Department for Transport

The Value of Road Freight Travel Time

Updated evidence for Transport Analysis Guidance

October 2025

Department for Transport
Great Minster House
33 Horseferry Road
London
SW1P 4DR

© Crown copyright 2025

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ or contact, The National Archives at www.nationalarchives.gov.uk/contact-us.

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is also available on our website at
www.gov.uk/government/organisations/department-for-transport

Any enquiries regarding this publication should be sent to us at
www.gov.uk/government/organisations/department-for-transport

Contents

Contents 3

Glossary 5

Foreword 7

Executive summary 8
- Introduction 8
- Scope of the research programme 8
- Emerging proposals - road freight values of travel time 9
- Emerging proposals - accompanying guidance 11
- Seeking your views 11

1. The purpose of this document 12

2. Overview of the research programme 13
   - Components of the research 13
   - Motivation for the research and acknowledged challenges 14
   - How the primary study was conducted 15
   - How the primary study estimated values 17
   - Reviewing the results 19
   - Testing the results and developing plans for implementation 21

3. Updating the values of road freight travel time 23
   - Values of time for Heavy Goods Vehicles 23
   - Questions: HGV Values of Travel Time 29
   - Values of time for Light Goods Vehicles 29
   - Questions: Freight LGV Values of Travel Time 33
   - Questions: LGV occupancy and journey purpose 36
   - Summary of proposed values of travel time 36
   - Questions: Proposed values of travel time 38

4. Updating values of reliability and accompanying guidance 39
   - Journey time reliability 39

Questions: Reliability ratios 41
Growing values over time 41
Questions: Growing values over time 45
Implications for modelling guidance and appraisal software 45
Questions: Implications for modelling guidance 45
Implications across mode 45
Questions: Implications across mode 46
Implications for appraisal results 46
5. Confidence in the updated evidence base 49
6. Seeking your views 54

Glossary

Boundary Value of Travel Time (BVTT)	In experiments where respondents are presented with a choice between alternatives with differing costs and journey times, the ratio of the cost and time differences between the alternative routes presented.
Carrier	A transportation provider; a business that specialises in the carriage of cargo e.g. haulage business
Choice modelling	A statistical technique used to understand and predict how individuals make decisions between two or more discrete alternatives.
Cost-Savings Approach	A method of valuing travel time changes based on the monetary costs incurred. In the context of freight, this method uses the (hourly) cost of employing the driver.
Exclusion criteria	A set of transparent criteria used to remove illogical, counterintuitive or anomalous results.
Factor cost	The cost of inputs used in production. In the context of freight transport, the total (typically hourly) cost associated with a shipment.
Heavy Goods Vehicles (HGV)	Also referred to as 'Other Goods Vehicles'. While specific definitions based on weight vary, the definition used in the Arup et al (2023) study was a lorry >3.5 tonnes gross vehicle weight.
Light Goods Vehicles (LGV)	While specific definitions based on weight vary, the definition used in the Arup et al (2023) study was a vehicle <=3.5 tonnes gross vehicle weight (GVW)
Marginal External Costs (MEC)	A method of estimating the social welfare impact of removing freight kilometres from the highway network
MyRIAD	Motorway Reliability Incidents and Delays; National Highways primary tool for estimating monetised reliability impacts on the Strategic Road Network.
Reliability Ratio (RR)	The ratio of the value of travel time to the value of travel time reliability. A key parameter used in the appraisal of reliability impacts.
Shipper	A (non-freight) organisation that sends cargo in the course of business e.g. retailers, manufacturers
Stated preference (SP)	An experimental approach used to understand how people make choices, based on their preferences when presented with hypothetical choices.

Strategic Road Network (SRN)	Motorways and major trunk roads in England managed by National Highways
Value of Travel Time (VTT)	A value reflecting a person's or business's willingness to pay to reduce journey time, or conversely, the compensation they would require to accept a longer travel time.
Value of Travel Time Reliability (VTTR)	A value reflecting a person's or business's willingness to pay to reduce journey time variability, measured by the standard deviation of journey time. Applies equally to the compensation they would require to accept an increase in journey time variability.
Willingness to Pay (WTP)	The amount of money an individual is willing to pay to obtain a benefit, or avoid a cost.

Foreword

The UK's road network carries 81% of the country's freight by distance-weighted volume. It is therefore the circulatory system that underpins economic activity and growth. But we have been aware for some time that in appraisal we undervalue the true benefits of time saved on freight journeys, which ultimately cuts the price of goods in our shops and saves households money. As a result we may underappreciate the value of interventions that make freight move more smoothly along our road network.

To address this, in 2019, DfT and National Highways launched major primary research aiming to estimate new road freight values of travel time, the largest study of its kind to date in the UK. Since we received the findings in 2023, we have undertaken a significant programme of testing and verification of the study results, including consulting some of the leading experts in freight and transport economics.

I'm delighted to present this report, which details the outcome from this evidence-gathering: a proposed update to our appraisal framework, Transport Analysis Guidance, to significantly enhance the representation of road freight in transport modelling and appraisal.

The proposed values move beyond the existing, narrower approach based on the cost of employing the driver to capture a far more comprehensive set of costs associated with road freight. In doing so, the proposed values provide a much better account of the gains that businesses - and ultimately households - across the country experience, when we improve the highway network.

These proposals will, if implemented, represent a step-change in how road freight is valued in our appraisals. This report therefore sets out several areas where we are seeking input from our stakeholders on the detail of the proposals, to ensure that the evidence we use to inform future decisions on interventions that affect road freight is of the highest possible quality. We look forward to hearing your views.

Ian Mulheirn, Chief Analyst

October 2025

Executive summary

Introduction

This document sets out the Department's emerging proposals for updating the values of road freight travel time (VTT) and reliability contained in Transport Analysis Guidance (TAG) and recommended for use in transport modelling and appraisal. The proposals are based on an extensive research programme jointly commissioned by DfT and National Highways, and aim to improve the robustness, coverage and evidential basis of road freight VTTs within TAG.

The completed research represents a significant development in the evidence base on valuing road freight journey time improvements. The proposed values provide a more comprehensive reflection of the economic value associated with road freight movements, moving beyond the existing methodology based solely on the cost of employing the driver. The intention is that the proposed values provide a more robust and comprehensive basis for supporting informed decision-making for freight transport investments.

This document sets out the key results, our plans for implementing those results in TAG, and our assessment of the confidence in those proposals. We are now seeking input and feedback from our stakeholders on these plans.

Scope of the research programme

The evidence base underpinning these proposals comprises three interlinked studies. The primary study, conducted by Arup, AECOM, the Institute for Transport Studies Leeds and Significance, involved a large-scale stated preference survey of over 600 UK businesses, including both carriers (e.g. hauliers) and shippers (non-freight businesses who send cargo). This survey was designed to elicit willingness-to-pay values for journey time savings and reliability improvements, utilising choice modelling techniques consistent with international best practice.

To assure the robustness of the findings, an independent peer review was commissioned from Ian Williams, a leading expert in freight modelling and appraisal. The review recognised the innovation and complexity of the primary study, but raised concerns over sample representativity and aspects of the experimental design. Two of the original study authors, Thijs Dekker and Gerard de Jong, were asked by DfT to provide a response; they acknowledged some of the critiques as valid, but clarified the rationale behind key

methodological choices and provided a rebuttal on the requirement for a fully representative sample in the context of choice modelling.

Taken together, these studies represent the most comprehensive attempt to date to estimate freight VTTs in the UK. They have provided a strong foundation for updating TAG guidance, while also highlighting areas where further refinement and caution are warranted. DfT and National Highways have subsequently undertaken extensive additional testing and benchmarking to arrive at the proposals set out in this document.

Emerging proposals - road freight values of travel time

The below table compares the emerging proposals in this document with the equivalent values currently contained in TAG. These and subsequent monetary figures are presented in 2022 prices and values, for consistency with the Arup et al (2023) study:

Mode	Journey purpose	Current % share of vehicle kilometres	Current TAG (VTT+b1[1] parameter)	Proposed % share of vehicle kilometres	Proposed VTT
HGV	Work (freight)	100%	£24.36	100%	£81.24
LGV	Work (freight)	88%	£16.39	24%	£21.34
	Work (services)			61%	£19.62[2]
	Average work			*85%*	*£20.11*
	Commute	3%	£14.51	8%	£14.51
	Other non-work	9%	£6.62	6%	£6.62
	Average non-work	*12%*	*£8.91*	*15%*	*£11.15*
	Average LGV	*100%*	*£15.49*	*100%*	*£18.81*

Table A: Comparing current TAG values with the proposed values (£/hour per person in 2022 prices/values)

The proposed updates to road freight VTTs reflect a balanced judgement based on the range of available evidence. For HGVs, we propose to adopt the carrier-derived value of £81.24 per hour (2022 prices/values) as presented in the Arup et al (2023) study, and which aligns well with industry benchmarks and international literature. While we recognise that shipper willingness to pay should contribute to the overall economic value of freight movements, we propose not to adopt the *explicit* valuations arising from this segment of

[1] The closest equivalent to the proposed VTT in current TAG is the sum of the existing £/hour VTT with the b1 non-fuel vehicle operating cost parameter, which captures time-related depreciation costs i.e. b1 captures the capital saving associated with business vehicles, and is zero for non-work vehicles.

[2] Total time-related value for Work (Services) consists of the VTT displayed (£19.62) plus an additional £0.61 via the existing TAG b1 parameter for Work LGVs. This b1 parameter is proposed to be removed for HGV and LGV freight, to avoid double-counting.

the study, due to concerns over experimental design and the risk of double-counting any element already captured implicitly in carrier valuations; for instance late penalties imposed by shippers on carriers. Similarly, differentiation by trips to or from ports to reflect the potentially time-sensitive nature these journeys is not recommended, given limited confidence in the estimates and their practical applicability. The proposal to update VTT is accompanied by a proposal to remove the b1 non-fuel vehicle operating cost parameter from guidance for HGVs and freight LGVs to avoid double-counting of impacts relating to time-related vehicle depreciation.

The below table shows a comparison of the proposed HGV VTT against a derived estimate of total hourly running costs (the so-called 'factor cost'), as well as the range of VTTs from the international literature[3]:

Category	Proposed VTT	Factor costs	Lower bound from literature	Upper bound from literature
HGV shipper	£81.24	£72.99	£0	£32
HGV carrier			£36	£97
Total HGV			£47	£109

Table B: Comparing proposed HGV VTT against running costs and international range (£/hour in 2022 prices/values)

The proposed HGV VTT aligns well with both the running cost benchmark, and range of existing international studies. While derived from the responses of carriers to the Arup et al (2023) survey, we think it is likely that our proposed VTT implicitly includes value attributable to shipper willingness to pay. While it is not possible to put a definitive number on what share of this estimate pertains to shippers, the proposed VTT exceeds our factor cost estimate (a benchmark of running costs typically indicative of the value pertaining to carriers) by 11%, suggesting a shipper contribution to total VTT within the wide range found in equivalent international studies (£0 to £32 per hour in 2022 prices/values).

For freight LGVs, the stated preference estimates from the primary study are not considered sufficiently robust for inclusion in guidance. Instead, a bottom-up estimate of £21.34 per hour (2022 prices/values) is proposed, derived from combined industry cost data and wage statistics. This approach captures the time-related transport costs associated with freight LGVs, ensuring consistency with the treatment of HGVs, while avoiding the methodological limitations identified in the peer review.

To accompany this, the proposals introduce an updated and more nuanced segmentation of LGV journey purposes, distinguishing between freight, services, commuting and other non-work trips. This enables the derivation of tailored VTTs for each segment, improving the accuracy and applicability of freight modelling and appraisal.

Overall, the proposed values represent a significant increase in the valuation of freight travel time changes, moving them into line with those used in appraisal frameworks internationally. The HGV VTT increases by 234% compared to the equivalent, current TAG

[3] From Table 44, Arup et al (2023). 'Total HGV' row reports the range from only those studies where both shipper and carrier VTT were estimated. Hence shipper and carrier rows do not sum to total value.

values (i.e. VTT+b1), while the LGV freight VTT increases by 30% (average LGV increase = 21%). These increases are to be expected, given the proposals reflect a more comprehensive and realistic assessment of the economic value of road freight movements, capturing wider cost considerations, such as potential logistical savings from fleet and depot efficiencies.

Emerging proposals - accompanying guidance

The Arup et al (2023) study examined not just how businesses benefit from quicker journeys, but also how they value improved reliability of journey time. New reliability ratios, a key metric in calculating reliability benefits, are proposed for both HGVs and LGVs, based on carrier data from the Arup et al (2023) study. These ratios, 0.6 for HGVs and 0.7 for LGV freight trips, will increase the monetised value of reliability benefits relating to freight movements.

To implement these proposals in guidance, further recommendations are made, relating to the real growth rate of road freight VTT over time, updates to modelling guidance and application in appraisal software.

We recognise that freight operates across multiple modes. However, the driving motivation for the launch of this research programme was the perception that our road VTTs do not reflect the true value of road freight. Rail, maritime and aviation freight use distinct modelling and appraisal approaches which do not currently heavily rely on the value of travel time. As such, the research programme focussed on road freight valuation only, and the proposed values apply directly to road freight modelling. However, indirect impacts to rail freight appraisal will arise through changes to the Marginal External Cost values in TAG, after modelling in the National Transport Model.

