attractive access via a motorway junction, and then, in my view, a long way behind that is a multiple- junction and convoluted route, where the Service Area is not contiguous with the motorway. All of the WG options fall into that last category.
- 4.11 **Figure MA2** below is a virtual drive through of the eastbound entry. **Appendix MA5** sets this, and all other routes, out in detail.

**Figure MA2 – Virtual Drive Through**



- 4.12 The WG advises that access to a list of existing motorway service areas will be comparable to the new access to Magor Services. It relies upon this, and its intention to provide signage, for its view that Magor would continue to operate as a Services.<sup>18</sup> Whether or not Magor continues to operate as a Services, and this is not the view shared by Roadchef, it makes no

<sup>17</sup> **Appendix MA10:** Driver Route Choice Behaviour: Experiences, Perceptions and Choices, Page 1199, V. Conclusions and Further Work

<sup>18</sup> WG Letter of May 2016, Para 11.1 (my **Appendix MA9**)

judgement about the degree to which turn in rate would be affected, or what the consequence is for driver fatigue related risk on the motorway.

4.13 The listed motorway service area sites that it says operate successfully (although there is no evidence presented for a trading performance judgement) are:

- Chieveley (M4 J13)
- Cardiff Gate (M4 J30)
- Cardiff West (M4 J33)
- Sarn Park (M4 J36)
- Swansea West (M4 J47)
- Pont Abraham (M4 J49)
- Bridgwater (M5)
- Oxford (M40)
- Cherwell Valley (M40), which it states is “notably remote from the motorway”

4.14 Access to these sites is set out in **Appendix MA6**, and compared with access to Magor on the basis of the WG Proposal. They are not comparable. In every case, access to Magor will be substantially and materially inferior. The detour from the motorway in each case is either further, involves passing through a more convoluted network, and will be perceptibly longer and less reliable in terms of time.

4.15 Dr McKay advises that there are nine service areas in the UK that have indirect access (ie, not directly from the motorway network). They are:

- Durham (A1 (M) J61)
- Sarn Park (M4 J36)
- Telford (M54 J4)
- Donington Park (M1 J23A)



- Bridgwater (M5 J24)
- Pease Pottage (M23 J11)
- Thurrock (M25 J30, J31)
- Peterborough (A1 (M) J17)
- Happendon (A74 (M) J11, J12)

4.16 I have compared these with the WG proposal for Magor in the same way. This is set out in **Appendix MA7**. In every case access to Magor will be substantially and materially inferior, for the same reasons.

### **Turn In Rates and Viability**

4.17 From an intuitive perspective, and also based on the advice from Roadchef, the effect on turn in rates will be severe. It will mean more drivers choosing to drive on, avoiding the opportunity to drink and rest, or missing the opportunity to react to signs of fatigue.

4.18 Roadchef advises that it is likely that the turn in rate will fall by a significant amount and ultimately lead to the closure of the MSA as it will be unsustainable to operate.<sup>19</sup>

