

## WELLINGTON PUBLIC TRANSPORT SPINE STUDY

### PEER REVIEW REPORT

#### 1. Introduction

This report provides a peer review of the Consolidated Report of the Wellington Public Transport Spine Study (PTSS) prepared by consultant AECOM for Greater Wellington Regional Council (GW) and its client partners NZ Transport Agency (NZTA) and Wellington City Council (WCC). This peer review report has been prepared by Ian Wallis, who is the independent peer reviewer to the client team.

This peer review is based primarily on the following documents prepared by the consultant and/or the PTSS project team:

- Consolidated Report (draft, 24 June 2013)
- Summary Report (undated)
- Option Evaluation Results-- Technical Note (including appendices, 16 June 2013)
- Short List Evaluation-- Modelling Report (April 2013)<sup>1</sup>.

It also takes account of knowledge gained and advice provided by Ian Wallis in his continuing peer review role throughout the study.

#### 2. Summary of Study Findings

The final (short-list evaluation) stage of the study focused on a comparative evaluation (relative to a 'base' or 'reference' case) of three options for providing improved public transport (PT) services from in the vicinity of the Wellington Railway Station through the CBD and onto the southern suburbs (principally Newtown) and the eastern suburbs (principally Kilbirnie). These options were titled:

- Bus priority
- Bus rapid transit (BRT)
- Light rail transit (LRT).

The following table provides a summary of the transport economic benefits and costs estimated for each option (all figures expressed in discounted terms over a 30-year evaluation period).<sup>2</sup> The main economic evaluation undertaken by the consultants was based on the procedures set out in the NZTA Economic Evaluation Manual (EEM) as at June 2013.<sup>3</sup> Alternative estimates of economic benefits were also prepared, at my suggestion, based on model (behavioural) parameter values in place of the EEM values. The resulting benefit:cost ratios on this basis are summarised in the bottom line of the table. Except where noted, the following comments relate to the main (EEM) economic evaluation.

For the two bus-based options, it is seen that there is a reasonable balance between the total costs and the total benefits, resulting in benefit:cost ratios in the order of 1.0 (range 0.57 to 1.55 for the two options, depending on the basis used for estimating PT user benefits). For the LRT option, the costs are an order of magnitude higher than the benefits, resulting in benefit:cost ratios of around 0.1 or lower (range 0.05 to 0.10). The LRT costs are dominated by the high capital costs for the required infrastructure: as well as the track infrastructure and vehicle costs, these include for a new Mt Victoria LRT-only tunnel<sup>4</sup>.

<sup>1</sup> The Modelling Report has not been reviewed in detail. However, I was involved in providing advice and commentary on modelling methodology as part of my continuing peer review role throughout the study.

<sup>2</sup> A wider summary of the relative features and performance of the three options is provided in the consultant's Summary Report.

<sup>3</sup> I note that the EEM itself has recently been reviewed: an updated version, effective from 1 July 2013, was released in October 2013

<sup>4</sup> The rationale for requiring an LRT-only tunnel, separate from the road tunnel (but not a separate BRT tunnel), is set out in the study document 'Light Rail Transit (LRT) and Road Tunnels FAQs'.

### 3. Peer Review Comments

As peer reviewer on behalf of the client partners, I have been involved throughout the study in reviewing and providing feedback on the various intermediate (and final) outputs of the consultant team and in advising the client and the consultants on appropriate methodology. I have been particularly involved in the following four important areas of the work: the process and rationale for the selection of the short-listed options; the methodology for assessing PT operating costs<sup>5</sup>; the formulation and application of the demand models used to assess travel demand in each option; and the development of an appropriate economic evaluation framework and its application in estimating transport user benefits. The following summarises my comments in each of these areas.

**(1). Selection of short-list options.** The methodology used to select the three short-list mode/route options involved a 'sieving' process, using an agreed set of criteria to reduce the number of candidate options from the long-list (88 options) through the medium-list to the short-list (3 options). I was involved in developing the process and criteria, and in reviewing the consultant's application of these. I am comfortable with the methodology and the options that were selected through its application.

**(2). PT operating cost methodology and application.** I provided advice, at both the medium-list and short-list stages, on an appropriate methodology for estimating PT operating costs across the three modes. The methodology adopted is based on a set of unit costs for each mode provided in the Australian equivalent of EEM<sup>6</sup>, for use in (pre-)feasibility studies such as this.

While PT operating costs in New Zealand are generally somewhat lower than the equivalent Australian costs, I consider that the approach adopted is satisfactory at this stage of the option development and assessment process, given that the differences between options in terms of operating costs (on a PV basis) are small relative to the differences in capital costs. More detailed work on developing an operations plan and associated operating costs will be appropriate at the next stage of project planning.

