Birmingham Development Plan – Public Inquiry

Response to Matters Raised by Dr Paul Hoad, Matter E, Question 4a

1 Matters Raised

The matters raised by Dr Hoad are set out in his written statement on Matter E, pages 3 to 6, which we summarise to the following 4 points:

A. Is the PRISM model a robust tool for use in the assessment of the Birmingham Development Plan and its associated transport infrastructure proposals;

B. Has the model been used correctly in the context of the assessment of the Birmingham Development Plan and its associated transport infrastructure proposals;

C. Can we provide evidence of the model's performance with respect to Table 5 of WebTAG Unit M3.1;

D. Has the impact of junction improvements on other junctions' performance been accounted for.

2 Matter A

2.1 Matter Description

Dr Hoad, in his evidence (page 6, para 2) refers to WebTAG when claiming that the PRISM model is 'fundamentally flawed'. He refers to the relationship between the PRISM model and the quantified guidelines contained in the Guidance.

2.2 Response

The WebTAG guidance clearly states that meeting these criteria is neither a prerequisite nor a guarantee that a model is fit for purpose. WebTAG – Guidance for the Technical Project Manager, para 3.1.4 states: *"It is important to emphasise that the modelling guidance in TAG is not intended as a textbook on modelling generally, nor is it aimed at those who wish to construct a state-of-the-art model from scratch. TAG provides advice aimed at ensuring that forecasts of the demand for new schemes are made on a consistent and reliable basis and that the models used are appropriate to the type of scheme and its circumstances, and provide the information required by the appraisal of a major transport scheme. The achievement of the validation acceptability guidelines described in TAG does not guarantee that a model is 'fit for purpose' and, likewise, a failure to meet the specified validation standards does not mean that a model is not 'fit for purpose'. A model which meets the specified validation standards may not be fit for particular purposes and, conversely, a model which fails to meet to some degree the validation standards may be usable for certain applications. The test of fitness for purpose of a model is: can robust conclusions be drawn from the model outputs?"*

According to WebTAG, *"the maxim governing the acceptability of a model has to be that it is fit for purpose. This means that outputs from the model are robust, have sufficient levels of detail to cover the important issues at hand and that the results are reliable"*. (WebTAG – Guidance for the Senior Responsible Officer, para 3.4.1).

Fitness for purpose then becomes more subjective, determined by the model's ability to satisfy the above statement in WebTAG, that outputs from the model are robust, have sufficient levels of detail to cover the important issues at hand and that the results are reliable. In that context we refer to the following additional evidence, in support of our professional opinion that the model is fit for purpose as support for the assessment of the Birmingham Development Plan and its associated transport infrastructure proposals.

PRISM has been developed in line with current good practice guidance as set out in the Department for Transport's WebTAG Transport Analysis Guidance. It has been successfully used in at least ten Department for Transport funding applications, and through that process the PRISM model and its outputs have been implicitly accepted for the purpose of such scheme appraisals:

- A45 Bridge Replacement
- M6 Managed Motorway Roll-Out
- Midland Metro extensions
- M6 Junction 6 Salford Circus
- Darlaston Access Improvements
- Burnt Tree Island
- West Midlands UTC Major Scheme
- Toll Bar End
- Chester Road
- Selly Oak Relief Road
- West Bromwich Expressway

Additionally the model has been used previously in policy and strategy formulation and core strategy assessments including:

- The Black Country Study
- Inputs to the Regional Spatial Strategy Examination in Public
- The Black Country Core Strategy
- Solihull Core Strategy

The Inspector's Report on the Black Country Core Strategy concluded that: *"The Councils have sufficient evidence to support the strategy."* In my opinion this provides support for the use of PRISM in policy and strategy development.

Finally, the model was independently audited in 2010, which concluded: *"PRISM is among the best transport models in Europe."* (Peter Davidson Consultancy).

