# Porirua Transport Model Stage 2
# Aimsun Peer Review



## Quality statement

| Rev. no | Date | Description | Prepared by | Checked by | Reviewed by | Approved by |
|---|---|---|---|---|---|---|
| | 25-1-24 | Porirua Transport Model Stage 2, Aimsun Peer Review | BW | TB | JB | SL |
| **1** | 8-2-24 | Revised wording section 3.1.1 | BW | TB | JB | SL |
| **2** | 12-2-24 | Consistency of wording in 3.1.1 and Summary. | BW | TB | JB | SL |
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# 1 Background

## 1.1 Porirua Transport Model Stage 2

The development of the Stage 2 Porirua Transport Model (PTM) will provide a final, post Transmission Gully (TG), calibrated and validated transport model. The intention is that this model is suitable for application to Porirua City Council (PCC) transport projects in the area.

The model is an operational transport model which concentrates on predicting the performance and operation of the transport network. The PTM sits under the higher tier regional Wellington Transport Strategy Model (WTSM). The model has been developed in the Aimsun software as a dynamic assignment model, with profiled vehicle demand, covering 4-hour AM, PM, and IP weekday periods, with vehicles physically represented on the traffic network.

## 1.2 PTM Purpose and Key Guidance

The purpose of the PTM is identified in the PTM Stage 2 Model Development Report as to provide a traffic modelling tool that will inform transport investment strategies for Porirua.

The key transport modelling guidance in NZ is the Waka Kotahi Transport Model Development Guidelines[1] (TMDG). Using this guide, Model Purpose category C, Urban Area has been identified for the PTM. This is considered appropriate. The TMDG notes that Purpose C assessments focus on the operation of urban conurbations, city centres, and other urban style environments. This is a potentially wide range of applications which may include local authority planning, development strategy, urban traffic management and road schemes, infrastructure and policy change assessments, ITS, etc.

Model purpose C from the TMDG identifies the calibration / validation criteria targets that are used to confirm the robustness of the traffic model in the observed and modelled data comparisons.

## 1.3 PTM Peer Review

Stantec has been commissioned by the Wellington Transport Analytics Unit (WTAU) to carry out a Peer Review through the base year development, calibration and validation, forecasting, and future year scenario modelling phases.

The purpose of this Peer Review is to identify any limitations, risks, and weaknesses in the PTM and draw these to the attention of the Client Group.

The technical working group associated with the model development includes the Modeller (Flow, the consultant developing the model), Wellington Transport Analytics Unit (WTAU), Porirua City Council (PCC), and Stantec as Peer Reviewers.

This Peer Review has been carried out in line with the EngNZ Peer Review Practice Note[2]. The Peer Review has maintained a degree of independence and is intended to reveal issues rather than necessarily solve them.

[1] https://www.nzta.govt.nz/assets/resources/transport-model-development-guidelines/docs/tmd.pdf
[2] EngNZ Practice Note 2: Peer Review (version 2: 2018)

# 2 Review Process and Documentation

## 2.1 Review Comments and Correspondence

Review comments and correspondence have been carried out in stages through the PTM modelling process. Key stages of this process, noting when review issues were identified and provided, are as follows;

- Review inception meeting, 19 April 23. Focus of this meeting was traffic data collection.
- Data Collection Tech Note, comments issued 2 May 23.
- Demand Process Tech Note, comments issued 1 August 23
- Email exchanges through August 23, notably in reference to spreadsheet calibration / validation outcomes provided 1 August 23.
- Model Development Report, comments issued 24 August 23
- Future DM (Do Minimum) Development Report, comments issued 7 December 23

## 2.2 Review Issues Tracking Spreadsheet

Review issues have been tracked on a shared spreadsheet and the 'live' status of these issues is recorded here; Porirua Transport Model Stage 2 - Peer Review Issues.xlsx

The tracking spreadsheet records an estimated level of risk of issues raised in the following levels;

- Minor
- Minor-to-moderate
- Moderate
- Moderate-to-significant
- Significant

The tracking spreadsheet summarises the changes and/or response to the review issue identified, and the subsequent estimate of the remaining level of risk following these changes and/or response. The resulting remaining level of risk is the risk associated with application of the model to transport projects in the study area. The table below provides a summary of the number of issues raised by level, the original estimated level of risk significance and the residual significance level following changes made to the model and/or response from the modellers.

