

Technical Note

Project Name National Highways Spatial Planning Contract (NHSPC)	Client National Highways	Date 21 November 2024	Prepared by Simon Deakin
	Revision No. 1	Checked by Sonia Sivanesan	Approved by Sonia Sivanesan

1. Background

Sandwell Metropolitan Borough Council (MBC) is currently in the process of preparing a Local Plan and National Highways were recently consulted for the Regulation 19 Publication Version of the Plan. National Highways provided comments on the transport evidence base (Black Country Modelling Report) prepared in support of the Local Plan, to which we received a response from Sweco (on behalf of the Council) aiming to address our queries.

2. Documents Reviewed

The following documents have been referred to as part of this review.

- Modelling for Local Plans in the Black Country Addendum 1 – Response to National Highway Queries (referred to from here on as “Addendum 1”).
- Transport Modelling to Support Local Plans within the Black Country. Dudley, Sandwell, Walsall and Wolverhampton Local Plan PRISM Modelling (referred to from here on as “Transport Modelling Report”).

3. Review of Addendum 1

National Highways provided comments on a few issues before commencing with a detailed review of the document “Transport Modelling to Support Local Plans within the Black Country”. Comments, responses and assessment of these responses are provided as follows:

1. *Clarification on how the impacts of Covid-19 on forecasts have been accounted for, ideally with reference to the guidance in TAG M4. We note that the report highlights that the previous local plan did not account for it, and that this was a red risk factor, but there is no reference to correcting for this, except for asserting that some elements of the lingering effects of Covid-19 are considered as part of NTEM 8.0. That is true, for the Behavioural Change CAS only (ref: Uncertainty Toolkit, para 5.30), but it’s a different issue from assessing whether the base from which forecasting is undertaken needs adjustment (which is what M4 appendix B looks at).*

In the response provided by Sweco, it is stated that “Forecasting was undertaken for a single Core scenario only, to assess the level of highway traffic expected upon full buildout of the Local Plans. It is a “Worst Case” model under Core DfT assumptions, using Core parameters and NTEM 8 Core population projections”. Following a review of the guidance in TAG Unit M4 and its appendices, it is not considered that assessing the impacts of Covid-19 on Core Local Plan modelling is a requirement, although it is good practice for forecasting. It would be expected, however, that any impact of Covid-19 would reduce the overall level of traffic in the network, to reflect new working patterns. As such, the conclusions drawn about the impacts of Local Plan traffic (comparisons between Do Minimum and Do Something) would be even less significant than they already are, requiring fewer interventions. As such, we retain the logic of modelling the “Worst Case” for highway traffic across the Black Country.

Technical uncertainties over how Covid-19 impacts might be reflected in PRISM and time and budget constraints are also referenced. The modellers propose potentially undertaking appropriate sensitivity tests at a later stage along with consideration of further CAS tests.

Additional sensitivity tests would be welcomed by National Highways alongside consultation on the exact nature of these tests ahead of them being carried out.

2. *Clarification on when NTEM is referred to, which specific version and scenario is being used.*

It is confirmed that NTEM8 is used.

3. *Clarification on the forecasting approach: this appears to be presenting the results of a single forecast. In line with the advice in the Uncertainty Toolkit, what was the decision process for not exploring uncertainty?*

We note the time / budget constraints, and it is suggested that sensitivity tests, as noted above, may satisfy this requirement in the future.

4. *Information on the derivation of any new parameters developed (e.g. how were the parameters for new forecast years created, including the sources of inputs to the parameter calculations).*

The parameters updated and relevant sources are listed. In general, parameters are derived from appropriate sources. It is noted that the TAG Databook v1.21 (May '23) is used for supplying some parameters. It should be noted that later versions of this Databook exist although the rationale for using v1.21 (that this is consistent with the PRISM6 model) is acceptable. There are risks associated with using different Databook parameter sets to those used under model development. **Nevertheless, it may be useful to undertake a comparison of the parameters between v1.21 and later versions to understand potential differences and implications on model results arising.**

5. *Information that allows us to understand the stability of model outputs, how these change by area, etc. We would expect to see, as a bare minimum, demand model convergence, highway model convergence and stability, and network statistics (ideally by sector).*

Statistics are provided as follows:

- Demand model convergence. TAG Unit M2.1 states that “Tests indicate that gap values of less than 0.1% can be achieved in many cases, although in more problematic systems this may be nearer to 0.2%. Where the convergence level, as measured by the % gap, is over 0.2% remedial steps should be taken to improve the convergence, by increasing the level of convergence in the assignment step.” Convergence levels for the 2042 Reference Case and Do Minimum runs are 0.13% and 0.21% respectively. Whilst this is marginally outside the recommended level for the Do Minimum run, it is noted that a better level of 0.15% was achieved in an earlier iteration. Ideally, results from this iteration would be used if possible but, nevertheless, it is considered that Demand Model convergence is adequate for the required model application in both cases. It is likely that convergence for earlier forecast years is as good, or better, than the 2042 runs although it would be beneficial for this to be confirmed.
- Highway model convergence. Statistics are provided for the 2036 and 2042 Reference Case and Do Minimum scenarios, and 2042 Do Something scenarios. A good level of convergence is generally achieved in the AM and IP time periods. PM convergence is less strong with GAP values of around 0.1 – 0.2% which is greater than the stated target of 0.1%. Assignment delta values are strong suggesting that junction stability in the PM peak period is problematic in places leading to the higher GAP values. Further analysis of junction stability should be undertaken to understand any issues, especially in any locations considered to be potentially sensitive.
- Network statistics for the 2042 model runs are provided, disaggregated by local authority area. It is worth noting that the Do Something assignment was undertaken using a fixed post-VDM assignment. Therefore, it is curious that volumes of trips across the full model slightly differ between the Do Minimum and Do Something results.

It is notable that there is a consistent pattern of higher trip numbers in the PM peak period which generally are seen to reduce in the Do Something scenario compared with the Do Minimum. This is further supported by large DS increases in vehicle hours in this time period, suggesting that the network is more congested in the PM peak period. Linked to the above comment, we also note that the network performance does not improve with Do Something schemes in place compared with the Do Minimum network.

The differences between these statistics in the Do Minimum and Do Something scenarios should be clarified.

4. Review of Transport Modelling Report

4.1 Introduction

The document reviewed was issued on 7th October 2024 and presents the results of the transport modelling of the proposed Local Plans of the four Local Authorities that make up the Black Country: Dudley, Sandwell, Walsall and Wolverhampton. Sweco were commissioned by Black Country Transport on behalf of the Local Authorities to prepare updated evidence for Local Plan purposes.

The following scenarios are reported.

Scenario	Demand	Network
Reference Case	Reference Case Demand	Reference Case Network
Draft Plan with DM Transport	Reference Case Demand + Draft Plan Housing and Employment	Reference Case Network
Draft Plan with DS Transport	Reference Case Demand + Draft Plan Housing and Employment	Reference Case Network + Draft Plan Mitigation Schemes

This review covers the assumptions and results of the modelling for each of the above scenarios.

4.2 Modelling Assumptions and Limitations

4.2.1 Time Periods and User Classes

The PRISM model covers the following time periods and user classes. It is understood from the PRISM 6 Model Validation Report (February 2024), Section 2.1.4, that the PRISM 6 highway assignment model represents an average weekday in 2019. The highway and public transport assignment represents an average hour of the following periods.

Time Periods:

- AM: 07:00 – 09:30
- IP: 09:30 – 15:30
- PM: 15:30 – 19:00

It should be noted that the model may slightly underestimate congestion conditions during peak demand conditions within the modelled time periods. The modellers views on the potential level of this impact would be welcomed.

User Classes in the highway model are as follows:

- Car Employers Business
- Car Commute
- Car Other
- Light goods vehicle (LGV)
- Heavy goods vehicle (HGV)

4.2.2 Development Forecasting Assumptions

The models are derived from the reference case model developed in April 2024. These are considered by the modellers to be appropriate for use. This is reasonable since subsequent model updates relate to other areas of the model.

Housing and employment assumptions adopted in the reference cases are set out and illustrated in Section 2.4.1 of the Transport Modelling Report and provide a useful high-level summary against which model results could be interpreted.

Local Plan developments are set out in Section 2.4.2 of the Transport Modelling Report. These are derived from discussion with officers from the relevant local authorities. Again, the location of expected growth zones is illustrated. It should be noted that:

1. Total Local Plan provision was adjusted to account for changes to committed developments that had not been added to the adopted PRISM Reference Case model. As such, some zones may experience higher or lower growth relative to the Reference Case than would actually occur, but the model now provides a more accurate picture of forecast traffic flows, following the adoption and full buildout of the proposed Local Plan.

