

## READING FRIENDS OF THE EARTH

### COMMENTS ON EXA'S FIRST WRITTEN QUESTIONS

#### HIGHWAYS ENGLAND'S RESPONSE

*Questions addressed: 1.2, 1.3, 1.5, 2.4, 4, 7.1*

**1. Question Reference 1.2: To what extent would the project deliver the objectives of the NNNPS to increase the capacity and improve the performance of the Strategic Road Network?**

*1.1 The Summary of Need in Section 2 of NNNPS gives equal weight to four themes – one of which is the delivery of environmental goals.*

*1.2 A 'managed motorway' without ALR will increase capacity and improve performance. The costs and benefits of ALR should be assessed separately.*

#### Highways England's Comment

1.2.1 Highways England agrees that a managed (“smart”) motorway without all lane running (“ALR”) which uses the hard shoulder during peak times (i.e. a hard shoulder running scheme (“HSR”)) would increase capacity and improve performance when compared to the existing M4 motorway. However, experience from the early smart motorway schemes has shown that there are a number of dis-benefits of introducing an HSR scheme when compared to an ALR Scheme. Highways England's experience of operating HSR has shown that it is resource intensive (to open and close the hard shoulder). It also has been found to have a number of potential technology points of failure, which means that the hard shoulder cannot be opened to traffic on occasion. For example, the opening of the hard shoulder as a running lane on an HSR scheme for safety reasons requires all hard shoulder lane signals to be available and also requires the operator to be able to view the full length of hard shoulder. When a hard shoulder lane signal or a camera develops a technology fault then the operator may not open the hard shoulder to traffic.

1.2.2 Furthermore, the level of potential technological failure results in a high maintenance burden which itself results Highways England's maintenance workforce being exposed to greater risk. All of these factors impact on the financial and operational benefits of smart motorways. ALR reduces the risk of technology failure (where there would be impact on the provision of additional

capacity and therefore subsequent impact on journey times) and risk to the workforce. It also provides journey time reliability benefits and provides a more consistent driving environment helping to reduce driver uncertainty and driver stress (as lane one is always available to traffic (unless there is an incident) there is no confusion with regard to which lanes are open and closed). Another benefit is that ALR schemes remove the risk of hard shoulder misuse which can occur on HSR schemes when the hard shoulder is closed. Optimising the smart motorways design from HSR through to ALR has enabled Highways England to establish an operating regime resulting in efficient schemes which provide value for money<sup>1</sup>, whilst maintaining safety above baseline levels<sup>2</sup>. These efficiencies have made it possible to deliver a far greater number of smart motorway carriageway miles and deliver significant benefits faster than would have been possible by replicating the heavily engineered original smart motorways HSR scheme (the M42 Pilot scheme).

1.2.3 Highways England does not consider that the costs and benefits of ALR should be assessed separately. There has been extensive consideration of the alternatives to ALR and it is not appropriate to separate out individual elements of the M4 junctions 3 to 12 smart motorway scheme (the “Scheme”) as the costs and benefits are based on the overall Scheme. However, a number of alternatives were considered as part of the development of the Scheme.

1.2.4 The operational scheme options considered for the Scheme (which include a smart motorway using the HSR operating regime) are detailed in Table 4, Paragraph 5.1.11 of the Engineering and Design Report (“EDR”) (Application Document Reference 7-3) which also notes that *“The four operational regime options and design concepts were identified (Table 4), developed and reviewed, by the Highways England based on the knowledge gained from delivering Managed Motorway schemes and incorporating the latest emerging concepts.”* This Scheme options assessment concluded that the smart motorway solution proposed for the M4 was the most suitable option for this stretch of motorway

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<sup>1</sup> The AST, together with supporting worksheets, was submitted to the Transport Appraisal and Strategic Modelling and Road Economics teams within the Department for Transport, who undertook a Value for Money (VfM) assessment. The metric used to define the VfM for the Scheme (or any other investment) is the ratio of the total net benefits divided by the total net costs, called the Benefit Cost Ratio or BCR. Taking account of all the costs and benefits, the Scheme has been assessed as having a BCR of 2.2, which affords the Scheme a rating of high value for money.

<sup>2</sup> The level of safety benefit is referenced within the Hazard Log Report (Annex E of the Engineering and Design report (Application Document reference 7-4)

and provided greater benefits than other modal solutions and existing technology. It was considered that the Scheme would allow Highways England to deliver the additional capacity required to tackle congestion by making best use of the available road space. These options were assessed in 2011, as part of Highways England's early scheme development work to identify the best option for the Scheme, and the conclusion reached was that the Scheme in the current configuration was the best option to take forward.