Seeking your views

We welcome feedback on the proposals set out in this document, and specific areas where we are particularly interested in receiving feedback are highlighted throughout the document. Responses can be submitted via email to TASM@dft.gov.uk with the subject “Freight VTT implementation” by Friday 7th November, or at the forthcoming engagement event.

1. The purpose of this document

1.1 The value of travel time (VTT, often referred to as 'values of time') are one of the fundamental sets of values used in the modelling and appraisal of transport investments. In the context of road freight movements, they represent the value attached to changes in journey time by businesses who carry or ship cargo. That is, the economic value that carriers (e.g. hauliers) attach to being able to save on for example labour or logistical costs, and the value that shippers (those using haulage services) attach to faster delivery for their customers. Freight VTTs also form the basis for the valuation of improvements to journey time reliability.

1.2 This document relates to a research programme commissioned jointly by the DfT and National Highways, to provide a robust set of road freight VTTs for use in transport modelling and appraisal. It encompasses three component studies; a major survey of businesses carried out over 2019-2023, a peer review of this study, and a subsequent response to the peer review. This document provides an overview of the research methodology, its findings and our planned implementation of these in Transport Analysis Guidance (TAG), the DfT's best practice guide for transport modelling and appraisal.

1.3 In recognition of the important role road freight plays in transport outcomes and economic growth, this document is intended to transparently share our plans for implementation, and to encourage feedback from stakeholders. We welcome views on the contents of this document, and feedback on our plans for new road freight VTTs in TAG. We have identified key questions throughout this document and would welcome stakeholders' views on these. Responses can be shared either via email, to TASM@dft.gov.uk, with the subject 'Freight VTT implementation' by Friday 7th November, or at the planned engagement event.

1.4 The research programme and subsequent plans for TAG contained in this document should be viewed in the wider context of upcoming developments to modelling and appraisal guidance. We will shortly be publishing a new Appraisal, Modelling and Evaluation Strategy, which will set our ambitions for the further development of our evidence base over the next five years. This will include further research on VTTs in the context of passenger movements across mode, as well as other development activities across a wide range of related topics, from wider economic impacts, to distributional analysis. The proposals in this document represent one piece of a larger picture ongoing research to ensure our transport investments are assessed using the best possible evidence.

2. Overview of the research programme

Components of the research

2.1 The evidence-gathering that underpins our proposed update to guidance comprises three studies commissioned to experts external to the DfT and National Highways, combined with internal testing and benchmarking, as set out in Figure 1 below. The three key studies are as follows:

1. **'Freight value of time and value of reliability: final report'; Arup, AECOM, ITS Leeds and Significance, 2023:** This was a new large-scale primary study into freight VTT and reliability, surveying hauliers (carriers) and those that ship cargo (shippers) during 2022. See the next subsection for more details.

2. **'Peer review of freight value of time and value of reliability'; Ian Williams Services, 2024:** This peer review, undertaken by transport analysis expert Ian Williams, reviewed the methodologies and results of the Arup et al (2023) study.

3. **'Response to "Peer review of Freight Value of Time and Value of Reliability"'; Thijs Dekker and Gerard De Jong, 2025:** This brief note summarises a response from two of the key academics involved in the original Arup et al (2023) study.

2.2 Taken together, these studies represent a substantial, rounded body of evidence on road freight VTTs in the UK. They significantly improve our understanding of how carriers and shippers value freight in relation to journey time savings, and act as a robust foundation for new road freight VTTs that can lead to better, more informed decision making on transport investments.

2.3 It is worth clarifying at this point that the scope of this research programme focused on road freight movements; that is, movements by Light Goods Vehicle (LGV; those goods vehicles under 3.5 tonnes) or Other Goods Vehicle (OGV; hereon referred to as Heavy Goods Vehicles (HGV); those goods vehicles over 3.5 tonnes). The motivation for examining these movements, as opposed to freight movements via other modes, such as rail, maritime or air, was acknowledged shortcomings in the methods used for road freight, in which the VTT plays a central role. This is not the case for other modes; rail freight schemes often rely on a 'Marginal External Cost'

method[4], while maritime and air freight investments tend to be delivered by the private sector. This report hence focuses on updates to LGV and HGV VTT.

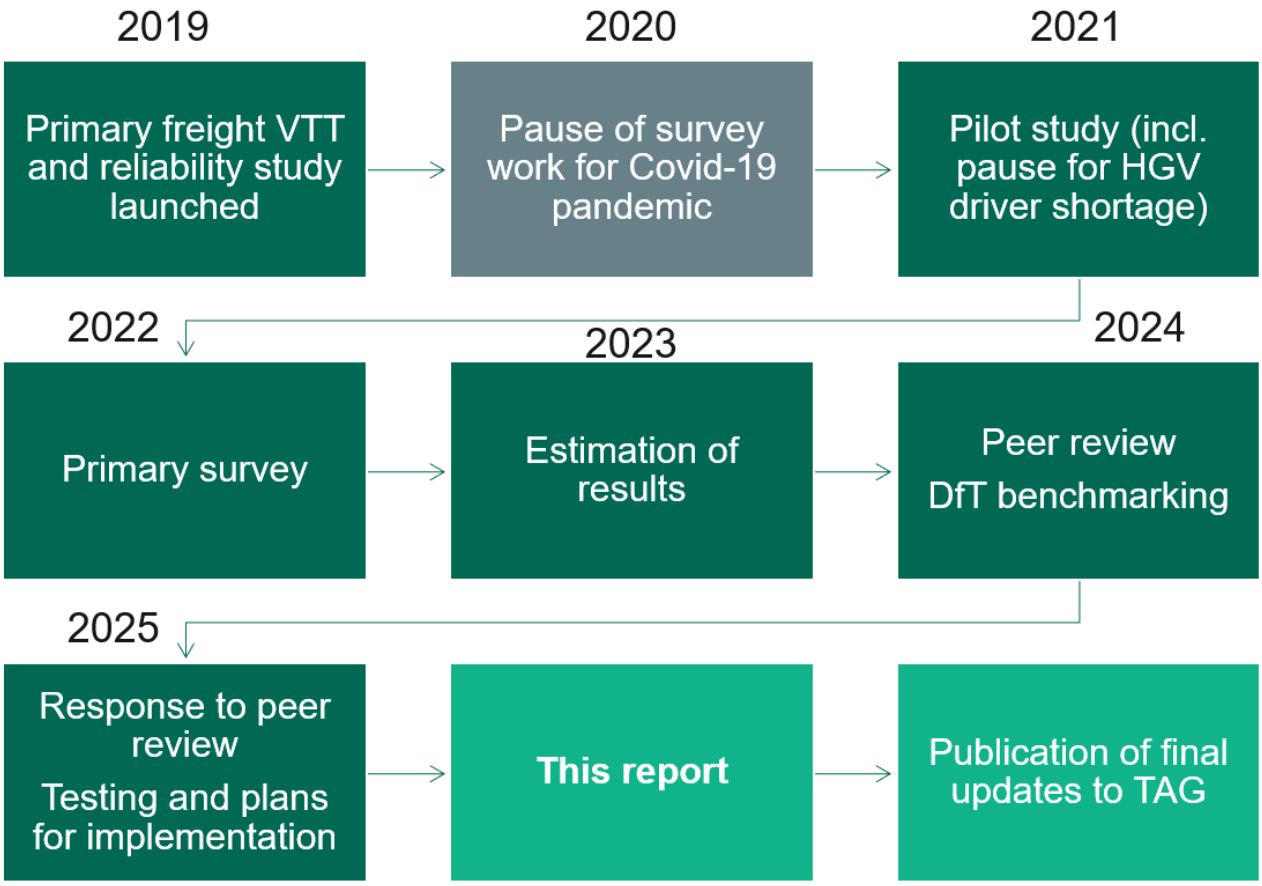


Figure 1 Overview of research programme

Motivation for the research and acknowledged challenges

2.4 As far back as 2010, the Phase 1 scoping study for the last national VTT programme[5] identified a need to improve the road freight VTT recommended in DfT appraisal guidance. Specifically, it noted how then-emerging methods internationally were providing a better understanding, and a more comprehensive valuation of the benefits associated with road freight movements, than the UK's approach of relying on the cost of employing the driver of the vehicle.

2.5 This so-called 'Cost-Saving Approach' relies on the economic assumption that the cost of employing the driver acts as a proxy for the economic value attached to moving goods, and hence labour costs are equivalent to the VTT. However, this approach excludes non-wage time-related transport costs faced by carriers, such as broader logistic costs, as well as any value held by shippers, to see their cargo (for

[4] In short, valuing the rail intervention by the benefit (in terms of reduced congestion, greenhouse gases, noise and accidents, among other attributes) arising from the road freight vehicles removed from the highway network.

[5] https://www.gov.uk/government/publications/values-of-travel-time-savings-updating-the-values-for-non-work-travel

instance time-sensitive cargo such as refrigerated food products) delivered in a timely manner.

2.6 The 2010 scoping study however also acknowledged the breadth of challenges associated with robustly estimating road freight VTT from stated preference (SP) evidence. This included challenges relating to sampling and surveying businesses in sufficient quantity to provide robust estimates. It also acknowledged the (again, then-emerging) need to draw distinct but cohesive responses from both shippers and carriers to build up a comprehensive understanding of the value of freight movements. Furthermore, the diverse and complex nature of the freight and logistics sector, comprising a wide variety of vehicle types, logistical movements and cost components, was acknowledged as a significant hurdle to estimating useful, robust values for use in guidance.

2.7 It was in part due to these challenges that freight was not included in the scope of what became the 2014/15 UK national passenger VTT study (Arup et al, 2015). However, further advancements and application of techniques in countries such as the Netherlands and Norway over subsequent years provided examples of potential mitigations for these challenges, as well as an indication of the scale of impacts being excluded under the UK's Cost-Saving Approach. Hence as part of the DfT's 2019 Appraisal and Modelling Strategy,[6] a new major primary study of road freight VTT was commissioned.

How the primary study was conducted

2.8 Drawing upon academic research and international best practice, an approach using a stated preference (SP) survey was proposed, where carrier and shipper businesses would be surveyed to understand how they trade off travel time and cost. In this sense, the proposed SP 'discrete choice' games closely resemble those used in the 2014/15 UK national passenger VTT study (Arup et al, 2015). If surveyed appropriately, the valuations arising from carriers and shippers can theoretically be treated additively to arrive at an estimate of total VTT (see Section 2.21 for more detail).

2.9 The primary study was launched in 2019, with a team comprised of considerable experience and expertise in the fields of freight and VTT research. Knowledgeable teams from Arup and AECOM led and advised on the fieldwork and freight insights, while ITS Leeds and Significance led the theoretical background, survey design and estimation efforts. ITS Leeds were part of the team that delivered the most recent UK passenger VTT study, while Significance have been responsible for the development of multiple freight VTT studies internationally over the past 15 years.

2.10 Primary fieldwork was paused twice during the project to maximise the chances of a good response rate from freight businesses. Firstly, during the height of the Covid-19 pandemic, and again, during the HGV driver shortages of 2021. A pilot study ran in 2021, the outcomes of which were used to guide the timing, structure and wording of the main survey.

[6] https://www.gov.uk/government/consultations/transport-appraisal-and-modelling-strategy-informing-future-investment-decisions

2.11 Fieldwork for the main survey ran from April to September 2022, with a pause in August to avoid the weeks where leave was expected to impact response rates from businesses. Transport or supply chain managers across carrier and shipper businesses, as well as those in-house 'own account' fleets who fulfil both carrier and shipper roles, were recruited via telephone to complete the online survey. Following engagement with industry bodies including the Chartered Institute of Logistics and Transport (CILT) and Logistics UK, 602 businesses completed the survey, from a total of 6,132 who agreed to take part or requested to do so (10% response rate). The primary study final report (Arup et al, 2023; Section 4.5) contains more detail on the composition of this sample, including business size, region and goods transported.

2.12 Following a similar approach to that taken in the 2014/15 UK national passenger VTT study (Arup et al, 2015), obtaining a fully representative sample was not the primary objective in the sample recruitment. Instead, the sample was constructed to be able to estimate values for different segments of interest; for example, those businesses typically moving freight to and from ports were targeted to provide VTT insights on these types of trips. Following the methodology established during the 2014/15 passenger study, the sample was later 'enumerated' following estimation of the VTTs; this used the DfT's Continuing Survey of Roads Good Transport[7] to expand the VTT estimated from the sample to be nationally representative average values.

Testing whether respondents understood the survey

2.13 To be able to rely on the values estimated from this sample, it was important to ensure that those completing the survey understood the tasks presented to them, and made choices that reflect those that they would make in real life. During the design and piloting of the study, significant effort was put into ensuring the questionnaire wording was fit for purpose, and included diagnostic questions to elicit how well respondents understood the information presented to them.

2.14 Prior to analysis, the initial set of 602 responses was therefore 'cleaned' to remove any illogical responses (such as the weight of a shipment being zero or the implied speed being above the maximum national speed limit), as well as being subjected to five 'exclusion criteria'.

2.15 These criteria, based on the diagnostic questions in the survey, for example covered whether the respondent felt able to make sensible choices, whether they perceived the descriptions of journeys to be unclear, and whether their resulting choices tally with rational behaviour. For instance where respondents were requested to trade-off travel time, cost, and reliability, the final choice included an option that rational respondents would never choose, because it is slower, more expensive, and more unreliable than the other alternative. All respondents selecting the dominated alternative were excluded under this criterion. This cleaning exercise resulted in a final sample for analysis of 472 responses, with the breakdown of these responses across business and vehicle type shown in Figure 2.

