Further Comments by D J Green

WRITTEN REPRESENTATION

HIGHWAYS ENGLAND'S RESPONSE

1. *The following comments are made regarding HE's Jan 8 deadline response to my paper for the Reading hearing. Whilst I have no wish to prolong this debate I find the HE position counterintuitive on several matters and would wish to bring an alternative perspective before the Inquiry. A lack of comment on my part on other matters does not indicate my acceptance but just my desire to focus on key differences.*

2. *I made the point that DfT's Road Transport Forecasts 2015 document suggests traffic demand rises across the UK of 29-60% by 2040 on the Strategic Road network (SRN) with up to 53% on remaining roads. I made the argument that high levels of economic activity, affluence and car use across the SE in general, combined with high levels of committed and ongoing development locally across Berkshire would suggest that the higher end of the range would be a plausible outcome locally. Consequently, I surmised that the HE design figure increase for the M4 from 2013 to 2037 of around 43% may well prove an underestimate of the likely demand for traffic movement. Whether that higher scale of demand can access or leave the M4 on any feeder roads or junctions is a separate matter that I shall return to later.*

Highways England Comment

2.1 In its response to Mr Green's previous written representation submitted at Deadline V, Highways England explained that the design figure (correctly stated to be around 43%) results from the growth assumptions input into the travel demand model. These growth assumptions are derived from the National Trip End Model ("NTEM") and are applied within the modelling on a local authority district basis. Therefore, Highways England considers that the estimate of growth is accurate for the specific area of the Scheme.

3. *In response HE stated that these assertions were based on supposition rather than evidence. However, in reality my argument was essential a summary of extensive local knowledge of Berkshire's consistently buoyant economy and demographics, common sense and logic and is based on the following representative although incomplete but still startling data set:-*

General
>Berks Household growth to 2026 of 53,002 or 15.27%
>Berks Population growth to 2026 of 79,159 or 9.4%
>Berks is 13th nationally in total workforce size
>Berks is UK's 6th biggest wealth producing sub region
>Berks generates 15% of the SE Region's economic output
>Berks generates 12% of the SE Region's jobs
>Central Berkshire has some of the highest UK car ownership rates
>Berks traditionally has high levels of car commuting via the M4

Housing
> Core Berks commitments to 2026 for 59,104 new homes (ongoing)

Employment
>Winnersh Triangle 200,000 sq m B1 (approx 10,000 jobs) ongoing
> Reading Science Park 75,000 sq m B1 (approx 4,000 jobs) start imminent

>Reading Station Hill (approx 5,000 jobs) ongoing
>Forbury Place, Reading (approx 200,000 sq m B1) ongoing
>Reading Southside (approx 100,000 sq m B1) subject to planning

Retail
>Ikea Store adj J12 (ongoing)
>Bracknell Town centre redevelopment (ongoing)
>Wokingham Town Centre (firm WBC commitments)

Highways England Comment

3.1 As explained above, the traffic forecasts for the Scheme are derived from the application of growth factors within NTEM. By way of comparison with Mr Green's stated statistics, the specific NTEM growth factors for Berkshire used in the model are summarised in Table 1 below.

	2009 - 2022		2009 - 2037	
	Growth Factor	Absolute Difference '09-'22	Growth Factor	Absolute Difference '09-'37
Population	1.1098	91,619	1.2112	176,136
Households	1.1343	45,549	1.2494	84,589
Jobs	1.1072	53,021	1.1763	87,161

Table 1: NTEM Planning Statistics for Berkshire (source TEMPRO v6.2)

3.2 Whilst not directly comparable to Mr Green's quoted statistics, the above tabulated data demonstrates that by allowing for projected growth in population of 21%, in households of 25% and employment of 18%, Highways England has made appropriate allowance for future projected growth in Berkshire.

3.3 Based on consultations with the local planning authorities in Wokingham and Reading, the traffic model forecasts have made specific allowance for the developments at Winnersh Triangle, Reading (Thames Valley) Science Park and Reading Station Hill. The recent developments at Forbury Place, Reading and Reading Southside have not been allowed for explicitly within the forecasts, but growth factors from NTEM have been applied to model zones representing central business and retail areas that adequately allow for future redevelopment and/or expansion.