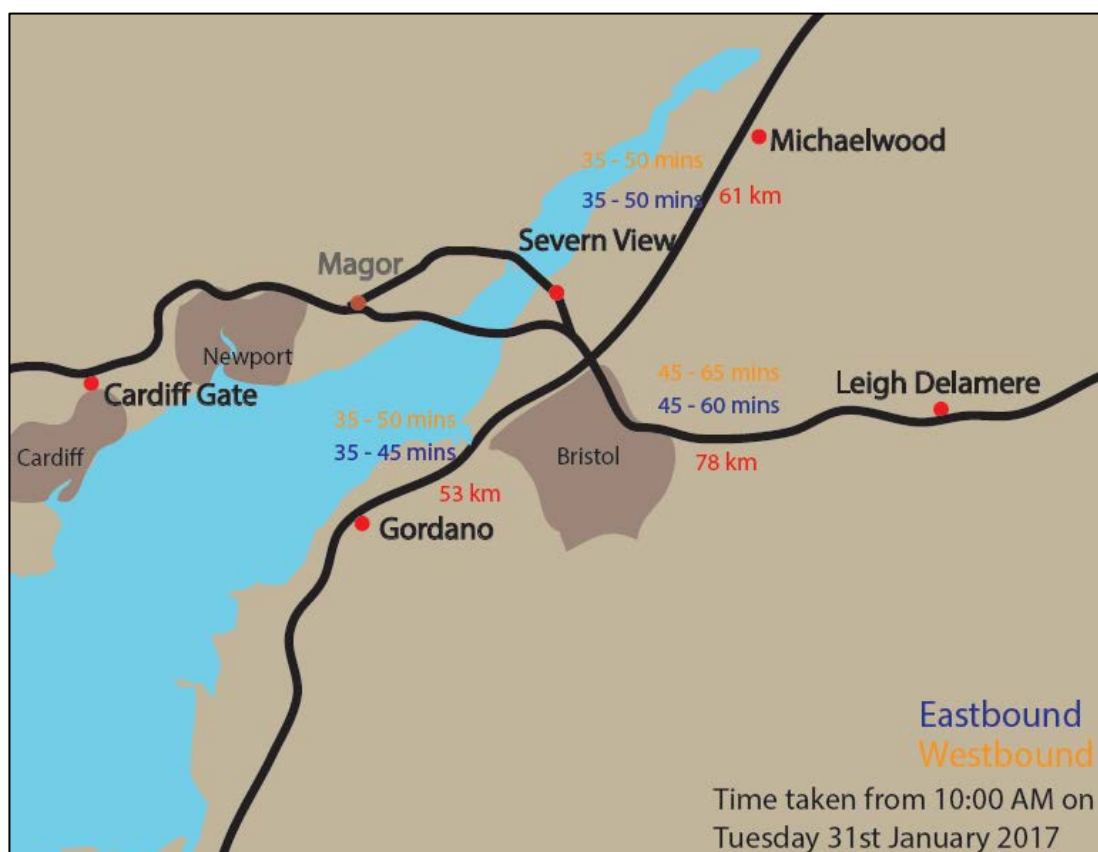
### **Practical Consequence**

4.19 The practical effect for a high proportion, or in the case of closure, all, of the travelling public on the M4 is that the distance between effective motorway service areas will be that between Cardiff Gate in the west, and Leigh Delamere in the east.

4.20 This is a distance of some 78 km (49 miles). Put another way, this is about an hour's drive for an HGV on a good day. It is a distance of 61km (38 miles) to Michaelwood and 53km (33 miles) to Gordano.

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<sup>19</sup> Ian McKay's Proof of Evidence, Para 8.6



- 4.21 This is extreme. It will be one of the longest distances and times between rest stops on the UK's motorway network.<sup>20</sup>
- 4.22 For a new motorway, intended to improve safety, improve the travel experience into South Wales, create an M4 that is attractive for strategic journeys, and provide safer, easier and more reliable travel,<sup>21</sup> this is a glaring omission and poor design.
- 4.23 The WG makes the judgement that the number of drivers (whether from the old M4 or the new M4) leaving Magor Services in the peak traffic periods remains roughly the same whether the WG Scheme goes ahead or not. There are no reasons provided for this judgement. **Table MA1** sets out the WG assumptions. WG has latest forecasts of traffic flows in its 2016 Traffic Forecasting Report, however, this report does not appear to provide the level of detail set out in the 2014 Traffic Forecasting Report, or the 2015 Alignment and Junction Report Supplement 2. There is an inconsistency in this information between different reports and emails, and the latest report doesn't reference them. We have asked for clarification.

<sup>20</sup> **Appendix MA11**

<sup>21</sup> M4 Corridor around Newport: Environmental Statement: Non Technical Summary – March 2016, page 8 – Core Document 2.3.3

**Table MA1 – WG Traffic Flow Assumptions (vehicles per hour)**

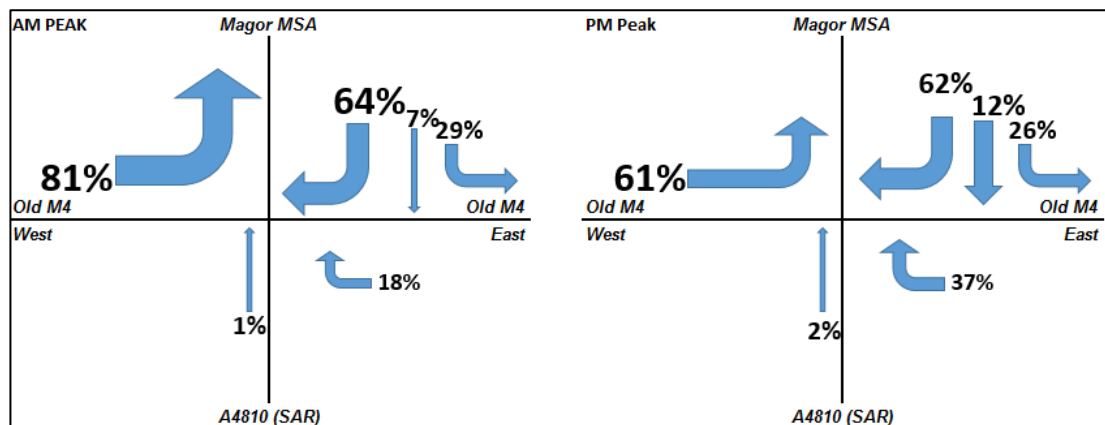
Scenario	AM (08:00 – 09:00)		PM (17:00 – 18:00)	
	Arrivals	Departures	Arrivals	Departures
2014 TFR - 2022 Do Minimum	180	350	220	280
2014 TFR - 2022 Do Something	180	350	200	280
2014 TFR - 2037 Do Minimum	210	390	340	300
2014 TFR - 2037 Do Something	200	400	230	310
2015 AJR – 2022 Do Something	207	273	223	184
2015 AJR – 2037 Do Something	221	292	230	197
2015 AJR – 2051 Do Something	232	309	239	213
Latest WG Flows - 2037 Do Minimum	236	346	251	217
Latest WG Flows - 2037 Do Something	240	345	247	219

\*TFR is the 2014 Traffic Forecasting Report

\*AJR is the 2015 Alignment and Junction Report Supplement 2

\*Latest WG Flows from WG email dated 18<sup>th</sup> May 2016 following request from Vectos

- 4.24 However, it assumes that the majority of traffic arrives and departs from and to the west along the de-classified M4.



- 4.25 I don't understand this, and I have been seeking clarification.

- 4.26 The advice from Roadchef is that turn in rates from the de-classified M4 will be minimal. This is also the view of Stephen Bussell, the WG's economist<sup>22</sup>. The traffic is local traffic and is not attracted to using motorway service areas. Furthermore, on the basis of the WG flows, drivers are making a special trip from the west to visit the service area (ie, travelling to the service area, and then returning by the way they have come).

