



URBAN TRANSPORT GROUP

Consultation response

Understanding and valuing impacts of transport investment

Values of travel time savings

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Content

1. Introduction	1
2. Response to consultation questions	1
Q1. Do you agree that we should introduce distance-based business values of time?	1
Q2. Do you agree with the 3 distance bands being proposed?	2
Q3. Should distance be based on crow-flies or network distances?	3
Q4. What practical difficulties might there be in applying distance-banded business values of time in TUBA appraisals?	3
Q5. Similarly for non-TUBA appraisals, what practical difficulties might there be and how might these be overcome?	3
Q6. For modelling, what would be the most desirable form for the business values? Could distance-based values be practically implemented? Or would it be preferable to have a continuous function of single, average values for modelling purposes? ...	4
Q7. Do you agree with our implementation of non-work values of time?	4
Q8. Do you agree with the proposed range for high/low testing around the values based on their 95% confidence intervals?	4
Q9. Are there additional data or values that it would be useful for us to make available for sensitivity testing?	5
Q10. Do you agree with the proposal to update the car occupancy assumptions in the TAG data book and to project no future change in occupancy?	5
Q11. Do you agree with our planned implementation of a reliability ratio of 0.4 for car travel?	5
Q12. In practice, is the current 0.8 reliability ratio also applied to freight? And is there any other evidence we should be aware of when considering how the results from this research might or might not be applied to freight?	5
Q13. Do you agree with our planned implementation of changes to the average lateness multipliers for public transport?	5
Q14. Do you agree with the plan to continue applying PDFH rail crowding multipliers?	6
Q15. Should it be a priority to provide guidance on valuing crowding reduction benefits for bus and other non-rail public transport modes in webTAG?	7
Q16. Do the crowding levels described in this study offer a suitable basis for that guidance? If not, what metrics should be used? And can these be translated or mapped to the levels used in this study?	7
Q17. Are there other sources of information or research that we should be aware of when preparing guidance in this area?	7
Q18. Do you agree with our planned changes to guidance on wait times and service frequency multipliers?	8
Q19. Do you agree with our proposal to apply values from the motorised modes to walking and cycling?	8
Q20. Where should priorities lie for further research?	8
Q21. Are there other areas not covered here that we should also be considering?	10



1. Introduction

- 1.1. The Urban Transport Group (UTG) represents the seven largest city region strategic transport bodies¹ in England, which, between them, serve over twenty million people in Greater Manchester, the Liverpool City Region, London, the North East Combined Authority area, the West Midlands conurbation, South and West Yorkshire.
- 1.2. Nottingham City Council, the West of England Partnership and Strathclyde Partnership for Transport (SPT) are associate members of the UTG, though this response does not necessarily represent their views. Our members plan, procure, provide and promote public transport in some of Britain's largest city regions, with the aim of delivering integrated public transport networks accessible to all.
- 1.3. We understand that some of our members are submitting individual responses to this consultation. This joint response focusses on common views across our members and on areas of shared interest.

2. Response to consultation questions

Q1. Do you agree that we should introduce distance-based business values of time?

- 2.1. Whilst the DfT's recent Stated Preference research does seem to suggest a positive correlation between distance and the value of time for business travel on some modes, we are not convinced that this is sufficient, on its own, to justify the changes being proposed. This is especially the case given that the current plans would introduce a number of practical complexities and new theoretical problems into modelling and appraisal.
- 2.2. In particular, we feel that:
 - (a) this latest empirical evidence is not matched by a robust and consistent theoretical framework;
 - (b) there has been only a very limited attempt to confirm this latest SP analysis with evidence from other sources, such as Revealed Preference studies, more qualitative research into passenger behaviour, other SP studies or meta-analysis.
 - (c) as the researchers themselves seem to recognise, this apparent correlation is likely to be masking other systematic differences in journey and personal characteristics between trips of different lengths.
- 2.3. In addition, some of our members have expressed further doubts over the way in which the new distance-based values of time have been derived for 'other public transport' passengers.
- 2.4. The DfT's own analysis of the research begins to unpick point (a), for example, by noting that for long journeys (of, say, over two hours in duration), time savings can have a large and direct impact on the amount of time available at the destination or on associated non-transport costs, for example, relating to overnight accommodation. However, this does nothing to explain differences in the value of time for the vast majority of journeys, which are much shorter in duration. It would therefore be worth exploring further what the driving