[7] https://www.gov.uk/government/statistics/continuing-survey-of-road-goods-transport-gb-respondents-section

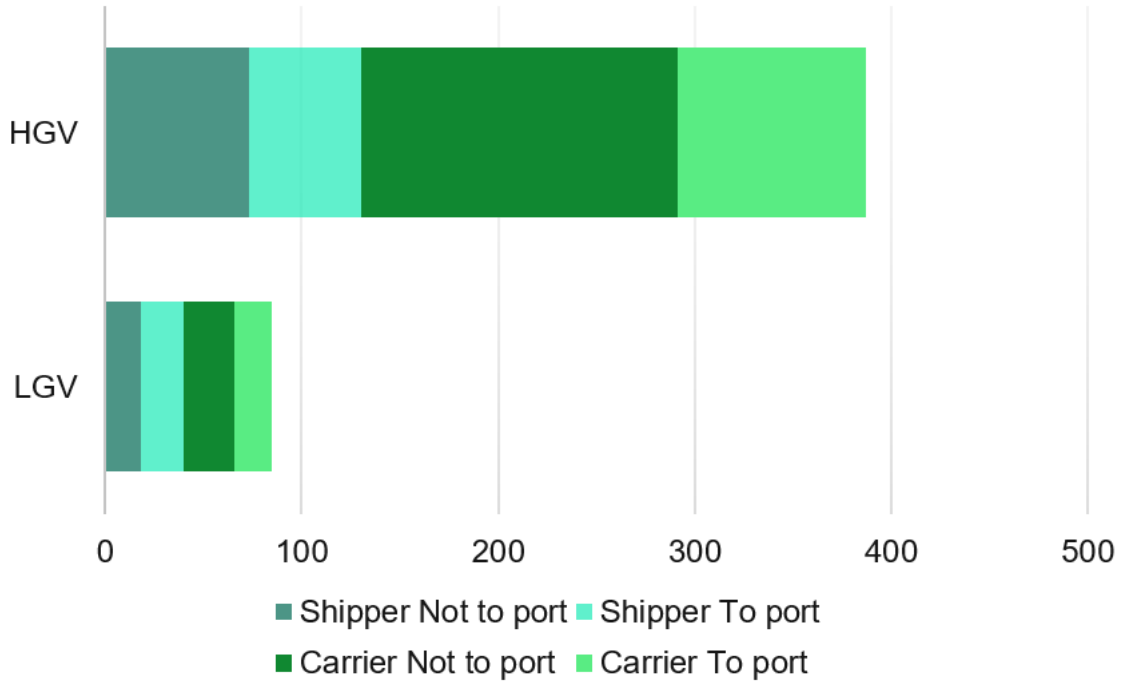


Figure 2 Final sample for analysis in the Arup et al (2023) study

How the primary study estimated values

2.16 Survey respondents were asked to provide information on a typical transport journey, denoting various characteristics about this journey, including vehicle type, type of goods and routing information (e.g. to port or not). Crucially, respondents were asked to provide information on the journey time and cost, specific to their business setting (either the typical fee incurred for shippers, or 'transport costs' incurred to carriers).

2.17 This information then served as the basis for two SP experiments. The first (SP1), asked respondents to choose between two options for a journey, one quicker and more expensive, the other cheaper and slower, and asked which they prefer. While the choice was hypothetical, the times and costs presented were based on the information provided by respondents on their actual typical freight movement. Figure 3 shows an example question in SP1, which enables the estimation of VTT.

SCENARIO A	SCENARIO B
Transport Time = 95 minutes	Transport Time = 115 minutes
Transport Costs = £130.08	Transport Costs = £122.08

Which scenario do you prefer (1 of 8)

● I prefer Scenario A ○ I prefer Scenario B

Figure 3 Example of SP1 - time vs cost experiment

2.18 SP2 featured a more complex choice, introducing uncertainty in journey time, to enable the estimation of journey time reliability values. Figure 4 shows an example of this.

Scenario A	Scenario B
The transport has the same probability to last each of the five following transport times:	The transport has the same probability to last each of the five following transport times:
2 hours and 10 minutes	3 hours and 10 minutes
2 hours and 40 minutes	3 hours and 40 minutes
2 hours and 40 minutes	3 hours and 40 minutes
2 hours and 40 minutes	3 hours and 40 minutes
3 hours and 10 minutes	4 hours and 40 minutes
Average transport time:	Average transport time:
2 hours and 40 minutes	3 hours and 40 minutes
Transport Costs:	Transport Costs:
£715	£635

Which scenario do you prefer (1 of 8)

● I prefer Scenario A ○ I prefer Scenario B

Figure 4 Example of SP2 - time vs cost vs reliability experiment

2.19 Both of these experimental approaches are consistent with best practice VTT studies, for both passenger and freight studies, internationally and in the UK. Respondents were shown eight variations of each SP choice, to elicit the required information.

2.20 'Choice models' were then used to estimate VTTs and values of reliability that best explain how respondents chose between the options presented to them. By incorporating information from the surveys on type of vehicle, type of good, and other contextual information, the choice models can explain what factors play a role in determining VTT.

Study results and economic reasoning

2.21 The established economic reasoning used in equivalent freight VTT studies internationally is that the VTT derived from carriers represents the time-related costs accruing to those moving goods; costs relating to employing the driver, or time-related costs relating to the vehicle, such as depreciation. These costs are incurred regardless of whether the vehicle is loaded or not, or the commodity in question. The VTT derived from shippers relates to the contents of the shipment; their value in their respective market, their tendency to degrade, likelihood of theft, and their place in the wider logistic system. Both carrier VTT and shipper VTT matter to the social valuation

of freight journey time and reliability, and hence it is the combined carrier and shipper VTT that represent a comprehensive measure of road freight VTT.

2.22 In arriving at this combined VTT, one must account for the empty running of vehicles; in these cases, the shipper VTT would be equal to zero (as no cargo is being transported). The final total average VTT therefore is a weighted average of empty (carrier) and loaded (carrier+shipper) VTT, with the weights being the share of vehicles that are empty running, and, where relevant undertaking a journey to port or not to port[8].

2.23 This weighting exercise, detailed in Section 5 of the Arup et al (2025) study, and utilising data from the DfT's Continuing Survey of Roads Goods Transport, produced the estimated VTT and value of travel time reliability (VTTR) shown in Table 1. The ratio of these two values resulted in estimates of the Reliability Ratio, also shown, a key value used in the appraisal of journey reliability[9].

		VTT (£/hour 2022 prices)		**VTTR (£/hour 2022 prices)**		**Reliability Ratio**	
		LGV	**HGV**	**LGV**	**HGV**	**LGV**	**HGV**
Loaded (Carrier+ Shipper)	**To port**	£158.70	£176.11	£61.77	£63.79	0.39	0.36
	Not to port	£136.04	£153.45	£57.71	£59.73	0.42	0.39
Empty (Carrier)	**To port**	£63.83	£81.24	£44.75	£46.77	0.70	0.58
	Not to port	£63.83	£81.24	£44.75	£46.77	0.70	0.58
Total (Average)		**£133.10**	**£131.86**	**£57.18**	**£55.85**	**0.43**	**0.42**

Table 1: Estimated results by shipment type, from Arup et al (2023)

Reviewing the results

2.24 In reviewing the study findings, we have consulted further expertise to give us an informed and rounded perspective on the work undertaken. A summary of these two further pieces of evidence is included below.

Independent peer review (Williams, 2024)

2.25 To provide assurance over the methodology and findings of the main study, we commissioned Ian Williams to conduct a peer review. Ian has significant experience

[8] Defined as a trip to port, airport, Channel Tunnel or rail interchange

[9] In reliability appraisal, the standard deviation of journey times is estimated to represent variation in journey times. A 'reliability ratio' is then applied to the value of time to give a 'value of reliability' that is used to value changes in the standard deviation of journey times.

and expertise in freight modelling and appraisal, and hence was well-placed to provide informed advice on the findings.

2.26 The peer review concluded that the main study had delivered the vast majority of a challenging, innovative and ambitious research programme to a good standard. However, it highlighted shortcomings in a small number of steps in the analysis, which cast doubt on the applicability of the results.

2.27 Given the varied nature of road freight operators in terms of operator size and scope of services, concerns were highlighted over the representativeness of the samples collected. For instance, the review highlighted that the sample was concentrated on larger businesses (those with 50 or more employees), whereas small firms make up the vast majority of the road freight industry in the UK. However, as highlighted in the response from ITS Leeds and Significance (see below), the comparison is not like-for-like given the presence of shipper businesses in the main study sample, and the premise of needing a fully representative sample to generate robust estimates of VTT was rebutted in the response.

2.28 The review outlined concerns relating to the estimation of LGV VTT, highlighting perceived issues with the range of costs and times presented to respondents (the so-called 'Boundary Value of Travel Time' (BVTT) - see below on HGV shipper estimates), the fact that reported average costs per hour for LGVs exceeded those of large HGVs, and the final sample size for LGVs, which as shown in Figure 2 was around a fifth of that used for HGVs.

2.29 The review also raised concerns with the BVTT for the HGV shipper sample. The review suggested that variance in the implicit BVTT, that is, the ratio of the cost and time difference between the two alternative hypothetical routes presented to the respondent[10], may have driven some of the unexpectedly high valuations arising from HGV shippers.

2.30 Overall, while the review considered the majority of the main study as carried out to a good standard, it advised against adopting the values arising from the study into guidance until greater confidence could be reached in the results derived.

Response to the peer review (Dekker and de Jong, 2025)

2.31 To provide a rounded view on the research undertaken, we commissioned two of the original academics involved in the main study, Thijs Dekker of the Institute for Transport Studies, and Gerard de Jong of Significance, to provide their reflections on the peer review.

2.32 The response recognised many of the critiques raised in the peer review as valid. For instance, it acknowledged that achieving the existing sample was challenging, and

[10] In simplified terms, a low (high) implicit BVTT results from a small (large) difference in costs, for a large (small) difference in times, across the alternative routes presented to the respondent. Section 5.2 of Williams (2024) highlights that HGV shippers typically faced low BVTTs, relative to their self-reported costs per hour, when compared with the choices presented to HGV carriers.

that working with limited sample sizes does limit the ability to derive statistically robust estimates for different segments of VTT.

2.33 Furthermore, while the Response reaffirms that the distinct BVTTs presented across segment were a study design choice as opposed to an error, and followed practice in the international literature to date, it acknowledged that this choice was based on the premise that shipper VTT has typically comprised a small share (~15%) of total VTT in the freight VTT literature to date. In retrospect, the Response acknowledges that it appears that using similar BVTT values for HGV shippers and carriers may have been a better approach.

2.34 The Response does however provide a rebuttal of the premise that a fully representative sample is required to generate robust estimates of VTT. The Response explains that overall representativity was not an objective of the main study; instead achieving sufficient observations to enable the estimation of a robust VTT for each segment of interest was the focus. This is in line with established choice modelling techniques, and is typical of the approach taken, both in the 2014/15 UK national passenger VTT study (Arup et al, 2015), and other international freight VTT studies.

2.35 Overall, the Response highlights the many strengths of the research undertaken, although it recognises some of the valid critiques made in the peer review around sample size and study design.

Testing the results and developing plans for implementation

2.36 In the period since DfT and National Highways took receipt of the main study, we have undertaken an extensive exploration of the relevant technical questions arising from both the study, and subsequent reviews. This has involved:

- Reviewing the results and recommendations across the three research documents.
- Benchmarking the derived VTTs against the international literature and freight industry estimates of hourly operating costs, as well as exploring evidence on the premium attached to faster delivery of goods.
- Understanding and testing the latest evidence on specific topics, from freight journey time reliability to LGV usage.
- Understanding the practical implications for modelling and appraisal of road schemes.

2.37 The aim of this testing has been to enable us to make as informed a decision as possible on what values to recommend for inclusion in TAG. We recognise that VTTs play an important role in the development of business cases for transport investments. Therefore, before introducing the new values into TAG, we have sought confidence in the evidence underpinning any proposals. Now, we are seeking stakeholder views on our plans, and in the subsequent sections have set out several key areas where we would welcome feedback.

2.38 Feedback on our proposals and the underpinning research should be sent via email to TASM@dft.gov.uk, with the subject 'Freight VTT implementation' by Friday 7th November, or alternatively at the forthcoming engagement event.

2.39 In line with the Orderly Release Process governing updates to our guidance, we plan to publish a Forthcoming Change notice detailing the final changes to guidance over winter 2025/26, in advance of the definitive implementation of new guidance, planned for May 2026. In the period between release of Forthcoming Change and implementation of new guidance, scheme promoters and sponsors may wish to review the TAG Proportionate Update Process, which provides useful principles to help inform the decision about whether an update to the analysis is required.

3. Updating the values of road freight travel time

Values of time for Heavy Goods Vehicles

3.1 As set out in the above section, the established economic reasoning used in freight VTT studies is that the final road freight VTT is the sum of the willingness to pay (WTP) of both carriers and shippers (weighted appropriately for empty running). In deriving a proposed VTT for HGVs, we have examined these two components in turn, to arrive at a robust total VTT that captures as much of the value accruing to changes in travel time for HGVs, while still ensuring it has a robust evidential foundation.

3.2 Before detailing our proposed approach and the evidence that underpins this, it is worth dwelling briefly on the use of road freight VTT in modelling and appraisal. As part of the preliminary literature review undertaken for the main study[11], the study team set out the two broad approaches to the use of road freight VTT in cost-benefit analysis. Table 2 shows these alongside the current approach adopted in the UK.

