

**Subject:** RE: Peel Hall Updated VISSIM Base Model (v6)  
**Date:** Monday, 2 November 2020 at 08:11:53 Greenwich Mean Time  
**From:** Heywood, Robert  
**To:** fiona.bennett@highgatetransportation.co.uk, 'Taylor, Mike'  
**CC:** dave.tighe@highgatetransportation.co.uk, 'Colin Griffiths', 'Wright, Colin', Gavin.Coupe, Wong, Lun, 'Lu, Tao', Laverick, Benjamin  
**Attachments:** 5188540.072 Peel Hall Base Vissim Review.pdf

Fiona,

Please find attached the latest review by Atkins of the Peel Hall VISSIM Base Model v6.

We have found that the latest model results do not validate as well as the previous version of the base model. Despite these findings, the overall journey time differences are still within the acceptable threshold of 15%.

In summary the model '2019AuditBase\_v6Final' is found to be fit-for-purpose in the primary area of interest to Highways England to assess the scheme mitigation for this development. Notwithstanding this, it is not necessarily a juxtaposition that Atkins were happy with the modelling and WSP not as the focus of our reviews was different.

Kind regards,

Rob

**Robert Heywood, Route Manager**

Network Development & Planning Team

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**From:** Heywood, Robert

**Sent:** 20 October 2020 16:38

**To:** fiona.bennett@highgatetransportation.co.uk; 'Taylor, Mike' <mike.taylor@warrington.gov.uk>

**Cc:** dave.tighe@highgatetransportation.co.uk; 'Colin Griffiths' <colin@satnam.co.uk>; 'Wright, Colin' <Colin.Wright@wsp.com>; Gavin.Coupe <Gavin.Coupe@atkinsglobal.com>; Wong, Lun <Lun.Wong@atkinsglobal.com>; 'Lu, Tao' <Tao.Lu@wsp.com>

**Subject:** RE: Peel Hall Updated VISSIM Base Model (v6)

Good afternoon Fiona,

We expect to have a response by the 2<sup>nd</sup> November allowing for leave for key people next week.

Kind regards,

Rob

**Robert Heywood, Route Manager**

Network Development & Planning Team

Highways England | Atlantic House | Birchwood Boulevard | Warrington | WA3 7WE

**Mobile:** + 44 (0) 7785 925 993

Our reference: 5188540.072

Your reference: NW066 20/21

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30 October 2020

Dear Rob

## **Re: Review of Peel Hall Modelling Information**

Atkins has been commissioned by Highways England to audit a Vissim model with associated Local Model Validation Report (LMVR), which have been produced by The Modelling Group (TMG). TMG are working on behalf of Highgate Transportation (HT) who has been commissioned by Satnam Millennium Ltd (Satnam) in support of the proposed development of land at Peel Hall in Warrington.

### **Background**

An ongoing process of modelling reviews has been taking place and we have provided several reviews in the past as well as providing supporting information to the 2018 Public Inquiry (LPA reference: 2016/28492, PINS reference: APP/M0655/W/17/3178530).

Recent document reviews include:

- A review of a submitted Addendum to the previously submitted Transport Assessment (HTp/1107/01/A dated January 2018), in support of the proposals for a new residential neighbourhood on land at Peel Hall to be considered at a forthcoming reopened Public Inquiry. This review was issued on 15th April 2020 and included a further review of the Vissim modelling.
- A review of a submitted documents that make up part of a second Addendum to the Environmental Statement (ES Addendum 2). The following documents (in PDF) were reviewed in a letter issued on 5<sup>th</sup> June 2020:
  - 1820\_Peel Hall- ES Non-Technical Summary- Volume 7
  - 1820\_Peel Hall- Environmental Statement ADDENDUM 2 - Volume 8- 2020
  - 1820\_Peel Hall- ES Documents and Figures- Volume 9- Part 1 and 2- 02.04.20
- A review of a submitted base Vissim model and supporting LMVR. This review was issued on 5<sup>th</sup> June 2020.
- A review of a revised base Vissim model and supporting LMVR. The spreadsheet work has also been reviewed which related to the conversion of future year flows from a SATURN model for use in the Vissim model so that scenarios can be created. This review was issued on 31<sup>st</sup> July 2020.
- A review of the revised base Vissim model, proposed Vissim model and supporting documents and technical notes produced. This review was issued on 7<sup>th</sup> September 2020.
- Subsequently, a revised base Vissim model, proposed Vissim model and supporting documents were provided by HT on 8<sup>th</sup> September 2020. This review was issued on 23<sup>rd</sup> September 2020.