¹ With the exception of Transport for London, these bodies were formally known as Passenger Transport Executives (PTEs) and the UTG was previously known as the Passenger Transport Executive Group. In recent years, some PTEs have been abolished with their functions transferred onto successor bodies, such as Combined Authorities. The new name for our group reflects these changes.



factors and possible explanations behind the observed correlation are likely to be. It is interesting to note that, in a recent published paper, some of the researchers involved in the DfT's latest work argue that "[f]urther **detailed exploratory research** [our emphasis] is needed into how employers value the benefits of employees' time savings."

- 2.5. We would add that those interpreting and applying guidance often do so in circumstances that go beyond the context in which the evidence was originally derived. An understanding of the factors driving observed behaviour is therefore critical in order for practitioners to be able to make sound and robust judgements.
- 2.6. In relation to point (b), we acknowledge that the scale of this latest SP research is likely to be unprecedented in the UK. However, that does not necessarily mean that this is the most robust evidence generated to date. On the one hand, there are well-known limitations to SP research. But more importantly, and despite the scale of this study, the sample size for individual market segments, and constraints around survey design, mean that researchers have only been able to explore the impact of a relatively narrow range of factors on survey responses. In order to go beyond this initial analysis, it would seem sensible to seek to comprehensively cross-reference these latest results with those from other sources. This was the point of past meta-analyses and of large scale literature reviews such as the TRL 593 report (www.demandforpublictransport.co.uk), which have informed past DfT guidance.
- 2.7. Point (c), relating to the issue of confounding effects, is reasonably well understood and we note that the researchers list factors such as personal income, industry category, job type and journey purpose (below the simply notion of employers' business) that could all be driving the observed correlation. Another possibility, highlighted by one of our members, is that the correlation between distance and the value of time is in fact masking a correlation with the size of travel time savings and/or journey duration. We feel that this possibility has not been fully explored in the research study or sufficiently acknowledged in the DfT's consultation document.

Q2. Do you agree with the 3 distance bands being proposed?

- 2.8. Conceptually, we have fundamental issues with the three discrete distance bands proposed. It seems difficult to explain why somebody travelling 49km would place 50% more value on travel time savings when making a journey 2km further.
- 2.9. We feel that the current proposal would therefore make it difficult to carry out a robust and reliable comparison of schemes where destination choice could vary and which involved a combination of trips of different lengths. The problem would be particularly acute for schemes aimed at journeys of around 50km or around 100km and we therefore don't think the current proposal could work as a general framework. In practice, a large proportion of scheme proposals developed by our members are dominated by journeys in the lower distance band. It would therefore be potentially helpful to widen that band and/or to allow the same value of time to be applied to all journeys affected by the scheme. This is particularly relevant for smaller or more targeted schemes, for which there may actually be no information available on the overall trip length distribution of users.
- 2.10. However, it remains a concern that the precise banding adopted would ultimately have a significant bearing on the outcomes of appraisal.



Q3. Should distance be based on crow-flies or network distances?

- 2.11. We understand from recent stakeholders that DfT's position on this issue has evolved since the original consultation document was published. We hope that our views, expressed below, serve to reinforce DfT's latest thinking.
- 2.12. There would be some potential practical advantages in using 'crow-flies' distance as the distance (and hence the value of time) between each OD pair would remain constant regardless of route choice.
- 2.13. A perhaps more important problem which is not acknowledged in the consultation document, is that of multi-leg journeys. We have not seen it clearly stated whether the proposed values of time apply to individual legs or to entire door to door journeys. Our view is that it should be the latter. Take the example of a journey between a suburb of London and a suburb of Birmingham. In one scenario, this journey could be made by a short walk to a local train station and a direct train service to a local train station near the destination. In another scenario, the same journey would require two additional local public transport trips at either end to connect to local train stations. It would seem sensible that (a) individuals would be willing to pay more for a given travel time saving in the first scenario and (b) that they would be willing to pay the same if not more for travel time savings on the local transport mode as this is likely to be the portion of the journey which is least likely to be used productively.
- 2.14. This example also highlights the issue of whether it is distance, journey time or the travel time savings that are correlated with the value of time, which we alluded to in our response to question one.

