Appendix 58

WSP Review of SATURN LMVR and HTp Response



MEMO

DATE 22 November 2017 CONFIDENTIALITY Confidential SUBJECT Peel Hall Farm – LMVR Review Image: Confidential ConfidentiaC Confiden	то	Mike Taylor, WBC	FROM		Colin Wright, WSP
SUBJECT Peel Hall Farm – LMVR Review	DATE	22 November 2017	CONFIDENTIALITY		Confidential
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Introduction

WSP have been commissioned by Warrington Borough Council (WBC) to review a suite of modelling documents that have been submitted to WBC as part of the planning application for a major residential development at Peel Hall Farm.

The Planning Application was submitted by Satnam Group in 2016 and rejected by WBC on the grounds of insufficient information relating to highway matters, namely a functioning traffic model and a set of mitigation measures to cope with the development traffic.

The following documents have been submitted to WBC in order to address the shortcoming of the planning application. These are:

- Local Model Validation Report (LMVR), Aecom, September 2017;
- Peel Hall Forecasting Report, Aecom, September 2017;
- Technical Note Impact Summary, Highgate Transportation, September 2017.

The proposed method of review by WSP is to produce a short summary "memo style" report for each of the above documents. This document will review the information provided within the LMVR. The purpose of this report is to summarise the key points of the LMVR and raise queries where additional information may need to be sought.

Model Overview

Originally the development was to be modelled using VISSIM micro-simulation software. An existing model of M62 J9 was extended in order to cover the area of influence of the development. The extent of this VISSIM network has been converted to SATURN by Aecom under the instruction of Highgate Transportation. SATURN has been chosen as it can model elements of blocking back.

The base model is of a typical neutral day in May 2015.

The model extent is given in Figure 1.1 in the LMVR. This shown below.

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Figure 1.1: Extent of Modelled Network

1. How has the area of influence of the development site been determined?

Model Data

The traffic count data used is taken from 21 junction turning counts. Traffic counts were collected between 07:00 - 10:00 and 16:00 - 19:00 on the 8th July 2014 for 17 of the sites. One of the sites was surveyed on 13th May 2014, two of the sites were surveyed on 9th July 2014, and one of the sites was surveyed on 9th February 2016.

Origin destination traffic data is based upon the 2008 base VISUM model of Warrington. The VISUM model was cordoned to the model extent and OD matrices extracted.

- 2. Has the 2008 OD data been uplifted to 2015 before matrix estimation was applied?
- 3. The OD data that informed the 2008 model is from Roadside Interview surveys that are at least 10 years old. How did the 2008 model validate in this area and are the OD patterns logical? Can they be relied upon to represent OD movements in May 2015?

Traffic signal data was obtained from WBC for nine junctions in the model area. Site visits were also undertaken to better understand staging and green time durations during peak hours.

Journey routes were set up and TrafficMaster data was downloaded for 3 neutral days in May 2015. The journey routes are given in Figure 2.1 in the LMVR. This shown below.

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Figure 2.1: Proposed Journey Time Routes for Validation

Finally a number of site visits were undertaken during May and June 2016. This observed driver behaviour, queue lengths, lane usage and estimations of vehicle speed. "The site visits and information collected provided a valuable resource in calibrating the SATURN base models".

4. How was this information used? There is no further mention of site specific adjustments to the SATURN model. Base year queueing in the model is not reported on or discussed.

Model Development

The modelled time periods were AM 08:00 - 09:00 and PM 17:00 - 18:00.

5. Confirmation that these are peak hour models and not one hour averages of the three hour data collection period?

The model has been constructed with 5 user classes: Car Commute, Car Work, Car Other, LGV and HGV. The pcu values used to convert vehicle matrices into Passenger Car Units for assignment in SATURN are 1.0 for Car, 1.0 for LGV and 2.3 for HGV.

