

Note to Tenderers: *the content of this Appendix 2 (Specification), will form Schedule 2 (Specification) of the Contract awarded pursuant to this procurement exercise.*

Requirement Overview

Background

NTMv5 is version 5 of the Department's National Transport Model. It is a strategic model of surface travel demand responses and highway route choice. It uses PTV VISUM software (currently version VISUM 23).

NTMv5 is a useful, detailed and practical tool. So far it has been used to inform a small number of Department projects (details of which are sensitive and therefore not shared here); it has potential to inform many more. It combines a high level of detail (over 7,000 zones and 135,000 highway links) with a practical approach allowing the model to be run overnight if needed.

First developed in 2015-2019, NTMv5 has continued to be developed in-house to meet the Department's requirements. The changes made include the following:

- An interface allowing users, some of whom may not be expert transport modellers, to select key inputs simply and efficiently;
- A modification to the previous simplification for urban area traffic speeds, allowing them to take account growth in total traffic across the urban area, rather than merely growth in trip ends;
- Additional outputs such as carbon and air quality emissions and accidents;
- Automatic projection of traffic to match DfT statistics;
- Automatic generation of traffic outputs and Marginal External Car Cost (MECCs) outputs;
- Reductions in run time and memory use, achieved through updating versions of the PTV VISUM software, regular clearances of matrices when they are no longer needed, and running parts of the model with subsets of zone pairs to (approximately) retain the trip length pattern and validation standard whilst reducing computing effort.

The Department now requires an update of NTMv5 with a particular focus on reflecting changes in travel demand following the covid-19 pandemic. An update is needed by the end of 2024 to support future forecasting activity in 2025. The forecasting activity is

likely to focus more on regional traffic by vehicle type and road type than traffic on individual links, although there may be interest in presenting some information (potentially relating to motorways and other trunk roads) in thematic maps.

This timescale presents at least two challenges:

- The update will need to use post-covid-19 data, in practice likely to be limited to data from years 2022 and 2023. This will be a much smaller data source than was used for the previous NTMv5 (which used 6 years of NTS data, for example);
- The timescale to carry out the work will be challenging. However, it may be proportionate to carry out a simpler update given the limited data available, and it is becoming increasingly important for the Department to update NTMv5 efficiently at speed, to enable it to keep pace with modern use of data and Artificial Intelligence (AI).

This update is, therefore, likely to be focused on incorporating post-covid19 data in a proportionate way, and it is expected that the update may not necessarily be to the same level of detail or rigour as we would normally expect.

The requirement set out here is part of a larger project. The Department intends to carry out high-level updates to the demand model component of NTMv5 (including trip frequency, mode choice, and if necessary location choice) in-house. The Department has considered updating the highway assignment demand matrices and calibration / validation in-house and believes a higher quality standard might be met with external expertise.

Whilst we do not necessarily expect the use of AI or other modern techniques to be a dominant feature of this requirement, we would welcome innovative approaches to meeting the challenge, providing they can be demonstrated to be sufficiently evidence-based, robust and repeatable. We would also be interested to receive any recommendations, as part of the final report, of how new technology could be used in future NTMv5 updates.

Objectives

The Department's objectives in letting this contract are as follows:

- To agree suitable standards for updating NTMv5 when less time and data is available but there is a clear need to update the model to reflect post-covid19 travel demand;

- To update the NTMv5 highway assignment model (including the base year assignment matrices) to reflect the situation after the covid-19 pandemic, by **October 2024**;
- To calibrate / validate the model to reflect DfT traffic statistics and, to the extent this is possible and proportionate, DfT traffic counts and travel time data, by **November 2024**. (The existing 2015-based model was calibrated to traffic data from National Highways rather than the published DfT counts, but for strategic forecasting it is increasingly important for NTMv5 to match published traffic statistics).
- To ensure that DfT can repeat this analysis with updated versions of the data sources, and carry out other updates including networks, in future years. This is not urgent for completion by end-2024, but should be complete by **February 2025**;
- To identify where there are opportunities to use innovative approaches and best practices and robust new technology, such as Data Science, Machine Learning, Artificial Intelligence, in future updates to NTMv5, throughout the contract.

Scope of work

We anticipate that the following tasks will be needed to meet the objectives (with timescales assuming the contract starts on **5 July 2024**):

- Deliverable 1: Inception Report – by **19 July 2024**
- Deliverable 2: Post-covid19 prior assignment matrices – by **30 September 2024**
- Deliverable 3: Post-covid19 calibrated assignment matrices – by **31 October 2024**
- Deliverable 4: Assignment validation – by **30 November 2024**;
- Deliverable 5: Documentation and handover – by **28 February 2025**.