Q4. What practical difficulties might there be in applying distance-banded business values of time in TUBA appraisals?

- 2.15. We understand this question to refer to both the use of the TUBA software application and network models which provide its inputs.
- 2.16. Views on this point vary amongst our members, reflecting both differences in the modelling suites used and the amount of in-house capability available.
- 2.17. Some of our members felt that this would be a relatively straightforward process. Others felt that it would involve considerably more preparation work and longer model running times.
- 2.18. It was generally felt that the three distance bands proposed could cause significant instability in model convergence. This would potentially also be a problem in the case of the value of time varying as a continuous function of distance.

Q5. Similarly for non-TUBA appraisals, what practical difficulties might there be and how might these be overcome?

- 2.19. Views on this point vary amongst our members, depending on the type of non-TUBA appraisal being employed. Generally, it was felt that this could be done with a greater or lesser amount of effort.



Q6. For modelling, what would be the most desirable form for the business values? Could distance-based values be practically implemented? Or would it be preferable to have a continuous function of single, average values for modelling purposes?

- 2.20. Appraisal and behavioural values should ideally be internally consistent in order to ensure the evidence on which decisions are made is as robust as possible. In some cases, we use appraisal values which deviate from behavioural evidence, for example, when central government chooses to adopt a national equity value of time. In such cases, behavioural values should reflect the best available evidence.
- 2.21. If behavioural values of time do indeed vary with distance in a continuous fashion, as suggested by this latest research, then there is clearly a case for implementing them directly in that form in modelling.
- 2.22. At the same time, moving away from a uniform value of time does pose some clear challenges. Model convergence and increases in run time are particular concerns amongst our members. These and other challenges would probably take some time to resolve and would best be addressed in close collaboration with the transport modelling software community.
- 2.23. Whether it is worth making the investment necessary to deal with this issue is something that needs to be weighed against the confidence we have in the link between distance and the value of time, and the specific form of the relationship, both of which are issues which still require further investigation.

Q7. Do you agree with our implementation of non-work values of time?

- 2.24. As we note in response to question one, we have some questions over the strength of the evidence on which the DfT's recommendations are based. Given these unanswered questions, we welcome the DfT's proposal to adopt values of time that are invariant with distance, pending further work. We agree that additional analysis (which could, for example, include qualitative surveys, RP analysis, a comprehensive literature review and further analysis of the existing datasets) could help shed further light on the reasons behind the recent research results. We are particularly interested in understanding why the average value of non-commute time appears to have dropped so considerably relative to current guidance.
- 2.25. An issue of particular concern is the value of time for "other" journey purposes – i.e. not business or commuting. This category encompasses a wide range of journey types, missing up some that are severely time constrained with others that can be scheduled much more flexibly. It is therefore possible that this average values will be understating the value of journeys for example to education facilities, to medical facilities or to sports/entertainment venues. It has also been suggested that SP survey respondents may not be representative of time constrained travellers, as those in a hurry would be less likely to respond.

Q8. Do you agree with the proposed range for high/low testing around the values based on their 95% confidence intervals?

- 2.26. We agree with the principle of sensitivity testing, although the proposed confidence intervals (around two standard deviations) seem remarkably wide. Assuming that some of the



estimated parameters were found to be significant at just around the 95% or 99% confidence level, then this would imply, by definition, testing schemes for a value of time close to zero.

Q9. Are there additional data or values that it would be useful for us to make available for sensitivity testing?