3.4 The IKEA store adjacent to M4 junction 12 has not been explicitly modelled. However, the traffic model does contain trips associated with the previous retail sheds that occupied the site prior to IKEA. The trips in the traffic model assumed to be generated by the previous users have been cross-checked against those forecast within the IKEA Transport Assessment and found to be higher than those forecast for the IKEA store. This matter has been discussed fully with, and to the satisfaction of, West Berkshire District Council officers as part of Highways England's consultation of the local planning authorities. Development within Bracknell and Wokingham town centres has not been allowed for explicitly within the forecasts, but growth factors from NTEM have been applied to model zones representing town centre business and retail areas that adequately allow for future redevelopment and/or expansion.

4. Given the above I consider my previous suggestion of traffic forecasts locally trending towards the higher end of the DfT's forecast range both for the SRN and the local road network to be perfectly reasonable. If not in Berkshire under these vibrant conditions then where in the UK are the 2015 DfT forecasts of future traffic demand appropriate? I am disappointed that this particular point has not been given more serious consideration

especially as the scheme runs mainly through Berkshire which suggests that future traffic growth in Berkshire is the prime mover for the scheme in the first place. It is clear that the current growth commitments for Berkshire to circa 2026 are likely to give rise to continued further pressure for growth in future years.

Highways England Comment

4.1 As demonstrated above, the traffic forecasts underpinning the Scheme are derived from planning statistics, provided by the planning authorities to the Department for Transport ("**DFT**"), that reflect the anticipated growth and performance of the local economy. Consultation has been undertaken with the local planning authorities on their local plans and the specific development proposals being brought forward for their respective authorities. Highways England refutes Mr Green's assertion that it has not given serious consideration to this issue.

5. In paragraph 1.3.2 it is stated "HE considers that the growth estimate is accurate for the specific area and the scheme will function effectively throughout its projected design life". I would comment that the design life referred to here is only the standard 15 years to 2037 from a projected start in 2022. The traffic figures that I have seen indicate that the M4 scheme would be running at effective full capacity for much of the working day by 2037 and (as stated in HE's paragraph 1.2.2) peak hour conditions would be felt across three hour peak periods. This does represent the standard DfT approach to highway planning but in this instance it would appear not to provide much in the way of future flexibility, reliability and resilience following a scheme valued at £0.8Bn especially in the event of future traffic demand being greater than HE forecast.

Highways England Comment

5.1 Highways England notes Mr Green's confirmation that the Scheme does meet the DfT standard approach to highway planning. Highways England does not agree with Mr Green's statement that the M4 would be running at effective full capacity for much of the working day by 2037. The ratio of actual traffic flow to its capacity (the total flow that a link is capable of handling), is a general way of indicating congestion as detailed in paragraph 4.3.2 of the Engineering and Design Report ("EDR") (Application Document Reference 7.3, APP-096). As demonstrated by Table 3 in paragraphs 4.3.4 of the EDR, none of the sections of the Scheme have a volume in excess of capacity in 2037 and less than half of the sections by direction have a total flow to capacity of more than 85%. In addition, from a comparison of Tables 2 and 3 in paragraphs 4.3.3 and 4.3.4 of the EDR, that show the without – and with-Scheme situations respectively, it can be seen that even when the motorway is reaching capacity in 2037 with the Scheme in operation, there is more available capacity than in the corresponding sections and time periods in 2022 without the Scheme. In addition to forecasts for the core scenario, Highways England has prepared alternative forecasts, in line with the standard approach, for growth above and below the core forecast. Taken together, these forecasts have demonstrated there is a robust business case for the Scheme that has been approved by the DfT as verified in its Value for Money Statement.

6. In my previous submission I questioned the rather counterintuitive HE view that the scheme would have a neutral effect on the local road network, motorway junctions, the A404T and the M25. I found the HE comments on this aspect less than helpful and incomplete. Paragraph 1.6.3 suggests marginal percentage increases on the A404T and M25 but doesn't stipulate whether these are peak or full day related. The reason for a limited increase on the M25 is given as capacity constraint but surely this will also apply to all alternative routes to/from the eastern end of the scheme. So where will the increased flow at the eastern end of the M4 actually come from and go to if not the M25? Doesn't the comment about capacity constraint apply equally across all feeder routes throughout the length of the scheme to some extent?