The original M62 J9 model coding was checked to ensure it was still reflective of the current situation. The remaining network was coded using CAD overlays, aerial images and notes taken during site visits. Speed flow curves were applied to the M62 and to Birchwood Way. The remaining links did not have speed flow curves applied, the free flow speed reflected the speed limit expect in areas where traffic calming was in place.

The original VISUM zone structure was not detailed enough in the residential areas that form the southern boundary of the Peel Hall Farm site. They were large zones with multiple connectors. An exercise was undertaken to disaggregate the zones and provide realistic loading points.

6. Provide updated zone plan showing the extent of disaggregation and loading points for trips? What is the final number of zones?

The process of matrix estimation describes running matrix estimation in both VISUM and SATURN. It is not entirely clear why this has been carried out. Is this two entirely separate processes or somehow linked (from VISSIM to VISUM to SATURN)? Prior and Post ME matrix results are not provided.

7. Provide Prior and Post ME matrix integrity results – Prior and Post ME totals, R2, slope and intercept values – to ensure OD patterns remain consistent.

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Convergence is good and in line with DfT TAG criteria, though DMRB is quoted as throughout the document.

8. Why is DMRB quoted as guidance, should be looking to DfT TAG guidance?

Calibration and Validation

The traffic counts are said to have been factored to a common year of 2015 using Tempro NTEM dataset v6.2, details of which are given in Technical Note HTp/1107/TN/20 which is an appendix to the forecasting report.

9. Technical Note TN/20 only details growth factors for 2015-2025 and 2015-2030? The dataset to be used should be NTEM v7.2 (available since March 2017) for car trips. LGV and HGV growth factors are typically derived from National Transport Model (NTM). State factors used and sources to adjust counts to a common year for all vehicle types.

10. Has any adjustment been made for seasonality?

Calibration statistics are presented for turning movements and link counts. The results show GEH<5 for 85% of counts across all vehicle types and time periods.

Validation performance is measured against journey times on the 10 routes (five bi-directional) selected. In each time period 9 out of 10 routes meet the criteria, though the modelled times are quicker than observed in 16 of the 20 routes, 9 out of 10 in the AM.

In the AM peak Birchwood Way EB (JR 6-9) is 55% quicker in the model than observed. This is a key route and known area of delay especially on the EB approach to College Place roundabout. Entry flows to the roundabout calibrate well with observed, which may conclude that the choice of speed flow curve on A574 is not representative and / or the turning movements at College Place roundabout are not being represented in the model.

- 11. Provide comparison between modelled and observed turning movements at College Place roundabout.
- 12. Were there any network issues that caused observed journey time EB in the AM peak on Birchwood Way to be higher than normal? How do other neutral periods compare?

Journey route 6-9 continues to Oakwood Gate junction (section 8-9). There is no count data used at that junction so getting the journey route to validate on that section will be very difficult.

13. If the model needs to extend to Oakwood Gate then count data should be used to ensure that the flows at that junction are accurately represented.

Other

14. Provide plots of base year flows, delays and queuing.



Summary

A SATURN model of the area around Peel Hall Farm has been produced using turning count data and OD patterns from the 2008 VISUM model. The model represents a neutral day in May 2015.

Notwithstanding the points of clarification regarding growth factors, final zone structure, prior and post ME comparisons, the model compares well with observed data for calibration counts and validation journey routes.

However, there are two issues that require further examination. Firstly, the OD data used in the model has been extracted from the 2008 VISUM model of Warrington. This model was informed by RSIs from 2006 and 2007 and thus the data is at least 10 years old. Evidence is required to show that the OD data is still relevant to trip patterns in May 2015. If the OD data cannot be shown to be suitable, there is now a validated SATURN / Emme multimodal model of Warrington with a base year of 2016 which can be used.

Secondly, the scale of the difference between the modelled and observed journey time EB on Birchwood Way in the AM peak requires further examination. Birchwood Way EB in the AM peak is one of the most congested routes on the network and is critical to model accurately given its influence in this part of Warrington. As it stands the model suggest additional capacity on this route that in reality doesn't exist. This may influence development traffic behaviour in forecast scenarios and underestimate the need for mitigation measures.