## Submitted Documentation

HT submitted the following documentation and model files on 16<sup>th</sup> October 2020:

### Vissim Model

- Vissim model '2019AuditBase\_v6Final' which includes the base models cover both Morning and Evening Peak periods

### Other documents

- Technical Note 'MG0123\_A49WarringCorridor\_BaseModellingReport\_v6.2'
- Technical Note 'MG0123\_A49WarringtonCorridor\_ChangesRegistry\_Oct2020\_v1'; and
- Excel Spreadsheet 'MG0123\_A49Warrington\_VISSIM\_CalVal\_v6'

The above documents are reviewed under the following sub-headings.

### **Peel Hall Vissim Model – Base Model Review**

It should be noted at the outset that, as with previous reviews, this review focuses on the parts of the network that are of interest to Highways England. As such, it cannot be said that Highways England agrees or disagrees with any part of the work that does not fall under that heading.

The previous base model submitted on 8<sup>th</sup> September 2020 has been reviewed and was deemed largely representative of the base year scenario within the primary area of interest to Highways England. As documented in the latest submission, the base model has since been refreshed to address the remaining concerns previously raised by WSP, on behalf of Warrington Borough Council, which is the relevant Planning Authority for this submission. A technical registry 'MG0123\_A49 Warrington Corridor\_ChangesRegistry\_Oct2020\_v1' has been provided to detail a change log for ease of reference. Majority of the model network coding changes are focussing on areas to the southern end of the network to better represent the local network queuing conditions, while some of the coding around the M62 junction 9 and mainline motorway have also been adjusted to address the journey time validation concern raised previously. The model has therefore been reviewed in more detail to ascertain its appropriateness for base year model benchmarking and for use in future scenario testing purposes. The table is set out in the same format as in our previous review for ease of reading.

| Review Criteria                     | Comments   |
|-------------------------------------|--|
| Basic Model Coding                  | The basic model coding is consistent with the previous modelling and is deemed appropriate in the area of interest to Highways England   |
| Use of Modifications                | The updated approach for scenario management within Vissim is deemed appropriate (note that this applies to the review of the base model only)   |
| Method of Assignment                | It is noted TMG has removed the now unused coding for Dynamic Assignment. This has 'tidied' up the model and is a welcome simplification.  |
| Traffic Volume / Profile Adjustment | <p>Following a discussion between HT, TMG, WSP (on behalf of Warrington Borough Council) and Atkins (on behalf of Highways England) on 24<sup>th</sup> September 2020, the base model has been amended to better represent existing queue situation in the local road network. In the latest submission, traffic flow entry volume and profiles have been manually adjusted to illustrate the known queuing conditions in the local road network with a particular focus on the A50 Long Lane, Cromwell Avenue and Sandy Lane West. Whilst the methodology of influencing the traffic flow profile to provide a more representative queuing condition appears reasonable, it has been noticed that the traffic volumes have also been altered as part of the model refinement process.</p> <p>While it is understood that by adjusting the traffic volume input on entry links to reflect the latent demand may have a most direct and visible impact on queue length, however, it is important to understand if this has led to a wider impact on the total number of vehicles that actually enter and filter through the wider road network.</p> |

Further examination has been undertaken to understand the difference in traffic turning movements at the key junctions which may have been impacted upon as a result of the amendment. A summary tables are provided below:

### AM Peak Traffic Turning Movements

| Junction/ Movement   |                                       | Vehicle Flow |               |                |
|--|---------------------------------------|--------------|---------------|----------------|
| Junction   | Approach                              | Observed     | Revised Model | Previous Model |
| A49 Winwick Road/<br>A574 Cromwell<br>Avenue/ Sandy Lane<br>West | A49 SB to Sandy Ln                    | 154          | 167           | 169            |
|  | A49 SB                                | 1277         | 1283          | 1280           |
|  | A49 SB to Cromwell Ave                | 243          | 277           | 277            |
|  | Cromwell Ave to A49 NB                | 250          | 278           | 275            |
|  | Cromwell Ave to Sandy Ln              | 314          | 351           | 351            |
|  | Cromwell Ave to A49 SB                | 645          | 574           | 616            |
|  | Cromwell Ave to Cromwell Ave (U-turn) | 55           | 55            | 54             |
|  | A49 NB                                | 776          | 820           | 823            |
|  | A49 NB to Sandy Ln                    | 71           | 73            | 76             |
|  | A49 NB to Cromwell Ave                | 424          | 440           | 425            |
|  | Sandy Ln to A49 NB                    | 210          | 265           | 231            |
|  | Sandy Ln to Sandy Ln (U-turn          | 0            | 0             | 0              |
|  | Sandy Ln to A49 SB                    | 81           | 112           | 116            |
|  | Sandy Ln to Cromwell Ave              | 203          | 236           | 252            |
| A49 Winwick Road/<br>Hawleys Lane/ A50<br>Long Lane              | A49 SB to Hawleys Lane                | 199          | 208           | 227            |
|  | A49 SB to Long Lane                   | 258          | 267           | 276            |
|  | A49 SB                                | 1447         | 1351          | 1385           |
|  | A49 NB to Hawleys Lane                | 77           | 82            | 78             |
|  | A49 NB to Long Lane                   | 236          | 200           | 196            |
|  | A49 NB                                | 805          | 805           | 792            |
|  | Long Lane to A49 SB                   | 390          | 430           | 402            |
|  | Long Lane to Hawleys Lane             | 134          | 153           | 162            |
|  | Long Lane to A49 NB                   | 239          | 282           | 273            |
|  | Hawleys Lane to Long Lane             | 113          | 94            | 92             |
|  | Hawleys Lane to A49 SB                | 58           | 53            | 52             |
| Hawleys Lane to A49 NB   | 174                                   | 167          | 170           |                |

### PM Peak Traffic Turning Movements

| Junction/ Movement   |                                       | Vehicle Flow |               |                |
|--|---------------------------------------|--------------|---------------|----------------|
| Junction   | Approach                              | Observed     | Revised Model | Previous Model |
| A49 Winwick Road/<br>A574 Cromwell<br>Avenue/ Sandy Lane<br>West | A49 SB to Sandy Ln                    | 233          | 220           | 214            |
|  | A49 SB                                | 822          | 804           | 803            |
|  | A49 SB to Cromwell Ave                | 306          | 286           | 288            |
|  | Cromwell Ave to A49 NB                | 403          | 377           | 369            |
|  | Cromwell Ave to Sandy Ln              | 259          | 315           | 302            |
|  | Cromwell Ave to A49 SB                | 517          | 529           | 505            |
|  | Cromwell Ave to Cromwell Ave (U-turn) | 96           | 81            | 86             |
|  | A49 NB                                | 1423         | 1429          | 1526           |
|  | A49 NB to Sandy Ln                    | 104          | 114           | 117            |
|  | A49 NB to Cromwell Ave                | 657          | 659           | 683            |
|  | Sandy Ln to A49 NB                    | 205          | 182           | 181            |
|  | Sandy Ln to Sandy Ln (U-turn          | 0            | 0             | 0              |
|  | Sandy Ln to A49 SB                    | 103          | 93            | 109            |
|  | Sandy Ln to Cromwell Ave              | 260          | 236           | 238            |
| A49 Winwick Road/<br>Hawleys Lane/ A50<br>Long Lane              | A49 SB to Hawleys Lane                | 189          | 200           | 199            |
|  | A49 SB to Long Lane                   | 319          | 354           | 341            |
|  | A49 SB                                | 904          | 849           | 844            |
|  | A49 NB to Hawleys Lane                | 70           | 50            | 56             |
|  | A49 NB to Long Lane                   | 215          | 164           | 171            |
|  | A49 NB                                | 1357         | 1374          | 1455           |
|  | Long Lane to A49 SB                   | 246          | 308           | 275            |
|  | Long Lane to Hawleys Lane             | 158          | 172           | 182            |
|  | Long Lane to A49 NB                   | 298          | 336           | 321            |
|  | Hawleys Lane to Long Lane             | 134          | 106           | 118            |
|  | Hawleys Lane to A49 SB                | 65           | 76            | 81             |
| Hawleys Lane to A49 NB   | 353                                   | 371          | 408           |                |