We are open to considering other ways of structuring this requirement to meet the objectives.

These deliverables, along with the assumptions of how we can provide data and otherwise support their delivery, are now described in more detail.

Deliverable 1: Inception Report

Key to this requirement is to produce the best possible validation for regional traffic and traffic on trunk roads, within limited timescales and with limited data availability. The Department would like to understand how the supplier proposes to meet this challenge. It may be helpful to schedule a meeting within 2 weeks of contract start, although the Department is open to other approaches.

The other essential features of this deliverable will include proportionate reporting to confirm the following:

- how the supplier intends to complete the remaining deliverables, including the standards they propose to achieve. This may be informed by a meeting as suggested above;
- any controlled items that need to be sent by the supplier, including the existing model, and data sources they intend to use (including which years the data was collected);
- the invoicing schedule and procedures for change control, risk management, and quality assurance;
- proposed level of contact with the Department (including regular online meetings).

Deliverable 2: Post-covid19 Prior Assignment Matrices and Assignment preparation

The essential features of this deliverable will include the following:

- 15 assignment matrices for a post-covid year (probably 2023), covering 5 assignment classes (Car Business, Car Commute, Car Other, LGV, HGV) for each of 3 time periods (AM 7am-10am; IP 10am-4pm; PM 4pm-7pm);
- The assignment matrices should all use the existing NTMv5 zoning system with 7,131 zones. Matrices can be prepared either on a complete zone-to-zone basis or a "masked" basis in which a sample of zone-to-zone movements is represented. Any "masked" approach would need to be agreed with the Department prior to use;
- Comparison with data sources to identify where improvements are needed, including but not necessarily limited to the trip rates, trip length distributions and (to the extent the data supports this) trip movements between suitable geographical sectors from the National Travel Survey;

- No matrix estimation is to be used for Deliverable 2. Should matrix estimation be needed, this should be delivered as part of Deliverable 3;
- A technical note detailing the assumptions made and any other information relating to the matrices. Sufficient information should be provided for DfT to repeat the exercise if necessary;
- Handover, to DfT, of any processes used to update the matrices, with all IPR and ownership of these processes vesting in the Department;
- post-covid19 traffic count data (DfT where possible) to be in the NTMv5 VISUM template version file ready for calibration and validation, including seasonal adjustments;
- post-covid19 travel time data, to be provided by DfT, to be in the NTMv5 VISUM template version file separated by modelled time period for validation purposes.
- For urban areas, we will also need an estimate of free-flow speeds and speeds by time period for links in selected urban areas and the external area. One approach might be to use travel times between 11pm and 5am for this purpose. The Department will use this data to update the urban traffic speeds method in NTMv5.

To support delivery of this, the Department can supply the existing 2015-based NTMv5 base assignment matrices and is willing to accept that the best approach in the limited timescales may be an update of these, rather than development of new matrices from scratch.

In preparation for matching the traffic count data, DfT intend to update the model links with traffic count locations where we are able to match these efficiently.

Subject to suitable assurances over data security and access control, the Department can provide National Travel Survey data records and Congestion Statistics data to support this Deliverable. The dates of data to be used will be agreed during the Inception stage of the contract.

Deliverable 3: Post-covid19 Calibrated Assignment Matrices

Key to success of this update will be the need to match DfT traffic data by region, road type and vehicle type in the model base year.

The essential features of this deliverable will include:

- Final assignment matrices for the same user classes, time periods and zoning system as Deliverable 2. These should be updated from the prior assignment

matrices from Deliverable 2, and be the best fit to DfT aggregated traffic data by region, road type and vehicle type that can be achieved within proportionate and available time and resources set aside for this work. Fitting to DfT Traffic Counts may be useful in helping to achieve this;

- It is expected that some manual adjustments to the trip movements between high-level geographic sectors (“sector-factoring”) will be needed prior to the use of Matrix Estimation methods. We would expect the factors applied to be kept as close to 1 as possible (a factor of 1 would imply no change);
- Should it be agreed this is appropriate, the assignment matrices for this deliverable can be refined using Matrix Estimation methods on post-covid19 (ie 2022 and 2023) DfT Traffic Counts at this stage. If Matrix Estimation is used, it should be constrained in a similar way to the Department’s Transport Analysis Guidance, Unit M3.1 section 8.3, to ensure that the matrices are not unduly distorted;
- A technical note describing any traffic count processing, sector-factoring and matrix estimation used in the work. Sufficient information should be provided for DfT to be able to repeat the work if necessary;
- Handover to the Department of any methods used to update the matrices, with all IPR and ownership of such methods vesting in the Department (except for underpinning methods already part of existing software, such as the matrix estimation step in VISUM).