**Table 2-1: Summary of Issues Identified and Resulting Risk Level**

| Initial Issues by Significance Level | Number | Residual Significance Level | Number |
|---|---|---|---|
| | | Resolved | 13 |
| Minor | 8 | Minor | 9 |
| Minor-to-Moderate | 6 | Minor-to-Moderate | 5 |
| Moderate | 11 | Moderate | 7 |
| Moderate-to-Significant | 6 | Moderate-to-Significant | 0 |
| Significant | 3 | Significant | 0 |
| | | | |
| **Total** | **34** | **Total** | **34** |

The table above demonstrates that following updates to the model and/or the provision of further information, the issues with moderate-to-significant and significant risk have been reduced to the moderate risk level or less. For the record, the issues, comments, and outcomes from the tracking spreadsheet are copied in Appendix A.

The commentary provided in this summary report focusses on the issues where the residual risk remains moderate. Information on the other issues identified, including a short description and summary of outcomes, can be found in Appendix A.

# 3 Commentary on Key Issues

## 3.1 Model Structure and Design

### 3.1.1 Review Issue #1: Use of Hybrid Modelling Method

The PTM uses the hybrid simulation approach - a mix of mesoscopic and microscopic simulation. Micro simulation is used in the Porirua urban / city region, with a mesoscopic simulation in the areas outside of this central area. The boundary of the micro and meso simulation is shown by the dotted blue line in the image below.

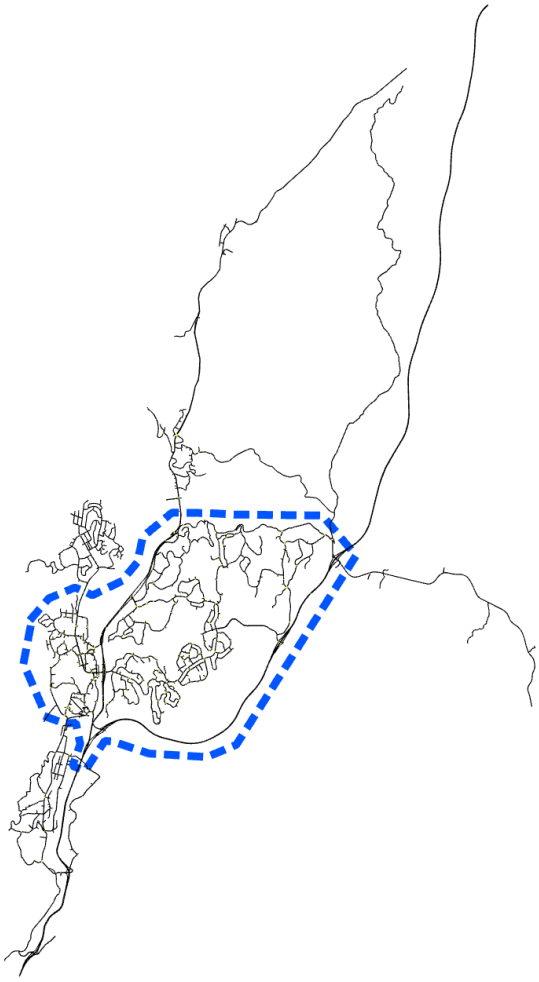

**Figure 3-1: PTM Stage 2 Model Area, Meso / Micro Simulation Model Areas**

Through use and application of the Aimsun transport modelling software, key senior Stantec transport modellers in Australasia have broadly established that the hybrid simulation method is not a preferred method for any newly developed, or revised / updated, Aimsun models. There are issues with the consistency of model coding, parameters, settings, and particularly with the representation of delays and capacity between similar network features in the meso and micro simulation. This creates a number of issues, particularly problematic can be the boundary areas between the two modelling methods. It is judged that new or revised / updated models are typically either micro simulation for small-to-moderate sized networks (e.g. Porirua) or meso simulation for much larger networks (e.g. whole of Auckland region model).