Colin Wright Principal Transport Planner

RESPONSE TO WSP LMVR REVIEW (Rev. A)

PROJECT: Peel Hall, Warrington

REVIEW DATE: 22 November 2017

REF.: APP/M0655/W/17/3178530

Land at Peel Hall, Warrington

Outline application for a new residential neighbourhood including C2 and C3 uses; local employment (B1 uses); local centre including food store up to 2,000m², A1-A5 (inclusive) and D1 use class units of up to 600m² total (with no single unit of more than 200m²) and family restaurant/pub of up to 800m² (A3/A4 use); site for primary school; open space including sports pitches with ancilary facilities; means of access and supporting infrastructure at Peel Hall, Warrington.

Model Overview

1. How has the area of influence of the development site been determined?

The area of influence of the development site was determined through our scoping meetings with WBC (19th January 2016 and updated following meeting 12th September 2016). See meeting minutes and modelling scope attached for reference.

Model Data

2. Has the 2008 OD data been uplifted to 2015 before matrix estimation was applied?

It can be confirmed that the 2008 OD data has been uplifted to 2015.

3. The OD data that informed the 2008 model is from Roadside Interview surveys that are at least 10 years old. How did the 2008 model validate in this area and are the OD patterns logical? Can they be relied upon to represent OD movements in May 2015?

The OD data was based on the 2008 VISUM model of Warrington, as this was agreed to be the most reliable data set available within the time-frame available. The planning application that is the subject of the appeal was validated in mid-2016 and 2015 was considered acceptable earlier this year; it would not be reasonable to update this now. Future years were agreed with WBC in March 2017 and HE confirmed in January 2017 that a year of opening assessment with all development traffic was unnecessary in this case. The current future years of 2025 and 2030 broadly align with what was previously discussed during 2016 in any event. 4. How was this information used? There is no further mention of site specific adjustments to the SATURN model. Base year queueing in the model is not reported on or discussed.

The 2016 flow data and 2016 and 2017 observations were taken into account during validation and calibration of the model. It is agreed that this can be made clear in any further LMVR.

Model Development

5. Confirmation that these are peak hour models and not one hour averages of the three hour data collection period?

A two and half hour model period was developed for both the AM and PM model periods in VISSIM to ensure that VISSIM replicated the rise of fall of queueing across the network. Within that period, it was agreed that 0800–0900 and 1700– 1800 would be reported upon. Within SATURN typically you model a single hour period and then report upon this. The SATURN model is intended to provide an assessment of the same data collected and used to inform the VISSIM assessment, which is a process that started in January 2016.

6. Provide updated zone plan showing the extent of disaggregation and loading points for trips? What is the final number of zones?

The zone structure for the Warring Multi Modal Model (WMMM) is shown in Figure 1 below, as provided in the original supporting LMVR.



Figure 1 – WMMM zone structure

The zone structure, totalling 42 zones, of the WMMM presented in Figure 1, was disaggregated within the central residential zone, to provide a more suitable structure for loading points into the VISSIM model, originally developed for this assessment. The updated VISSIM zone structure including loading points is presented below in Figure 2 (see also Appendix 1).



Figure 2 – VISSIM model zone structure

The zone structure and number of zones remained the same at 71 when moving to SATURN, only the zone numbers changed. A plan of the SATURN zone structure is presented in Figure 3 below (see also at Appendix 2).

Figure 3 – SATURN model zone structure



7. Provide Prior and Post ME matrix integrity results – Prior and Post ME totals, R2, slope and intercept values – to ensure OD patterns remain consistent.

Whilst these can be provided, it is considered unnecessary; the original VISUM model was built by WSP.

It is acknowledged that a considerable volume of work was required to convert the matrices to VISSIM originally, and then into SATURN.

8. Why is DMRB quoted as guidance, should be looking to DfT TAG guidance?

The guidance reference can be updated going forward; these are essentially the same standards.