2.27. We would strongly encourage the DfT to make all the data, script files and related implementation tools openly available to the wider practitioner and researcher community.

Q10. Do you agree with the proposal to update the car occupancy assumptions in the TAG data book and to project no future change in occupancy?

2.28. Yes, this seems sensible given the evidence. However, given the relatively small sample sizes in the National Travel Survey and the intrinsic weaknesses in trend-based forecasting we would welcome further work to attempt to understand the factors driving changes in car occupancy and how these might change in future.

Q11. Do you agree with our planned implementation of a reliability ratio of 0.4 for car travel?

2.29. While this seem sensible given the evidence, guidance could do with a more comprehensive explanation of the alternative conceptual approaches for dealing with reliability (schedule deviation/lateness multipliers, mean-standard deviation/reliability ratios) and how they relate to each other functionally. There are some inherent weaknesses

Q12. In practice, is the current 0.8 reliability ratio also applied to freight? And is there any other evidence we should be aware of when considering how the results from this research might or might not be applied to freight?

2.30. We refer you the consultation response of our members, Transport for London, which highlights the complexities around modelling the value of reliability for freight users of the transport network and notes some of the work which they are conducting in this area.

2.31. In general, we would note that there are likely to be large variations in the scheduling constraints and the penalty for late arrivals that apply to different freight users (a postal van carrying same day parcels, post or documents is very different to a lorry carrying aggregates). We would support further research in this area by the DfT and would be keen to be involved in any future work.

Q13. Do you agree with our planned implementation of changes to the average lateness multipliers for public transport?

2.32. As stated in response to question 11, we feel that the DfT's consultation document could do with a more comprehensive explanation of the alternative conceptual approaches to dealing with reliability (schedule deviation/lateness multipliers, mean-standard deviation/reliability ratios) and how they relate to each other functionally. This is particularly important background in the context of public transport where there are significant differences in how passengers choose an arrival time at stops and stations, depending on the typical interval between services.



- 2.33. More specifically in relation to the proposed implementation of lateness multipliers, we believe that in the context of high frequency public transport services which tend to operate in urban areas, many passengers are more aware of, and more interested in, the variability of journey times than in the mean lateness relative to the timetable.
- 2.34. There is also a case, rooted in Prospect Theory and supported by some empirical research, for arguing that transport users are likely to place much greater weight on unusually large delays, which are better represented by standard deviation of journey times than by average lateness. This pattern tends to be observed in empirical studies which allow the value of time to vary with the scale of unreliability. The proposal put forward by the DfT to continue to use average lateness multipliers across all public transport modes can therefore be criticised for not adequately reflecting passenger behaviour. More specifically, it is likely to continue to under-estimate the negative impact of very unreliable public transport services, typically those travelling on un-protected rights of way.
- 2.35. In relation to the specific proposal to revise the lateness multiplier for non-rail public transport modes from 3.0 to 2.4 we do not find the rationale given by the DfT at all compelling, as we fail to see the link between the value of wait time and lateness multipliers. Taking the results of this latest empirical research at face value (Table 4.7 in the Phase 2 consultants' report), then the lateness multiplier should be 3.5 for bus and 2.5 for 'other public transport'². In general, there seems to be a strong case for using separate values for bus and other public transport modes, not least because of differences in the waiting environment (take, for example, an uncovered, un-lit bus stop, without any timetable information available, and compare it with a medium sized staffed rail station with a few shops and real time information displays). There is also evidence to support different values of reliability for different journey purposes.
- 2.36. This is an area in which we feel DfT's recommendations could be strengthened and would welcome the opportunity for a more detailed discussion.

Q14. Do you agree with the plan to continue applying PDFH rail crowding multipliers?

- 2.37. We agree with the proposal to continue to apply PDFH rail crowding multipliers to rail, with a couple of caveats:
- We do not consider that the main reason given in paragraph 5.16 is especially compelling (*'the greater focus on crowding in the research that led to the PDFH multipliers'*). Each research exercise has its own strengths and weaknesses, and is representative of potentially different user groups. We would suggest that it would be useful to explore the source of differences in results, not least to the Passenger Demand Forecasting Council, who maintain PDFH, and of which we are members.
 - It is not clear why crowding multipliers for rail are given in relation to all modes. Couldn't this be corrected, thereby enabling a more reliable comparison between PDFH guidance and this latest research?