Use of hybrid was raised as an issue noting the concerns above, particularly around the boundaries between the micro and meso simulation areas. A resolution would be to use micro simulation for the entire model area due to the Porirua model being towards the smaller end of the model scale size.

The area of micro simulation was increased and the Modellers response to simulating the full network as micro simulation was that meso coding allows for coarser model coding and faster run times. The boundary issue is notable in the south where congestion / delay spills back into the micro Porirua area from capacity constraints (merges) further south on SH1 which are in the meso area. The model run times are fast and are unlikely to significantly change from simulating the full network as micro simulation.

This issue remains a moderate risk. There are risks that the modelled response to changes in congestion around the micro / meso simulation boundaries, which interacts and effects traffic within Porirua may not be entirely robust. Additionally, applying the model to projects outside of the micro simulation area would require careful consideration. These considerations could include additional calibration / validation checks in these locations before applying the model to testing, care and caveating when reporting results from these locations, identifying and acknowledging limitations etc.

### 3.1.2 Review Issue #2: Transmission Gully Traffic Count Data

A review issue was identified that there was no classified count data along Transmission Gully (TG) in the Porirua area and at the TG / Porirua Interchanges. This results in a lack of calibration checks at these locations, potentially effects the robustness of the Origin / Destination demands on these movements, but particularly presents a challenge in developing profiles on movements on TG and to / from Porirua and key areas (e.g. Wellington).

Timeframes were identified as preventing this data being collected. Therefore this remains a moderate risk.

## 3.2 Traffic Demand

### 3.2.1 Review Issue #11: Use of WTSM Cordons

The WTSM peak and shoulder period model have been used to extract cordon model demands to develop the PTM demands. There are several approaches to the creation of cordon WTSM demands and it was noted that it should be verified whether the peak and shoulder approach has been validated WTSM (subsequently verified through discussion with the WTSM developers as not validated by shoulder and peak hour).

This issue remains identified as a moderate risk as no further information was provided in response to the issues being identified.

### 3.2.2 Review Issue #14: Profiling Key Traffic Movement Patterns

An issue was noted with a general lack of more detailed information relating to the development of profiles for the PTM. Once information was provided, the issue was clarified that the profiling approach does not include a strong representation of profiles based on destinations and travel patterns. As an example, traffic is not separately profiled for travel from TG North into Porirua CBD and TG North into Wellington. This issue was raised during the base model development phase.

In the forecasting phase it became clear that the representation of AM peak travel times on TG / SH1 southbound was not appropriate and that this was associated with the southbound profiles. Southbound profiles were redeveloped and the base model calibration / validation rechecked. This improved the operation of the future Do Minimum network and the representation of observed southbound travel times in the base year model.

This issue remains identified as a moderate risk. Although SH1 southbound profiling has improved, it would be beneficial for key travel patterns in / out of Porirua to be profiled. This may affect the predicted performance of key locations, e.g. the Porirua TG interchanges.

## 3.3 Model Network / Settings / Parameters

### 3.3.1 Review Issue #17: Length of Dynamic Response Update Interval

The dynamic response update interval provides drivers the opportunity to re-route based on their knowledge of the current traffic conditions, which is provided to them at regular intervals. We recommend that the interval is 2-to-3 minutes for a model of this nature (where the city centre is an important focus and has a relatively dense roading network) and size (the model is relatively small and runs quickly).

Initially the response interval was 15-minutes and this was then reduced to 5-minutes following review discussions and set to cover the last 30-minutes of simulation. The interval could still be reduced further and set to cover a longer period of the simulation; this is particularly relevant in the forecast years where congestion is present over a large portion of the model period (2-3 hours in the AM period).

### 3.3.2 Review Issues #18 & 19: Paths between ODs and % Following Paths

The review identified that the number of paths between ODs is low in the AM and higher in the PM and that percentage of vehicles following the static OD paths is high. These settings were adjusted marginally following review discussions.