- 1.3 *By investing in enabling/encouraging greater travel on the M4 by implementing ALR the project will increase motorway travel in the short term – making demand management and modal shift harder to achieve.*

Highways England's Comment

- 1.3.1 The purpose of the Scheme is not enabling/encouraging greater travel on the M4. Its objective is tackling existing congestion. The short term for the Scheme is 15 years which is defined as the Scheme design year 2037 within the project appraisal, in accordance with the requirements of The Green Book – Appraisal and Evaluation in Central Government published by HM Treasury.
- 1.3.2 The effect of the Scheme on traffic congestion between 2022 and 2037 is clearly illustrated in Table 2 and Table 3 within section 4.3 Forecast Traffic Flows of the EDR. These two Tables confirm that the Scheme relieves all eight links of the motorway which are forecast by 2037 to exceed traffic flow capacity during the peak period. These Tables also illustrate the effect of the Scheme on traffic congestion with the increase in the number of links with no peak period traffic capacity issues by 2037. The Scheme also provides improved information and operational capability for Highways England to manage those links which are forecast to have higher capacity peak hour traffic flows.
- 1.3.3 The Government has recognised that there is a range of options to address the identified need for improvement to the strategic road network, inter alia tackling congestion. These options are described in more detail in Table 1 of the National Policy Statement for National Networks (“NN NPS”). However, the NN NPS provides that relying solely on alternatives to travel by a particular mode (or a combination of alternatives as set out in Table 1) is not viable or desirable as a means of managing that need. As such, demand management is not the sole approach endorsed by policy and should not be used in isolation if the need

identified is to be met. Similarly, it is not accepted that this makes modal shift harder to achieve, at least to any extent greater than policy already envisages.

1.3.4 In particular, in terms of demand management, Table 1 contains the following statement: *“Non-fiscal measures to influence the use of the national road network for journeys, including provision of information and traffic management are important. New technologies can also help improve and make more efficient use of capacity. However, demand management and technology can only make a contribution to alleviating the damaging effects of congestion across the network. Some areas have undertaken significant demand constraint measures or used smarter choices to reduce car use, which has resulted in reductions in urban traffic. However, this has not translated into significantly less pressure on the Strategic Road Network.”*

1.3.5 On the subject of modal shift, Table 1 contains the following statement: *“Across Government, policies are being implemented and considered which encourage sustainable transport modes including public transport, significant improvements to rail capacity and quality, cycling and walking. However, it is not realistic for public transport, walking or cycling to represent a viable alternative to the private car for all journeys, particularly in rural areas and for some longer or multi-leg journeys. In general, the nature of some journeys on the Strategic Road Network means that there will tend to be less scope for the use of alternative transport modes.”*

1.3.6 Whilst stating the case for the need for improvements to the strategic road network and rejecting the assertion that measures such as demand management and modal shift can provide the complete solution, there is clearly a recognition within the NN NPS that these measures are complementary and play an important part of a wider transport policy.

1.4 *If traffic grows more than predicted congestion will continue to be a problem and air quality and climate-changing emissions will be even worse than predicted.*

#### Highways England's Comment

1.4.1 An increase in traffic growth could lead to an increase in congestion either with or without the Scheme. The Scheme will increase the road capacity of the M4 and therefore levels of congestion will be lower for the same amount of traffic growth than without the Scheme. As such, in terms of traffic-related congestion, the

Scheme represents an improvement on the “do minimum” scenario. This is demonstrated by reference to Tables 2 and 3 of the EDR that illustrate the forecast ratios of traffic flow to capacity both with and without the Scheme.

1.4.2 The air quality assessment presented in Chapter 6 of the Environmental Statement (“ES”) (Application Document Reference 6-1) and calculations of greenhouse gases has followed relevant Design Manual for Roads and Bridges (“DMRB”) guidance, which focuses on the most realistic worst case scenario. In relation to the traffic data utilised in the air quality assessment, the data used reflect a central growth set of assumptions.

1.4.3 In assessing congestion, air quality and climate-change emissions, Highways England has adopted a reasonable worst case scenario approach throughout. In the case of air quality this has involved the use of medium growth traffic data and a precautionary approach to future air quality. The approach to the consideration of future air quality is outlined in paragraph 6.2.58 of the ES.

1.5 *Priority should be to reclaim the M4 from local traffic for long-distance travel - by demand management and modal shift.*

Highways England's Comment

1.5.1 In terms of the issue raised concerning reclamation of the M4 from local traffic, it is agreed that the principal role for the M4 is as an important link in the strategic road network. However, in the absence of any additional regulation on who can use motorways, they are open to use for local trips and it is acknowledged that there may be alternative means available for such trips, particularly close to the main urban centres where this more choice.