3 Matter B

3.1 Matter Description

Dr Hoad, in his evidence (page 3, para 2 to page 5, para 3) suggests an alternative application of the PRISM model, rather than its standard variable demand application, as used in this case.

3.2 Response

The Department for Transport's WebTAG M2, section 1.3.1 guidance states: *"there should be a presumption that the effects of variable demand on scheme benefits will be estimated quantitatively unless there is a compelling reason for not doing so"*. We do not consider there to be compelling reasons to deviate from the guidance.

4 Matter C

4.1 Matter Description

Dr Hoad, in his evidence (page 6, para 4) refers to WebTAG M3.1 table 5 and this information not having been provided in the Transport Modelling Assessment Initial Output Report.

4.2 Response

The reason for this not being reported is that such validation detail is usually provided in the Local Model Validation Report. We provide below an abstract from this report, which is still in draft pending client approval (PRISM Local Model Validation Report, Draft, 10 September 2014).

i. Trip Matrix Estimation

Matrix estimation is a process of refinement whereby non-zero cell values in a matrix are increased or decreased. Matrix estimation was undertaken on the prior Car Work, Car Non-Work and LGV matrices. HGV matrices have not undergone matrix estimation.

There are relatively few classified counts from which the %HGV could be determined. In addition, the HGV flows would generally be quite low which would mean they are generally without the modified acceptability criteria. In general, it is best to avoid matrix estimation if you can to retain the structure of the observed data.

Matrix estimation within VISUM requires the following inputs as a minimum:

- *A network*
- *A matrix*
- *An assignment of the matrix to be estimated*
- *Target and range values for link traffic flows*

ii. Trip Matrix Validation

1. Matrix zonal cell values

Table 4.1 summarises the change brought about by matrix estimation for each time period at the matrix OD cell level. TAG Unit 3.19 states the following targets for zonal cell values:

- *Slope within 0.98 and 1.02*
- *Intercept near 0*
- *R^2 in excess of 0.95*

Table 4.1: Monitoring zonal cell values

Time period	Gradient	Intercept	R^2
AM	0.99	-0.02	0.96
IP	0.99	0.02	0.98
PM	1.00	0.03	0.97

Source: Mott MacDonald

2. Matrix zonal trip ends

Table 4.2 summarises the change brought about by matrix estimation for each matrix for trip origins. TAG Unit 3.19 states the following criteria for matrix zonal trip ends:

- *Gradient between 0.99 and 1.01*
- *Intercept near 0*
- *R^2 in excess of 0.98*

Table 4.2: Monitoring zonal trip ends – origins

Time period	Gradient	Intercept	R^2
AM	0.95	5.22	0.95
IP	0.97	27.27	0.97
PM	0.99	37.35	0.97

Source: Mott MacDonald

Additional note: the average number of trips originating per zone equals 404, hence the intercept is less than 10% in the worst performing time period.

Table 4.3 summarises the change brought about by matrix estimation for all matrices for trip destinations.

Table 4.3: Monitoring zonal trip ends – destinations

Time period	Gradient	Intercept	R^2
AM	0.97	-5.03	0.96
IP	0.98	24.30	0.98
PM	1.00	34.35	0.96

Source: Mott MacDonald

Table 4.4 shows the mean trip length for each matrix before and after matrix estimation.

Table 4.4: Mean trip lengths (km)

	Car Work			Car Non-Work			LGV		
	Prior	Post	% Difference	Prior	Post	% Difference	Prior	Post	% Difference
AM	58	62	7%	17	16	0%	38	37	-1%
IP	63	61	-3%	14	14	-3%	40	36	-10%
PM	69	69	0%	17	16	-5%	41	38	-7%

Source: Mott MacDonald

5 Matter D

5.1 Matter Description

Mr Hoad raised the matter presented in his written statement (page 5, para 4) that the junction improvement measures proposed to facilitate Green Belt Development traffic have been designed in isolation and have not therefore taken into account the extra traffic that each junction improvement will release onto the local network. He cites the example of the "Minworth Roundabout – Option Development and Appraisal Report" (TA23) which predicts a pre-improvement queue of 200 vehicles on the A38 southbound approach and suggests that this suppressed demand might be released by an improvement to this junction, thereby increasing flows at the Tyburn Roundabout junction downstream. He contends that the impact of this released demand has not been taken into account in the "Tyburn Roundabout – Option Development and Appraisal Report" (TA24).