<sup>22</sup> Stephen Bussell Proof of Evidence, Para 6.20 – Core Document 1.3.1

- 4.27 On the strict basis of the WG flows, the turn in rate from the M4 is less than 2.9% in the morning peak period, although I do believe the forecast flows to be inaccurate, and therefore this result to be unreliable.

## **Environmental**

- 4.28 If one assumes that the number of vehicles using the Services from the M4 remains the same as present, and uses the route signed by the WG proposal<sup>23</sup>, the difference in annual vehicle travel distance as a result of the M4 Corridor scheme, compared with the existing arrangement, will be an increase of about 11.7 million km.
- 4.29 Of course, as the turn in rates reduce, the level of comparative environmental disbenefit reduces, but the safety risks increase.

## **Consideration of MSAs within the Assessment**

- 4.30 I have found no evidence in the Environmental Statement; Non Technical Summary, or in the meetings that I have had with Welsh Government before January 3<sup>rd</sup> January 2017, to suggest that the important issue of access to a motorway service area at Magor, or an alternative, has been seriously considered in the planning of the WG Scheme. Even within the Non Technical Summary, under the section 'Effects on Businesses', the effect on Magor Services as a business has not been identified.
- 4.31 At a meeting on January 3<sup>rd</sup> 2017, the WG explained that it had considered the position, and may be willing to consider introducing a Supplementary Order to add an eastbound slip road to Junction 23A. This is, in my view, a reaction to a realisation that the safety concerns associated with deterring a proportion of travellers who would otherwise have chosen to stop at the services<sup>24</sup> is a material matter.

## **The WG Scheme Detailed Design**

- 4.32 Roadchef has wanted to work with WG to prepare a design that enables the WG Scheme and also provides for the Service Area. It believes that the deficiency in design can be readily remedied. In the absence of an enthusiastic response from WG to seeking a solution, Roadchef has needed to investigate this independently ahead of the Inquiry.

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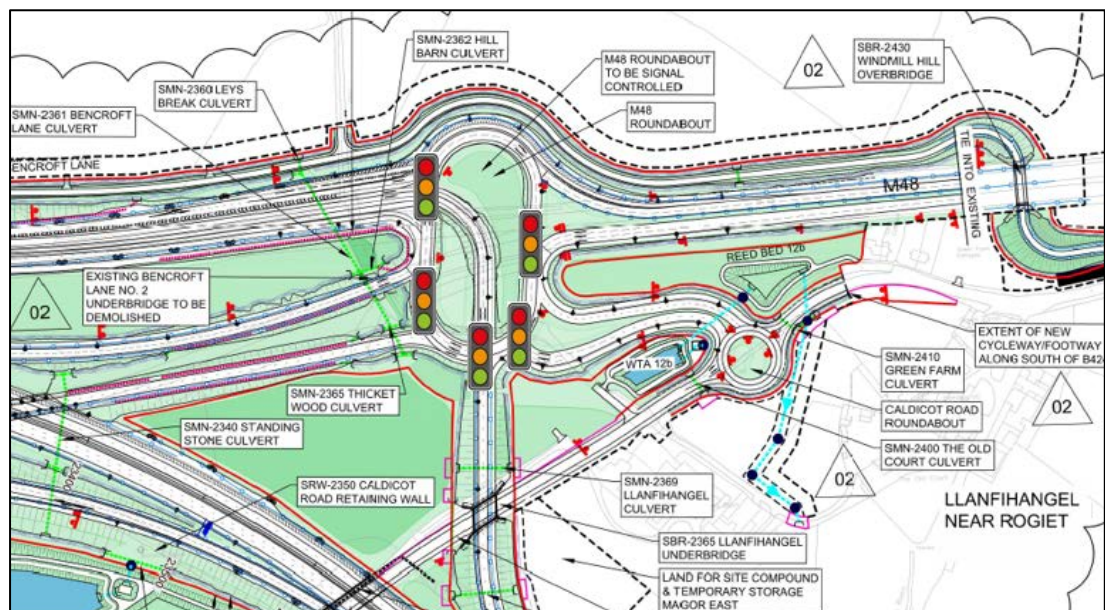
<sup>23</sup> Bryan Whittaker Proof of Evidence Figure G.1 – Core Document 1.2.1, and Stephen Bussell Proof of Evidence Appendices Pages 4/5 – Core Document 1.3.1