1.5.2 It is also acknowledged that demand management can play a role in reducing local car trips and, indeed, it is a key part of the strategy recommended by the TVMMS. However, as explained in the response to paragraph 1.3 above, whilst demand management and modal shift are important components of transport policy, in themselves they do not remove the need for improvements to the Strategic Road Network, which in the case of the M4, the Scheme will address.

1.5.3 The Planning Statement states (paragraph 3.1.11) ‘that consideration was given to a range of potential multi-modal interventions...to address the transport problems within the Thames Valley’. It also notes (paragraph 3.1.13) that the proposed

‘strategy recognised that even with travel demand management and public transport enhancements in place, the overall magnitude of car-based demand would remain higher than now and that ‘congestion will remain and, in specific areas, may intensify significantly, eroding some of the wider benefits delivered by a wider strategy. Consequently, even with better public transport links being provided or greater use of other modes, car-based demand on the M4 is such that improvements to the M4 to relieve congestion in the form of the Scheme are required.

1.5.4 Furthermore, it is to be noted that demand management for local traffic is not within the powers of Highways England, which is responsible for the Strategic Road Network. Whilst road user charging is a mechanism that could be used for demand management and forms a component of the recommended TVMMMS strategy, it is not current Government policy to introduce this measure.

**2. *Question Reference 1.3: Would the project deliver appropriate environmental and social benefits as required by NNNPS para 3.3?***

2.1 *Is there any evidence that the project will mitigate its climate-changing emissions as required by NNNPS 3.3?*

Highways England's Comment

2.1.1 Paragraph 3.3 of the NN NPS states:

*In delivering new schemes, the Government expects applicants to avoid and mitigate environmental and social impacts in line with the principles set out in the NPPF and the Government’s planning guidance. Applicants should also provide evidence that they have considered reasonable opportunities to deliver environmental and social benefits as part of schemes. The Government’s detailed policy on environmental mitigations for developments is set out in Chapter 5 of this document.*

2.1.2 Paragraph 3.3 is a general policy, and the specific policies are noted in Chapter 5 of the NN NPS. In the assessment of the Scheme, and the approach to mitigation, Highways England has taken care to meet the policy requirements set out in Chapter 5 of the NN NPS.

2.1.3 The carbon emissions of the Scheme have been considered and assessed to be consistent with the requirements of the policies contained within the NN NPS, as

described in paragraph 6.18.9 of the ES. For that reason, further mitigation is not proposed.

- 2.1.4 In order to ensure that, in relation to design and construction, the carbon footprint of the Scheme is not unnecessarily high the scheme design has, and will continue to, maximise the opportunity for retention of existing motorway infrastructure, for example, the positioning of the gantries has been optimised to ensure maximum reuse of existing gantry structures (see paragraph 6.4.8 of Chapter 6 of the EDR). Highways England is committed to recycling and waste minimisation throughout construction of the Scheme as illustrated in Figure 11.2 of the ES, showing the waste hierarchy, and associated text within Chapter 11 of the ES. In line with this, the proposed design and construction works are integrated to maximise the re-use of available materials (see paragraph 8.3.4 of Chapter 8 of the EDR). In particular, as noted in Table 11.16 in Chapter 11 of the ES *“It is a Scheme design objective to achieve a ‘cut and fill balance’ where possible so that the amount of material produced by Scheme works is matched by the amount of material required to build embankments and landscaping and therefore the excavated materials do not become waste”*. Further opportunities for waste minimisation are included in Chapter 11 of the ES starting at paragraph 11.2.32.

**3. *Question Reference 1.5: Does the Thames Valley Multi Modal Ttudy (TVMMS) provide an adequate assessment of options to comply with the requirement in NNNPS para 4.27?***

- 3.1 *TVMMS does not present all lane running on the M4 as an option in its Table 4.1 – in our view it was right to reject major expansion of motorway capacity because of “The risks of accentuating the existing high levels of car dependency for trips through and within the Thames Valley by providing substantial new highway capacity within the study area” (TVMMS 4.3)*

Highways England's Comment

- 3.1.1 The Thames Valley Multi-Modal Study (2003) (“TVMMS”) does not present or reject ALR. Table 4.1 of the TVMMS does not present any specific design solutions, such as all lane running, but does convey the concepts of the proposed strategy for the Thames Valley. The first concept presented under the category of ‘Management of Roadspace’ is ‘Traffic flow management through design and technology’, which is the essence of the proposed design solution for the Scheme.
- 3.1.2 Over recent years other forms of technology have been introduced on the M4 between junctions 3 and 12 to help manage traffic on this congested section.