The DfT aggregated traffic data will be released to the supplier and will need to be kept securely. The supplier may also wish to consider using DfT Traffic Counts by time period, which are available online, and other data sources. Consideration should be given around removing counts that are not on a “typical weekday” (for example Monday, Friday, Saturday, Sunday or holiday periods). Suitable adjustments will be needed to take seasonal effects into account.

The DfT Traffic Counts may not be sufficient to provide watertight screenlines. The supplier should advise whether it is best to fill the gaps with other data sources, or use the DfT counts to calibrate the model as much as possible with a focus on the (most-heavily-used) motorways and A-roads.

The Department’s preference would be that DfT Traffic Counts that are not needed to support this task are retained for the validation in Deliverable 4.

Deliverable 4 – Assignment Calibration and Validation

The essential features for this deliverable are:

- Any proportionate and evidence-based adjustments to the assignment settings to improve the model fit, with the exception of matrix adjustments (which are covered by Deliverable 3). Small evidence-based network adjustments may also be made; these will need to be set up as Scenario Manager modifications so that they can be incorporated in the Department's future year network building;
- Validation of the model traffic flows against DfT traffic counts. Any validation dashboard should be delivered to DfT with sufficient instructions for DfT to reuse it;
- Validation of modelled speeds / journey times against automatically-collected data provided by DfT. Again, any validation dashboard should be delivered to DfT with sufficient instructions for DfT to reuse it;
- A technical note describing the adjustments carried out and validation processes undertaken, with sufficient information for DfT to repeat the process.

The Department will provide the base year model file (a PTV VISUM version file) including network updates to 2023.

Deliverable 5 – Documentation and Handover

The requirements for this deliverable are:

- A report compiling the contents of Deliverables 2-4, advising on conclusions and possible next steps. As part of the next steps, the report should mention how much effort would be involved in importing an updated network from raw data into NTMv5, and how future NTMv5 development might benefit from new technology such as Artificial Intelligence;
- A meeting, or series of meetings, where the supplier will demonstrate to the Department how to use the tools it has developed to carry out Deliverables 2-4.

Exclusions from scope

The scope of the contract will explicitly exclude the following:

- Review of the NTMv5 process structure, zoning system and activity structure. Minor changes to the procedure sequence might be made if needed to accommodate changes made as a result of this work.
- A comprehensive review and update of the NTM highway network. The supplier might identify small network updates to be made to help improve or

accelerate the calibration process. Any such changes need to be developed as Scenario Management “modifications” or comprehensively listed in order to ensure DfT can incorporate them into their future network building process.

- Any work to update or calibrate the variable demand model components. The Department believes that there is still insufficient post-covid-19 data to make a comprehensive update worthwhile at this stage; the intention is to make smaller high-level updates in-house.
- Realism testing. This is most likely to be affected by changes to the demand model, and as such will be carried out by the Department once both changes to the assignment and adjustments to the demand responses have been carried out.

Service Conditions and Environmental Factors

The supplier will need sufficient computing to run NTMv5. The following specification is required as a minimum:

- 1 TB SSD for swap files
- 256GB RAM
- SSD storage sufficient to store model run files. A full NTMv5 model run can generate up to around 150GB files, so it is likely that multiple terabytes of storage will be needed
- The supplier will need to supply a VISUM licence sufficient to run a model with 7,131 zones and up to 150,000 links.

It is also recommended that:

- To get similar run times as the Department, 20 cores may be needed;
- It may be helpful to double the cores and RAM requirements (ie 40 cores and 512GB RAM) to allow two model runs to take place simultaneously.

All the above computing provision must be sufficiently secure to satisfy the Information Assurance, Offshoring of Government Data, Data Protection and Cyber Security sections listed above.

There are a few dependencies in the contract that need to be agreed at the inception:

- Timescales for availability of the most recent data;
- The supplier may be required as part of Deliverable 2 to process travel time data and enter it into the model. After this, the Department will need to do some

additional processing or calculations for urban traffic speeds, prior to the calibration and validation work for Deliverables 3 and 4.