Following this review correspondence, further investigation in relation to current modelling projects in NZ has identified that these settings relating to passing OD paths from the static assignment to dynamic can be overly restrictive. Observed behaviour is that drivers do choose a range of routes between locations on a network and dynamic assignment models benefit from, and are more realistic, when a wider ranges of paths between ODs can and is selected. We would recommend the following settings, which have been developed through NZ practice;

- All paths are passed from the static assignment to dynamic
- Percentage of vehicles in the dynamic assignment that are fixed to follow these paths is kept lower (high range for this setting is around 60% for light vehicles)
- New paths are able to be generated in the dynamic assignment

The settings in the PTM remain towards the restrictive end of the above ranges, limiting the response within the dynamic assignment.

### 3.3.3 Review Issue #20: Inconsistency in Roundabout Coding

The review identified that there is a degree of inconsistency with roundabout coding. In particular, there are a number of roundabouts that are not following the Aimsun recommended coding approach for multi-lane roundabouts. The Modellers response to this issue is to maintain these inconsistencies, noting that the roundabout operation has been checked.

There are several reasons for coding features (e.g. intersections, motorway features, and notably roundabouts) consistently. Key reasons include that there is a consistent response at similar network features to predictions of delays (and, as a result, the assignment and volumes) so that when new features are coded in test scenarios the same settings, parameters, and coding can be adopted as per the base model. Checking the existing operation does not negate these reasons and this remains a moderate issue.

# 4 General Review Overview of Model

The section below provides a high-level summary of the review findings as they relate to key areas / stages of the PTM Stage 2 model development.

## 4.1 Observed Traffic Data

A reasonable set of observed traffic count data was collected for the purpose of the model development exercise through most regions of the study area. The lack of Transmission Gully data, both on the motorway links but particularly for movements passing through the Porirua TG interchanges, remains a moderate risk. This should be considered in applications where the performance of the TG interchanges is a factor in assessments.

No issues were noted with the observed travel time dataset.

## 4.2 Network, Settings and Assignment Parameters

As described in the sections above, there are several issues around the network coding and settings where moderate risks remain. There are several moderate issues linked with the dynamic assignment settings, risks remain about the appropriateness of the route choice response in the model.

## 4.3 Demand Development

No significant issues were identified with the base year Origin-Destination (OD) matrix development processes although clarification should be provided on the use of the WTSM cordons. The process used follows the general industry practice of cordoning the regional model, refining / updating the cordon demands to provide a developed prior matrix, and using matrix estimation to make finalised adjustments to the developed prior matrix.

However, the lack of profiling of key traffic movements through the wider study area remains a concern.

## 4.4 Base Year Calibration / Validation

The Waka Kotahi Transport Model Development Guidelines (TMDG) contain targets for comparing observed and model data based on the purpose of the model. Model Category C, Urban Area, has been identified as an appropriate purpose for the PTM Stage 2 model and this identifies the targets for observed vs. modelled comparisons (calibration / validation).

The model achieves the majority of the key TMDG traffic count targets in each modelled hour and each time period and achieves the travel time targets in the peak hours.

There are no significant concerns with the level of model calibration / validation achieved.

## 4.5 Forecasting and Future Year Do Minimum

Broadly the forecasting approach / method is considered appropriate and follows industry practice. Some corrections and improvements were identified and these are recorded in the tracking spreadsheet. No significant issues remain in the development of the future year Do Minimum network, demand forecasting, and associated 2033 network performance and operation.

# 5 Review Summary

## 5.1 Porirua Transport Model Stage 2 Peer Review

An operational transport model has been developed of the Porirua area. The model represents a calibrated and validated scenario following the opening of Transmission Gully (TG). The model sits beneath the regional transport planning model, WTSM, and the PTM concentrates on predicting the performance and operation of the transport network in the study area.

Stantec has been commissioned by the Wellington Transport Analytics Unit (WTAU) to carry out a Peer Review through the base year development, calibration and validation, forecasting, and future year scenario modelling phases.

The purpose of this Peer Review is understood to be to identify any limitations, risks, and weaknesses in the PTM and draw these to the attention of the Client Group.

## 5.2 Residual Risks

The Peer Review process has been carried out over a period of time involving commentary on reports, reviews of the model networks and model data (e.g. calibration / validation spreadsheets), email discussions, and several review meetings.

A live online tracking spreadsheet has been used to record issues, responses / updates, and assess the risk and residual risks associated with the issues identified during the review.