Highways England Comment

6.1 For clarity, where percentage increases in traffic flows on the M25 and A404T have been stated, these have related to peak hour flows, as it is during these periods that any increase will have the greatest effect on junction capacity. It is acknowledged that the traffic forecasts show little change in flow on the M25 as a result of the Scheme despite there being an increase in traffic on the M4 on the approach to the M25. To explain how this apparent counterintuitive position can happen it is necessary to examine what is occurring beneath the headline figures. From examination of the model outputs, it becomes apparent that there is a reduction in flow using the M40 west of the M25. Traffic which, prior to the Scheme, travelled eastbound on the M40 and then turned south on the M25 is re-assigned on to the M4 (to take advantage of the increased capacity provided by the Scheme) and now turns south at M4 junction 4b/M25 junction 15. The result is that there is an increase in traffic turning off the M4, but no net increase in the flow on the M25 south of junction 15. There is a similar effect in respect of the M3. Traffic previously travelling towards the M25 along the M3 and turning north on to the M25 switches to the M4 and joins the M25 at junction 15. Again, more traffic uses the M4 and turns off at junction 4b, but there is no net change on the M25 north of junction 15. Clearly there are complementary reductions in flow on the sections of M25 no longer used by the traffic that has switched but, as is often the case, there is the phenomenon often referred to as the 'domino effect' whereby traffic switches from one route to another sequentially to take up the available capacity.

6.2 Traffic switches routes to find the one with minimum cost until there is no further advantage to be gained. The limiting factor is the available capacity and to, that extent, Mr Green is correct to assume that limitations in capacity are the governing factor in what happens across the length of the Scheme. However, it is not confined to the M4 and the junctions feeding it; it is an issue across the wider local network. The net effect of the secondary re-assignment of traffic between routes to take up released capacity is that, after the model has iterated and reached a stable final assignment, on many routes there appear to be no net changes in flow. As has been demonstrated with previous reference to the Traffic Forecasting Report, the matrix of total trips remains largely unchanged between Do-Minimum and Do-Something; there is negligible induced traffic and minimal switch from public transport. It is simply the case that traffic has re-assigned from one route to another.

7. Paragraph 1.6.3 also contains a remark "some of that increase joins the M4 west of Junction 12" but without any quantification. So it is difficult to draw any conclusions from this other than it cannot be sufficient growth to warrant extending the scheme to Junction 13 or beyond. Similarly there is no discussion of increases on the local road network or indeed on all the M4 junctions despite this being the focus of my original point. Given that DfT Road Transport Forecasts 2015 suggest up to a 53% increase on local roads this warrants much further discussion whilst the discussion of driver stress on local roads in paragraph 1.6.2 does nothing to explain the basic point.

Highways England Comment

7.1 The quantification of the increase in traffic joining the M4 west of junction 12 with the Scheme in place is provided in Tables A-14 to A-17 of the Traffic Forecasting Report. For example, the traffic flow in the early am peak (7am to 8am) in the eastbound direction is forecast to increase by 13%. By 2037 the flow during this hour is forecast as 6300 vehicles per hour, which is at the limit of a three-lane motorway, suggesting that consideration did not need to be given to extending the Scheme. In respect of the issue of increases on the local road network, there has been considerable discussions with those local highway authorities who have raised the issue with Highways England. Where there has been no discussion is on the subject of decreases on other local roads and the consequent benefits that arise from that.

7.2 Paragraph 15 of the Executive Summary to Road Traffic Forecasts 2015 states that between 2010 and 2040, growth on other principal roads is forecast to be between 12% and 51% and 10% to 54% on minor roads. Figure 3.10 of RTF 2015 shows projected growth for Scenarios 1, 2 and 3 by region. The South-East shows one of the potentially higher levels of growth (up to 45%), outstripped by the East Midlands, South West, Yorkshire and Humberside and Eastern England. Whichever of these statistics turns out to be correct, the projected growth and its implications for the local road network will occur irrespective of the M4 Scheme.

7.3 Finally, the assessment of driver stress is a requirement within DMRB for inclusion in an Environmental Statement. The assessment has been properly undertaken and its conclusions reflect the position in respect of the effect of the Scheme on the stress level of travellers using the Scheme and the associated local roads. The quantum of change in traffic flow and speed is insufficient to move from one defined level to another, hence the conclusion of a neutral effect.

