

PUBLIC INQUIRY
DIDCOT HIF1 ROAD PROPOSALS
CASE REF: APP/U3100/V/23/3326625.

Evidence of Professor Phil Goodwin, BSc (Econ), PhD (Civ. Eng), FCILT, FCIHT
At the invitation of POETS

6 February 2024

Summary

1. In February 2022, Cllr Charlie Hicks, as Chair of the Transport Scrutiny Working Group and Climate Scrutiny Working Group, Oxfordshire County Council, asked me to comment on the treatment of forecasts of traffic, including induced traffic, which were being used to support compulsory land purchase for the construction of the HIF road projects
2. My main conclusion was

“The issue of concern is that I believe this work must have been carried out during the period when the dominant general traffic forecasts were informed by the DfT’s 2015 or 2018 National Traffic Forecasts. These were made before the onset of (a) Brexit, (b) Covid19, and the radically increased recognition of (c) the effects of climate change and (d) the importance of policies to combat it, both nationally and in Oxfordshire. It is my view that these four factors radically change the forecasts of traffic which would now be appropriate. Therefore even if the Paramics simulation is correct on the basis of these earlier forecasts, it would not necessarily be accurately representing the relevant current base level, or the factors leading to change. The assessment of the impact of the HIF schemes cannot be more accurate than the assessment of the base level of demand and the factors operating on it.”
3. I also suggested that induced traffic, which (from the papers available) did not seem to have been properly taken into account in the appraisal, and some other matters. I mentioned that the Welsh Government had set up an Independent Commission of well qualified people to reconsider each one to assess its contribution to the Government’s wider policy objectives, and that initiative might provide a useful way forward¹. The full text of my advice at that time is included as an Annex to this submission.
4. POETS, as an Interested Party to the current Inquiry asked me to extend this advice to take account of the changes in circumstances and DfT advice since that date. There have been very substantial changes to the DfT traffic forecasts at a national level, and profound changes in the advice by DfT on how these forecasts should be handled when appraising specific local or strategic road proposals. I broadly support those changes, and indeed was one of many specialists involved in the DfT’s consultation on them. Essentially, it is no longer acceptable to calculate benefit cost ratios, and value for money, by reference to a dominating ‘most probable’ or ‘central’ traffic forecast, whatever it might be. Now, the criteria of assessment must take into account a wide variety of different scenarios of the future, marked by substantially higher and lower levels of traffic growth and the factors underpinning them, with the intention of establishing that the scheme provides good value for money even if the original forecasts or planning assumptions turn out to be substantially wrong.

¹ That exercise has now been completed, and the Committee on Climate Change suggested it would be a useful initiative to apply more widely.

Introduction

5. I am Phil Goodwin, Emeritus Professor of Transport Policy at University College London and the University of the West of England. I have a degree in Economics and a PhD in Civil Engineering, and am a Fellow of the Chartered Institute of Logistics and Transport, and of the Chartered Institute of Highways and Transportation. I formerly worked as a transport planner in the Greater London Council, as Director of the Transport Studies Unit, University of Oxford 1979-1996, and as a Professor in the Centre for Transport Studies, UCL, and the Centre for Transport and Society, UWE, and as a non-Executive Director of the Port of Dover.
6. I have advised the Department for Transport, and its predecessors, on matters of demand forecasting, project appraisal, economic and policy analysis throughout the period 1991 to the present, in roles which included Ministerial appointment to various Advisory Committees (notably Standing Advisory Committee on Trunk Road Appraisal (SACTRA) 1991-1999, Advisory Panel for the White Paper 'A New Deal for Transport' 1997-8, and the Joint Analysis Development Panel (JADP) 2015-2023, and in commissioned research projects and evidence reviews on travel demand, behavioural responses, and economic appraisal. . I have also advised the Welsh Government, some foreign Governments, and many local authorities. My personal and collaborative research, for DfT and other national and international bodies, comprises several hundred published reports and papers, listed at [Google Scholar](#). From 2020-2022 I was Senior Fellow on Transport and Carbon for the Foundation for Integrated Transport, and my work on that topic is compiled [here](#), including the text of evidence submitted with colleagues to three inquiries of the House of Commons Transport Committee.
7. I have submitted this evidence at the request of POETS, pro bono publico. None of it represents the views of the Department for Transport or any other body except where I specifically quote them.
8. I am personally grateful to the Examining Authority for permission to submit this evidence late, due to issues of health and family care in recent months. Bearing that in mind, and to allow opportunity to the Applicant or others to consider or respond if they want, I have not tried to comment on all the issues in front of the examiners, but focus mainly on one central issue which, in my reading of the submitted documents, does not seem to have been treated properly, or at all. This is the Guidance published by the Department for Transport on how to handle the problem of 'uncertainty', especially in relation to traffic forecasts, and what follows for the appraisal of projects.