The following moderate risks remain from this process;

1. Use of the hybrid simulation methodology and the location of the border between meso / micro simulation boundaries being in areas effected by congestion.
2. Lack of Transmission Gully Interchange turning movement survey data.
3. Lack of profiling of key movements through the network.
4. Dynamic assignment settings which towards the restrictive end of the currently understood ranges.
5. Inconsistent roundabout coding

## 5.3 Overall Suitability of Model

Broadly the Porirua Transport Model is considered fit for purpose, particularly in relation to projects within the Porirua city centre area – the model is likely to be robust at predicting delays/operation of critical intersections and key corridors within this area.

Some consideration, and potential further checks against observed data, would be required for applications of the model to areas outside of the central city area, e.g. TG, the TG interchanges, and locations near to the meso / micro boundary,

Careful consideration is required when applying the model to assessments / projects / analysis in areas of the network, corridors, developments, intersections, etc. which are outside of the micro simulation area (i.e. in the meso simulation areas). This may include additional calibration / validation checks and care and caveating when reporting results from these locations.

# Appendix A Peer Review Tracking Issues

| # | Review Issue | Location Raised | Significance | Suggested Mitigation | Discussed Response / Update | Residual Risk |
|---|---|---|---|---|---|---|
| 1 | Use of Hybrid methodology and microsimulation area. | Inception Meeting | Moderate-to-Significant | Develop microsimulation-only model to avoid conflicts / discrepancies between micro & meso capacities which may results in issues such as differing assignment perception in different areas of the network. | Discussed that meso allows for 'coarser' / 'faster' model coding. Discussed extending microsimulation model area to cover anticipated future congestion areas. Agreed to extend to SH58, noting this leaves very peripheral area as meso. Results in large proportion of network being microsimulated, and boarder area close to interchanges / intersections - remains more straightforward to simulate entire model area<br><br>Review of DoMin model appears to show critical area of network in AM peak has congestion and route choice response spilling between meso / micro areas of the model. | Moderate |
| 2 | Transmission Gully (TG) data coverage and particularly lack of classified data along TG through Porirua and at Porirua interchanges. | Inception Meeting | Moderate | Obtain classified turning movement survey counts at TG interchanges. | Timeframes prevent surveys being carried out at TG Interchanges, 4 week turnaround estimated. | Moderate |
| 3 | Level of road network detail in model, needs to be commensurate with supporting data (traffic counts and information from higher tier WTSM model) and model purpose. | Inception Meeting | Minor-to-Moderate | Trim / remove unnecessary and unsupported level of network detail. | Agreed to trim unnecessary detail resulted from GIS import. Detail remains in some areas without supporting traffic count data, notably Titahi Bay. A number of unused side roads remain. | Minor-to-Moderate |
| 4 | Level of zone detail. Similar to above, zone splitting needs to be supported by data available - notably observed traffic counts at key locations | Inception Meeting | Minor-to-Moderate | Zone size, splitting, and connections to network need to be supported by traffic count data available. | Discussed one location where zone splitting may be required to load traffic onto arterials at appropriate locations. Modellers view was other locations (e.g. Titahi Bay) PTM zones matched with WTSM zones - this does not appear correct, zone splitting appears reasonably extensive. Final check required on number of zones splits.<br><br>Model development report details 152 WTSM zones disaggregated to 215 PTM zones. As noted, appears be a higher level of zone disaggregation supportable or necessary for model purpose. | Minor-to-Moderate |
| 5 | Turncount summed to create linkcounts and linkcounts used in Matrix Estimation (or any iterative calibration process) - the turncount data can not be described as an "independent validation dataset" | Inception Meeting / Model Development Report | Moderate | Modeller to determine which data to use in Matrix Estimation (ME) (or any iterative calibration process), noting reviewer does not have an issue with using larger dataset in ME and calibration process as long as ME is constrained and controlled. | Model development report describes use of Tuesday Linkcount (sum of Tcounts) in ME and Wednesday Tcounts for validation. Appears robust, but several areas of clarification required - what data is used in which comparisons in Mod Dev Rep & whether any final adjustment to OD matrices/model were made to improve Wed TCount comparison<br><br>Modeller has confirmed that final adjustments of OD matrices has been carried out to improve Wed TCount comparison, i.e. calibration.<br><br>Latest Model Development report provides table of data used in each comparison set and numbers of counts in comparison tidied | None |