Management and Contract Administration

10% of the contract value will be paid only on completion of the whole contract, with the remaining 90% to be invoiced based on completed and delivered work only. The supplier will need to agree a delivery and invoicing schedule as part of the Inception stage of the contract (Deliverable 1)

We expect that we will require regular business meetings with the supplier to:

- Confirm the amount of work completed and the amount of any invoicing due, in line with the arrangements set out in the document;
- Review plans for ongoing work, identify any risks, issues or challenges to delivery in the period until the next meeting, and methods to mitigate them.

Quality Assurance Requirements

The successful tenderer will require suitable Quality Management certification, for example ISO9001.

Throughout the contract we expect that:

- the supplier will conduct the updates according to relevant manuals in the Department's Transport Analysis Guidance (TAG). Where they need to diverge from this guidance for technical reasons (including but not limited to insufficient data), time or resources, this should be stated clearly and openly;
- the supplier will carry out their own reviews of products they produce, with each product being reviewed by a different member of staff to the one who originally produced it, to ensure they have been assembled to a satisfactory standard, and provide records to demonstrate who carried out these reviews and the extent of the review (eg through a Document Control sheet in reports);
- the supplier will expect the Department to carry out proportionate checks on the quality of all deliverables prior to agreeing to paying invoices. In general, we would expect such checks to be carried out within 3 days conditional on DfT staff being available at the point of delivery. In the event the Department identifies a significant quality issue following their checks, it is expected that this will be corrected before the invoice is paid.

Social Value priorities

The Social Value Act (2012) requires contracting authorities to consider social value when procuring services, by taking into account the additional social benefits that can be achieved in the delivery of its contracts. It has been identified that [Procurement](#)

[Policy Note 06/20](#) – taking account of social value in the award of central government contracts applies to this procurement.

Using policy outcomes aligned with Government's priorities, a weighting of 10% of the overall score for this requirement is dedicated to social value criteria.

The social value themes for this requirement is/are set out below, which requires Tenderers to demonstrate how, in the delivery of this contract, they can assist the Department in delivering the policy outcomes.

Theme	Policy Outcome	Delivery Objective – What good looks like
Tackling economic inequality	Create new businesses, new jobs and new skills	<p>Create employment and training opportunities for people in the transport analysis industry where there are known shortages.</p> <p>Support educational attainment relevant to the contract, including training schemes that address gaps and result in recognised qualifications.</p>
Equal opportunity	Reduce the disability employment gap and Tackle Workforce Inequality	<p>Demonstrate action to increase the representation of disabled people in the workforce.</p> <p>Support disabled people in developing new skills relevant to the contract, including through training schemes that result in recognised qualifications.</p> <p>Demonstrate action to identify and tackle inequality in employment, skills and pay in the contract workforce.</p> <p>Support in-work progression to help people, including those from disadvantaged or minority groups, to move into higher paid work by developing new skills relevant to the contract.</p>
Wellbeing	Improve health and wellbeing	Demonstrate action to support the health and wellbeing, including physical and mental health, in the contract workforce.

The required social value criteria are detailed in [**Annex 1 of Appendix 6 Quality and Social Value– amend as appropriate**].

The successful supplier will demonstrate how they deliver social benefits that support key social outcomes that are highlighted in the table below.

Modern Slavery Considerations

Modern Slavery Assessment Tool (MSAT)

The MSAT is a modern slavery risk identification and management tool. This tool has been designed to help public sector organisations work in partnership with suppliers to improve protections and reduce the risk of exploitation of workers in their supply chains. It also aims to help public sector organisations understand where there may be risks of modern slavery in the supply chains of goods and services they have procured.

Please note that the successful tenderer, as part of the contract, will be expected to complete the MSAT and, where appropriate, work with the Buyer in resolving any issues identified. Suppliers who have previously completed the MSAT for another Government body may share their results with the Buyer.

The requirement to complete and assess the MSAT at appropriate intervals throughout the lifecycle of the contract will also form part of the Contract Management process.

In addition to completing the MSAT, and depending on the outcome of this assessment, it may be necessary for the Buyer to work with the successful supplier to undertake a supply chain mapping exercise to have a more informed position of any modern slavery risks within the wider supply chain beyond first tier/prime supplier. Such an exercise may also cover wider compliance with all relevant social, ethical and legal requirements of first tier/prime suppliers and their supply chain.