These include Ramp Metering, Closed Circuit Television (“CCTV”), Motorway Incident Detection Automatic System (“MIDAS”) and message signs. However even with these measures in place, the forecast traffic flow during peak periods in substantial areas of the motorway (J3 to J12) will approach or exceed the available capacity without the Scheme as per see Table 2, Paragraph 4.3.3 of the Engineering and Design Report (Application Document Reference 7-3). The Scheme will allow Highways England to deliver the additional capacity that is required to tackle congestion by making best use of the available road space, and is accords with paragraph 2.23 of the NN NPS.

3.1.3 Rail developments, including Crossrail and improvements to train capacity and frequency and other improvements to public transport are also taken into account within the traffic model for the Scheme, as described in section 3.1.2 of the Traffic Forecasting Report, submitted as Appendix 1 to Document 3 of Highways England's response to relevant representations issued for Deadline I. Tables A-31 and A-32 of the Traffic Forecasting Report, that compare mode share with and without the Scheme in the two forecast years of 2022 and 2037, show that the Scheme has no material impact on mode share.

3.1.4 Highways England acknowledges that the quotation, from paragraph 4.3 of the TVMMS, provides one of the numerous considerations taken into account when developing the preferred strategy, but as stated above Highways England confirms that the Scheme will have no material impact on mode share and therefore does not exacerbate the issue of car dependency. Furthermore, Highways England notes that paragraph 2.8 of the TVMMS outlines congestion as the underlying problem within the study area and it is Highways England's contention that the Scheme also addresses the problem of growing congestion.

3.2 *The options selection process for this application has been inadequate and arguably contravenes NN NPS para 4.27 – we are not aware there has been any serious consideration and modelling of a ‘managed motorway’ without all lane running, or of the approaches advocated by the TVMMS, namely (TVMMS Para 4.4)*

- a) *Modal shift and improved accessibility through improved public transport;*
- b) *Managing the demand for travel through LTPs, travel plan initiatives, and road user charging;*
- c) *Improved management of road space through design and information.*



## Highways England's Comment

- 3.2.1 Highways England rejects the assertion that NN NPS paragraph 4.27 has not been followed. The above-quoted paragraph 4.4 from the TVMMS summarises the recommended strategy that forms the outcome of the study. As it is a strategy, it is not a collection of sequential options to be assessed, but rather an inter-related set of components that in combination were considered capable of delivering the desired outcome. As paragraph 6.1 of the TVMMS recognises, actions will be required by a range of bodies to implement the recommendations of the study. The delivery of the Scheme by Highways England will provide improved management of road space through design and information, and further, as will be demonstrated in the following paragraphs, the choice of ALR reflects the consideration that has been given to the selection of the option that makes best use of the available road space.
- 3.2.2 The TVMMS sets out a strategic case for what has become the Scheme. It was completed in 2003, and so preceded the publication of the NN NPS by some 11 years.
- 3.2.3 The initial development of the current Scheme commenced in 2010 when the operational regime options and design concepts were identified (see paragraph 5.1.11 of Chapter 5 of the EDR), developed and reviewed, by the Highways Agency (now Highways England) based on the knowledge gained from delivering managed motorway schemes and incorporating the latest emerging concepts. Again, this work preceded the publication of the NN NPS.
- 3.2.4 The development of the Scheme and the corresponding options appraisals for both the overarching concept and scheme elements are reported in Chapter 5 of the EDR.
- 3.2.5 Paragraph 1.2.4 explains that a managed motorway scheme using the hard shoulder in periods of congestion only (i.e. an HSR scheme) has been considered through the options assessment for the scheme. Paragraph 1.2.1 and 1.2.2 explain why a managed motorway scheme only using the hard shoulder in periods of congestion (i.e. an HSR scheme) is not the preferred solution when compared to an ALR scheme. The Managed Motorways ALR Generic Safety Report (Ref: 1039092-GSR-016 - <http://assets.highways.gov.uk/specialist->

[information/knowledge-compendium/2011-13-knowledge-programme/MM-ALR%20generic%20safety%20report%20final.pdf](http://www.dft.gov.uk/information/knowledge-compendium/2011-13-knowledge-programme/MM-ALR%20generic%20safety%20report%20final.pdf)) provides further details:

*“In January 2009 the Government announced that hard shoulder running (HSR) would be extended to some of the busiest parts of the Highways Agency’s major road network and this initiated the managed motorways (MM) programme. The MM concept built upon the success of the M42 Active Traffic Management Pilot (M42 MM) scheme. IAN 111/09 “Managed Motorways Implementation Guidance – Hard Shoulder Running (MM-HSR)” and IAN112/08 “Managed Motorways Implementation Guidance – Through Junction Hard Shoulder Running” provide designers with guidance on the implementation of managed motorways with dynamic hard shoulder running and the option for including through junction hard shoulder running.*

*Further knowledge and experience of operating managed motorways schemes indicated that there was scope to further reduce capital and operating costs, whilst meeting congestion objectives and not reducing safety performance compared to the baseline.*

*Managed motorways all lane running (MM-ALR) has been developed by the Highways Agency to enable a reduction in the amount of infrastructure necessary for a managed motorway scheme, resulting in significant cost savings without a reduction in safety.*

*Permanent conversion of the hard shoulder to a running lane along with the ability to dynamically control mandatory speed limits is a key aspect of MM-ALR. This removes the complex operating regime of opening and closing a dynamic hard shoulder.”*

- 3.2.6 The options assessment for the M4 also considered the implementation and development of other alternative modal uses. The Planning Statement (Application Document Reference 7-1, paragraph 3.1.3) explains that the strategic case for providing additional capacity on the M4 within the Thames Valley was first examined in the TVMMS. The purpose of the TVMMS was to identify the most effective means of addressing current and future transport-related problems in the Thames Valley. The final report for the TVMMS states (paragraph 2.9) that the scale of road-based demand in the Thames Valley is such that during the morning and evening workday peaks, demand is at, or exceeds,

available road capacity. This results in congestion and increasingly unreliable journey times which affect private vehicle users, and also freight and public transport operators.

- 3.2.7 The Planning Statement (paragraph 3.1.11) states that *"consideration was given to a range of potential multi-modal interventions (as set out in Government Policy) to address the transport problems within the Thames Valley"*. It also notes (paragraph 3.1.13) that the proposed *"strategy recognised that even with travel demand management and public transport enhancements in place, the overall magnitude of car-based demand would remain higher than now"* and that *"congestion will remain and, in specific areas, may intensify significantly, eroding some of the wider benefits delivered by a wider strategy"*.
- 3.2.8 Managing the demand for travel through Local Transport Plans and travel plans are complementary measures (to the improved management of road space) that are pursued by local authorities along the extents of the Scheme. Consideration has been given to ensuring these policies have been taken into account as demonstrated in Appendix 1 to the Planning Statement (Application Document Reference 7-1).
- 3.2.9 The TVMMS did suggest road user charging but, as stated in Table 4.1 of the TVMMS, this was not a core element of the proposed strategy due to political and technological uncertainties. Highways England has no plans to introduce road user charging on the strategic road network unless, potentially, under the auspices of a privately funded project.
- 3.2.10 The proposed strategy for the Thames Valley road network in the TVMMS placed an emphasis on better management of the existing road space, involving, as stated in paragraph 4.98, the identification of *"measures designed to reduce congestion broadly within existing road space, either through changes to the road layout, or through use of technology to better control traffic movements"*. This is exactly what the Scheme does, by providing an engineering and technological solution that deploys existing highway assets effectively.
- 3.2.11 Over recent years other forms of technology have been introduced on the M4 between junctions 3 and 12 to help manage traffic on this congested section. These include Ramp Metering, CCTV, MIDAS and message signs. However, the assessments show that even with these measures in place, the forecast traffic flow

during peak periods in substantial areas of the Scheme will approach or exceed the available capacity without the Scheme (Table 2, Paragraph 4.3.3 of the EDR).

**4. Question Reference 2.4: Is the scheme compatible with regional and local strategies to increase uptake and mode share for public transport, walking and cycling?**

4.1 *Increasing capacity on M4 will encourage car use and car ownership in the area which will directly work against increasing uptake and mode share for public transport, walking and cycling.*

Highways England's Comment

4.1.1 The Scheme is compatible with regional and local strategies to increase uptake and mode share for public transport, walking and cycling.