Calibration and Validation

 Technical Note TN/20 only details growth factors for 2015-2025 and 2015-2030? The dataset to be used should be NTEM v7.2 (available since March 2017) for car trips. LGV and HGV growth factors are typically derived from National Transport Model (NTM). State factors used and sources to adjust counts to a common year for all vehicle types.

The growth calculations are as per previously agreed approach with WBC and were updated in May 2017 to reflect NTEM v7.2, which provided lower growth rates than v6.2. HTp/TN/07/Addendum (October 2016) provided an update on reducing background growth, further to the previously provided HTp/TN/07 dated May 2016 that set out the agreed strategy. It is understood that AECOM originally used v6.2 to growth the 2014 survey data to 2015.

10. Has any adjustment been made for seasonality?

No additional adjustments were made for seasonality, as per previously agreed approach.

11. Provide comparison between modelled and observed turning movements at College Place roundabout.

This will be provided going forward.

12. Were there any network issues that caused observed journey time EB in the AM peak on Birchwood Way to be higher than normal? How do other neutral periods compare?

No network issues were reported for the journey times dated 12th, 13th, 14th, May 2015 as obtained from Basemap.co.uk.

Since 2015 the Oakwood Gate roundabout has benefitted from signalisation of the eastbound approach and corresponding internal circulatory link. The implementation of traffic signals has significantly reduced queues on the A574 Birchwood Way in an eastbound direction and so comparison of the existing journey times with those in 2015 is not recommended. To provide a comparison of journey times for the eastbound route following the A574 Birchwood Road a number of week's data from 2015 and 2014 has been obtained from Basemap.co.uk. and summarised in Table 1 below.

Year	Month	Date Range	Journey Time (Seconds)
	April	21st - 23rd	616
		28th - 30th	638
	Мау	5th - 7th	490
		12th - 14th	502
2015		18th - 21st	637
	September	8th - 10th	599
		15th - 17th	567
		22th - 24th	764
		29th - 1st	768
	•¥		
2014	May	13th - 15th	556

Table 1, Comparison of Eastbound Journey times for the A574 Birchwood Way

*Journey time used to Validate Model

Table 1 identifies that journey times along the A574 differ noticeably, depending upon the time of the year. Comparison of the same week in 2014 identifies the average journey time in the AM peak was approximately 10% higher than the journey time observed during 2015. The journey time data identifies a significant proportion of the delays to vehicles in an eastbound direction traveling along the A574 Birchwood Way are experienced at roundabouts along the route. The route is characterised by a number of roundabouts, so a small change in flows can have a significant impact upon the levels of delay at junctions.

The introduction of the new signals at Oakwood Gate regulate the flow of traffic in an eastbound direction, which has a significant impact on and can be attributed to a significant proportion of the journey times.

13. If the model needs to extend to Oakwood Gate then count data should be used to ensure that the flows at that junction are accurately represented.

We are happy to consider removing the far eastern extents from a future version of the SATURN model; please confirm.

Other

14. Provide plots of base year flows, delays and queuing.

Base year flows have been provided within the spreadsheets supplied as part of the validation exercise, and also as part of the comparison exercise with the future year flows. Plots of delays for the base year are provided below in Figures 4 to 7 (see also Appendix 3 and 4).



PM

Figure 5, PM Peak Period Delay Plots



Base Year Queue Plots

AM

Figure 6, AM Peak Base Year Period Average Queue Plots





Figure 7, PM Peak Base Year Period Average Queue Plots

PM

Appendix 1



Appendix A – VISSIM Zone Structure



Appendix 2



Appendix B – SATURN Zone Structure



Appendix 3

AM Peak Period Total Delay Plot



Project number: 60487959

PM Peak Period Total Delay Plot



Appendix 4

Project number: 60487959

AM Peak Period Average Queue Plot



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Project number: 60487959

PM Peak Period Average Queue Plot