| 6 | Matrix Estimation to all vehicles, and then demands subsequently split LV and HV. HVs and LVs will have different travel patterns and volumes to/from zones will differ due to land-use. Risk dependent on method use to split matrices. | Inception Meeting | Moderate-to-Significant | TBD - what is methodology for splitting HV and LV demands, noting that local travel patterns (residential vs. shopping centre) will result in differing LV and HV travel patterns (matrices) in study area. | Discussed in cal/val meeting 29 Aug, ME approach was to separately estimate LV and HV matrices to LV and HV counts. | None |
| 7 | Screenlines: Initially proposed screenlines didn't cover key area of Porirua CBD. | Inception Meeting | Moderate-to-Significant | Additional screenlines created from data available in CBD area | Three screenlines in Porirua CBD Area | None |
| 8 | Screenlines: At least one additional screenline recommended in eastern Porirua | Data Report / Model Development Report | Minor-to-Moderate | Create at least one additional east-west (north-south traffic movements) screenline in east Porirua, either north and/or south of Whitford Brown Ave / Waitangirua Link Road | Screenlines provide good coverage of core area of network, although some clarification required around directionality & mapping<br><br>Further minor clarity on screenlines has not been provided. | Minor-to-Moderate |
| 9 | Clarify 'manual' intersection traffic counts. | Data Report | Minor | Clarification | Clarified in Mod Dev Rep | None |
| 10 | Use of SCATS detections, not robust 'count' data. | Data Report | Minor | No issue with modeller using as internal 'checks', however enough robust count data available from other sources so should not be necessary to use in calibration reporting. | No mention of use of SCATS detection data in Mod Dev Report | None |
| 11 | There are alternative approaches for WTSM cordons. Should check whether peak & shoulder method has been validated in WTSM. | Demand Process Report | Moderate | Provide notes on alternatives and justification for selected approach. | No commentary provided | Moderate |
| 12 | Information missing, approach to developing vehicle type matrices | Demand Process Report | Minor-to-Moderate | Provide additional information. | As above, discussed 29 Aug and LV / HV matrices separately developed | None |
| 13 | OD demands expanded to 4-hours from profiles, vs. 4-hour OD demands developed from counts and then profiled | Demand Process Report | Moderate | General principle of dynamic time-slice modelling is to develop OD demands for time periods uncongested-uncongested, check against counts, and profile these OD demands | Discussed in Mod Dev Report that the 4-hour raw demands from WTSM have been checked. However, they remain low in some periods compared with observed and the low trend presents through outcomes to final cal/val results. Discussed emphasis on developing adjusted prior to account for CBD trips. XY scatter outcomes are *similar (appear identical in some cases)* in latest base model reporting (21-Sep-23), but underestimate does appear minor | Minor |
| 14 | Information missing, a number of details relating to the development of profiles. | Demand Process Report | Moderate-to-Significant | Profiling by vehicle type, number of profiles developed and list of these, how count data was selected, adjustment to profiles to account for travel time between source & count / congestion / vehicle loading | Some detail is included in Mod Dev Rep, but detail remains missing.<br><br>Report now clarifies that profiles have been developed with departures from area, two 'all to destination' profiles, and school profiles. This profiling does not include a strong representation of profiles based on destinations and travel patterns. As example, profiles do no separately profile travel from TG North->Porirua CBD and TG North->Wellington<br><br>This is likely to be important in the Porirua study area where TG and major regional land use results in different travel patterns within and through study area - large volumes of vehicles are anticipated on these movements.<br><br>Addition: DoMin shows that SH1 south of Porirua is critical area of AM peak model in forecast scenario. Highlights risk / issue with missing profiles for key movements.<br>In final stage, SH1 southbound profile was revised and model calibration/validation rechecked | Moderate |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | Consideration only. It may be beneficial for profiling to be more refined in key areas (e.g. town centre) and less refined in other areas (e.g. wider residential areas). | Demand Process Report | Minor | Additional profiling by land-use (e.g. retail) in town centre and aggregate profiling in residential areas (e.g. northeast / north residential) | Remains a consideration | Minor |
| 16 | Zone connections limited to just one loading point in a number of areas | Network review | Moderate | Zones covering an area should have several connections to load / unloading traffic. | Latest model still has examples of zones covering areas with one network connection, from spot check appears as though this is minority of zones | Minor |
| 17 | Dynamic feedback interval is set to 15-minutes using the past 2 intervals. This is considered too long and the assessment of delay for routing calculations should be carried out over a number of intervals, | Network review | Significant | The dynamic interval should be 2 or 3 minutes with 10 or more intervals used (covering at least the last 30minutes of simulation). | Dynamic interval has been reduced to 5mins (which gives fast 15-min runtime) and intervals are set to 6 (cover last 30mins of simulation). Interval could still be reduced to reflect routing opportunities in key areas of network such as town centre, however this is significant improvement from earlier version - providing greater dynamic routing response than earlier 15min interval | Moderate |