Cost impact on business	**Approach A (e.g. Sweden)**	**Approach B (e.g. Netherlands)**	**Current UK Approach**
Time-savings (captured by VTT)	Cargo time	Cargo time Staff time Vehicle time	Staff time
Transport cost savings (captured by Vehicle Operating Costs)	Distance costs Staff costs Vehicle costs	Distance costs	Distance costs Vehicle costs

Table 2: Approach to freight time and cost impacts in cost-benefit analysis

[11] A summary of this review is provided in Section 3.1.1. of Arup et al (2023)

3.3 The first approach, used for example in Sweden, defines the VTT solely through the value associated with cargo, with all other transport costs (e.g. fuel, staff costs) captured separately. The second approach, as used in the Netherlands, places all freight time benefits in the VTT, with only distance-related costs (i.e. those relating to changes in trip lengths) captured separately.

3.4 The current approach in TAG is a hybrid of these, capturing only staff time costs in the VTT, while distance costs (e.g. fuel, maintenance, tyres), and vehicle costs (e.g. depreciation) are reflected in the fuel and non-fuel vehicle operating cost (VOC) parameters.

3.5 The premise of the main study, and our subsequent implementation plan, has been to move TAG's handling of freight time and cost impacts towards the 'Approach B' method. That is, a comprehensive VTT that captures as much of the time-related costs as possible, with only distance-related costs remaining outside the VTT. We think this is the most intuitive approach to capturing the value of freight travel time.

3.6 A key implication of this to be kept in mind when comparing our proposed values against current TAG is that, as part of this approach, and to avoid double-counting of benefits, the b1 non-fuel VOC parameter, which captures time-related depreciation for working vehicles, will need to be removed for HGVs and freight LGVs. We use this frame of reference in the comparisons below.

Carrier valuation

3.7 The carrier valuation derived for HGVs in the main study (£81.24 per hour, 2022 prices/values) can be interpreted to capture the value (WTP) that carriers associate with saving time on a journey. This could relate to the quite direct short-term saving on driver wage costs, but also represents longer-term cost savings and logistical efficiencies enabled by regularly making quicker journeys. When a carrier's journey time is reduced, they can undertake more journeys, or the same number of journeys with fewer vehicles and staff. They may also be able to re-optimise their logistics operations in the longer term, for example depot locations and markets served. Hence the carrier valuation captures a much wider base of costs (or potential savings) than a wage-based approach.

3.8 The estimated value sits within the range derived in the main study's review of the relevant international literature (£36/hr-£97/hr, 2022 prices/values). The main national study to have been published since that review, the Dutch national study (Significance, 2023[12]), derived a carrier value equivalent to £49/hr (2022 GBP). Hence the valuation derived in the Arup et al (2023) study sits above this but within the range of values from existing studies.

3.9 As summarised above, the main concern raised in relation to the HGV carrier valuations by the Peer Review (Williams, 2024) was in relation to the representativity of the underlying sample. However, as discussed, this is contended by the original

[12] https://www.rwseconomie.nl/kengetallen/kengetallen-bereikbaarheid-map

authors, who make clear that a fully representative sample is not a pre-requisite for the robust estimation of VTTs via choice modelling.

3.10 We hence view the HGV carrier valuation arising from the study as robust evidence, potentially suitable for inclusion in TAG. Furthermore it would significantly improve the coverage of time-related costs captured in the VTT. However, to properly benchmark and contextualise the carrier results, we must consider a combined, total VTT estimate that includes the valuation attributable to shippers. We consider these valuations now, and return to the potential implementation of the carrier values in guidance below.

Shipper valuation

3.11 The shipper valuation derived for HGVs (£73.35/hr, 2022 prices/values) were significantly higher than expected prior to the study, and more than twice as high as the top of the range of international values for shipper values prior to this study, as shown in Table 3. The most recent Dutch study sits towards the bottom of this range, at £5.50/hr (Significance, 2023).

Category	Estimated VTT from Arup et al (2023)	Lower bound from literature	Upper bound from literature
HGV shipper	£73.35	£0	£32
HGV carrier	£81.24	£36	£97
Total HGV	£131.66[13]	£47	£109

Table 3: Comparing HGV VTT from Arup et al (2023) against international range (£/hour in 2022 prices/values)

3.12 Further to the comparison with absolute values, the derived UK value accounts for a far higher *share* of total VTT (~40%) than as found in previous national studies, where the shipper valuation typically accounts for ~15%[14] of total VTT, the rest coming from carrier WTP.

3.13 The Peer Review (Williams, 2024) raised concerns with the BVTT presented to HGV shippers, and contends that this may have in part driven the very high valuations seen in the findings. The response from ITS Leeds and Significance (2025) acknowledges that the BVTTs were set in accordance with international evidence to that point (specifically accounting for the expectation that shipper VTT would represent a much lower share of total VTT than carrier VTT), and that this 'leaves us in a situation where we do not have a clear explanation for the patterns in the share

[13] Estimated total HGV does not equal the sum of shipper and carrier, due to the need to account for the share of empty vehicles (which attract the carrier VTT) in the fleet. The range from the literature is drawn only from those studies where both shipper and carrier VTT were estimated; hence shipper and carrier rows do not sum to total value.

[14] Arup et al (2023), p.53

of acceptance of the BVTT'[15]. These patterns will have contributed to the high VTT seen for HGV shippers.

3.14 Despite the range of further evidence reviews undertaken by the DfT and National Highways, the reasons for the high shipper valuations remain unclear, and potentially partially attributable to the experimental design. Hence we are not recommending the use of these figures in TAG.

Trips to port

3.15 On the request of DfT and National Highways, the main study additionally segmented carrier and shipper VTT results based on whether the respondent indicated that their reference trip was to or from a port. As set out in Table 1, the study team were able to derive statistically robust estimates for shipper trips to port, but not carrier trips. The derived shipper 'to port' VTT was higher than the 'not to port' equivalent.

3.16 However, the only statistically robust estimate of a To Port 'premium' was derived from the valuations arising from shippers. As discussed above, these valuations are subject to lower confidence, with outstanding concerns over the scale of the findings, and the role of the experimental design in driving this.

3.17 Furthermore, as raised in the peer review (Williams, 2024), only a small subset of HGV trips to ports are likely to be exposed to additional time pressure (e.g. accompanied freight trips where missing a sailing would involve significant delay, and hence, cost). In contrast, the vast majority of HGV trips to port relate to unaccompanied freight, where trailers will be delivered to port continuously over time. Without information on the breakdown of the 'to port' sample in the study in terms of accompanied vs unaccompanied freight, this limits to applicability of the derived 'To port' estimates, for risk of bias.

3.18 Resultingly, we view the 'To Port' estimates of HGV VTT to be unsuitable for adoption in TAG. The same critiques, and hence conclusion, applies to the 'To Port' estimates for LGV VTT.

Proposed implementation

3.19 Bringing together the above evidence, we propose to use the valuations arising from carriers only, from the Arup et al (2023) study. These VTTs, proposed to apply equally to OGV1 and OGV2 vehicle types in TAG[16], would still represent a significant increase in VTT compared with current TAG, capturing a much more comprehensive picture of the business (and hence societal) value associated with changes in HGV journey time.

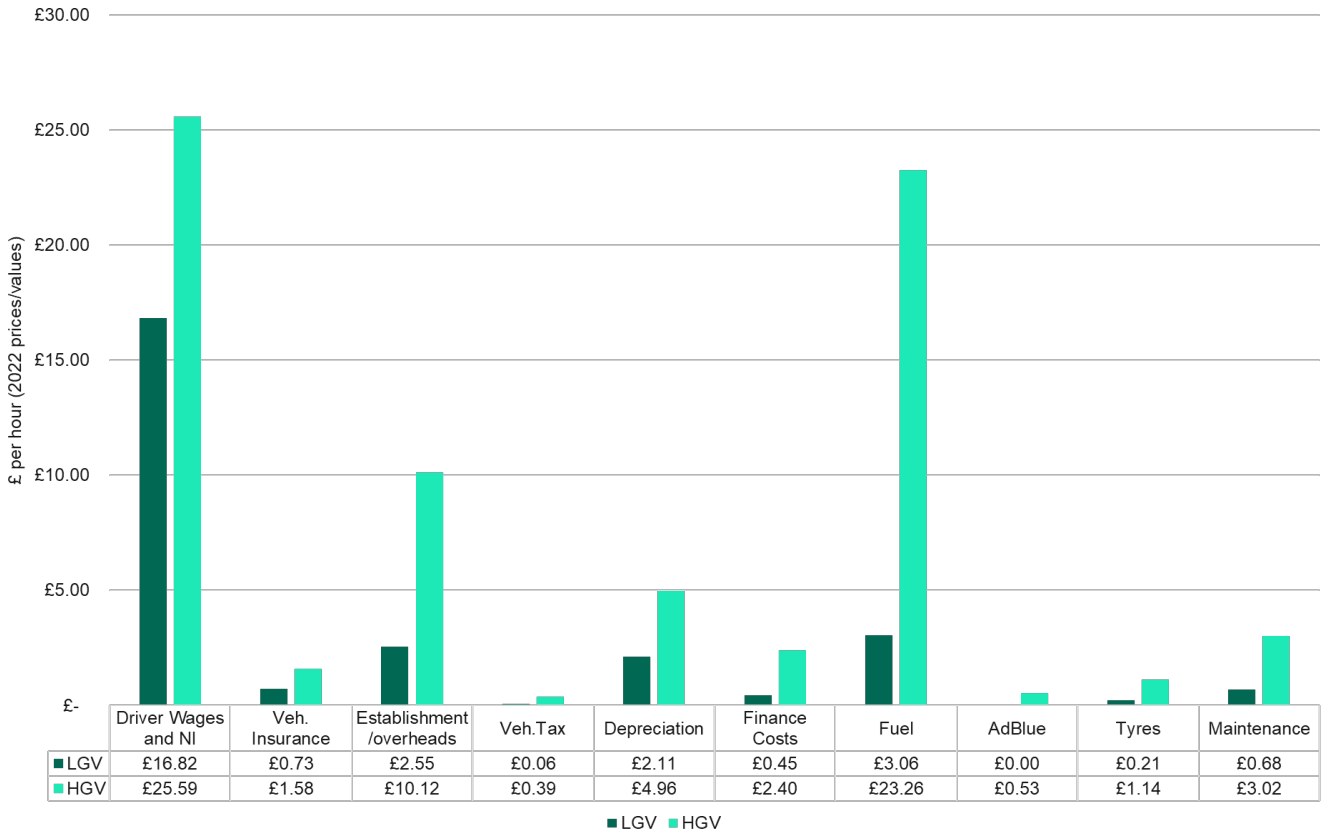
3.20 As part of our testing and benchmarking of the study results, a key test was a comparison of the derived valuations against a 'Factor Cost' estimate of total hourly costs faced by carrier businesses. The Factor Cost represents both time-related

[15] ITS Leeds and Significance (2025), p.6

[16] OGV1 is defined in the survey as a lorry >3.5 tonnes gross vehicle weight (GVW), but <=26 tonnes GVW. OGV2 is defined in the survey as a lorry>26 tonnes GVW.

costs such as overheads, and distance-related running costs such as fuel, maintenance and tyres. As such it provides a useful benchmark of the total value of the factors of production used in moving goods from one location to another.

3.21 For consistency across cost component, we used hourly cost figures from the Motor Transport publication[17]. A full breakdown of the cost components included for each vehicle type is shown in Figure 5.



	Driver Wages and NI	Veh. Insurance	Establishment /overheads	Veh.Tax	Depreciation	Finance Costs	Fuel	AdBlue	Tyres	Maintenance
LGV	£16.82	£0.73	£2.55	£0.06	£2.11	£0.45	£3.06	£0.00	£0.21	£0.68
HGV	£25.59	£1.58	£10.12	£0.39	£4.96	£2.40	£23.26	£0.53	£1.14	£3.02

Figure 5 Components of factor cost estimate (from Motor Transport, 2022)

3.22 We then compared these estimates to the VTT modelled as part of the Arup et al (2023) study, as well as the mean hourly self-reported transport costs from respondents to the study survey. This comparison is displayed in Table 4, including for LGVs.

[17] 2022 data for comparability with the main study findings; Motor Transport, 2022. Note the wage component was scaled by the TAG non-wage labour uplift factor of 26.5%.

Segment	Factor cost estimate (£/hr)	Mean self-reported hourly transport costs (£/hr)	VTT (£/hr)
	DfT calculation	*Arup et al (2023)*	
LGV carrier	£26.68	£66.56 [£55.46]*	£63.83 [£53.19]*
HGV1 carrier	£72.99	£74.84	£81.24
HGV2 carrier		£66.49	

Table 4: Hourly cost comparison (2022 prices/values)

** It is possible to interpret the study responses to be implicitly in per vehicle terms. LGV values (where average freight LGV occupancy = 1.2 as per TAG Data Book v2.01, Table A1.3.3) have been scaled down by this occupancy factor in square brackets to provide an indicative range of costs. For HGV, occupancy = 1 so no adjustment has been made.*

3.23 This comparison highlighted that the self-reported hourly costs and VTT derived for HGV carriers in the study broadly aligns with factor cost estimate. This is reassuring, suggesting the respondents' reported hourly costs, and the resulting modelled VTT, is reflecting the expected magnitude of economic costs for HGVs. We return to the LGV comparison below.