8. Paragraph 1.7.1 asserts HE's position that their analysis to date shows little impact requiring junction improvements and so any necessary future improvements would fall to local highway authorities presumably although nothing is currently planned or funded.

Highways England Comment

8.1 Highways England maintains that its position in respect of the impact on local junctions is correct. The issue has been raised by a number of local highway authorities and interested parties. The position in respect of each affected authority is as stated in the respective Statement of Common Ground.

9. In summary as the scheme's traffic figures stand it is being suggested by HE that a 43% increase in mainline traffic can be developed and accommodated on an improved M4 but without any significant increases of any feeder roads or access junctions many of which are already congested at extended peak times. This apparent conjuring trick against a backdrop of much higher DfT forecast traffic growth on all roads and massive development locally. Consequently, I make no apology for standing behind my original comment that these conclusions are totally unrealistic.

Highways England Comment

9.1 Highways England has prepared its forecasts for the Scheme using a traffic model developed in accordance with, and employing best practice set out in, Transport Analysis Guidance. The forecasts take proper account of that element of national growth forecast for the South-East which, in turn, is based on the development planned within the region, and allowed for in the constituent local plans. Highways England refutes Mr Green's assertions that these conclusions are totally unrealistic.

10. The impact of the scheme as it stands may well be to develop increased capacity on the main line and to "guarantee" free flow by holding back or effectively gating residual traffic demand at unimproved junctions and local roads. Egress from the motorway at these unimproved junctions however could be difficult but in this case traffic would stack up back along the slip roads onto the improved M4. Is this a scheme objective or a side consequence?

Highways England Comment

10.1 Highways England rejects the assertion that its forecasts are masking the full level of traffic demand and in particular that it is an objective of the Scheme to put road users at undue risk. Queuing of traffic exiting the motorway is not anticipated under normal traffic conditions but

should it occur (e.g. due to traffic incidents) the Scheme will provide the added benefit of improved signing and control on the approach to it.

11. *At best HE's conclusions are counterintuitive and I would recommend a thorough review of the Saturn model to identify just where the apparent anomaly arises. A Select Link analysis at peak times of the main line links between J10 and J12 would show how traffic assignments to the improved M4 were derived and the impact on all local feeder roads. I would also ask whether there is any frustrated demand shown (to access or leave the M4) at peak hours at 2037 within the Saturn model. Lastly Saturn is essentially a strategic tool and so is not appropriate to model the detailed operation of complex and congested junctions. Has any detailed operational analysis work been done on the many significant junctions within the modelled area and particularly the motorway roundabout junctions at J5, J6, J11 and J12 and what are the results?*

Highways England Comment

11.1 Highways England does not accept that a review of the M4 traffic model is required. It has been subject to scrutiny via the Appraisal Certifying Officer and DfT as part of Highways England and the DfT's governance processes. The risks identified by that scrutiny have been appropriately addressed as explained in the note submitted at Deadline VII.

11.2 It is acknowledged that the model uses the SATURN suite of programs and is designed to undertake a strategic level assessment at a regional level. However, the software has the capability to simulate the operation of junctions at a detailed level with software developed to replicate standard junction capacity algorithms. Whilst this is not at the level of detail achieved by bespoke junction capacity or micro-simulation type models, it is more than adequate to identify operational problems, delays or blocking back on to adjacent links. As such, Highways England is satisfied that it has undertaken an appropriate level of assessment for the operation of the Scheme and that the suggested work noted by Mr Green is both unnecessary and would not reflect appropriate use of public funds.

12. *Lastly I have read the Enhanced Noise Mitigation Study published at the January 8 deadline and welcome the move to provide much more in the way of noise mitigation for local residents. I ask for clarification on a number of key points as follows:-*

- *Is this a commitment from HE to fund these mitigation works?*
- *Will HE commit to erect these barriers when work starts for early impact?*
- *Will the Low Noise surfacing still be provided as well?*
- *Will HE commit to maintain Low Noise surfacing acoustic effectiveness?*
- *Why a 2.5m barrier across Lower Earley when 3.5 m used elsewhere?*
- *Why were noise bunds not considered as an alternative?*

Highways England Comment

12.1 Highways England welcomes Mr Green's positive response to the proposals for enhanced noise mitigation. The following addresses Mr Green's key points in turn.