| 18 | The number of paths to use between ODs in the static assignment is set to 3 in the AM peak and 20 in the PM peak. | Network review | Significant | This should be consistent between periods and set around the middle of this range. | Some centroids in the model have more than 3 connections to the network, e.g. within the CBD area. With this parameter set to 3, at least 1 connector will not be used to travel in/out of these zones. More generally/broadly, this setting limits the routes out of zones to other zones (zones can cover, in some cases, moderate sized areas with multiple connections to the network) and constrains the model route choice. Recommend this parameter is set to 5-to-10. | Moderate |
| 19 | The % of vehicles following static paths is set to 70% for Light vehicles and 100% for heavy vehicles. This means only 30% of light vehicles can respond dynamically to congestion / delays and re-route and is considered too high. | Network review | Significant | An appropriate range is considered 40-60%, and it is desirable to use the lower end of this range so that the dynamic assignment is responsive to changes in delays. | Improved marginally from 70% to 60% in updated model, as per adjacent comment 60% is low end of this range and means dynamic assignment has limited response. | Minor-to-Moderate |
| 20 | There is some minor degree of inconsistency with roundabout coding. In particular, there are a number of roundabouts that are not following the Aimsun recommended coding approach for multi-lane roundabouts. Spot check examples include, Kenepuru Dr / Kenepuru Link Rd, Takapu Rd, SH1 Ramps, Paremata Roundabout (3x approaches coded consistently, southeast inconsistent), Paramata Cresc / SH58, SH58 roundabouts each side of TG. | Network review | Moderate | Roundabout coding should be consistent throughout the network, following Aimsun recommended coding techniques. This is important so that the approach to coding a new roundabout, in a test scenario, is established via the base model and for establishing industry consistency. | Response is to maintain inconsistent roundabout coding approach, noting that roundabout operation has been checked | Moderate |
| 21 | Model purpose is high-level, 'a range of projects'. | Model Development Report | Minor | List specific elements model would be used for, e.g. estimation of X, Y, and Z. | One specific project noted, but application of model and specific purpose remains unclear | Minor |
| 22 | PM peak hour appears incorrectly identified as 17:00 to 18:00. | Model Development Report | Minor | Check and clarify PM peak hour. | Corrected to 4pm to 5pm | None |
| 23 | Missing detail on approach to modelling intersections and assignment parameters | Model Development Report | Moderate | Provide details of methods for modelling intersections and details / supporting information on the assignment parameters | Model development report details approach to coding each form of intersection and key parameters | None |
| 24 | Tendency for demands to be lower than observed flows through model development process. | Model Development Report | Moderate | Noting that adjustments are being made to Prior to increase trip making and improve total screenline comparison, it does appear as if there is issue with 3hr WTSM or, particularly, the adjustment from 3hr->4hr WTSM. | Further information and updates indicate that although trend remains of lower demand, this is minor. | Minor |
| 25 | Present Tip Length Distributions as % rather than total trips | Model Development Report | Minor | Total matrix trips increase through process, makes comparison of trip distribution difficult with totals used. Present % in each trip length bin. | Checked through spreadsheet provided for Light vehicles.<br><br>Noted that there a significant changes to HV trip distribution which is a result of matrix estimation. This is noted by Modeller as 'WTSM missing short distance HV trips', this should be corrected in the *prior*, rather than allowing ME to make this level of change to the matrix. | Minor |
| 26 | Road type modelled speed limits appear to have been reduced below on-ground speed limits in nearly all cases | Model Development Report | Minor-to-Moderate | If observed on-ground free-flow speeds a consistent lower than posted on-road speed limits, global speed distribution by vehicle type should be adjusted. | Discussed cal / val meeting 29 Aug, only smaller number of roads have modelled speed reduced below posted speed.<br><br>Model Dev Report indicates that 7 of 15 road types have reduced modelled speed limits cf on-road posted speed limit, this remains higher than desirable | Minor |
| | Overall count calibration / validation outcomes and model fit-for-purpose consideration - reserved view pending further info | Model Development Report | | Key clarifications - dataset use, further adjustments made to improve count validation, response re: low demands, trip distr as %, specificity on model purpose, updates to assignment settings | Count comparisons demonstrate reasonable observed vs. modelled outcomes.<br><br>Moderate issues above (route choice settings, TG data, travel pattern representation) should be noted / recorded.<br><br>Broadly model is considered fit for purpose, particularly in relation to projects within the city centre area - predicting delays/operation of critical intersections and key corridors in this area | |