2. The Local Plans may also account for changes in the provision of housing and employment sites to alternative purposes (e.g. housing to employment and vice versa).

4.3 Reference Case

4.3.1 Network

It is stated in section 2.2.1 of the Transport Modelling Report that *“the proposed intermittent and horizon years of the Local Plans for the four Black Country Local Authorities are understood to be 2035 and 2042. 2035 will be modelled through the existing 2036 PRISM model, whilst a new scenario will be created for 2042.”*

The 2042 scenario is largely derived from the existing 2046 scenario. Section 2.3 of the Transport Modelling Report states *“A new scenario has been created for the 2042 Reference Case and Local Plan models, derived from the existing 2046 PRISM Reference Case model. As above, this has been done to simplify the modelling process. Key modelling inputs such as car demand, freight demand, generalised cost and PT fares have been amended to 2042 to ensure reliable routing and overall levels of traffic, but parameters such as PT speeds and model network will remain at 2046 level. This is appropriate because the majority, if not all transport schemes in 2046 are pre-existing in 2036, indicating that no additional committed schemes are proposed to be added past 2036. Furthermore, a review of the changes in bus speeds between the existing PRISM Reference Case models indicates that the majority of changes to speeds compared to the base year occur before 2036, at over 66% for all time periods.”*

This is largely acceptable although the rationale regarding bus speeds should be further explained to ensure that there is no significant difference expected between 2042 and 2046. This may have an impact on mode choice in the 2042 forecast year.

4.3.2 Developments

The PRISM uncertainty log v34 is used to derive the reference case demand. To ensure consistency with other PRISM models, this log is used as opposed to changes to committed developments. “Near certain” and “more than likely” sites are included.

Tables 3-1 to 3-6 of the Transport Modelling Report set out the figures used for deriving the growth. Based on these, it appears that growth is constrained to NTEM levels with adjustments made up or down to the outputs of the uncertainty log at a local authority level. There are some discrepancies in the tables where the factors in the “UL NC Factor” and “UL MtL Factor” columns cannot be reconciled with the figures shown in the “Extra for NTEM needed?” and “PRISM Revised Growth” columns (e.g. Solihull in Figure 3-1). It is possible that this is due to rounding in the calculations. **This should be clarified.**

It is also uncertain if constraining to NTEM growth is the correct approach for the testing of a Local Plan on the basis that NTEM forecasts can be expected to include sites that would also be included in a Local Plan. This is covered in more detail in the review of the Do Minimum modelling below.

4.3.3 Model Results

Model results are provided as follows:

- Flow changes compared with model base year.
- Volume / capacity compared with model base year.
- Changes in queue lengths compared with model base year.
- Changes in delay levels compared with model base year.

Plots are provided covering the whole of the Black Country for 2042 only. It is stated that further appendices covering individual authorities are included but these have not been provided.

Section 3.4.1.1 of the Transport Modelling Report highlights those links where significant V/C increases are seen along with impacts on queuing and delay. It is highlighted that the main impacts of reference case growth are on the SRN (M5 and M6) as well as some other key corridors.

- The A4150, A4036 and A4123 in Wolverhampton;
- The A4148, A454 and A461 in Walsall;
- The A41 and A4123 in Sandwell; and
- The A491 and A461 in Dudley.

Based on the plots included in Section 3.4.1 of the Transport Modelling Report, it is difficult to verify the above.

In terms of the strategic road network, it can be seen that the M6 between Junction 10 and the M5/M6 interchange, the M5 between Junction 2 and the M5/M6 interchange and M5 Junction 3 are expected to see increased V/C increases that may lead to increased congestion and delay levels in the modelled reference case.

More detailed model result plots should be provided, covering both individual authorities to allow the above to be verified and also highlighting the forecast impacts on the SRN links and junctions.

4.4 Do Minimum

4.4.1 Network

The reference case network is used, as only changes in demand levels are being assessed.