<sup>24</sup> Stephen Bussell Proof of Evidence para 6.26 – Core Document 1.3.1

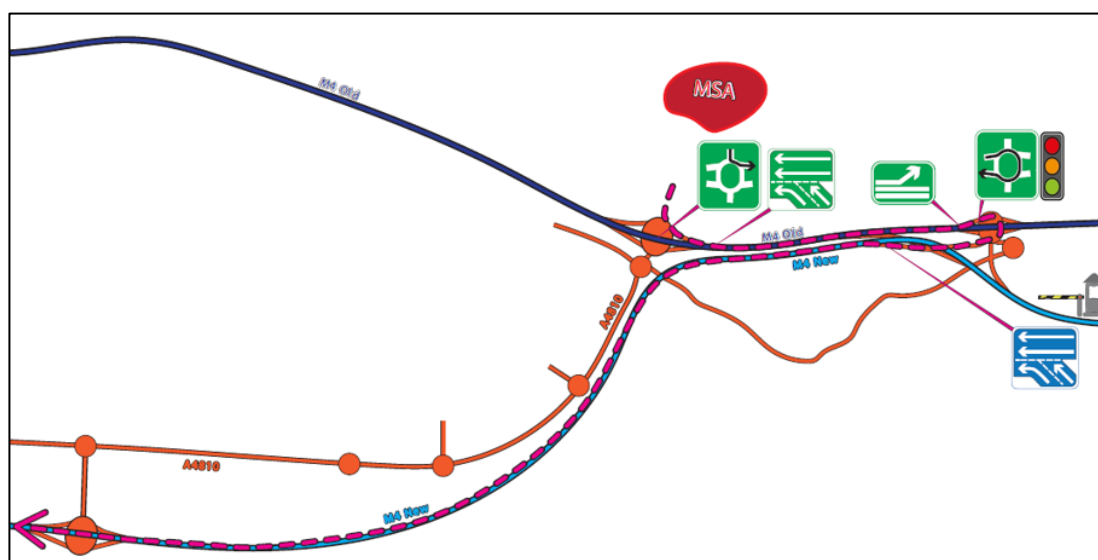
- 4.33 During that process, Roadchef has needed to critically consider the WG Scheme design itself. It has found a number of circumstances where that design does not comply with the design standards, DMRB, that the WG follows. This in itself may not be a problem if WG has made the judgement that the Departures are acceptable in the circumstances.
- 4.34 Either I perpetuate these Departures or make good these deficiencies, bringing the design back to 'standard' in these respects. For the time being I have chosen to design to 'standard' in the expectation that in these respects the design is no more onerous than the eventual design of the WG Scheme.

## Junction 23

- 4.35 Junction 23 creates the boundary between the end of the M48, the new trunk road, and access to the local road network. It is the second access to the local road network in the area, the other being Junction 23A.



- 4.36 It is an 'at grade' (all roads at the same level) signalled roundabout. For clarity, it would mean that drivers exiting the Services westbound on the M4 would, after joining the old M4 (new trunk road, with a 60 mph speed limit), pass through three sets of traffic signals before joining a slip road onto the M4. This is explained in the virtual drive through at **Appendix MA5**.