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| 27 | Future assumptions in regional model (WTSM). | Future Do Minimum report | Minor | Document the future DoMin key assumptions in regional model (WTSM). | Stated in updated Future Do Minimum Model Development report | None |
| 28 | Provide forecast 3hr to 4hr expansion factors | Future Do Minimum report | Minor-to-Moderate | Provide light & heavy 3 to 4 hour expansion factors used, and how these were calculated | Based on profiling, provided in report | None |
| 29 | Setting forecast Odds to zero if negative predicted | Future Do Minimum report | Moderate | Correct, alternative method is to substitute percentage reduction for ODs where calculation gives negative | Method is maintained, no justifcation provided for adoption of method - just observation that correcting makes minimal difference | Minor-to-Moderate |
| 30 | Halving of predicted growth southbound in AM peak on SH1 | Future Do Minimum report | Moderate-to-Significant | Provide further information on the performance / operation of the model and effects of increase congestion to support. | Improved southbound SH1 profiling provides a) improvement to modelled v observed travelled times, b) appropriate timing of peak delays southbound and c) lessons effects of SH1 delay / queue on Porirua area allowing for full growth to be achieved.<br><br>As result, growth capping removed. | None |
| 31 | Future predicted performance of SH1 merge, extent of congestion, and model routeing response | Future Do Minimum report | Moderate-to-Significant | Provide further information on the performance / operation of the model to determine whether predicted future model operation is plausible / reasonable. | As per notes above, significantly improved with adjustment to SH1 sbd profiles.<br><br>Initial response to sbd congestion raise and minor flag, and overlap between Micro / Meso model areas south of Porirua on SH1 remains a concern/risk | Minor |
| 32 | Percentage sector growth patterns, WTSM & PTM | Future Do Minimum report | Moderate | Provide sector-to-sector percentage growth pattern, light and heavy vehicles, by time period. WTSM and PTM. To verify growth patterns are reflected in PTM. | PTM sector patterns provided, but not direct comparison with WTSM cordon sector growth. Commentary provided on WTSM / Regional growth patterns | Minor |
| 33 | Network travel time peak timings (base vs. do min) | Future Do Minimum report | Minor | Clarify timing of peak delay, particularly in AM period. May relate to how network travel times are calculated - suggest this should be based off vehicle zone departure times. | As noted above, investigation into this issue revealed refinements/improvements to SH1 southbound profile. | None |
| 34 | Additional information on performance of Future Do Min | Future Do Minimum report | Moderate | Provide additional straightforward information on performance of future Do Min - model run times & how this influences number of runs selected, whether any runs are locking, missed turns, deleted vehicles, vehicles waiting to enter network | Information provided. Shows higher number of vehicles waiting to enter in IP period (Base and Future) than AM and PM periods. No comment provided on this. | None |