4.1.2 It is acknowledged that owning a car can work against policies to encourage the use of alternative modes. However, increasing capacity on strategic highway links such as the M4 does not in itself lead to increased car ownership. The ownership of cars and the level of their use are the results of complex relationships. Recent research by the Department for Transport (“DfT”) (‘Understanding the drivers of road travel: current trends in and factors behind roads use’, DfT, January 2015 ([https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/395722/understanding-the-drivers-road\\_travel.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/395722/understanding-the-drivers-road_travel.pdf))) recognises changing attitudes and behaviours in travel and concludes in paragraph 22 of the document’s Executive Summary:

*“In particular, we may expect traffic in urban areas to grow less strongly, as rising populations and growing incomes continue to push up the number of people wanting to drive, but the availability of public transport services keeping traffic growth down, alongside more limited road capacity. In contrast, we would expect continued strong growth on rural roads and the SRN, where traffic has grown strongly up until now, and the availability of alternative modes of transport are more limited.”*

4.1.3 Increased capacity on the M4 will allow the road to carry out its principal function, attracting traffic most suited to using it and delivering benefits to the communities it serves. Slough Borough Council, for example, having noted the Scheme, includes the following statement in its LTP for 2011-2026 (detailed in

Table 1 of the Planning Statement) in connection with its network management duties: “

*We will work with the Highways Agency (now Highways England) and neighbouring authorities to improve the interaction between traffic on the M4 and the local road system. This will be an integral part of our network management and ITS.”*

4.1.4 The Scheme is forecast to have no impact on the public transport mode share. This is demonstrated by reference to Tables A-31 and A-32 in the Traffic Forecasting Report, submitted as Appendix 1 to Document 3 of Highways England's response to relevant representations issued for Deadline I, which shows the respective mode share statistics with and without the Scheme in 2022 and 2037. There is no significant change as a result of the Scheme.

4.1.5 Following completion of the Scheme, some traffic is forecast to transfer from less suitable local roads on to the M4, freeing up road space and improving the amenity for walking and cycling trips. Many of the bridges and subways crossing the M4 form important local routes for non-motorised users and Highways England has given, and will continue to give, particular consideration to preserving the amenity for pedestrians, cyclists and equestrians who value these links.

## **5. *Question Reference 4 - Environment***

5.1 *We are extremely concerned that there are no specific questions to explore the climate change impacts of the proposal.*

### Highways England's Comment

5.1.1 Highways England has no comment to make.

5.2 *The UK is committed to reduce emissions overall and increased emissions from transport will make this harder to achieve by increasing the burden on reductions in other sectors.*

### Highways England's Comment

5.2.1 The assessment for the Scheme has calculated that carbon dioxide ("CO<sub>2</sub>") emissions will increase by approximately 4 million tonnes over the 60 year appraisal period following the approach described in the DfT Transport Analysis Guidance ("TAG").

5.2.2 The modelled increases in CO<sub>2</sub> attributable to the Scheme have been considered in line with the requirements of the NN NPS (refer to paragraphs 6.18.1 to 6.18.10 of the ES). Paragraphs 5.17 and 5.18 of the NN NPS state:

*5.17 "For road projects applicants should provide evidence of the carbon impact of the project and an assessment against the Government's carbon budgets"; and*

*5.18 "Determine whether it would have a material impact on ability of the Government to meet its carbon reduction targets. Where the increase in carbon emissions resulting from the proposed scheme are so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets, then it should refuse development consent."*

5.2.3 In line with the requirements of paragraph 5.17 above, the increase in CO<sub>2</sub> attributable to the Scheme has been shared with DfT for comparison against the National Carbon Plan. DfT has advised Highways England that, when taken together with the DfT's wider strategy on carbon reduction, including the Government's commitment for almost every car and van to be zero emission by 2050, the increase attributable to the Scheme should not have a material impact on the Government's ability to meet its carbon reduction target. Paragraph 6.18.9 of the ES shows that, "*the carbon emissions anticipated over the next 10-15 years from the [UK wide] strategic road building programme are considered to be small (less than 0.1% of annual carbon budget) and the increases associated with the Scheme are part of that small increase.*" Highways England is working to support the Government's Plan by implementing measures such as installing electric vehicle charging points along the Strategic Highway Network, investigating solar panel provision and assessing the feasibility of Ultra Low Emission Vehicles in the traffic officer fleet.

5.2.4 Further, the Scheme, along with all schemes in the Spending Review programme and Road Investment Strategy, is included within the Government's National Carbon Plan. The measures developed by Government to deliver the National Carbon Plan targets take into account any changes in carbon associated with the Scheme as part of the wider programme of schemes at the national scale.

5.2.5 In summary, the Scheme will not affect the ability of the Government to meet its carbon reduction targets overall across all sectors (paragraph 6.18.9 of the ES).