3.24 Previous international studies of a similar nature have typically found total 'joint' VTT (i.e. carrier + shipper VTT) to be 4-18% below total hourly factor cost[18]. The HGV carrier VTT sits 11% *above* the factor cost estimate. We think there are two contributing explanations to this that are worth highlighting. Firstly, that there was significant value arising to the carrier respondents to the survey that is not (and cannot be) captured by comparisons with bottom-up estimates, such as factor cost. It is after all reasonable to expect that the estimates arising from an SP setting would be capturing some notable valuation of changes to journey time per se, that are not captured by (for instance) a cost-based approach to valuation.

3.25 Further to this however, we think a second contributing factor is that the VTT estimate to some degree captures an element of the valuation of customer (i.e. shipper) WTP for faster delivery, and hence can implicitly be considered a 'joint' estimate of VTT. While the survey questionnaire was explicit that carrier respondents should only factor transport-cost-related considerations in their responses, it cannot be ruled out that some of them ignored this instruction, or (deliberately or mistakenly) factored in penalties that they, as carriers, may receive from shippers for late delivery, which in turn reflect shipper WTP.

3.26 While it is not possible to put a definitive number on what share of the carrier-derived estimate pertains to shipper WTP, the fact that the value exceeds our factor cost estimate by 11% suggests a material shipper share of total VTT. Factoring in the aforementioned view that the carrier WTP likely sits above bottom-up estimates of time-related costs, we believe it likely that the potential implicit shipper VTT sits in the

[18] Figure derived from Dutch and Norwegian studies; figure provided by Arup et al (2023) study team.

wide range found in equivalent international studies, as shown in Table 3 (£0-£32, 2022 prices/values).

3.27 This raises the prospect of double-counting some aspect of shipper valuation, if we were to include the explicit shipper-derived VTT from the main study. This risk of double-counting has been acknowledged in other international studies (e.g. the previous Norwegian freight VTT study, Halse et al, 2010). With a risk of double-counting the WTP of shippers, we are proposing the more conservative option, adopting just the valuation arising from carriers.

Questions: HGV Values of Travel Time

1. On the basis of the evidence presented here and in the research reports, do you agree that we should use the Arup et al (2023) estimates from carriers (£81.24 in 2022 prices/values) as the basis for the HGV VTT?

2. Do you agree that we should exclude the *explicit* valuation of HGV shipper willingness-to-pay (£73.35 in 2022 prices/values), on the basis of the evidence presented here and in the research reports? Do you think some element of this valuation may be reflected, implicitly, in a carrier-based VTT?

3. Do you agree with the proposal to exclude differentiation of trips to/from port and not to/from port from guidance?

Values of time for Light Goods Vehicles

3.28 The estimation of VTT for LGVs in the main study followed the same premise as for HGVs; that is, that the total VTT is the combination of the value derived from carrier and shipper LGV respondents, and that any more comprehensive VTT would entail the removal of the b1 non-fuel VOC parameter in TAG, to avoid double-counting of time-related depreciation.

3.29 A distinction for LGVs is the segmentation of the LGV market by purpose, something that is not a factor in the freight-dominated HGV sector. At a basic level, LGV trips can be separated into trips for the purpose of work or business, and those for non-work purposes. These two areas can be segmented further. Work trips can be classified as relating to freight (delivery of goods) or services (carrying tools or equipment to undertake work), while non-work trips can be segmented into leisure or 'other' trips, following the traditional segmentation used in transport modelling and appraisal. Clearly, each of these segments could be broken down further, although with corresponding effects for the complexity of transport modelling and appraisal. We use this four-segment definition as the basis for our exploration of LGV VTT.

Primary study values

3.30 The Arup et al (2023) study derived an LGV carrier valuation of £63.83/hr (2022 prices/values). For shippers however, as explained in Section 5.5 of that study, a

robust, separate LGV shipper VTT was unable to be estimated due to concerns over the choice behaviour displayed and small sample size[20]. Instead, in the absence of other data, the HGV shipper VTT (£73.35/hr, 2022 prices/values) was to applied to the equivalent LGV cohort.

3.31 Meaningful comparison of the derived values against the existing academic and international literature is a challenge for LGVs, given variability in how national studies have defined and estimated LGV figures. Instead, more instructive are comparisons against other benchmark metrics, such as factor costs.

3.32 As shown in Table 4 of this document, even after accounting for a vehicle occupancy >1, the mean self-reported hourly transport costs and the estimated carrier VTT for LGV far exceed our estimate of factor costs (by more than 100%). This result is difficult to square with economic theory, and suggests potential flaws with the LGV evidence in the study.

3.33 The peer review (Williams, 2024) highlighted concerns relating to the LGV valuations across a range of areas. Firstly, as with the HGV shipper results, the review raised concerns around the implicit design of the Boundary Values of Travel Time (BVTT) applied in the experiments. For LGVs in particular, the range of costs presented to survey respondents appeared low, relative to the self-reported mean transport costs per hour. This in turn would lead to a lack of trading-off of time and cost (as options featured consistently low-cost choices), which would, once modelled, result in a very high LGV VTT. The response to the peer review (ITS Leeds/Significance, 2025) acknowledges that, while the BVTTs were selected on the basis of previous international literature, the unexpectedly high relative valuation arising from shippers may have meant more similar BVTT values across segment would have been better.

3.34 However, as per Table 4, the unexpectedly high LGV valuations are present in the self-reported transport costs, as well as the estimated VTT. This suggests issues with the sample informing the study (i.e. the high LGV carrier valuations were not simply a function of the experimental design that generated the VTT). Indeed, as per Table 12 of the Arup et al (2023) study, the LGV carrier sample was only a quarter of the size of the HGV carrier equivalent (75 vs 292), and, after application of exclusion criteria, the final sample was less than a fifth of the HGV carrier equivalent (45 vs 257; see Figure 2). As acknowledged in the Response to the peer review (ITS Leeds/Significance, 2025), working with small samples limits the capacity to derive robust estimates for different segments of VTT.

3.35 The above evidence, underlined by the peer review and response, has hence diminished our confidence in the LGV VTT estimated in the main study. However, we recognise that a driver-earnings-only VTT for LGVs not only likely underestimates the true scale of the economic value of journey time changes, but would be inconsistent with the proposed treatment of HGV freight trips. Hence we have sought alternative evidence to estimate a robust, more comprehensive freight LGV VTT.

[20] Specifically, the LGV shipper results were found to be particularly sensitive to the application of an 'exclusion criteria' relating to the acceptance of very high BVTTs. Including these results would be problematic, while excluding them reduced the sample size to a point where no robust estimates could be made.

Alternative evidence of LGV freight costs

3.36 The underlying premise of our review of relevant economic literature and cost data was to derive values equivalent to the valuations arising from carriers in the main study. This would ensure consistency of approach with the treatment of HGVs. As a result, with carriers our focus, we reviewed relevant sources of cost data for the haulage industry.

3.37 One valid, up-to-date, and widely used source of information on these costs are the annual cost tables published by Motor Transport, a road freight industry publication. The cost tables published by Motor Transport set out, for a range of vehicle types and sizes, typical standing and running costs. These are provided in per vehicle terms and are published on a consistent annual basis.

3.38 As part of our review of relevant evidence, we verified the Motor Transport cost tables against alternative sources (for example those tables published by Logistics UK[21]), examined trends in the cost tables over time, and discussed the basis for the tables with the freight industry expert responsible for their production. We also performed equivalent checks on the published Motor Transport HGV tables as part of our benchmarking exercise, which also highlighted the Motor Transport cost estimates to be reliable and validate well against other sources. This gave us confidence in this data as a reliable source of LGV transport costs.

3.39 Motor Transport provides estimated annual costs for a 3.5 tonne diesel van, which we consider to be representative of a typical van used for carrying freight[22]. Motor Transport provides annual costs across several categories that can be viewed to represent time-related transport costs:

- Establishment/overheads
- Vehicle tax (Vehicle Excise Duty)
- Depreciation[23]
- Finance Costs

3.40 In each of these categories, improvements to journey times can be viewed to lead to opportunities for carriers to save costs, via reorganisation of logistical activities and efficiencies in the use of business LGVs.

3.41 The 2024 version of these tables (adjusted back to 2022 values using the proposed LGV freight uprating series, see later section of this report) can be supplemented with information from the Office for National Statistics (ONS) Annual Survey of Hours and Earnings (ASHE)[24], to inform both an estimate of driver wages (including the DfT

[21] https://logistics.org.uk/distribution-costs
[22] For example, see: https://www.vansales.com/how-to-choose-the-right-3-5-tonne-van-for-your-needs/
[23] Assumed to be entirely time-dependent, consistent with the current approach to non-fuel VOCs in TAG (COBA, 1989)
[24] Using the same two four-digit Standard Occupational Classification (SOC) professions as currently inform the CSA-approach in TAG; SOC 8214 'Delivery Drivers and Couriers' and SOC 8219 'Road Transport

26.5% Non-Wage Labour Uplift factor) and hours worked (inclusive of basic and overtime hours).

3.42 Scaling the non-wage components appropriately for freight LGV occupancy (see next section for details) provides the below estimate of time-related transport costs per person:

Cost category	**Annual time-related transport costs (£, 2022 prices/values)**	**Hourly* time-related transport costs (£, 2022, prices/values)**	**Share of total VTT (rounded)**
Driver wages and NI	£28,999	£15.60	73%
Establishment/overheads	£5,082	£2.73	13%
Vehicle tax	£104	£0.06	0%
Depreciation	£4,581	£2.46	12%
Finance costs	£905	£0.49	2%
Total VTT	**£34,952**	**£21.34**	**100%**

Table 5: Derivation of LGV Freight VTT (all costs per person)

** On the basis of 46 working weeks, 5 days a week, 8.1 hours a day*

3.43 From an economic perspective, the resulting total hourly cost (£21.34/hr in 2022 prices/values) can be seen to be broadly analogous to the carrier VTTs estimated via stated preference methodology in the main study. That is, it reflects the hourly value to LGV freight operators of an hour of working vehicle use, scaled to be in per person terms for consistency with existing TAG VTTs, and removing the b1 non-fuel parameter to avoid double-counting of time-related impacts. This value implicitly assumes that 100% of these non-wage cost components in the VTT (e.g. overheads) are attributable to changes in travel time.

3.44 This assumption is the most logical approach from the perspective of economic and resource cost theory; that is, all saved costs are fully time-dependent over the long-run i.e. 100% sensitive to time. This is equivalent to the cost-saving approach currently applied to wages, and reflects that appraisal aims to capture the economic (resource) value, once consumers (or in this case businesses) have had time to fully absorb the impact of an intervention into their decision-making.

3.45 Returning to our comparisons against factor cost, the derived LGV freight VTT (£21.34) is 20% below total factor cost (£26.68; from Table 4), very close to the estimated range of relativity between factor cost and VTT, from the Dutch and Norwegian studies (that is, VTT approx. 4-18% below factor cost). This provides

Drivers n.e.c'. 2024 data (the latest available) on pay was scaled back to 2022 values using the real earnings index (TAG Data Book v2.01), and combined with 2022 estimates of median hours worked.

reassurance over the magnitude of the derived freight LGV VTT as a valid equivalent to the carrier VTTs estimated in the main study, and as we are recommending for use in TAG for HGVs.

3.46 Clearly, the other side to this validation is that it highlights that the bottom-up nature of this LGV estimate means it is unlikely to capture WTP arising from shippers for faster delivery (beyond any consideration of customer demands for timely delivery in, say, the wage rate of the driver).

Questions: Freight LGV Values of Travel Time

4. On the basis of the evidence presented here and in the research reports, do you agree that we should avoid using estimates of freight LGV VTT from the Arup et al (2023) study? If so, do you agree with our proposal to use a bottom-up estimate of time-related transport costs (£21.34 in 2022 prices/values), combining data from the Office for National Statistics and Motor Transport publication? Should we prioritise further work to build on these values to develop improved LGV VTTs?

LGV Occupancy

3.47 As set out above, in order to derive a robust estimate of freight LGV VTT from industry cost data, evidence on the average freight occupancy rate was required. While the TAG Data Book[25] contains estimates of LGV occupancy, these are based on data from the National Travel Survey years 1999-2001. Hence as part of the evidence gathering for this proposal, we revisited this evidence to check we were applying an appropriate scaling factor to account for LGV freight occupancy.

3.48 After reviewing the available data and evidence on this, and consulting with both the peer reviewer, Ian Williams, and academic response team (Thijs Dekker and Gerard de Jong), we consider there to be insufficient evidence (i.e. neither recent nor of suitable quality) to recommend a change to the current TAG recommendation of a 1.2 average occupancy for LGV freight. The most recent suitable evidence (DfT surveys of privately- and company-owned vans in 2003-2005) appear to corroborate the current TAG values.

Purpose of LGV travel

3.49 As highlighted in the peer review (Williams, 2024, section 7.5), given the focus of the Arup et al (2023) study on freight LGVs only, it is important that, in applying any updated LGV freight VTT, a clear distinction is made between LGV journeys that are primarily for the purpose of freight, and those used for other purposes, be it other work purposes (carriage of tools/equipment), commuting or any other non-work purpose. Following the recommendations of the peer review, we have reviewed the

[25] TAG Data Book v2.01 (May 2025), Table A1.3.3

evidence in this area, and believe that the 2019-20 DfT Van Survey[26] offers the most reliable and robust source of UK evidence on this topic.