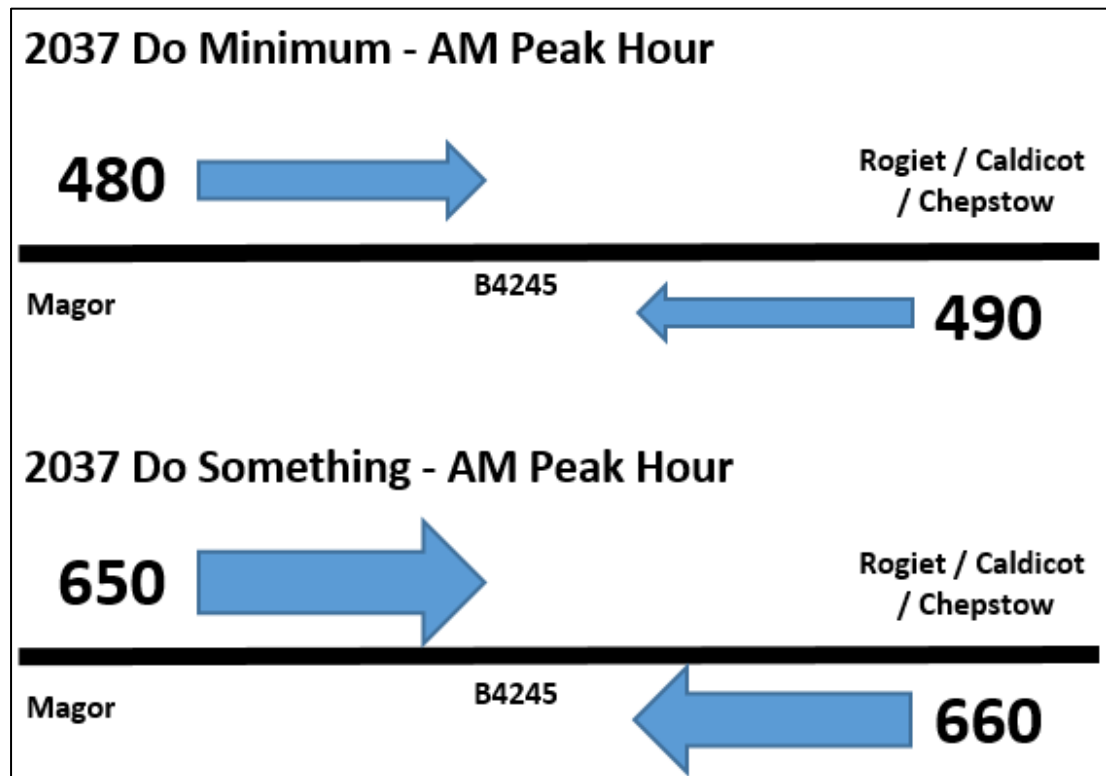


**\*The red dashed line indicates the westbound exit route from Magor MSA**

- 4.37 The cost of this junction is understood to be £60m.
- 4.38 We understand from our meeting with WG on 3<sup>rd</sup> January 2017 that the primary purpose of this junction is to facilitate the U turn from the M48 to the M4 eastbound in the event that the M48 Severn Bridge is closed. We understand that an additional purpose is to reduce traffic flows through Magor, effectively using the motorway as a bypass for the town.
- 4.39 It is difficult to reconcile the need for this WG Junction 23 with the purpose of the WG Scheme. It is not the purpose of a motorway to provide multiple local accesses, and indeed this is what WG is trying to rectify in downgrading the old M4 (with multiple local access) to a trunk road.
- 4.40 On the basis of the traffic flows provided by the WG, it provides a benefit to Magor in relieving some traffic movement through the town in the commuter peak periods. On the basis of the flows that we have been provided with, which are incomplete, it provides a morning peak hour convenience benefit to 500 car drivers from the Rogiet and Caldicot direction, and a convenience benefit to about 450 vehicles originating in Magor<sup>25</sup>.
- 4.41 It is of course not the primary purpose of planning policy to protect the convenience of the car commuter. In terms of environmental benefit, the degree to which there is such benefit, or need for such effect, in Magor is not quantified, and nor are alternatives considered.

<sup>25</sup> Traffic Forecasting Report, July 2014, Figure E4, Figure E8, Figure E12, Figure E16 – Core Document 4.6.7

- 4.42 The junction will induce traffic. The concept of additional trips or additional mileage caused by providing new highway capacity is explained by Bryan Whittaker<sup>26</sup>. Local access to the motorway will become easier and more attractive. The use of the road network, including by commuters, will increase. This is not consistent with the general aims of the Scheme.
- 4.43 The WG model has some regard to this. Based on the 2014 Traffic Forecasting Report flow diagrams, traffic heading to and from the local towns of Rogiet, Caldicot and Chepstow increases as a direct result of this junction.<sup>27</sup>



### Cost Benefit

- 4.44 The WG proposal for Junction 23 is relevant to Magor Services in terms of quality of access, and potentially cost.
- 4.45 Vehicles following the signed route from the Services and back to the M4 pass through this junction. They pass through a large junction, hindered by the stop/start of traffic signals and tight turns. This is not attractive, and that has consequences to the turn in rate and hence fatigue related safety.

<sup>26</sup> Bryan Whittaker Proof of Evidence, Para 4.1.5 – Core Document 1.2.1

<sup>27</sup> Traffic Forecasting Report, July 2014, Figure E4, Figure E8, Figure E12, Figure E16 – Core Document 4.6.7

- 4.46 In addition, the WG has advised me that cost is one of the reasons that eastbound and westbound slip roads at Junction 23A have not previously been included in the scheme.
- 4.47 I do not share the WG judgement that cost is more important than safety in this respect. However, there is an opportunity to remove, or alter Junction 23, making a significant cost saving compared with the £60m price tag, and offsetting the cost of improving the motorway service area related safety characteristics.
- 4.48 The WG advised, in our meeting of 3<sup>rd</sup> January 2017, that investigating the modification of Junction 23 was not an option and would not be the subject of further discussion.
- 4.49 In our meeting, WG was unable to point me to an assessment of the benefits of designing to accommodate commuters from Chepstow to England on closure of the M48 Severn Bridge. I have requested information on the frequency of closures, and evidence on how people react in any event when closures are advertised. For instance, do some people take the train, work from home, change the time of their journey, use Junction 23A etc. I have neither received nor seen any evidence that suggests that providing this convenience for car commuters contributes positively to the cost benefit case for the scheme. This is particularly in light of the alternative for those that may still be driving of U turning instead at Junction 23A.

### **Environmental**

- 4.50 I have requested the WG assessment setting out the degree of environmental benefit that it claims for Magor as a result of Junction 23. I also requested its assessments of alternatives. I understand from the answers given on 3<sup>rd</sup> January 2017 that neither exist.
- 4.51 I have requested the WG's assessment of the environmental effects of induced traffic movement as a result of Junction 23. My understanding is that such an assessment has not been undertaken.

### **Commuter Convenience Over Safety**

- 4.52 In light of the responses that I've received, I have concluded that the WG is prioritising the convenience of local car driving commuters over fatigue related safety on the motorway.