For further information on the MSAT and registration process, please visit:

<https://supplierregistration.cabinetoffice.gov.uk/msat>

Information Assurance

This contract will require the successful tenderer to process Government data on the DfT's behalf. The successful tenderer will be required to complete a Statement of Assurance Questionnaire (Questionnaire attached at Annex X) prior to Contract Award.

The HMG Security Policy Framework requires Departments to conduct an annual compliance review of third-party suppliers. The Questionnaire will therefore need to be completed annually throughout the term of the contract in order to assess ongoing compliance. The DfT may also audit suppliers to validate the responses and evidence provided in the Questionnaire.

Offshoring of Government Data

Government policy states that data it holds should be protected appropriately regardless of location.

Offshoring is defined as "Any arrangement where the performance of any part of the services or a solution under a contract may occur outside the UK for domestic (UK) consumption."

Tenderers must indicate in their response whether any data supplied as part of the contract, would be offshored. If so, tenderers must confirm the location(s) including the location of any business continuity, disaster recovery and technical support staff.

All Central Government Departments are required to seek approval for any proposed offshoring activity, which ensures that information held offshore is appropriately managed and that pan-government risks are identified, tracked and managed, where appropriate.

In the event that the successful tenderer proposes to offshore any Data as part of the contract, they would be required to provide details about the processing to be carried out offshore, the privacy risks and the security controls in place to protect the data. If the intention is to store the information in a cloud environment outside the UK, the successful tenderer will also need to confirm the extent to which the environment complies with the cloud security principles. This information would be used to submit the offshoring proposal for approval.

Any request to offshore must receive clearance prior to the commencement of any data processing activity.

Data Protection

Delivery of this contract will require the supplier to process Personal Data (as defined in the GDPR) on the Buyers behalf. The Buyer will be the Data Controller and the supplier will act as the Data Processor. The supplier will process Personal Data only on the Buyers documented instructions. Further details will need to be added if and when a tender is

Cyber Security

The Government has developed Cyber Essentials, in consultation with industry, to mitigate the risk from common internet based threats.

It will be mandatory for new Central Government contracts, which feature characteristics involving the handling of personal data and ICT systems designed to store or process data at the OFFICIAL level of the Government Security Classifications scheme (link below), to comply with Cyber Essentials.

<https://www.gov.uk/government/publications/government-security-classifications>

All potential tenderers for Central Government contracts, featuring the above characteristics, should make themselves aware of Cyber Essentials and the requirements for the appropriate level of certification. The link below to the Gov.uk website provides further information:

<https://www.gov.uk/government/publications/cyber-essentials-scheme-overview>

As this requirement features the above characteristics, you are required to demonstrate in your response that:

- Your organisation has [Cyber Essentials] or [Cyber Essentials Plus] certification; **or**
- Your organisation will be able to secure [Cyber Essentials] or [Cyber Essentials Plus] certification prior to contract award; **or**
- Your organisation has other evidence to support that you have appropriate technical and organisational measures to mitigate the risk from common internet based threats in respect to the following five technical areas:
 - Boundary firewalls and internet gateways
 - Secure configuration
 - Access control
 - Malware protection
 - Patch management

The successful tenderer will be required to provide evidence of [Cyber Essentials] or [Cyber Essentials Plus] certification 'or equivalent' (i.e. demonstrate they meet the

five technical areas the Cyber Essentials Scheme covers) prior to contract award. This will be through the completion of the Statement of Assurance Questionnaire.

The successful tenderer will be required to secure and provide evidence of [Cyber Essentials] or [Cyber Essentials Plus] re-certification 'or equivalent' (i.e. demonstrate they meet the five technical areas) on an annual basis.

Further information regarding the certification process can be found here:

<https://www.ncsc.gov.uk/cyberessentials/overview>

Accessibility

Technical notes, training materials and other documents produced for this project must satisfy the accessibility requirements for public sector bodies as detailed in the link below.

[Understanding accessibility requirements for public sector bodies - GOV.UK \(www.gov.uk\)\]](https://www.gov.uk/guidance/understanding-accessibility-requirements-for-public-sector-bodies)

Our expectation is that these meetings will be at intervals of 2 weeks; however, we are open to considering other arrangements in discussion with the supplier.

Training / Skills / Knowledge Transfer

Requirements for knowledge transfer are set out above, relating to Deliverables 2, 3, 4 and 5 of the specification.

Any meetings for training and knowledge transfer can be undertaken on Microsoft Teams or, if preferred and without attracting undue expense, at an office in central London.

Documentation

Requirements for documentation are set out above, relating to Deliverables 2, 3, 4 and 5 of the specification.