3.50 The below table sets out a mapping of the categories of primary usage in the 2019 van survey (Table VAN0211) to four broad categories proposed for TAG, alongside their corresponding share of vehicle distance.

Primary usage in DfT Van Survey 2019/20	**LGV purpose type in TAG**	**% vehicle kilometres**
Carrying equipment, tools, materials to enable the provision of a service	Work (Services)	61.1%
Delivery/collection of goods to other businesses/individuals	Work (Freight)	24.4%
Private/domestic non-business use, including travel to work	Non-Work (Commute)	8.3%
Recreational/leisure and holidays	Non-Work (Other)	6.2%
Providing transport to others		
All uses		**100%**

Table 6: LGV Van Purpose Splits

3.51 These updated shares of LGV journey purpose provide a more nuanced representation of the LGV market, with a clear separation of 'freight' and 'service' work purposes. While the overall work:non-work ratio is not significantly different to the current ratio in TAG (88:12 currently[27], vs 85:15 proposed), this breakdown of work LGV trips should provide an improved representation of LGV travel patterns[28].

3.52 This breakdown of work trips does however necessitate the derivation of a dedicated VTT for the Work (Services) component. For this, unlike in a freight setting, we have assumed the driver's wage (+ non-wage labour uplift) to likely be the best representation of the economic value associated with a change in travel time. Hence we have followed the Cost-Savings Approach as currently applied in TAG for work LGV purposes.

3.53 That is, we reviewed 2024 ONS ASHE data for 15 occupations we consider likely to use LGVs for non-freight work trips. We uplifted the estimated gross pay per hour by

[26] https://www.gov.uk/guidance/van-statistics-information
[27] TAG Data Book v2.01 (May 2025), Table A1.3.4; from National Travel Survey 1996-1998
[28] It is worth highlighting the distinction between trip purpose splits based upon distance travelled by purpose, the number of trips undertaken by purpose, and, as used here, distance travelled based on reported primary use of the vehicle. Whilst we believe the latter measure provides a reasonable proxy of the first, there is a risk that these shares underrepresent non-work purposes, given the survey asks respondents to report their van by primary purpose, and many non-work trips will be undertaken in LGVs that have work as a primary purpose. However, we still consider this evidence to be the best currently available in the UK context.

the TAG non-wage labour uplift to arrive at a weighted average[29] LGV Work (Service) VTT of £19.62 (2022 prices/values), as shown in the table below.

Occupancy	**SOC Code**	**Number of jobs (thousand)**	**Gross pay per hour incl. non-wage labour uplift (£, 2022 prices/values)**
Gardeners and landscape gardeners	5113	34	£16.03
Air-conditioning and refrigeration installers and repairers	5225	7	£23.11
Electricians and electrical fitters	5241	100	£20.44
Telecoms and related network installers and repairers	5242	27	£22.06
Electrical service and maintenance mechanics and repairers	5246	70	£21.91
Bricklayers	5313	8	£17.59
Roofers, roof tilers and slaters	5314	13	£17.58
Plumbers & heating and ventilating installers and repairers	5315	58	£19.75
Glaziers, window fabricators and fitters	5317	18	£16.72
Plasterers	5321	7	£18.97
Floorers and wall tilers	5322	12	£16.97
Painters and decorators	5323	21	£17.79
Ambulance staff (excluding paramedics)	6132	24	£16.99
Computer system and equipment installers and servicers	5244	13	£20.97
Security system installers and repairers	5245	10	£19.60
Weighted average	**N/A**	**422**	**£19.62**

Table 7: Derivation of LGV Work (services) VTT

3.54 The updated purpose split must also inform updated average occupancy values; for this, in the absence of a breakdown of work LGV occupancy into freight and services,

[29] Weighted by number of jobs as per ONS ASHE data, as opposed to distance travelled.

we have assumed the existing TAG 'Work (freight)' value applies equally to Work (services). An updated version of TAG Data Book table A1.3.3 is shown below; to be clear, this simply applies the existing LGV occupancies by journey purpose category to the new journey purpose splits.

Journey purpose	Weekday average	Weekend average	All week average
Work (freight) and Work (services)	1.20	1.26	1.20
Non-work	1.46	2.03	1.59
Current average LGV	*1.23*	*1.35*	*1.25*
New average LGV	**1.28**	**1.50**	**1.32**

Table 8: LGV Occupancy per vehicle kilometre travelled.

Questions: LGV occupancy and journey purpose

5. Do you agree with the proposed updates to LGV occupancy and trip purpose splits? If so, do you agree with the proposed 'Work (Services)' LGV VTT, based on the Cost-Savings Approach?

Summary of proposed values of travel time

3.55 Table 9 provides a summary of the proposed updated HGV VTT, compared against current TAG (TAG Data Book v2.01, May 2025) and the range of total VTT from the Arup et al (2023) review of international literature.

Journey purpose	Current TAG (VTT+b1 parameter)	Proposed VTT	% increase	Range from international literature
Work (freight)	£24.36*	£81.24	234%	£47-£109

Table 9: Summary of proposed VTT for HGV (£/hr, 2022 prices/values)

**Calculated using a weighted average b1 parameter, weighted as 39:61 HGV1:HGV2, from the DfT Continuing Survey of Roads Goods Transport 2022*

3.56 This shows an effective 234% increase in the equivalent value attributable to time-related transport costs, with the proposed VTT replacing the current combination of a VTT and b1 non-fuel VOC parameter. This significant increase is well aligned with results in other countries, and reflects the improved representation of WTP relating to HGVs.

3.57 Table 10 shows a summary of the proposed LGV VTTs and journey purpose splits, compared against current TAG (TAG Data Book v2.01, May 2025).

Journey purpose	**Current % share of vehicle kilometres**	**Current TAG (VTT+b1 parameter; £/hr, 2022 prices/values)**	**Proposed % share of vehicle kilometres**	**Proposed VTT (£/hr, 2022 prices/values)**	**% increase**
Work (freight)	88%	£16.39	24%	£21.34	30%
Work (services)			61%	£19.62[30]	20%
Average work			*85%*	*£20.11*	*23%*
Commute	3%*	£14.51	8%	£14.51	0%
Other non-work	9%*	£6.62	6%	£6.62	0%
Average non-work	*12%*	*£8.91*	*15%*	*£11.15*	*25%*
Average LGV	**100%**	**£15.49**	**100%**	**£18.81**	**21%**

Table 10: Summary of proposed VTT per person for LGV

**Breakdown follows methodology in TAG Data Book Table A1.3.5, which applies the car splits by non-work purpose to the non-work LGV total*

3.58 This table shows that, for freight LGVs, there is an effective 30% increase in the value attributable to time-related transport costs. This reflects the addition of non-wage time-related components into the LGV VTT (and accounts for the removal of the b1 non-fuel VOC parameter for freight LGVs).

3.59 The updated journey purpose splits enable the derivation of a Work (services) LGV VTT, and the table additionally demonstrates how these updated splits lead to increases in *average* non-work VTT, given the increased overall share of vehicle kilometres attributable to non-work purposes. Note we propose to retain the b1 parameter for Work (Services) LGVs, in line with the existing TAG approach of combining Cost-Saving-Approach-derived VTT with a standalone b1 parameter; that

[30] As per Table A, total time-related value for Work (Services) consists of the VTT displayed (£19.62) plus an additional £0.61 via the existing TAG b1 parameter for Work LGVs, which we propose to retain in guidance. A like-for-like comparison of VTT+b1 for Work (Services) would therefore show an increase of 23%. Note this would push the % increase relating to 'Average work' up slightly as well.

is, time-related depreciation costs will continue to be reflected in the non-fuel parameters, as opposed to the VTT.

Questions: Proposed values of travel time

6. Do you generally view the proposed HGV and LGV VTTs to represent an improvement in how we capture the benefit to businesses of road freight journey time improvements?

4. Updating values of reliability and accompanying guidance

Journey time reliability

A reliability ratio for HGVs

4.1 The current approach to the appraisal of reliability (journey time variability) in TAG is set out in Section 6 of TAG Unit A1.3 - User and Provider Impacts. While TAG does not reference reliability for freight directly, the methods set out are broadly applicable to non-freight and freight traffic alike.

4.2 The calculation of reliability benefits is via the below formula:

$$Benefit = -\frac{1}{2}\sum_{ij} \Delta\sigma_{ij} * \left(T_{ij}^{0} + T_{ij}^{1}\right) * VOR$$

Equation 1: Reliability benefit calculation (TAG Unit A1.3)

4.3 Where σ represents the standard deviation of journey time; T represents the journey time; i and j represent origins and destinations; 0 and 1 represent before- and after-scheme scenarios; and VOR is obtained by multiplying the relevant VTT by the 'Reliability Ratio' (RR), which is the ratio of the VTTR to VTT. Resultingly, the values used are multiples of the VTT. This applies to the appraisal of reliability impacts on all road types.

4.4 At present, TAG recommends a reliability ratio 'for all journey purposes by car' of **0.4**. No recommendation is made for HGVs or LGVs.

4.5 For interventions on the Strategic Road Network (overseen by National Highways), MyRIAD (Motorway Reliability Incidents and Delays) is the primary tool used to appraise reliability impacts. MyRIAD currently applies an RR of 0.4 to all LGVs (across all purposes), and a RR of 0.6 to HGVs.

4.6 As explained in section 2 of this document, the main study ran two stated preference choice games, following a very similar approach to the 2014/15 passenger VTTR study (Arup et al, 2014/15) to estimate RRs for each segment as shown in Table 1.

4.7 Once enumerated using data from the Continuing Survey of Roads Goods Transport to weight across loaded, empty and trips to/from port, this generated an average HGV RR of 0.42 (see Table 42 in Arup et al, 2023).

4.8 However, as set out in the proceeding sections, we have insufficient confidence in the valuations arising from the shipper sample to use the estimated VTTs in guidance. Some of the same critiques apply to the use of the shipper-estimated VTTRs, and hence we instead view the HGV RR estimated from the carrier sample (**0.58**) to be the most robust estimate arising from the study, and the value we recommend for inclusion in TAG.

4.9 This implies an increase to the RR used outside of MyRIAD assessments. Furthermore, setting aside the recommended change to the RR, appraised monetised reliability impacts will increase due to the application of the significantly higher HGV VTT recommended in earlier sections. This will see monetised reliability impacts relating to HGVs increase as a share of total present value benefits.

A reliability ratio for LGVs

4.10 As noted above, at present, TAG makes no explicit recommendation on a RR for LGVs. General practice therefore, as well as the MyRIAD software, applies the 'car' RR of 0.4 to LGVs of all purposes, with no distinction made for freight LGVs.

4.11 While, as discussed above, there is insufficient confidence in the carrier sample of the main study to use the estimated LGV carrier VTT, there is no obvious reason to suggest that the *ratio* between SP games 1 and 2 (for VTT and VTTR respectively) would be biased, and as such the RR derived from the carrier segment of the study (**0.70**) should be considered suitably robust for recommendation in guidance. We have tested this logic with Thijs Dekker and Gerard de Jong from the original study team, who saw merit in this approach.

4.12 By contrast, the overall LGV RR, drawn from the combined shipper and carrier sample (0.43), is not considered of sufficient assurance, given concerns raised over the results derived from shippers as part of the Peer Review (Williams, 2024). It is therefore proposed to use the RR from the carrier sample for LGVs.

4.13 We propose that this RR is applied to Work (freight) LGV trips only, with Work (services), Commute and Other non-work trips attracting the existing TAG RR of 0.4. Given reliability benefits for LGVs are typically calculated for average LGVs, rather than with any journey purpose breakdown (for example National Highways' MyRIAD software does not break down LGV beyond 'Average LGV'), the resulting Average LGV RR (based on the proposed shares shown in Table 6) would be **0.47**. This implies a relatively modest increase to the average LGV RR recommended in TAG or as applied in MyRIAD. Reliability benefits for LGVs would increase further however, driven by the increased proposed LGV VTTs.

Questions: Reliability ratios

7. On the basis of the evidence presented here and in the research reports, do you agree that we should use the Arup et al (2023) reliability ratio from the carrier segment, for both HGVs (RR=0.58) and freight LGVs (RR=0.70)?

Growing values over time

4.14 As with our passenger VTTs, it is important that we apply appropriate adjustments to our recommended values such that they reflect real growth in economic values over time. Through this, we can ensure that the values underpinning appraisals, often conducted over a period of 60 years into the future, are still reflecting the economic fundamentals in the parameters used.

4.15 The main study (Arup et al, 2023, section 5.6.3) recommended that where possible, specific indices reflecting different cost components are used to uprate road freight VTTs over time. We will act upon this recommendation to propose four relevant series for reflecting the real growth in LGV and HGV VTT over time in modelling and appraisal.

4.16 For both HGVs and LGVs, we propose to uprate road freight VTT over time by blending the real wage growth rate for the wage-related component of VTT, with the GDP deflator for the residual component (relating to the wider range of costs reflected in the VTT). We believe this has the benefit of reflecting any premium associated with wage growth, over and above general inflation, while still basing the growth rate on widely used and understood metrics (as opposed to more bespoke freight price indices).

4.17 The derivation of the growth rate for HGVs is shown in Table 11. This results in a real long-term trend rate of 0.35% p.a., based on the trend growth rates from the Office of Budgetary Responsibility (OBR). This growth rate would be implemented in the DfT's appraisal software, TUBA, and more generally would apply equally to the growth of HGV VTTs in both modelling and appraisal[31]. This will require changes to the TUBA software, defining HGV freight as a new journey purpose (distinct to 'Business', which is applied to other vehicle types).