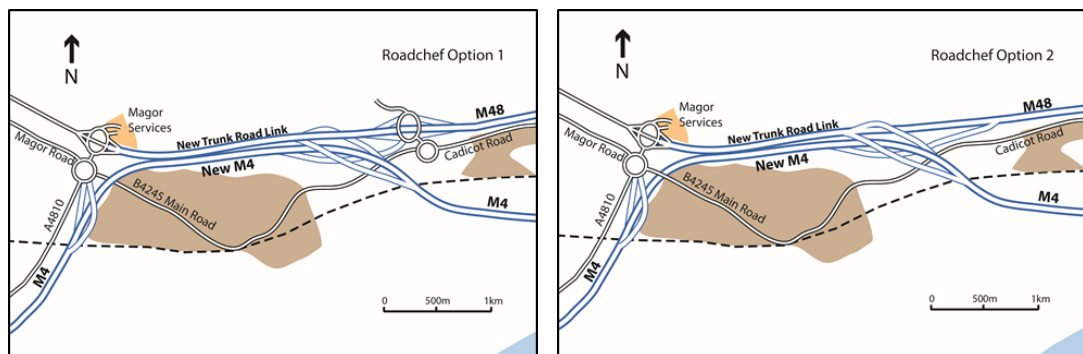


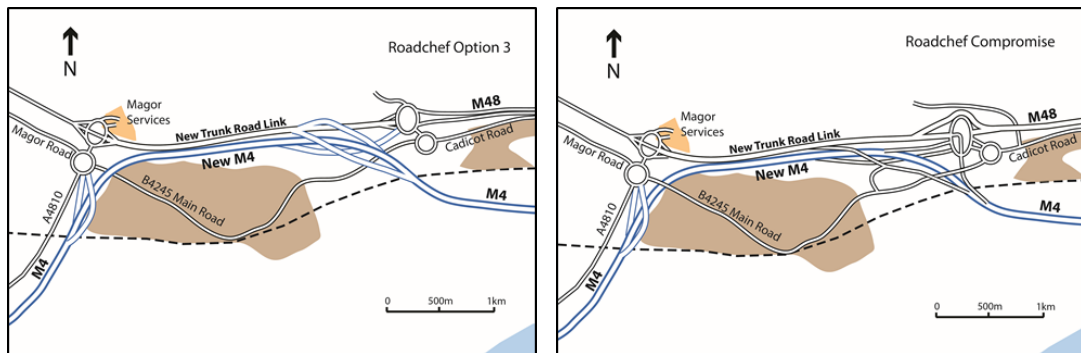
## 5 THE ROADCHEF SCHEME

- 5.1 Roadchef is disappointed with what it sees as a defensive attitude by the WG, in place of a chance to embrace the opportunity to improve the WG Scheme design. In particular, WG has chosen to withhold technical information and drawings that would make it easier for Roadchef to prepare schemes that improve the safety characteristics of the M4 through more attractive access to the Service Area, making it more likely that travellers will take a break.
- 5.2 Despite this reluctance from the WG, Roadchef has been able to produce options for access to Magor Services which demonstrate that betterment is achievable. The engineering design and detail is in **Appendix MA8**.
- 5.3 None of these options provide as attractive an access to the motorway service area as exists at the moment. Therefore, there remains disbenefit, in varying degrees, to fatigue related safety on the motorway with all of these.
- 5.4 Roadchef's aim is access and egress that minimises the deterrent to turning in. In principle this means minimising the perceived complications.

### Roadchef Scheme Options

- 5.5 Roadchef's options are in **Appendix MA8**, and summarised below.





- 5.6 All of them include an eastbound and a westbound slip road at Junction 23A. One (the Roadchef Compromise to WG's offer of an eastbound only slip road) assumes the existing Junction 23. The others assume alternatives for Junction 23.
- 5.7 The options that best minimise the deterrent to vehicles turning in, and hence have the best fatigue related safety characteristics, are those which maximise free flow between the MSA and the M4, namely Option 1 to 3.
- 5.8 A virtual drive through of these options is in **Appendix MA5**, compared with the virtual drive through of the WG Scheme and alternatives.
- 5.9 Roadchef's opinion is that at best, there will be a 10% reduction in visitor numbers with Options 1 to 3, and a greater reduction, 25%, with the Roadchef Compromise<sup>28</sup>. Its opinion is that the MSA will remain viable and open with implementation of any of these options.

## Environmental

- 5.10 The Roadchef scheme options don't involve doubling back, and will reduce the extra annual travel compared with existing to about 5.7 million km. Therefore, implementing the Roadchef scheme will reduce vehicle travel by about 6 million km compared with the WG Scheme, albeit based on the flawed assumption that similar numbers of M4 drivers will continue to use the Services.

## Scheme Objectives

- 5.11 The Roadchef scheme fits much better with the scheme objectives<sup>29</sup> of improved air quality, reduced greenhouse gas emissions and safer and easier travel, compared with the WG Scheme.

<sup>28</sup> Simon Turl Proof of Evidence para 6.1

## WG Design Influence

- 5.12 The WG has already considered and proposed similar layouts. The Roadchef design at Junction 23A is similar to the WG design for this junction presented in 2006.<sup>30</sup>
- 5.13 In addition, it is similar to the layout provided by WG in response to a meeting on 7<sup>th</sup> July 2016.<sup>31</sup>
- 5.14 Vehicles accessing Magor Services from the east follow the arrangement already proposed by the WG. They diverge from the M4 at the Toll Booths via a slip road that enters the old M4 (new trunk road), then diverging to the old Magor junction and into the Services. To leave westbound, vehicles enter the old Magor junction, exit via the new local road junction, leaving that via a new onbound slip road to the M4, on the alignment, and with the same technical characteristics as that shown by the WG alternative access drawing.<sup>32</sup>
- 5.15 With this arrangement, drivers access the Service Area whilst always travelling in the same direction as their direction of travel on the motorway.

## Traffic Modelling

- 5.16 We have requested the WG traffic modelling files. These would incorporate the modelling detail and the forecast traffic flows. The WG has responded, refusing the request.<sup>33</sup>

## The Roadchef Position

- 5.17 Roadchef's position is that attractive access to a motorway service area on the M4 between Leigh Delamere and Cardiff Gate is fundamental to the suitably safe operation of a modern motorway. The only service area able to provide this facility is Magor. No other service areas, or land for service areas, are set aside by the M4 Corridor scheme.
- 5.18 The WG has judged the new access to Magor Services, involving a detour of 8 kilometres (5 miles) from the M4 along non motorway routes, with junctions and restrictive speed limits, sufficient for this purpose. Roadchef disagrees. It is only very recently, in early 2017, that it appears WG may now disagree as well.