|   |  |
|---|--|
|   | <p>As can be seen in the tables provided, most of the traffic turning movements match closely with the values presented in the previous base model submission. One noticeable difference is for the A49 northbound movement in the Evening Peak period where a 7% reduction has been recorded at both the junctions with the A50 Long Lane and Sandy Lane West. The changes appear to improve the goodness of fit for the traffic turning count validation at both junctions.</p> <p>Overall, it is concluded that the actual traffic throughput difference at the two key junctions remain largely similar to the pre-refinement level compared with the previous base model submission. This implies that the traffic adjustment has limited impact on the number of traffic actually entering the wider network, the amount of traffic accessing onto the M62 Strategic Route Network would remain largely unaffected albeit concerns over the methodology.</p> |
| Temporal Scope                          | The temporal scope has always been deemed appropriate  |
| Network Layout Coding                   | The network coding for the base model is now deemed appropriate  |
| Driving Behaviour Parameters            | The Driving Behaviour Parameters were updated as recommended in the previous review. It continues to be the case that this provides for more accurate and robust basis for the assessment.   |
| Traffic Functions Setting               | All HGV acceleration and deceleration functions were updated as recommended in the previous review to match current default settings found within the latest Vissim version 2020. It continues to be the case that this provides for more accurate and robust basis for the assessment.  |
| Signals                                 | It was understood that traffic signal timings for M62 J9 were acquired from Warrington Borough Council. The information has now been incorporated and re-calibrated in the base model.   |
| Speed Distributions and Speed Decisions | Speed distributions and decisions are deemed appropriate. In the latest submission, the desired speed controls on the M62 slip roads have been refined using 2019 HATRIS data and the reduced speed areas have also been refined in the Morning Peak model with an attempt to enhance the journey time validation along the M62 mainline and to better represent the base year situation.  |
| Calibration to Counts                   | <p>The LMVR reports 100% of model flows are within a GEH value of less than 5 which is therefore within the TAG threshold albeit it is noted that TAG was not designed for micro-simulation models.</p> <p>Whilst it is noted that this is an improvement on the original modelling thus ratifying our comments which have assisted TMG with the model improvements, it should also be noted that a high level of link count matching does not necessarily mean that the model matches turns at key junctions such as M62 J9 as no turning count validation has been undertaken at this location.</p>  |
| Validation to Journey Times             | <p>The key segments which are within the primary area of interest to Highways England are therefore Route Sections 3, 4, 5 (northbound and southbound through M62 J9) and 9 to 16 (The M62 mainline and slip roads from M62 to J9).</p> <p>Compared with the previous base model validation report v5, a significant number of validation statistics have been updated following the changes made in the Vissim network coding as set out in the change log provided within the technical registry 'MG0123_A49 Warrington Corridor_ChangesRegistry_Oct2020_v1'. The number of route sections which are within 15% of the observed records have seen improvement from 79% to 85%, and from 77% to 88%, for the Morning Peak and Evening Peak periods respectively.</p>  |

### Northbound and Southbound Journey times (both Morning and Evening Peak periods)

In the revised base model, it is noted that all of the northbound and southbound Route Sections 3, 4 and 5 are within 15% of the observed values for both peak periods, the values as a whole appear representative to demonstrate a goodness of fit.