[31] Strictly, the real wage growth component of the uprating series should vary between modelling and appraisal, growing in line with forecast real wage growth for future modelling years, and the existing TAG long-term productivity growth rate (1.5% p.a.) for future appraisal years. However, to prevent additional complexity for practitioners, we propose a single series for modelling and appraisal of HGVs.

	Wage component of VTT	Residual component	Total proposed VTT	
£, 2022 prices/values	19.03	62.21	81.24	
% weight	23%	77%	100%	
Year	Wage growth (real % growth p.a.)	GDP deflator (real % growth p.a.)	Weighted HGV series (real % growth p.a.)	Weighted HGV series (Index, 2023 = 100)
2010		0.00	0.00	98.6
2011	-0.19	0.00	-0.04	98.6
2012	-1.17	0.00	-0.27	98.3
2013	2.74	0.00	0.64	98.9
2014	-0.63	0.00	-0.15	98.8
2015	1.30	0.00	0.30	99.1
2016	0.09	0.00	0.02	99.1
2017	1.58	0.00	0.37	99.5
2018	0.48	0.00	0.11	99.6
2019	-0.20	0.00	-0.05	99.5
2020	-4.83	0.00	-1.13	98.4
2021	6.49	0.00	1.52	99.9
2022	-0.58	0.00	-0.13	99.8
2023	0.95	0.00	0.22	**100.0**
2024	0.56	0.00	0.13	100.1
2025	1.03	0.00	0.24	100.4
2026	0.49	0.00	0.12	100.5
2027	0.04	0.00	0.01	100.5
2028	0.30	0.00	0.07	100.6
2029	0.63	0.00	0.15	100.7
2030	1.25	0.00	0.29	101.0
Trend beyond 2035	**1.5**	**0.00**	**0.35**	**N/A**

Table 11: HGV freight uprating series derivation

4.18 For LGVs, the same approach (i.e. blending real wage growth and the GDP deflator) results in a long-term trend rate of 1.10% p.a.[32], with the derivation of this shown in Table 12. The higher trend rate when compared to HGVs is attributable to the higher share of LGV VTT attributable to wages.

[32] As with HGVs, strictly the real wage growth component should vary between modelling and appraisal. However we propose a single series for modelling and appraisal of freight LGVs for simplicity.

	Wage component of VTT	Residual component	Total proposed VTT	
£, 2022 prices/values	15.60	5.74	21.34	
% weight	73%	27%	100%	
Year	Wage growth (real % growth p.a.)	GDP deflator (real % growth p.a.)	Weighted LGV Freight series (real % growth p.a.)	Weighted LGV Freight series (Index, 2023 = 100)
2010		0.00	0.00	95.9
2011	-0.19	0.00	-0.14	95.7
2012	-1.17	0.00	-0.85	94.9
2013	2.74	0.00	2.01	96.8
2014	-0.63	0.00	-0.46	96.4
2015	1.30	0.00	0.95	97.3
2016	0.09	0.00	0.07	97.4
2017	1.58	0.00	1.16	98.5
2018	0.48	0.00	0.35	98.8
2019	-0.20	0.00	-0.15	98.7
2020	-4.83	0.00	-3.53	95.2
2021	6.49	0.00	4.75	99.7
2022	-0.58	0.00	-0.42	99.3
2023	0.95	0.00	0.69	**100.0**
2024	0.56	0.00	0.41	100.4
2025	1.03	0.00	0.76	101.2
2026	0.49	0.00	0.36	101.5
2027	0.04	0.00	0.03	101.6
2028	0.30	0.00	0.22	101.8
2029	0.63	0.00	0.46	102.3
2030	1.25	0.00	0.92	103.2
Trend beyond 2035	**1.5**	**0.00**	**1.10**	**N/A**

Table 12: LGV freight uprating series derivation

4.19 The implementation of the LGV growth rate would necessarily require more nuance than the equivalent growth rate for HGVs, given the presence of non-freight LGVs. We propose to publish two LGV uprating series; one that is freight-specific (i.e. the series shown in Table 12), and one that is a weighted average of the freight series and the existing relevant (i.e. modelling or appraisal) uprating series for VTT. The former series would be added to the DfT's appraisal software, TUBA, for application to a new 'LGV Freight' purpose, while the latter growth rate would be available for analysts to apply to 'average LGVs', given that in modelling and appraisal there is often no distinction of LGV purpose, and so a single series is required. For clarity, the various uprating series we propose to recommend in our guidance and software suite is set out in Table 13.

Uprating series	Status	Derivation	Proposed application	In TUBA
"TAG modelling"	Existing TAG (Col. T-W of Data Book Annual Parameters table)	GDP per capita growth in historic and future years	Modelling of non-LGV/HGV, modelling of non-freight LGV if isolated from freight.	N/A
"TAG appraisal"	Existing TAG (Col. X-AA of Data Book Annual Parameters table)	GDP per capita growth in historic years; long-run productivity growth (1.5%) in future years	Appraisal of non-LGV/HGV, appraisal of non-freight LGV if isolated from freight.	Series included in TUBA for Business, Commute, Other purposes, as at present, and applied to 'LGV personal' submode.
"LGV freight"	New	Blend of real wage growth and GDP deflator	Modelling and appraisal of LGV freight, if isolated from non-freight LGVs*	Series included in TUBA for 'LGV Freight' purpose (new), and applied to 'LGV Freight' submode.
"LGV modelling"	New	Weighted average of "TAG modelling" and "LGV freight"	Modelling of average LGVs	N/A
"LGV appraisal"	New	Weighted average of "TAG appraisal" and "LGV freight"	Appraisal of average LGVs	N/A
"HGV freight"	New	Blend of real wage growth and GDP deflator	Modelling and appraisal of HGVs	Series included in TUBA for 'HGV Freight' purpose (new) and applied to 'OGV1' and 'OGV2' submodes.

Table 13: Uprating series in TAG, with proposal for freight

** In these cases, non-freight LGVs would attract the general "TAG modelling" or "TAG appraisal" series, depending on the context.*

Questions: Growing values over time

8. Do you agree with our proposed methodology for growing HGV and LGV VTT over time? Do you think the proposed implementation in TAG provides sufficient flexibility of application, for different types of model?

Implications for modelling guidance and appraisal software

4.20 We are proposing that for the definition of generalised costs for relevant vehicle types/journey purposes in transport models, the proposed VTTs (plus accompanying removal of the b1 non-fuel vehicle operating cost parameter for HGVs, freight LGVs but not service LGVs) should be adopted. This would entail a change to guidance in paragraph 2.8.8 of TAG Unit M3.1 - Highway Assignment Modelling, which currently recommends analysts 'use a value of time around twice the TAG unit A1.3 values' (i.e. the current recommended values based on the cost-saving approach) for HGVs. The rationale currently provided is that this is because the existing HGV VTTs '[relate] to the driver's time and does not take account of the influence of owners on the routeing of these vehicles.'

4.21 We are proposing that this guidance is removed, given the updated, more comprehensive approach to the valuation of road freight VTT. In practice, this would mean modelling and appraisal VTTs for HGVs are aligned.

4.22 The proposed VTTs would also be applied in the relevant TAG software, namely TUBA, which as indicated in the prior section, will require an update to its structure to enable the full range of application of the values to different segments.

Questions: Implications for modelling guidance

9. Do you agree with the proposal to apply a single VTT for all HGV vehicle types? Do you agree with the proposal to remove existing advice in TAG relating to doubling the recommended HGV VTT in modelling?

Implications across mode

4.23 The UK freight sector operates across almost every mode of transport, not just via HGVs and LGVs on the road network. However, the modelling and appraisal of non-highway freight modes such as rail, aviation and maritime feature distinct methods and practices.

4.24 For instance, the economic value associated with an investment in rail freight is typically measured via the 'Marginal External Cost' (MEC) methodology, capturing the social welfare impact of removing freight kilometres from the highway network. Aviation and maritime freight investments are often funded by the private sector, and

hence where detailed modelling and appraisal takes place, it often adopts bespoke valuation approaches.

4.25 Thus the new evidence presented in this document relating to the valuation of road freight movements does not apply equally to other freight modes. More practically, the valuation framework set out in Table 2 of this document, and that underpins the research undertaken into the valuation of road freight journey time changes, is simply not applicable to these modes; non-highway freight modes use distinct methods, underpinned by separate, robust evidence.

4.26 There will be an indirect impact of the presented proposals for guidance on the MEC method described above, and as used for rail freight appraisals (alongside other applications). The MEC values presented in the TAG Data Book are derived by combining modelling in the National Transport Model (NTM) with appropriate economic valuations from research. It is to be expected that the updates to freight VTT will generate changes to both the modelled outputs from NTM and the accompanying economic valuations relating to freight movements, which in turn will generate changes to the MEC values used in appraisal. This indirect effect will be broadly equivalent in scale to the overall change to appraised travel time impacts expected from the changes to HGV and LGV VTT.

4.27 We will continue to review our approaches to valuing freight movements across all modes as part of TAG, including ongoing evidence from research into the wider economic impacts of freight movements.

Questions: Implications across mode

10. Do you agree with our proposal to restrict the *direct* application of the updated evidence to highway modelling and appraisal only?

Implications for appraisal results

4.28 When considering the likely implications for appraisal results from the proposals, it's worth dwelling upon the role of road freight traffic as part of wider trends in travel in the UK. As shown in Figure 6, Vans (analogous to LGVs) and Lorries (HGVs) represent a relatively small share of overall traffic, at 17% and 5% of total traffic respectively.

4.29 Furthermore, these shares vary significantly, when considering different areas of the national road network. For instance, while 92% of HGV miles are accrued on motorways and 'A' roads, 35% of LGV miles occur on minor roads (those below 'A' road classification)[33]. Figure 7 meanwhile shows how HGV traffic is concentrated on the Strategic Road Network (SRN; motorways and major trunk roads in England managed by National Highways), while LGV traffic has a profile closely matching the overall average. These headline statistics don't show further nuance that is present in

[33] https://www.gov.uk/government/statistics/road-traffic-estimates-in-great-britain-2024/road-traffic-estimates-in-great-britain-2024-traffic-in-great-britain-by-vehicle-type#van-traffic

road freight traffic patterns; for example that LGV's use of urban road networks is markedly different to HGVs and car traffic more generally.

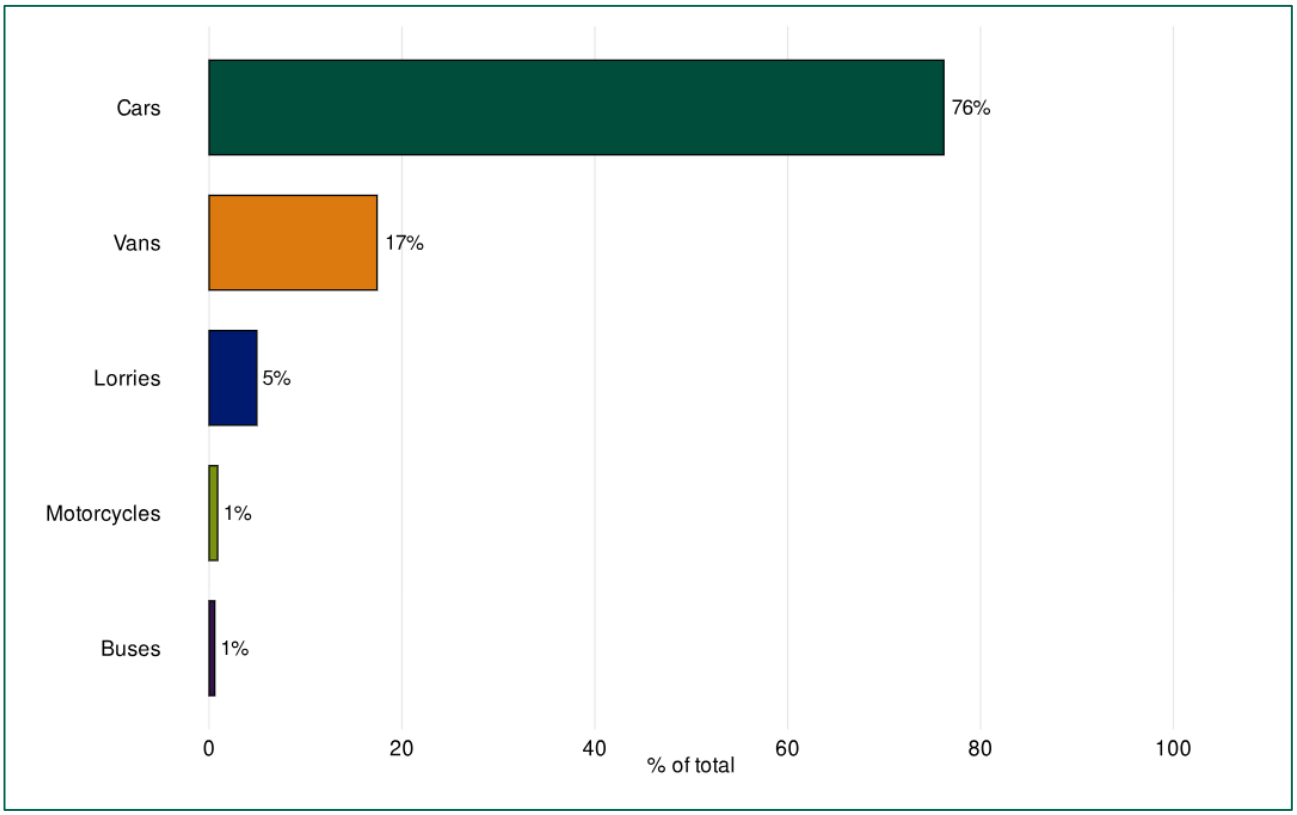


Figure 6 Share of traffic by vehicle type in Great Britain, 2024 (DfT)