² Lower figures (2.88 and 1.75) are presented later in the report though it is not clear whether they are for a representative journey. In particular, we are not sure how to interpret mention in one footnote of 'cost impute for a trip with zero cost'.



Q15. Should it be a priority to provide guidance on valuing crowding reduction benefits for bus and other non-rail public transport modes in webTAG?

2.38. Yes, for the following reasons:

- There is relatively little other robust evidence that we are aware covering this issue;
- From the latest DfT research, the impact of crowding on passenger behaviour could be very large indeed;
- There is a considerable interest from many transport authorities in policy measures which could potentially reduce crowding levels considerably. The business case for these measures may not always stack up purely as the result of frequency improvements. The addition of a crowding in-vehicle time multiplier could significantly change this calculus in some cases, in particular for services at peak times which carry a large proportion of commuters and are vital to ensure good accessibility to large centres of employment.
- This is at the heart of one of the unresolved points of conflict between transport authorities and bus operators, in the context of reimbursement for the English National Concessionary Travel Scheme, the largest single source of public funding for bus services in England.

Q16. Do the crowding levels described in this study offer a suitable basis for that guidance? If not, what metrics should be used? And can these be translated or mapped to the levels used in this study?

- 2.39. The crowding levels described in this study seem like a reasonable starting point in a bus context. Many transport authorities undertake bus occupancy surveys using this level of precision and the fact that results obtained are sensible and significant suggests that this maps reasonably well with passenger perceptions.
- 2.40. At the same time, transport models may employ a more detailed continuous function and it also seems likely that passengers' values of time increase more steeply close to crush point.
- 2.41. Given this, there would be significant value in a small piece of work which could provide a clearer mapping between the descriptions used in the survey and vehicle occupancies expressed in passengers per number of seats or passengers per number of seats and standing capacity. We would also see value in research that could provide more precise and realistic estimates of the value of time under very crowded conditions, which could come, for example from RP data.

Q17. Are there other sources of information or research that we should be aware of when preparing guidance in this area?

- 2.42. Our members regularly carry out SP, RP and other types of travel behaviour survey. Some of these have been included in previous meta-analyses and literature reviews which have informed appraisal guidance. We would be happy to discuss with the DfT whether there may be value in sharing some of this evidence.



Q18. Do you agree with our planned changes to guidance on wait times and service frequency multipliers?

- 2.43. We agree that the evidence from the Wardman *et al* meta-analysis supports the DfT's proposal to revise WebTAG wait time multipliers downwards from 2.5 to 2.0.
- 2.44. However, it would be useful to get greater clarity on what exactly is being proposed with respect to headway penalties. Although the evidence from the latest research is potentially inconclusive if taken as a whole, there does seem to be a strong suggestion that bus passengers place a high value on shorter service headways and this should be reflected in guidance. It is of course possible that valuations of service headway in part reflect valuations of wait time and this is something that we would like to see being discussed and explored in more detail.
- 2.45. One point of correction: service frequency is not the same as headway, as stated in paragraph 5.25. If frequency is expressed as number of services operated over a period of time, then average headway (the time elapsed between consecutive services) is its inverse.

Q19. Do you agree with our proposal to apply values from the motorised modes to walking and cycling?

- 2.46. Given the evidence produced by the DfT's latest research, we agree that the proposal to apply values of time from motorised modes to walking and cycling seems to be a sensible temporary solution.
- 2.47. On the other hand, the DfT's proposal seems to largely ignore other available evidence, which suggests, for example, that cycling time valuations vary widely between different types of user and as a function of cycling conditions.
- 2.48. There is also a considerable past body of evidence on the value of walk time which suggests that this is consistently higher than for motorised modes and tends to increase with distance. This makes some sense as pedestrian's value of time must implicitly include the physical effort involved.
- 2.49. We suggest that it would therefore be worth supplementing this latest research with information from a comprehensive literature review before making changes to WebTAG guidance.