**(3). Demand model formulation and application.** The main model used in deriving the PTSS demand forecasts and providing inputs to the economic evaluation is GW's Wellington Public Transport Model (WPTM). This model was recently developed and calibrated (separately from the PTSS work), using a base PT demand matrix derived from public transport user surveys undertaken in 2011. It should represent a major improvement on any models used previously in Wellington for assessing projects such as PTSS. Consultants Arup were largely responsible for the model development, with peer review by John Bolland Consulting: both these organisations have good reputations in the field of public transport/multi-modal network modelling. Despite the newness of the WPTM model (the modelling undertaken for the study was its first substantial application), I would have a high degree of confidence in the appropriateness and assumptions of the WPTM model for its role in the study.

In terms of the specific application of the models in the study for assessing PT demand and user benefits, during the study I participated in a number of discussions with client and consultant staff on the models to be used for the study and their manner of application, and I provided advice on these aspects. In relation to the public transport modelling (using WPTM), while I was not in a position to check all model inputs in detail, I am satisfied that the key model input assumptions (eg unit values of travel time in different circumstances) were reasonable, and hence reasonable outputs would be expected.

<sup>5</sup> I have not examined the infrastructure capital costs in any detail.

<sup>6</sup> Australian Transport Council, 2006. National guidelines for transport system management in Australia: vol 4--urban transport.

**(4). Development and application of framework for estimating transport user benefits.** I played a substantial role in advising the client and consultant teams on the framework and methodology to be used for assessing transport user benefits, starting from the outputs from the demand modelling work. I subsequently reviewed and provided feedback on the consultant's application of this methodology to derive PT user benefits and other benefit components (as shown in the table). I note three aspects in which the benefit estimates may be contentious:

- The unit values of time used are arguably not consistent with the (then) EEM requirements.<sup>7</sup>
- No estimates have been included for the benefits of improved PT service reliability in the corridor (which would be likely to add significantly to the economic benefits estimated for all three options).
- No basis or justification is given for the estimates of 'wider economic benefits' that have been included.

Despite these concerns, and while not being able to endorse all the estimates in detail, I am comfortable that the economic evaluation results are sufficiently robust to draw the conclusion that, in transport economic terms, the value for money associated with the LRT option would be considerably poorer than that of either of the bus-based options. Further, the evaluation as a whole has not identified any other factors (not encompassed in the transport economic evaluation) that would be of such importance as to offset the economic disadvantage of the LRT option. My conclusion is therefore that no further work is warranted on the LRT option, and that further investigations should focus on bus-based options.

In regard to the bus-based options, in my view the work to date does not point to a clear conclusion as to the choice between the bus priority option and the BRT option. In any event, these options should be regarded as only representative of a spectrum of possible solutions to improve the quality of (bus-based) public transport through the Wellington CBD. I suggest that further work should explore solutions in this spectrum, giving particular attention to:

- Addressing service reliability problems and potential solutions, including more extensive bus lanes and signal priority measures.
- Speeding up bus boarding (principally) and alighting, particularly at peak periods, including through off-bus ticketing and improved bus entry/exit layout.
- The role of specific 'spine' services (involving high quality, high capacity vehicles and limited stop/semi-express operation) additional to the existing services, as a means of providing improvements in PT service quality through the CBD.
- Finalisation of proposals for a more integrated, effective and efficient PT route network serving the CBD, as appropriate incorporating and building on the proposals resulting from the Wellington City Bus Review.
- Development of a staged implementation plan.

**Ilan Wallis**

**18 November 2013**

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<sup>7</sup> Although I note that the unit values of time used for PT users are closer to the values specified in the October 2013 updated version of EEM than to the values in the earlier version of EEM (current at the time the work was undertaken).

<b>TABLE: SUMMARY OF OPTION BENEFITS AND COSTS (AECOM)</b>			
<b>Item</b>	<b>Costs and Benefits in \$M (present values)<sup>(1)</sup></b>		
	<b>Bus priority</b>	<b>BRT</b>	<b>LRT</b>
<b>Costs</b>			
Capital costs (infrastructure and vehicles)	48.4	164.7	665.9
PT operating costs (2)	-2.9	-46.5	5.4
Car parking (savings)	-10.2	-22.7	-8.4
Total costs (PV)	35.3	95.5	662.9
<b>Benefits<sup>(2)</sup></b>			
PT user benefits	34.7	95.5	56.0
Road traffic benefits	-18.2	-23.6	-31.6
Subtotal transport benefits	16.5	71.9	24.4
Wider economic benefits	4.1	18.0	6.1
Total benefits (PV)	20.6	89.9	30.5
<b>Benefit: Cost ratio</b>			
EEM	0.58	0.94	0.05
Behavioural (3)	0.68	1.67	0.10

**Notes:**

- (1) 2012 prices, 30 year evaluation period, 8% discount rate, discount base year 2012/13.
- (2) The figures given in this table for PT operating costs and results dependent on these (ie Total costs, Benefit: Cost ratios) differ slightly from those shown in the published consultant reports, as a result of a small error in the PT operating cost calculations identified at a late stage. The differences are such as not to materially influence the choice between options.
- (3) Except in this row of the table, benefit estimates were intended to be consistent with the NZTA Economic Evaluation Manual (EEM), as at June 2013. The behavioural figures in this row represent the 'behavioural' benefit estimates, consistent with GW model assumptions.