The 2022 National Road Traffic Projections, and the treatment of 'Uncertainty' in Appraisal

9. One of the common problems with appraisal of 'old' projects which have been under consideration for many years, is that a lot of the initial work becomes less and less relevant as years go by, but the task of re-doing the appraisal from scratch, and

rethinking the logic and case, meets great resistance. This is especially the case for appraisals which have been carried out under earlier government advisory notes, procedures and assumptions. My view is that this has left the Didcot proposals without an adequate appraisal, because the analysis does not comply with current DfT advice.

10. National Road Traffic Forecasts have provided a framework which has affected all national and local road and indeed other transport project appraisals at least since 1958. These have evolved over time, with particularly important change made in 2015 and 2018. Until then it had been common to make a single ‘best’ or ‘most probable’ forecast of future trends, and even where alternatives were calculated, most appraisal was dominated by a central or base set of forecasts. This practice was no longer endorsed by the DfT after 2018, when a set of alternative possibilities were all treated as possible future scenarios, (though many road promoters were very slow to implement this in practice). Between 2018 and 2022 the issue of an uncertain future forced itself to the forefront of discussion, because of major changes triggered by Brexit, Covid 19, economic disruptions, the reality of climate change, and the potential changes in transport policy, costs, and priorities required to counter, or adapt to it. [The 2022 forecasts](#) – now retitled ‘projections – represented a broad band of possible future trends, taking into account new insights on behavioural trends, alternative assumptions about economic growth, the uptake of electric vehicles, and emerging issues including working from home.
11. The scale of uncertainty involved was very substantial. The range of traffic growth in the forecasting period ranged from an overall traffic growth from 8% to 54% over 35 years even when the constraint was applied that only already completely committed and funded policy and infrastructure changes were to be considered. On issues where decisions had not yet been taken, or might change, it was accepted that the range of future possibilities was even greater.
12. The DfT published guidance on how this should be treated in project appraisal, evolving during 2022 in the DfT’s Transport Analysis Guidance Note [TAG Unit M4 Forecasting and Uncertainty](#). and its associated [Uncertainty Toolkit](#) ²
13. DfT TAG Unit M4 states that

“For all interventions, a core scenario appraisal should be undertaken. However, there are significant and often unquantifiable uncertainties associated with forecasting travel demand, such that it is not possible to robustly identify a ‘most likely’ or expected outcome with any certainty. Key questions include:

- Under high demand assumptions, is the intervention still effective in reducing congestion or crowding, or are there any adverse effects, e.g. on safety or the environment?
- Under low demand assumptions, is the intervention still economically viable?

² These are the latest versions, dated November 2023. They were preceded by substantial discussion, a first published version in 2021, with what DfT describes as ‘extensive engagement with stakeholders’ and already referred to in the publication of the 2022 National Road Traffic Projections, so it will not have come as a surprise to any Applicant carrying out appraisals during 2022 and since..

- Under a wide range of possible futures, does the intervention still provide value for money?
14. This requires a form of Scenario Analysis, and the Uncertainty Toolkit lists the level of detail and scope sort of reporting that should be done to address these three ‘key questions’, which clearly specify that ‘value for money’ should be addressed, both in the Outline Business Case stage presented for public examination, and at the ‘Full Business Case’ stage.