- 5.3 *The emissions associated with the civil engineering aspects of the project should be quantified – they will have an ‘up front’ and irreversible impact.*

Highways England's Comment

- 5.3.1 As outlined in paragraph 11.4.71 of the Chapter 11 of the ES, the magnitude of impact of the embodied carbon contained within the main material resources to be used in the civil engineering works has been assessed. Further, a quantification of the embodied carbon contained within the main material resources to be used for the construction phase, including the civil engineering works, of the Scheme has been included in Table 11.10 of Chapter 11 of the ES.
- 5.3.2 The embodied carbon dioxide emissions of the materials resources covers the “cradle-to-grave” stages of the project lifecycle and, by definition, are up front. Highways England recognises the need to take a responsible approach to sourcing of materials with the aim to maximise the use of recycled or secondary source materials in preference to primary aggregates. The assessment of the materials likely to be used for the Scheme concludes in paragraph 11.4.6 of the ES: “*Given the high levels of UK supply and demand for the key material resources required for the Scheme (steel, concrete, aggregates) the sensitivity of this receptor is judged to be low*”.
- 5.3.3 Highways England will ensure that, in relation to design and construction, the carbon footprint of the Scheme is not unnecessarily high, as outlined in paragraph 2.1.4 above.
6. ***Question Reference 7.1: Does the scheme comply with the need to be designed to minimise social and environmental impacts and improve quality of life in accordance with para 3.2 of the NNNPS?***
- 6.1 *The capacity to impose speed and lane controls – if it were aggressively used to reduce speeds and traffic volumes, and to create priority lanes for certain vehicle types – has the capacity to reduce noise, air quality, and climate change impacts – but there is no indication that it will be used in this way.*

Highways England's Comment

- 6.1.1 It is acknowledged that: (i) restrictions on speed and lane control can influence demand; and (ii) reallocation of road space for the use by limited road types will limit available capacity for other users; and these two issues can therefore create unintended consequences in terms of traffic displacement (and this may effect noise and climatic concerns). That aside, such measures are not in line with the

stated objectives for the Scheme and as no significant adverse environmental effect upon air quality is predicted as a result of the Scheme, Highways England are not required to address such issues. As a result, it would be wholly inappropriate to deploy speed and lane controls “aggressively”. Indeed, in light of the limited effects on air quality, there is no requirement for mitigation to address such impacts at all.

6.1.2 The use of smart motorway controls in the manner identified above does have the potential to reduce vehicle emissions along the Scheme route. However, as set out in paragraph 6.15.16 and Tables 6.21 and 6.22 of the ES, significant adverse effects on air quality are not predicted, and therefore mitigation measures such as those identified above are not recommended, required or proposed for the Scheme. The introduction of measures such as this would also have the potential to divert traffic onto the local road network, with the associated risk of air quality effects on sensitive receptors along those routes.

6.1.3 Again, the Scheme will not affect the ability of the Government to meet its carbon reduction targets overall across all sectors (paragraph 6.18.9 of the ES) and therefore there is no requirement for mitigation for climate change effects.

6.1.4 The use of smart motorway controls in the manner identified above would also have the potential to reduce noise levels along the Scheme route. However, as stated in paragraph 12.4.110 of the ES, significant adverse effects on the noise climate within the Scheme corridor are not predicted. On the contrary, the vast majority of the Scheme corridor is predicted to experience negligible or minor reductions in noise levels with the Scheme in operation.

6.1.5 These noise reductions are shown in Figure 12.4 for the short term and in Figure 12.5 for the long term (Application Document Reference 6-2). The reductions in noise levels throughout the Scheme corridor with the Scheme in operation are evident.

6.1.6 It follows that mitigation measures such as those identified above are not appropriate for the Scheme.

6.2 *We can see no environmental or quality of life benefits from ALR.*



## Highways England's Comment

6.2.1 A number of environmental and quality of life benefits are identified in the documents supporting the DCO Application. Paragraph 5.2.197 of the Planning Statement (Application Document Reference 7-1) notes that one of the stated aims of the planning process is in pursuing sustainable development which will lead to an improvement in quality of life, which includes improving the conditions in which people travel (paragraph 9 of the National Planning Policy Framework (“NPPF”). Paragraph 5.2.211 of the Planning Statement goes on to state that the Scheme strongly accords with the key aims of the NPPF, notably by improving the conditions in which people travel. Other benefits of the Scheme in relation to quality of life are considered below.