5.2 Response

As described in report TA6 (Stage 3 Transport Modelling Assessment Initial Output Report), the strategic transport impacts of the Birmingham Development Plan were identified by comparing a 2031 Reference Case scenario with a 2031 Development Case scenario.

The Reference Case represents the future situation without Green Belt Development but includes all future transport schemes which are presently deemed to be 'near certain' or 'more than likely'. A full list of these schemes is presented in Table 4.1 on pages 14 and 15 of report TA6.

The Development Case represents the future situation *with* Green Belt Development and so includes all the future transport schemes from the Reference Case as well as key enabling schemes to support the Green Belt Development. A full list of these schemes is presented in Table 4.2 on page 15 of report TA6. Of the eight schemes listed in this table, the majority are public transport related schemes while two are junction improvement schemes to facilitate access to the development. These schemes apply to:

1. New Peddimore access roundabout on the A38 north of Minworth Roundabout
2. Minworth Roundabout

The design and testing of these schemes is detailed in:

- Report TA25 (Peddimore Access Modelling – Final Report)
- Report TA23 (Minworth Roundabout – Option Development and Appraisal Report)

In both cases, 2031 Development Case traffic flows were conventionally calculated based on:

- Observed flows + background traffic growth + predicted development traffic

Associated improvement schemes were designed on a 'nil-detriment' basis to provide enough capacity to accommodate the extra development traffic only.

As noted above, the resulting improvement schemes for these two junctions were then included in the 2013 Development Case PRISM model run, so that the impact of these improvements on surrounding junctions are reflected in the results.

Table 6.1 on pages 49 and 50 of report TA8 (Transport & Infrastructure Evidence Base & Strategy) presents a comprehensive costed list of infrastructure schemes proposed to support the Birmingham Development Plan. Of these, and in addition to the schemes proposed for the Peddimore access junction and Minworth Roundabout, more detailed improvement schemes were developed for the two off-site junctions likely to be most affected by the Green Belt Development, as follows:

- Tyburn Roundabout
- M42 Junction 9

The design and assessment work for these two junctions is described in:

- Report TA24 (Tyburn Roundabout – Option Development and Appraisal Report)
- Report TA28 (M42 Junction 9 Initial Appraisal)

Page 19 of report TA24 describes how the traffic flows used to test the Tyburn Roundabout improvement scheme were taken from the 2031 Development Case PRISM model. As described above, these flows therefore included the impact of the proposed schemes upstream at the Peddimore access junction and Minworth Roundabout.

Likewise, page 2 of report TA28 describes how the traffic flows used to test the M42 Junction 9 improvement scheme were derived by applying growth factors to observed flows taken from the 2031 Development Case PRISM model. This scheme design therefore also takes account of the impact of upstream schemes on the A38.

In summary, therefore, the design of improvement schemes for Tyburn Roundabout and M42 Junction 9 do take into account the impact of upstream improvement schemes on the A38.

It is also noted that these upstream schemes have only been designed to increase capacity to mitigate the impact of new development traffic, as per NPPF policy, and not to solve capacity problems which will already exist without the Green Belt Development. In that respect, therefore, we would not expect these improvements to release significant suppressed demand downstream.

It is further noted that the Peddimore roundabout and Minworth Roundabout are both proposed to be signalised as part of the improvement works which will allow the Council to regulate the volume of flow released both ways on the A38 at this location.

I confirm that this submission is both independent and impartial in accordance with my professional institution standards and that any opinion expressed reflects my own honest professional judgement.

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Version 2, 29 October 2014