Table 2 Technique selection for a proportionate approach to scenarios analysis

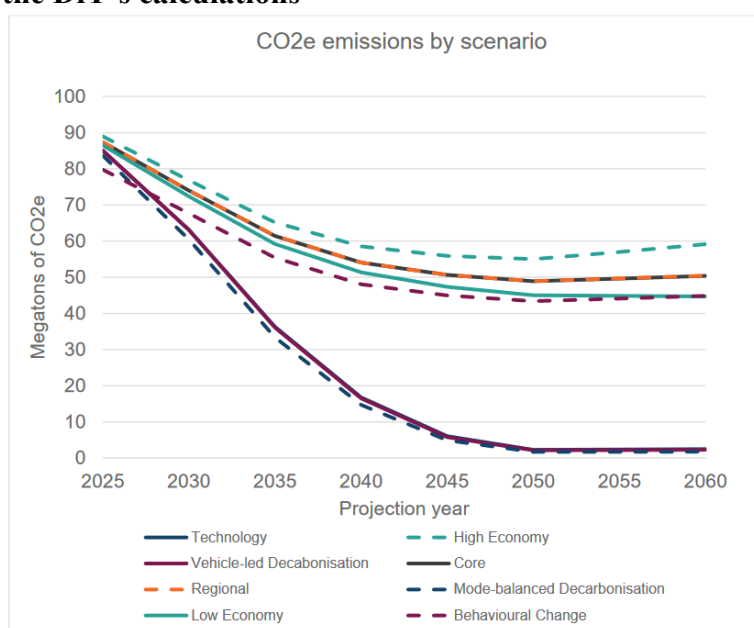
| | Low Impact Projects | Medium Impact Projects | High Impact Projects |
|--|--|--|---|
| Requirement for all schemes at all stages | Qualitative discussion of how the options developed could be impacted by the different Common Analytical Scenarios | | |
| Recommended for Strategic Outline Cases | Qualitative discussion of Common Analytical Scenarios as described in the ‘requirement for all schemes’ | Proportionate quantitative analysis of scenarios critical to decision making | Proportionate quantitative analysis of scenarios critical to decision making on a subset of longlisted options |
| Recommended for Outline Business Cases | TAG M4 Low/High or envelope of Common Analytical Scenarios to be run and VfM reported | Critical Common Analytical Scenarios to be run, with reported VfM. Alongside this, any relevant local scenarios could be run. For scenarios not critical to decision making, there should be proportionate quantitative analysis | Critical Common Analytical Scenarios to be run, with reported VfM. Alongside this, any relevant local scenarios could be run. For scenarios not critical to decision making, there should be proportionate quantitative analysis |
| Recommended for Full Business Cases | TAG M4 Low/High or envelope of Common Analytical Scenarios to be run and VfM reported | Critical Common Analytical Scenarios to be run, with reported VfM. Alongside this, any relevant local scenarios should be run. For scenarios not critical to decision making, there should be proportionate quantitative analysis | Critical Common Analytical Scenarios to be run, with reported VfM. Alongside this, any relevant local scenarios should be run. For scenarios not critical to decision making, there should be proportionate quantitative analysis. |

15. (‘Low impact’ here has a suggested definition of: costs less than £50m; calculations of value for money ‘solidly within a value for money category’ (low, medium, high); there is limited corporate risk of ‘minor embarrassment’; input assumptions have a low range of uncertainty; and there is a short lifetime of less than 5 years. ‘Medium Impact’ has a suggested definition of: costs of £50m to £500m; there is a risk of a ‘minor’ loss in confidence; the scheme is close to a value for money category

boundary; lifetime of 5 to 50 years. I am not aware of an assessment for this scheme, but would have thought that it is more likely to be medium impact than low impact. The toolkit points out that ‘As a rule of thumb, the potential benefits gained or costs avoided by improved decision-making should be greater than the costs of doing the uncertainty analysis’. This is a sensible principle, though it is difficult to see how the test could be applied with any confidence without doing at least some scoping work of the uncertainty analysis).

16. In general, the guidelines favour a systematic consideration of all the Common Analytical Scenarios, to assess the key question of ‘Under a wide range of possible futures, does the intervention still provide value for money?’
17. There is a short cut method available in which only ‘high traffic growth’ and a ‘low traffic growth’ scenarios, roughly the equivalent of the highest and lowest of the CAS scenarios, although the calculation is done differently. (In this case the DfT recommends symmetrically adding or subtracting 4% per year to the traffic levels in the core case, damped by using the square root of the number of years. This gives a rather similar range to the CAS, ie 8% to 54% at the national level and proportionately for local variations).
18. The key policy significance of carrying out such tests tends to be different when considering high growth and low growth assumptions: low traffic growth can substantially reduce the estimated value for money, eg BCR or NPV, even pushing it negative. High growth assumptions tend to increase the value for money, using the conventions of how this is usually calculated, but can significantly impact on estimated traffic conditions, most obviously seen by a significant reduction of the number of years for which traffic conditions are improved, and therefore raising the question of an embarrassingly rapid need to consider further capacity increases, or the need to add major demand management policy interventions, which, if they are not programmed in advance, can also cause loss of confidence.