4.4.2 Developments

Section 4.3.1 of the Transport Modelling Report states that local plan development details were obtained from local authority officers and then *“as the Local Plan demand is added on top of the existing Reference Case models, an exercise was undertaken to compare the two Uncertainty Logs (RC and DM), then adjust any sites that were previously included in the Reference Case to more accurately reflect the difference between Reference Case demand and Do Minimum demand. Following this, the sites from the Local Plans were extracted and applied to PRISM’s Population Segmentation Model to apply the necessary age and sex splits, and constrain to national growth forecasts.”*

The precise details of this approach are not clear from the supplied material, particularly the adjustments made to sites are also included in the reference case scenario. **This should be clarified.**

Tables 4-7 and 4-8 of the Transport Modelling Report summarise the growth forecasts made for the Reference Case and Do Minimum scenarios in 2036 and 2042. Checks suggest that this is consistent with the detailed tables in Tables 4-1 to 4-6 of the Transport Modelling Report. This shows across the modelled area that a population increase of around 91,000 and an employment increase of around 22,000 is forecast across the plan period. Section 4.3.2 of the Transport Modelling Report further notes that growth in the “Outer Shires” area of the model is suppressed with this growth allocated to the Black Country to accommodate the forecast Local Plan growth. It is assumed that the forecast approach within the model constrains growth to NTEM levels over a wide area to make this adjustment necessary. **This should be clarified.** The reductions to growth in the shire counties are relatively small (around 12% in 2042).

4.4.3 Discussion

As noted above, there are some concerns over whether it is appropriate to constrain demand to NTEM levels in the context of a Local Plan assessment.

Whilst the methodology adopted allows for the difference in Reference Case and Do Minimum growth (i.e. identified local plan sites) to be reflected correctly, it should be noted that NTEM forecasts contain an estimate of development growth that includes developments that could be included in a Local Plan.

There is also a possibility that absolute growth included in the Do Minimum scenario does not reflect growth expected to occur over the plan period (i.e. the methodology adopted may underestimate or overestimate potential growth levels).

It is noted that the Reference Case models use NTEM constraints for reasons of consistency with other PRISM runs. This may be desirable in some respects but, noting that NTEM is a national dataset, it is considered that it is more important for model outputs to accurately reflect the specifics of local policies and forecasts.

Therefore, in summary, further information on the assumptions adopted for development forecasts would be beneficial as follows:

- **Clarification of the calculations undertaken in Tables 3-1 to 3-6 and 4-1 to 4-6 of the Transport Modelling Report to allow a full understanding of how NTEM constraints have been applied.**
- **Further details of how the Reference Case assumptions have been modified for the Do Minimum assessment.**

- **Clarification of how the NTEM forecasts are applied (e.g. by geographical area).**
- **Comparison of the out-turn growth levels and how these compare with historic growth levels in each area and other local policy documents if available (e.g. core strategies).**

4.4.4 Model Results

In a similar way to the Reference Case, results comparisons of flow, V/C, queue length and delay are made.

Section 4.5 of the Transport Modelling Report includes a comparison of the Do Minimum results with the Reference Case results. This comparison highlights the impact of the Local Plan related demand over and above what is seen in the reference case. The key findings are set out in Section 4.6 of the Transport Modelling Report:

“As expected, the Do Minimum model shows increased congestion when compared to the Reference Case, with traffic flow increases corresponding to areas with increased housing and employment provisions. The impacts of these flow increases have identified several potential areas where delays may be expected to increase, and these are primarily on major transport corridors across the Black Country, although typically not on the major flows.

Key areas for consideration in the Do Something model include:

- *A4150, A460 and A449 in Wolverhampton, particularly close to the city centre*
- *A4124 (and B4154), A461 and A4148 in Walsall*
- *A41, A4031 and A4123 in Sandwell*
- *A491, A461 and A459 in Dudley.”*

In terms of the SRN, it appears that impacts are relatively minor although there are potential increases in delay at M6 Junction 10 and M5 Junctions 1 and 2.

As above, more detailed model result plots should be provided, covering both individual authorities to allow the above to be verified and also highlighting the forecast impacts on the SRN links and junctions.

4.5 Do Something

4.5.1 Network

A number of network schemes have been included in the Do Something models. These are grouped as follows:

- Signal optimisation at locations found to experience reduction in performance in the Do Minimum compared with the reference case.
- Other minor changes to other non-signalised locations.
- Other more significant schemes taken from the Black Country Draft Plan O1 scenario.

It is noted that active travel and public transport related schemes have not been included meaning that the model results may represent a worst case scenario in highway terms. It is accepted that limitations to the model prevent these impacts being effectively represented in the model and this should be borne in mind when interpreting model results.

4.5.2 Developments

The Do Minimum developments are used.

4.5.3 Results

In a similar way to the Reference Case and Do Minimum, results comparisons of flow, V/C, queue length and delay are made.