- ***Is this a commitment from HE to fund these mitigation works?***

12.2 Highways England has made a commitment to provide the enhanced noise mitigation strategy. The barriers which form part of the strategy are shown on the Environmental Masterplan and their provision is secured by requirement 22 of the DCO.

- ***Will HE commit to erect these barriers when work starts for early impact*?**

12.3 The primary purpose of the enhanced noise mitigation strategy is to provide further **operational** noise benefits, in addition to those provided by the Scheme as reported in the ES (Document Reference 6-1, APP-152), not to mitigate construction noise. Construction noise is controlled by way of the measures proposed at requirement 21 of the DCO.

12.4 Whilst the construction of acoustic barriers will not be undertaken in advance of the main works, they will be carried out as early as practicable in the relevant sections (e.g. generally the acoustic barrier in a section verge will be completed as part of the verge works and hence prior to the completion of cabling and finishing activities in the relevant areas). This will allow the acoustic barriers to offer some protection to the later construction works.

- ***Will the Low Noise surfacing still be provided as well?***

12.5 Highways England has made a commitment to provide low noise surfacing along the complete extent of the Scheme, as secured under requirement 5 of the DCO.

- ***Will HE commit to maintain Low Noise surfacing acoustic effectiveness?***

12.6 All road surface types degrade over time, with consequent increases in tyre/road noise. However, research has indicated that new low noise surfaces provide, on average, between 4 and 6 dB(A) benefit over tested hot road asphalt ("HRA") surfaces. In spite of the better acoustic durability of the HRA surfaces, the research concluded that low noise surfaces still outperformed the HRA surfaces by 1 to 3 dB(A) after 10 years. The -3.5 dB correction for a low noise surface, as prescribed in DMRB and used in the noise assessment for the Scheme, is a reasonable average over the life of the surface for calculation and assessment purposes.

12.7 Although low noise surfacing is a mitigation factor for noise for the Scheme, a noise criterion for road condition replacement assessment would not be appropriate. It is the general wear of the surfacing which would result in it being replaced, and it is general wear which would lead to a reduction in the Scheme's acoustic properties. However any replacement required within the first 15 years after construction of the relevant section of the carriageway between any two junctions, as set out in requirement 5 of the draft DCO, would be replaced with low noise surfacing. Highways England cannot confirm what material would be used after 15 years, as it would depend on the material approved by the Secretary of State at this time.

- ***Why a 2.5m barrier across Lower Earley when 3.5 m used elsewhere?***

12.8 The enhanced noise mitigation study was based on a robust quantitative assessment (the methodology for which was agreed with the Highways England's principal noise adviser). As described in the Enhanced Noise Mitigation Study Report (Ref 514451-MUH-00-ZZ-RP-EN-400158), this assessment is a three step process comprising i) calculation of the perceptible noise reductions achieved through enhanced mitigation, ii) a cost/benefit analysis (in terms of health benefits related to noise reductions against mitigation costs), and iii) professional judgment where the combination of i) and ii) does not provide an obvious conclusion.

12.9 The Lower Earley area was included in the enhanced noise mitigation study (reference EM8), and was treated in exactly the same manner as all other areas in the study. The outcome was that a new 2.5 metre high barrier would be provided. The length of the new barrier is 2126 metres. Highways England has made a commitment that the barrier will be of an absorptive type.

12.10 The outcomes for other locations in the study area (e.g. Sindlesham and Winnersh) may be different than that for this area given that, each outcome is based on the result of the three part process described above, which takes into account the estimated noise reductions, the number of properties benefitting, the associated health benefits, and the costs of the barrier or barriers.

- ***Why were noise bunds not considered as an alternative?***

12.11 Earth bunds would require a substantial volume of earth, which would have to be obtained from non-renewable sources (such as quarries or dredging) or from the re-use of construction waste from other projects. Highways England considers that to use aggregate, especially from a non-renewable source, is not sustainable development for a mitigation measure which in any event is not as effective in reducing noise as a noise barrier close to the motorway.

12.12 Further, the construction of earth bunds along the eastbound carriageway in this area would require extensive removal of mature tree cover, which currently provides valuable visual screening.