19. The Scenarios have a very substantial impact on carbon emissions, as shown in the DfT’s calculations



20.

21. There are equivalent results for other environmental factors (NOx, PM10) and congestion levels, mostly driven by distance travelled and vehicle type. Without prejudging the analysis, I would argue that the careful examination of these, to inform both the business case and environmental case, is entirely material to the investment decision.

Endnote

The POETS evidence refers to a quotation by the Minister of Transport which mentions my name, as follows

“In written evidence the Minister for Transport stated that road traffic projections were “not a predict & provide approach”. He rejected the argument by Prof. Phil Goodwin, that road traffic projections were a “predict & provide core, surrounded by decarbonisation language.” (Evidence from POETS)

I won't entirely disclaim these words attributed to me, which are in sympathy with my concern that predict and provide policies can be followed even at the same time as claiming to support decarbonisation, but the quote does not sound quite right. I have not been able to track down those exact words anywhere: I think the phrase may have been a note drafted by civil servants for the Minister to sign, in relation to evidence I submitted to the House of Commons Select Committee on Transport. The proposition would clearly need to be put into context of when it was exactly said, in relation to which projections, and under which Secretary of State and Prime Minister. To avoid misunderstanding I should clarify that I do **not** think the road traffic projections are necessarily a “predict and provide core surrounded by decarbonisation language”: the projections are perfectly *capable* of being used to support decarbonisation, demand management, alternative policy options and an integrated consideration of all modes of transport, with recognition of the key importance of uncertainty, as discussed above and, for example, in the version of ‘Decide and Provide’ provided in the [TRICS Summary Guidance](#) which I understand Oxfordshire County Council has supported. Whether that is the case or not depends on the policy decisions, the appraisal of projects, the alternatives which are considered, funding, and commitment.

Appendix: Outline Comments on HIF Forecasts and Appraisal made in February 2022

Professor Phil Goodwin³, BSc (Econ), PhD (Civil Engineering), FCILT, FIHT

Introduction

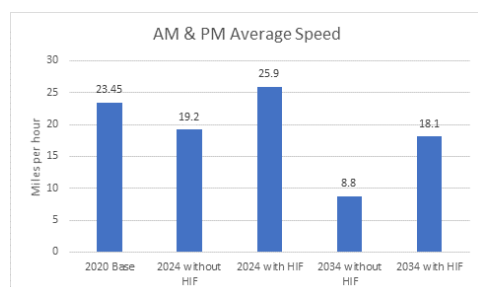
Cllr Charlie Hicks, Chair of the Transport Scrutiny Working Group and Climate Scrutiny Working Group, Oxfordshire County Council, asked me to comment on the treatment of forecasts of traffic, including induced traffic, which are used to support compulsory land purchase for the construction of HIF road projects. These are part of County's housing and other development plans. He provided me with an email chain between himself and the Head of Infrastructure Delivery, Ms Hannah Battye, and links to various published summary material about the proposals, which I have read, but I have not studied the voluminous earlier work about the development proposals themselves, and do not have a view about these.

The main relevant material is contained in an email from Ms Battye dated 17.2.2022, which embodies earlier correspondence. The extracts below are taken from that email.

Background

Oxfordshire County Council has worked up, over some years, a proposal for additional housing, employment and related development in Didcot and neighboring areas. This would increase the number of people living and working in the area, and therefore the volume of traffic. Calculations suggest HIF proposed road schemes would allow the development to go ahead while reducing congestion and carbon emissions.

Traffic Forecasts



The main forecasts cited by Ms Battye are made by the Consultancy Systra using a model called the Didcot Paramics Microsimulation model, owned by OCC.

At face value, they show that without the road schemes, average peak speeds on the relevant part of the network would reduce as a result of the development, from 23.45 mph in 2020, to 19.2 mph in 2024 and a further decline to 8.8 mph in 2034. However, if the HIF schemes are implemented speeds would rise to 25.9 mph in 2024. But then they would fall back to 18.1 mph in 2034 even if the HIF schemes are implemented. This speed is not only less than in 2024, but is even less than the 2020 base figure.