### Eastbound and Westbound Journey times (Morning Peak period)

Throughout the ongoing model review process, Highways England has provided recommendations and support TMG / HT to improve the model calibration and validation to reach a consent. Highways England is generally content with the model coding along motorway section in the previous version of the base model and the journey time validation for the Morning Peak period was deemed acceptable. However, it is unclear why the eastbound M62 exit control has been amended with changes made to the Reduced Speed Areas 1430 to 1462 on the eastern edge of the network to regulate the traffic throughput, which influence the M62 mainline eastbound section travelling away from the M62 J9. As a result of the above changes, the journey times for eastbound direction are generally faster than the observed records. A summary table is provided below:

#### **AM Peak Eastbound Journey Time**

| Section      | Direction | Description    |   |                | Observed     |            | Revised Model | Previous Model |
|--------------|-----------|----------------|---|----------------|--------------|------------|---------------|----------------|
|              |           | From           | - | To             | Dist.        | Avg.       | Avg.          | Avg.           |
| 9            | EB        | EB M62         | - | EB M62         | 1313m        | 58         | 55            | 62             |
| 10           | EB        | EB M62         | - | EB M62 offslip | 347m         | 16         | 15            | 16             |
| 11           | EB        | EB M62 offslip | - | M62 J9         | 291m         | 71         | 66            | 71             |
| 12           | EB        | EB M62 @ J9    | - | EB M62 @ J9    | 869m         | 47         | 40            | 41             |
| 13           | EB        | M62 J9         | - | EB M62 onslip  | 433m         | 30         | 30            | 27             |
| 14           | EB        | EB M62 onslip  | - | EB M62         | 1074m        | 65         | 52            | 60             |
| 15           | EB        | EB M62/M6      | - | M6             | 624m         | 28         | 28            | 32             |
| 16           | EB        | EB M62         | - | EB M62         | 1115m        | 256        | 249           | 248            |
| <b>TOTAL</b> | <b>EB</b> | <b>EB M62</b>  | - | <b>EB M62</b>  | <b>6065m</b> | <b>570</b> | <b>534</b>    | <b>557</b>     |

As can be seen in the table above, the vehicles are generally traveling faster on nearly all sections compared with the observed values. Of particular concern is Route Section 14 which covers the motorway section travel eastbound from J9. In the previous version of the base model, the journey time for this 1km section was 5 seconds faster than the observed value, whilst in the latest submission, the difference has now extended to 14 seconds with a percentage difference of over 20% compared with the observed record. For the cumulative M62 eastbound journey time figure, the journey time is now 36 seconds faster, compared with the previously modelled difference of 13 seconds.

While it is unclear what is the key driver for the proposed change along the M62 mainline coding in the latest base model which has been accepted previously, the overall journey time differences are still within the acceptable threshold of 15%. The overall impact of such changes would not pose any risks that compromise the ability for the model intended use of future scenario testing and therefore deemed acceptable on this occasion. Caution will have to be applied to the interpretation of any modelling results for the Morning Peak period.

### Eastbound and Westbound Journey times (Evening Peak period)

In terms of the eastbound and westbound route sections along the M62 motorway, as highlighted in the model review issued on 7<sup>th</sup> September 2020, concern was raised regarding the journey times for a number of route sections which are generally slower than the observed records. In the latest base model submission, the overall validation for the Evening Peak model has been improved. The M62 eastbound journey times between Route Sections 12 and 15 have seen the biggest improvement for the Evening Peak period. Majority of the route sections in both directions are now within 15% of the observed value with a tolerance of +/- 5 seconds and the values as a whole deemed acceptable.

**Summary**

Atkins has been commissioned by Highways England to audit a base Vissim model and associated LMVR document produced by TMG on behalf of Highgate Transportation (HT) who has been commissioned by Satnam Millennium Ltd (Satnam) in support of proposed development of land at Peel Hall in Warrington.

Overall, the revised base model looks to be of a reasonable standard along the main study corridor. A number of issues which have been noted in the previous reviews have now been addressed. Even though the model calibration and validation statistics presented are generally with the TAG threshold, the journey time along the M62 eastbound mainline, particularly for the section travel away from the M62 J9, is modelled to be faster in the Morning Peak period compared with those observed records, caution will have to be applied to the interpretation of any modelling results.

Given the above, the base model '2019AuditBase\_v6Final' submitted on 16<sup>th</sup> October 2020 can be recommended as being fit-for-purpose in the primary area of interest to Highways England to assess the scheme mitigation for this development. Notwithstanding this, it is not necessarily a juxtaposition that Atkins were happy with the modelling and WSP not as the focus of our reviews was different.

Yours faithfully

Lun Wong