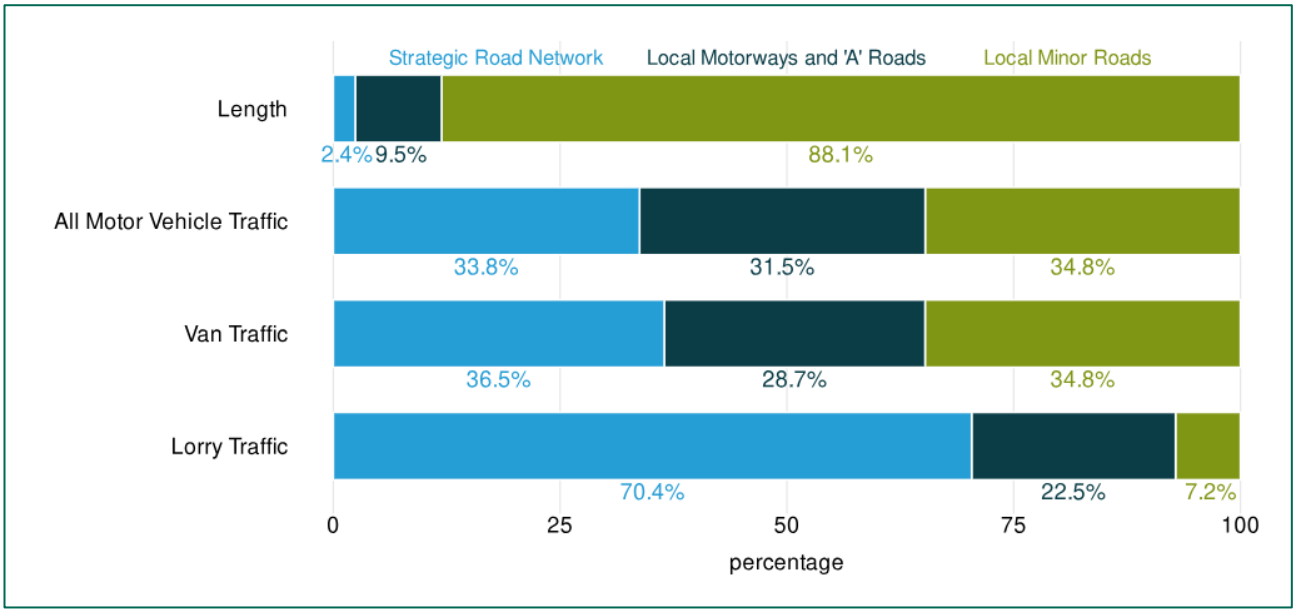


Figure 7 Share of traffic and length by road types in England, 2024 (DfT)

4.30 With this in mind, we can consider the likely implications of the proposals set out in this document. The notable proposed increase to HGV VTT will have the largest effect on estimated scheme benefits on the motorway and major 'A' road network. Clearly, corridors on these roads carrying particularly high modelled shares of HGV

traffic (e.g. those leading to terminals or distribution sites) will see the largest uplift to monetised impacts. This uplift will feed into user benefits (via the VTT directly), but also reliability impacts as discussed earlier in this document, as well as wider economic impacts, some of which are underpinned by estimates of benefits accruing to businesses.

4.31 The implications of the proposed updates to LGV VTT, and accompanying guidance, will be even more dependent on the nature and geography of the scheme in question. Freight LGVs represent only a relatively small share of total LGV traffic (24% as per the proposals in this document), and these movements are often quite distinct to other purposes of LGV, and other vehicle types more generally.

4.32 Bringing together the above to account for the contributions of HGVs and LGVs to the overall fleet, we approximate the fleet-weighted average VTT (i.e. the mean VTT of all vehicle types and purposes, weighted by traffic volume) to increase by a range of 15-40% as a result of the proposals in this document. Average VTTs on motorways, which feature the highest share of HGVs and LGVs, would sit at the top of this range. Where road freight represents a lower share of total traffic (e.g. in rural areas with a high share of minor roads), the average VTT will be towards the bottom of this range.

4.33 Journey time impacts are only one component of the monetised impacts captured in appraisal, but, when combined with the expected uplift to reliability impacts as well as some elements of wider economic impacts, we believe this range provides a reasonable proxy for the expected magnitude of impacts on estimated monetised benefits.

5. Confidence in the updated evidence base

5.1 The evidence presented in this document brings together an extensive programme of research and analysis undertaken in the period since the main study (Arup et al, 2023) was launched in 2019. At that time, there was a long-standing sense that the VTTs for HGVs and LGVs in guidance were not accounting for the full economic worth attributable to these movements. However, the evidence base on freight VTT in the UK is significantly less mature than the equivalent literature for passenger travel. Hence it is only through the collection of this significantly enhanced evidence on UK road freight willingness-to-pay that we have confidence to recommend updates to TAG. The below outlines the steps we have taken to establish this confidence.

5.2 The Arup et al (2023) study represents the most comprehensive and sophisticated attempt at deriving UK road freight VTTs (and equivalent reliability estimates) to date. The study team comprised some of the leading international experts in the fields of freight VTT estimation and choice modelling, supported by an extensive team of freight industry and primary research experts. Careful testing and checking of questionnaire design and outreach strategy helped to generate a total sample that is the largest of its type collected in the UK, and larger than many equivalent samples collected as part of European national freight VTT studies. State-of-the-art choice modelling techniques were applied, following international best practice, to arrive at the best possible balance of statistical robustness and representation of different freight segments. As set out in Section 6 of the main study, the survey and analysis undertaken were subject to a significant degree of quality assurance, complemented by oversight from experienced DfT and National Highways officials.

5.3 Because of the cutting-edge nature of the Arup et al (2023) research, there is necessarily a lack of precedent in the UK context and few existing equivalent studies which we can use to understand the final valuations derived. For this reason, we have spent significant time and effort trying to assure and contextualise the results from the main study. This has been done with input from some of the leading experts in freight modelling and appraisal.

5.4 We commissioned Ian Williams, who has decades of experience as an expert in the modelling and appraisal of freight, to undertake a peer review (Williams, 2024) of the methods and findings of the main study. This peer review recognised the scale, complexity and ambition of the primary research, concluding that the study team had successfully tackled many of the challenges involved in producing robust valuations.

However, it highlighted several limitations to the study findings relating to the size and make-up of the sample, as well as choices made in the design of the cost-time trade-offs presented to respondents. The peer review concluded that as a result of these shortcomings, greater confidence in the findings needed to be established for them to be applied in TAG. This recommendation, combined with further recommendations made on the modelling and appraisal of LGV and HGV movements in TAG more widely, was the basis for a significant subsequent programme of testing and benchmarking.

5.5 As part of this, we commissioned two of the key academics from the original study, Thijs Dekker of the Institute for Transport Studies at the University of Leeds, and Gerard de Jong of Significance, to provide a response to the peer review (2025). In this response, they acknowledge the validity of some of the peer review's main critiques, in particular around the need for good sample sizes, and recognising that in retrospect, improved cost-time trade-offs to shipper and LGV respondents in particular may have produced improved results. However, they provided a rebuttal to the peer review's comments on sample representativity, noting that state-of-the-art choice modelling techniques do not require a fully representative sample to produce robust estimates of VTT.

5.6 Furthermore, the DfT and National Highways have undertaken an extensive programme of testing and benchmarking, reviewing relevant literature and benchmarking possible values against a range of data sources. This included:

- Benchmarking the Arup et al (2023) carrier values against estimates of time-related transport costs from multiple sources;
- Benchmarking of the estimated shipper valuations against pricing evidence from the haulage industry;
- Understanding the practical implications for modelling and appraisal of road schemes;
- Investigation of the evidence on reliability values, and testing in National Highways MyRIAD software in a real-world application;
- Reviewing the latest evidence around LGV journey purpose splits and occupancy; and
- Consideration of the evidence on differentiating VTT for trips to/from port.

5.7 The recommendations set out in this document are ultimately, as with all valuations 'adopted' in TAG, the result of a balanced judgment around the quality and robustness of evidence in a range of areas, considering the extent to which the values perform against a range of criteria. This criteria ranges from the ability to reflect different aspects of the WTP of carriers and shippers for faster or more reliable delivery, to the type and quality of underpinning research, to the views of the peer reviewer and original study response team.

5.8 Table 14 provides a simplified representation of how we have taken on board the recommendations of both the peer review and subsequent academic response,

supplementing this with further evidence to arrive at a series of robust proposals for TAG. The detail of this evidence gathering and judgement is embedded in the detail provided in this document; this table provides an at-a-glance view of this process.

Segment	Peer review comments*	Response comments	Further relevant evidence	Overall assessment of evidence
Carrier (HGV)	Sample not representative	Representativity of sample not necessary for a robust VTT	Values align well against factor cost estimate and sit within range of international literature.	Arup et al (2023) provides a robust, and significantly more comprehensive representation of the WTP of HGV carriers for faster delivery. The carrier estimate may capture some element of shipper WTP, given the VTT exceeds the factor cost comparator. RR underpinned by same evidential basis. Recommend Arup et al (2023) values for TAG.
Carrier (LGV)	Sample small and not representative. Issues with BVTT design.	Small sample size limited ability to estimate robust VTTs by segment. Representativity of sample not necessary for a robust VTT. In retrospect, BVTT ranges could have been improved.	Values do not align with factor cost estimate and economic theory. Alternative measure of time-related transport costs from Motor Transport provides transparent measure that aligns well with factor cost estimate.	Arup et al (2023) estimates not suitable for inclusion in TAG, given small sample, concerns over BVTT design and comparisons vs factor cost. Alternative measure combining ONS and Motor Transport data provides robust estimate of LGV carrier WTP that incorporates non-wage time-related costs into the VTT. RR drawn from ratio of comparable stated preference experiments; as such not subject to same concerns over sample and BVTT design. Recommend alternative measure of VTT, and Arup et al (2023) RR from LGV carrier segment.

Segment	Peer review comments*	Response comments	Further relevant evidence	Overall assessment of evidence
Shipper (HGV and LGV)	Issues with BVTT design Incorrect defining of shippers in final estimates	In retrospect, BVTT ranges could have been improved. No error in defining of shippers; clarify error in original reporting	Values significantly larger than international comparisons, in absolute terms and as a share of total VTT. Robust alternative measures of this WTP that are separable from carrier VTT a challenge. Factor cost comparisons suggest carrier respondents may have accounted for some component of shipper WTP in responses.	Arup et al (2023) estimates not suitable for inclusion in TAG, given concerns over BVTT design and comparisons against international benchmarks. To avoid double-counting potential element of shipper WTP in carrier VTT, exclude explicit valuation at this stage.

Table 14: Summary of evidential assessment feeding into implementation

** Based on Table 8 of Williams, 2024.*

6. Seeking your views

6.1 This document provides an overview of the evidence gathered on the value of road freight travel time, and our proposed recommendations for updating TAG to reflect this evidence. We would welcome views on the contents of this document, and feedback on our plans for new road freight VTTs in TAG. These can be shared either via email, to TASM@dft.gov.uk, with the subject 'Freight VTT implementation' by Friday 7th November, or at the planned, upcoming engagement event.

6.2 Throughout this document we have identified key questions or issues which we would welcome feedback on; for convenience, these are collated below:

1. On the basis of the evidence presented here and in the research reports, do you agree that we should use the Arup et al (2023) estimates from carriers (£81.24 in 2022 prices/values) as the basis for the HGV VTT?

2. Do you agree that we should exclude the *explicit* valuation of HGV shipper willingness-to-pay (£73.35 in 2022 prices/values), on the basis of the evidence presented here and in the research reports? Do you think some element of this valuation may be reflected, implicitly, in a carrier-based VTT?

3. Do you agree with the proposal to exclude differentiation of trips to/from port and not to/from port from guidance?

4. On the basis of the evidence presented here and in the research reports, do you agree that we should avoid using estimates of freight LGV VTT from the Arup et al (2023) study? If so, do you agree with our proposal to use a bottom-up estimate of time-related transport costs (£21.34 in 2022 prices/values), combining data from the Office for National Statistics and Motor Transport publication? Should we prioritise further work to build on these values to develop improved LGV VTTs?

5. Do you agree with the proposed updates to LGV occupancy and trip purpose splits? If so, do you agree with the proposed ‘Work (Services)’ LGV VTT, based on the Cost-Savings Approach?

6. Do you generally view the proposed HGV and LGV VTTs to represent an improvement in how we capture the benefit to businesses of road freight journey time improvements?

7. On the basis of the evidence presented here and in the research reports, do you agree that we should use the Arup et al (2023) reliability ratio from the carrier segment, for both HGVs (RR=0.58) and freight LGVs (RR=0.70)?

8. Do you agree with our proposed methodology for growing HGV and LGV VTT over time? Do you think the proposed implementation in TAG provides sufficient flexibility of application, for different types of model?

9. Do you agree with the proposal to apply a single VTT for all HGV vehicle types? Do you agree with the proposal to remove existing advice in TAG relating to doubling the recommended HGV VTT in modelling?

10. Do you agree with our proposal to restrict the *direct* application of the updated evidence to highway modelling and appraisal only?