As above, more detailed model result plots should be provided, covering both individual authorities to allow the above to be verified and also highlighting the forecast impacts on the SRN links and junctions.

Section 5.5 of the Transport Modelling Report includes a comparison of the Do Something results with the Do Minimum results. This comparison highlights the impact of the Local Plan related demand over and above what is seen in the reference case. The key findings are set out in Section 5.7 of the Transport Modelling Report:

“The Do Something model shows, in some areas, worse performance than the Do Minimum model. These are mainly at Burnt Tree junction, on the A449 north of Wolverhampton, and on the A4123 between Wolverhampton and Sandwell.

However, these areas are hotspots for active travel and public transport interventions, with many of the schemes being implemented placing greater emphasis on the promotion of sustainable transport infrastructure. The modelling results indicate this may come with additional delays for car users as we have not modelled a quantitative level of modal shift. Delays seen when the Local Plans are fully built out are expected to be less severe.”

Impacts on the SRN in this scenario appear to be generally minor, although it is not possible to fully verify this from the plots provided.

A table comparing V/C ratios on key corridors / junctions is provided (Table 5-3 of the Transport Modelling Report). This suggests, that in V/C terms, the following junctions do not experience a significant worsening of conditions between the reference case, do minimum and do something.

- M5 J1;
- M6 J11;
- M42 J1;
- M42 J2;
- M42 J3; and
- M54 J1 to J3.

It is not clear if approach roads to these junctions are included in this assessment as, for example, M5 J1 appears to see a deterioration in conditions in the Do Minimum scenario. This should be clarified.

4.6 Modelling Conclusions

Section 6 of the Transport Modelling Report sets out Modelling Conclusions. These are considered by individual local authority area.

Impacts on the strategic road network (M5, M6) are not explicitly considered.

This section should be expanded to include a summary of potential impacts on these routes.

5. Summary and Recommendations

5.1 Review of Addendum 1

Addendum 1 adequately responds to some of the issues raised previously. The following comments are provided as noted in the text.

- Sensitivity tests: Additional sensitivity tests would be welcomed by National Highways alongside consultation on the exact nature of these tests ahead of them being carried out.
- TAG parameters: It may be useful to undertake a comparison of the parameters between v1.21 and later versions of the TAG databook to understand potential differences and implications on model results arising.
- Summary statistics: The differences between some results in the Do Minimum and Do Something scenarios should be clarified as noted above.

5.2 Review of Transport Modelling Report

5.2.1 Assumptions and limitations

- It should be noted that the model may slightly underestimate congestion conditions during peak demand conditions within the modelled time periods. The modellers views on the potential level of this impact would be welcomed.

5.2.2 Reference Case

- Bus speeds: The rationale regarding bus speeds should be further explained to ensure that there is no significant difference expected between 2042 and 2046. This may have an impact on mode choice in the 2042 forecast year.

- Development growth: Clarifications of the methodology adopted and discrepancies in Tables 3-1 – 3-6 should be clarified as noted in the text.
- Results: More detailed model result plots should be provided, covering both individual authorities to allow the summary results to be verified and also highlighting the forecast impacts on the SRN links and junctions.

5.2.3 Do Minimum

- Developments: The precise details of this approach used are not clear from the supplied material, particularly the adjustments made to sites also included in the reference case scenario. This should be clarified.
- NTEM constraints: The methodology regarding constraining to NTEM growth (e.g. how this is applied over geographic areas) should be clarified.
- The rationale for the approach used in deriving model growth should be further explained, including a discussion of why the decision to constrain to NTEM factors has been made and how the growth outputs derived compare with historic growth levels in each area and other local policy documents if available (e.g. core strategies).
- Results: More detailed model result plots should be provided, covering both individual authorities to allow the summary results to be verified and also highlighting the forecast impacts on the SRN links and junctions.

5.2.4 Do Something

- Results: Regarding Table 5-3, it is not clear if approach roads to these junctions are included in this assessment. For example, M5 J1 appears to see a deterioration in conditions in the Do Minimum scenario. This should be clarified.
- Results: More detailed model result plots should be provided, covering both individual authorities to allow the summary results to be verified and also highlighting the forecast impacts on the SRN links and junctions.

5.2.5 Modelling Conclusions

- Model results are considered by individual local authority area. Impacts on the strategic road network (M5, M6) are not explicitly considered. Section 6 should be expanded to include a summary of potential impacts on these routes.