6.2.2 Section 5.2.6 of the Planning Statement states:

*“National Policy Statement for National Networks (“NN NPS”) paragraphs 2.17 and 2.18 re-affirm that the national road network is under significant pressure and that this is forecast to increase. NN NPS paragraph 2.22 makes clear that: ‘Without improvements to the road network, including its performance, it will be difficult to support further economic development, employment and housing and this will impede economic growth and reduce people’s quality of life. The Government has therefore concluded that at a strategic level there is a compelling need for development of the national road network’.”*

6.2.3 The Scheme was considered against a range of metrics in relation to sustainability. These indicate that it is of high value for money, providing longer term benefit. The environmental impact assessment of the Scheme concludes that, generally, there are no significant adverse effects (see Table 1 of the ES Non-Technical Summary (Application Document Reference 6-4)).

6.2.4 With the Scheme, Highways England does not just to mitigate impacts where they may occur, but also provides appropriate environmental and social benefits in delivering the Scheme where possible. Examples of these additional benefits include (but are not limited to):

6.2.5 **Noise environment improvements** – paragraph 17.9.3 of the ES concludes that there are some 17.2km of existing noise barriers along the west and eastbound carriageways of the M4 between junction 3 and junction 12, as well as sections of

low-noise surfacing. However, Highways England has taken the opportunity to provide additional mitigation, which has been incorporated into the Scheme design in the form of:

- low-noise surfacing (a Thin Surface Course System) across all lanes along the entire length of the Scheme (paragraph 12.2.49 of the ES and Chapter 7 of the EDR); and
- the provision of additional noise barriers (paragraph 12.2.49 of the ES).

6.2.6 **Reduced driver stress** – paragraph 13.8.12 of the ES states that journey time reliability will improve as a result of the introduction of the Scheme, a benefit proven by the introduction of other smart motorway schemes. Paragraph 13.8.13 of the ES refers to the combined effect of the introduction of a smart motorway and the resurfacing of all lanes with low noise surfacing as being beneficial to driver stress. Paragraph 13.8.14 of the ES refers to improvements in the safety performance of the road network using smart motorway techniques (reference is made to the M42 pilot where a 55.7% improvement in personal injury accidents has been reported as a result of that scheme).

6.2.7 **Additional capacity and more reliable journey times** – the Scheme will provide additional capacity and more reliable journey times on the M4, where peak time congestion regularly occurs, and will help maintain connectivity within the wider Thames Valley, Heathrow Airport and London. Paragraph 4.3.3 and Tables 2 and 3 of the EDR illustrate the improvements in traffic capacity during peak periods with the Scheme. Connectivity between key destinations in the region is described in Section 2.1 of the ES for the whole Scheme and Sections 2.3 to 2.10 of the ES for the links between consecutive junctions and Chapter 3.3 of the Socio-Economic Report (Application Document Reference 7-2).

6.2.8 **Economic benefits** – paragraph 6.2.8 of the Socio-Economic Report identifies that the assessment of economic benefits has made use of guidance contained within the DfT's TAG. The TAG Appraisal Summary Table (Appendix 1 of the Socio-Economic Report) identifies key Scheme-wide benefits as including an overall improvement in the transport economic efficiency of business users as a result of the Scheme, principally in the form of savings in journey time – a total of 56.7 million vehicle hours are anticipated to be saved by business users in the

Design Year (2037) during normal operation. In addition, paragraph 14.4.21 of the ES notes that the Scheme may positively influence decision-making for businesses looking to locate to areas within the sub-region, as it makes a significant and strategic improvement to local infrastructure.

- 6.2.9 **Impact on Regeneration Areas close to the Scheme** – paragraph 14.4.19 of the ES summarises the findings of the Regeneration Report produced for the Scheme. Here it is stated that the Scheme passes within close proximity to five regeneration areas, namely Reading, Wokingham, Bracknell, Maidenhead and Slough. The analysis shows that there are minor but positive changes to travel times to the hinterlands from and to the regeneration areas with the largest change in travel time occurring in the Slough area, where travel time within the 30-60 minute category for travel to or from regeneration areas, is reduced by 10%. Each improvement in travel times is an additional benefit from the Scheme.
- 6.2.10 **Local Employment** – paragraph 5.2.2 of the Socio-Economic Report states that *“the Scheme provides an opportunity to develop good practice in terms of use of a proportion of the workforce from local communities, development of skills and training programmes, and apprenticeship schemes.”* This represents an additional benefit conferred by the Scheme during the construction phase.
- 6.2.11 Paragraph 5.2.10 of the Socio-Economic Report highlights that *“the effect of the operation of the Scheme on community and private assets in general is considered to be beneficial overall. The operation of the Scheme would relieve congestion and smooth the flow of traffic along the M4. It can therefore be expected for there to be improvements in the road network relied upon by local businesses and residents.”*
- 6.2.12 On that basis, Highways England considers that the Scheme will contribute to an improvement in quality of life.