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<sup>29</sup>M4 Corridor around Newport: Environmental Statement: Non Technical Summary – March 2016, page 8 – Core Document 2.3.3

<sup>30</sup> Junction Strategy Review, April 2006, Figure 1.1 – extract at **Appendix MA12**

<sup>31</sup> **Appendix MA9** – Received 14<sup>th</sup> July 2016

<sup>32</sup> **Appendix MA9** – Received 14<sup>th</sup> Jul 2016

<sup>33</sup> **Appendix MA9** – Letter dated 13<sup>th</sup> December 2016

5.19 The WG has shown concern over the cost of a change to the current M4 Corridor proposals to achieve better Service Area access. There will be a cost. The Roadchef position is that the modification is necessary for a characteristically safe and convenient motorway, and that it should be considered a fundamental part of the proposal, and not a wish list add on. It is for WG to prioritise expenditure, but our position is not just that practical MSA access is fundamental, but that it is clearly of higher priority than a second local access and an occasional car commuter convenience, as proposed by this corridor scheme.

## 6 RESPONSE TO THE WELSH GOVERNMENT CASE

### WG Letter 18<sup>th</sup> May 2016

- 6.1 Some of the rationale for the WG position is set out in the letter from Matthew Jones (MJ) (Project Engineer) to Michael Dempsey of Berwin Leighton Paisner acting for Roadchef<sup>34</sup>. I comment on aspects of it here.
- 6.2 MJ's advice at para 2.1 is that the Junction 23 local access will shorten travel times for access to local facilities, and reduce traffic flows through Magor.
- 6.3 There is no explanation of the weight that has been attached to these benefits in the course of a judgement about design and cost, and particularly in terms of the Scheme Objectives. There is no evidence that alternatives that can achieve the same effect have been considered in the round. For instance, there is no evidence that there is an environmental issue in Magor that is sufficiently important that it requires addressing as part of the WG Scheme, or if there is that it cannot be solved by, for instance, environmental improvements within the town.
- 6.4 I note that by shortening travel times for access to local facilities, the WG Scheme is inducing traffic, and adding traffic movement to the Rogiet and Caldicot roads. In the same way that I cannot find evidence on the Magor effects, I can find no evidence for the degree of effect on Rogiet and Caldicot, and consequently the weight to be attached to any of these effects in the planning and design context.
- 6.5 In meetings the WG has explained that one of the benefits of, and reasons for, local access from Junction 23 is easier accessibility to the proposed Severn Tunnel Junction Park and Ride site. This is also mentioned in MJ's letter at paragraph 3.1.
- 6.6 The Severn Tunnel Junction Park and Ride scheme is a proposal to add up to 100 - 200 parking spaces to the Severn Tunnel Junction railway station. In the context of a daily flow of about 92,000 vehicles two way on the M4 and M48, what is essentially a local Park and Ride facility (being investigated by Monmouthshire County Council), with such a small change in car parking, is inconsequential in the context of the nationally strategic objectives of the WG Scheme. In my view it is not a sufficiently material matter if it is to be used as a reason to

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<sup>34</sup> **Appendix MA9** – Letter dated 18<sup>th</sup> May 2016

prioritise costs away from a design that otherwise provides more attractive access to Magor Services and consequently a motorway with a more normal safety characteristic.

- 6.7 The Park and Ride scheme is not a committed proposal, and there is no certainty that it either be funded or delivered.<sup>35</sup>
- 6.8 In Section 8 MJ responds to my question about how judgements about the design have been made, and in particular how balanced judgements about access to Magor Services have been made. MT referred me to Weltag and an overall points system for the WG Scheme as a whole. My understanding was that there was no specific assessment of, for instance, the effect of Service Area access on driver fatigue and related accidents.
- 6.9 At paragraph 11.1 MJ relies upon what he judges as the successful operation of other UK services as the reason for judging that Magor Services would continue to operate as a services.
- 6.10 In the first instance, whether or not Magor Services continues to exist, does not detract from the severely diminished attractiveness of the facility and the consequent poor, and lower than average, driver fatigue safety characteristic on the motorway.
- 6.11 In the second instance, the examples that MJ relies on to make his judgement are materially different to the position that Magor Services will be in.
- 6.12 Drivers make decisions based on perceptions. Travel time and travel distance are not the only reasons, and indeed in many case drivers will not perceive time and distance accurately. However, as a simple measure to illustrate the differences I have compared distances and difficulty. **Table MA2** below simply compares distances, where in the instance of the WG proposal this is the signed route as per Bryan Whittaker's evidence<sup>36</sup>. **Appendix MA6** compares distances and routes.

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<sup>35</sup> **Appendix MA13** – E-mail from Christian Schmidt at Monmouthshire County Council

<sup>36</sup> Bryan Whittaker's Proof of Evidence Appendix G Page 33, Figure G.1 – Core Document 1.2.3

**Table MA2 – Travel Distances from Motorway Entry / Exit to MSA Entry / Exit**

<b>MSA</b>	<b>Eastbound (m)</b>	<b>Westbound (m)</b>
Chieveley (M4 J13)	2,100	1,800
Cardiff Gate (M4 J30)	1,900	1,500
Cardiff West (M4 J33)	1,200	1,800
Sarn Park (M4 J36)	1,700	2,000
Swansea West (M4 J47)	1,200	1,900
Pont Abraham (M4 J49)	700	700
Bridgwater (M5 J24)	2,000	1,600
Oxford (M40 J8A)	1,600	1,100
Cherwell Valley (M40 J10)	1,800	1,900
<b>AVERAGE</b>	<b>1,578</b>	<b>1,589</b>
<b>Magor - Existing</b>	<b>1,300</b>	<b>1,800</b>
<b>Magor - WG Proposal</b>	<b>7,000</b>	<b>6,800</b>
<b>Magor - Roadchef Schemes</b>	<b>4,000</b>	<b>2,800</b>