Therefore it seems that the forecast relief from congestion of the HIF schemes is expected to be very short lived. I do not know if there is an implied further set of road schemes that is planned for the early 2030s.

³ See personal statement at end.

The Paramics model, as I understand it, is essentially a comparison of two cases: both with the development in place, which produces a given total number and location of journeys, but one figure with and one without the road schemes.

Traffic forecasts from 2020 to 2024 and 2034 must clearly be influenced by many other factors than the development and the roads – assumptions about demographics, the state of the economy, the level of car ownership, the cost of fuel, the cost and quality of public transport, policy on traffic management, speed limits, the proportion of vehicles of different types, progress on active travel, and any additional traffic that would be induced by the presence of the road improvements themselves. If I have understood correctly, the Paramics model has itself not been used to make forecasts of all these factors, and indeed does not have the functionality to do so. Rather it has looked at the effects only of the traffic generated by the proposed developments themselves.

But in that case, therefore, the actual forecasts of traffic due to all these other factors have not come from the Paramics model, which seems to be overlaid (I think) on forecasts produced earlier using the Oxfordshire Strategic Model (OSM) which does have the functions to calculate the effects of some of these other factors. I am familiar with the nature of this Model, but have not seen a report of its earlier calculations.

The issue of concern is that I believe this work must have been carried out during the period when the dominant general traffic forecasts were informed by the DfT's 2015 or 2018 National Traffic Forecasts. These were made before the onset of (a) Brexit, (b) Covid19, and the radically increased recognition of (c) the effects of climate change and (d) the importance of policies to combat it, both nationally and in Oxfordshire. It is my view that these four factors radically change the forecasts of traffic which would now be appropriate. Therefore even if the Paramics simulation is correct on the basis of these earlier forecasts, it would not necessarily be accurately representing the relevant current base level, or the factors leading to change. The assessment of the impact of the HIF schemes cannot be more accurate than the assessment of the base level of demand and the factors operating on it.

Induced Traffic

Induced traffic is defined as the additional traffic which results from the provision of additional road capacity which reduces travel times. It may be thought of as the equivalent of the extra traffic which results from reduced journey costs. Both are also influenced by convenience, comfort and other conditions, as well as the availability and attractiveness of other modes of travel. The induced traffic will be made up of the net effect of additional trips or greater frequency of trips, transfer from other modes, increased journey length from more distant origins or to more distant destinations, changes in routes chosen, and will have different effects depending on location, time and season. Where road provision changes land use patterns, this can also be treated as induced traffic.

The only response included in the Paramics modelling is the choice of route travelled, for the two cases with and without the schemes, but both taking the development as given⁴. It is very widely experienced that the provision of additional road capacity does in fact change behaviour in the ways described, and such induced traffic is therefore likely to occur. This means that there will be additional traffic due to other people using the road system. It is also clear that the Paramics model does not have the facility to make such calculations, and has not tried to do so. My

⁴ Note that the roads schemes are described as a necessary condition of the development, which means that strictly the traffic speed forecasts for the case with the development but without the road schemes could not actually occur. Sometimes this causes considerable misunderstandings.

understanding is that there is no claim that such induced traffic will not exist. Rather, the suggestion by Ms Battye is that it is unlikely to be big enough to make any difference:

“for any ‘induced demand’ to have a negative impact on HIF results (make the speed lower than 2024 without HIF), the induced trips would have to be approximately at least the same as the number of trips from ten years of housing and employment growth”

Note that a ‘negative impacts’ is defined, in the brackets, as making the speed in 2024 with the roads lower than the speed without the roads. It is established in traffic science that it is possible for such a big effect to occur, but in the short run it is thought to be rare. However, even in the short run I do not think that this is the correct comparison. Induced traffic has a negative impact on the HIF results even if it is say half the number of trips (or even just 10% of the number of trips) from the housing and employment growth. In these cases the speeds will be lower than calculated, and the benefits therefore less⁵. This would be revealed when any consideration is made bringing the normal criteria for value for money for road schemes into consideration of the special criteria of value for money of development.