Q20. Where should priorities lie for further research?

Making the data available

- 2.50. As stated in our response to Q1, we feel that the DfT should go beyond its current plans and make the data and analysis scripts produced as part of this research openly available for primary research as is now the norm in many academic fields. This would enable other people to derive more value, and potentially new and valuable insights, at no extra cost to the public purse. It could also provide a free peer review service, an expensive activity whose scope is often severely constrained by project timescales. And finally, it would strengthen public confidence in the DfT guidance.



Scoping an ongoing programme of value of time research

- 2.51. As the peer review team pointed out, the “balance of effort in the study was skewed towards developing advanced choice models, at the cost of more detailed investigation of data quality issues and requiring ad hoc assumptions to be made in implementation”.
- 2.52. We would add to this that this also came at the cost of alternative data collection methods and of exploring insights from different disciplines such as sociology and psychology. Some of the questions being explored by this research are unlikely to ever be satisfactorily answered by stated preference methods and might instead be more fruitfully explored by in-depth investigation of individual and social behaviour. The ability to make productive use of travel time by different people in different circumstances, the ability to cope with scheduling constraints, delays and unreliability, the attitude to car ownership and to other types of goods amongst different socio-economic groups are all examples of problems which can be difficult to study through large scale ‘representative’ surveys, based on trade-offs between an artificially small number of attributes.
- 2.53. We would therefore encourage the DfT to broaden the range and types of evidence which it is willing to consider.

Exploring the use of distance-based values of time

- 2.54. This is a fundamental issue raised by this latest round of research. We feel that there is an open question as to whether the positive relationship between value of time and distance is not merely a reflection of correlation with other, unobserved variables, such as socio-economic group, type of industry or type of activity (below the level of aggregation employed in the study). Being able to understand and explain this relationship is a fundamental next step in order to strengthen our confidence in the research results and our ability to apply values out of sample.

Further analysis of the non-work values of time, and differences between them by mode

- 2.55. This follows, in part, from our previous point.
- 2.56. In addition, we would again highlight an earlier point about the difference between non-commuting journey purposes and the wide variations in scheduling constraints that are likely to exist between different types of journey that fall within that category. We would be particularly supportive of future research to better understand the value of time for these types of journey and in particular to distinguish between more and less time constrained journey purposes.

Congestion-based values for road travel

- 2.57. The estimation of ‘congestion multipliers’ seems like a sensible extension of the latest value of time research and we feel there is particular value in deriving values for the purpose of route choice modelling (assignment).



Walking and cycling

- 2.58. Whilst time savings typically represent a small proportion of the overall benefits of cycling and walking schemes, the value of time itself can play a central role in the appraisal of these sorts of schemes. This is because the value of time can vary substantially as a function of the environment in which cycling and walking take place, which in turn means that an improvement in those conditions can generate journey ambience, decongestion and health benefits, all of which are a function of values of time. Some of the difference in values of time as a function of environmental conditions is likely to be explained by differences in physical and psychological effort, as well as safety and security risks. And there also may be other important effects at play. We would therefore like to see a more comprehensive and explicit treatment of these issues in appraisal guidance.
- 2.59. Whilst more research would be welcome, this is not necessarily the best way to proceed given that there is a considerable body of evidence already available, which is not fully incorporated into WebTAG. We would therefore suggest that a useful first step would be a comprehensive literature review to bring the evidence base available to the DfT up to date. We have done some recent work in this area and would be happy to assist if helpful.
- 2.60. We note the proposal to undertake further qualitative research in this area. This is something which we consider could be of value, especially as recent work in this area (such as the Understanding Walking and Cycling research programme) shows that there are wide variations in behaviour and preferences amongst different groups of users, which tend to be largely overlooked in appraisal and modelling.

Q21. Are there other areas not covered here that we should also be considering?

Please note our earlier points in response to Q11-19.