- 6.13 In the third instance, MJ assumes success. There is no evidence for this, and in any event, no evidence that MJ provides for the relative volume of passing traffic at each of these sites compared with Magor.
- 6.14 In paragraph 11.8, MJ suggests that traffic could be signed to Magor Services via the proposed Glan Lyn junction. I don't find this a practical or helpful solution, and if it is what the WG is relying on then it is easy to judge that many drivers will not be encouraged to stop and take a break, to the severe detriment of driver fatigue related safety on the motorway. It is not what the WG proposes in Bryan Whittaker's evidence<sup>37</sup>.
- 6.15 Highways England in England is sufficiently exercised on this issue to positively promote on line service areas over service areas served directly from a motorway junction, in order to encourage drivers to take break. Accessing a service area with a round trip of about 10km (6 miles) from leaving the motorway to returning to the motorway, passing through eight junctions, passing through an industrial and proposed urban extension area, subject to a 40 mph speed limit, is less attractive by orders of magnitude. It is in my view a ludicrous suggestion that a motorway service area remains sufficiently attractive for the purpose of appropriately relieving driver fatigue with this degree of inconvenience.
- 6.16 Likewise, in the context of the industry standard position that online service areas are more attractive than service areas served directly from a motorway junction, suggesting that a

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<sup>37</sup> Bryan Whittaker's Proof of Evidence Appendix G Page 33, Figure G.1 – Core Document 1.2.3

similar number will find it sufficiently attractive to leave the M4 for a 24km (15 mile) journey away from the M4, to visit the service area is not believable. Apart from anything else, there is no evidence to support such a premise, and implicit evidence in the industry standard approach to have confidence that it won't happen.



## 7 SUMMARY

- 7.1 Roadchef objects to the way in which the M4 Corridor Scheme fails to deliver suitable access to Magor Services.
- 7.2 Motorway service areas (MSAs) are essential for the safety and wellbeing of the long distance traveller. Driver fatigue is a major cause of road accidents, and sleep related accidents are much more severe than non sleep related accidents.
- 7.3 The DfT places great weight on MSAs being accessible, attractive and conducive to encouraging drivers to stop and take a break. This is so much so that it makes a distinction between the attractiveness of online service areas, and service areas served directly from a motorway junction.
- 7.4 The M4 Corridor Scheme design and analysis has not demonstrated any regard for this important highway safety function, or the attractiveness of MSA access. The analysis that underpins the Corridor Scheme has not specifically assessed the MSA, and the mathematical forecasts of movement distribution to and from the MSA are obviously unrealistic.
- 7.5 Far from integrating this MSA properly into the M4 scheme, and maintaining at least the DfT's lowest preference for access, which is still from a motorway, WG has designed a detour away from the motorway of between 7km (the signed route) and 24km (a route that it says is still attractive).
- 7.6 The result is that Magor MSA will not be attractive to many potential users. It will not be conducive to encouraging drivers to stop and take a break.
- 7.7 The consequence of that will be exactly what the DfT is seeking to avoid, which is a higher proportion of fatigue related accidents, and a higher proportion of serious and fatal injuries.
- 7.8 This is unnecessary. WG can, by design, minimise that risk. It has chosen not to, reportedly for reasons of cost, and for what it states as environmental reasons, but which it has not assessed and quantified.
- 7.9 It has placed a higher priority on funding a large junction at Junction 23, to maximise the convenience of local car commuters from the Chepstow area, in the occasional event of the M48 Severn Bridge closure. This is not consistent with the aims of the Scheme.

- 7.10 WG has very recently reconsidered its position. It now makes the judgement that the Corridor Scheme access to the MSA is not suitable. It proposes a halfway house, with an eastbound off slip at Junction 23A.
- 7.11 This is not nearly enough. Even the Roadchef schemes result in an MSA that is not as attractive to users as it should be, resulting in some detriment to highway safety compared with what the DfT strives to achieve as a minimum. This is accentuated by the already poor level of service on this part of the M4, with the next nearest service area east of Magor at Leigh Delamere, some 53km (33 miles) away, and in excess of the DfT's maximum spacing for service areas.
- 7.12 The three Roadchef options for access, and the Roadchef Compromise, show what Roadchef is confident are schemes that will not result in closure of the MSA on grounds of viability. They have varying degrees of highway safety detriment compared with the DfT expectation, and are all significantly better in this respect than the Corridor Scheme option, or the Corridor Scheme option amended by the addition of an eastbound slip road.
- 7.13 These are achievable. Some of these options offset the costs by enabling a reallocation of funds away from local car commuter convenience, to MSA access and the safety of longer distance travellers.
- 7.14 We propose that the recommendation to WG is that the Corridor Scheme is amended to provide access to Magor Services that is more direct to and from the M4, with easy and clear wayfinding, and with no doubling back. As a minimum, we propose that this includes eastbound and westbound slip roads at Junction 23A, and free flow eastbound and westbound access from Junction 23. All three Roadchef options include this.