In the longer run, there is a further effect. The question is whether the combined effect of the development and the roads results in a more car dependent life style, a dynamic process which tends to reduce the quality of public transport, and location of facilities, triggering a sort of vicious circle in which the end result is indeed worse for all. This is not inevitable – it would depend, for example, on parking policies, density, provision of facilities like shops, frequency of buses, access to rail services, cycling and pavement standards, schools, doctors etc. But then the traffic forecasts would need to be different depending on the outcome of all these decisions. It is difficult to see how this would be done using the Paramics model, which implicitly will be assuming particular details of development whether or not they have yet been defined.

Taking account of induced traffic will have the effect of further reducing the predicted benefits of both reduction in congestion and reduction in CO₂. (That is, they will be worse than the current forecasts for 2034 'with' the schemes). This will reduce the value for money of the schemes and increase the climate damage caused even if the amount of induced traffic is smaller than the amount of increased traffic from the development. I am not aware that there has yet been any calculation of value for money, but that will may be scrutinised in any Inquiry or Public Examination.

Other considerations.

The effect of speed on carbon emissions is different for an individual vehicle travelling at those speeds (which I think the graphs refer to), compared with a stream of traffic whose average speed varies (which the traffic forecasts refer to). Also, low speeds have entirely different effects if they are in stop-start conditions due to heavy congestion, or if they are a smooth lower speed due to reduced speed limits and managed traffic flows which, hopefully, is what can be implied in the future. Slower speeds are in general inefficient for vehicle which have been designed to be able to travel must faster than the deign speed (or speed limt) or the road. I note that there is currently much more consideration of the effect of different designs of development can have on traffic conditions, for example if housing design is on the basis of multiple car ownership, or reduced car use by provision and accessibility to local services and attractions, and good alternative facilities for walking, cycling and pubic transport. These are of course, quite rightly, a priority for

⁵ At a technical level, the relationship between speed and traffic flow is not linear, especially in congested conditions, so I'm not sure I understand the 'at least the same as...' rule of thumb.

the Council, but it is not clear how the forecasting methodology allows such policies to have any effect on the traffic.

What to do?

Oxfordshire is not alone in being faced with this problem, which is not uncommon in Local Government when a large proposal inherited from a previous administration has to be assessed (a) following a change in the political complexion of the County, and (b) in the middle of a very substantial change in Government objectives and appraisals, due primarily (though not only) to climate change.

I think the current experience in Wales may be helpful to Oxfordshire. Faced by a large number of ‘inherited’ road schemes whose appraisals had been carried out at a time of different traffic forecasts and different policy priorities, the Welsh Government has announced a pause in further progress on those schemes, and set up an Independent Commission of well qualified people to reconsider each one to assess its contribution to the Government’s wider policy objectives. Their approach derives from similar thinking to the UK Treasury revision last year of its ‘Green Book’ of the general rules of appraisal. So far one scheme has been formally abandoned, and another I think will be modified. I don’t prejudge the overall outcome, but what is clear is that existing or modified schemes which go ahead, will do so with a much greater confidence that they are well thought through and consistent with objectives.

Personal Statement

I have experience in the assessment of traffic forecasts, the calculation of induced traffic from road schemes, and similar matters. I am Senior Fellow of the Foundation for Integrated Transport, and Emeritus Professor of Transport Policy at University College London and the University of the West of England. I was formerly Director of the Oxford University Transport Studies Unit (1979-1995) and a resident of Oxford during that time. I have been an advisor to the Department for Transport on traffic forecasting and road appraisal methods for 40 years, and currently, including being co-author of the official SACTRA report on Induced Traffic in 1994, and reports on suppressed or ‘disappearing’ traffic and forecasts. I am also currently advising the Welsh Government on its new road appraisal methodology. I have appeared as an expert witness in a number of planning enquiries particularly Public Examination of road schemes.

I am conscious that I have not had the opportunity to read all the documentation and technical reports that surely exist even if not all published, on all the background to the Oxfordshire Transport Strategy, the development proposals and the technical modelling reports, as I would expect to do in a proper professional study. Therefore my conclusions are necessarily provisional. I built my career in Oxford during the late 1970s to mid 1990s, with good working relationships with both City and County at that time, and have a great affection for the region. These comments are offered pro bono publico.

Phil Goodwin 28.02.2022