

Columbia River Crossing

Review of Traffic & Revenue Reports and Related Material

Summary Report

RBCONSULT Ltd, London

4 July, 2011

This Final Note marks the conclusion of my initial review of the traffic and revenue forecasts prepared for the Columbia River Crossing (CRC). It builds on material already submitted to the Oregon State Treasury and summarises the key findings to date¹.

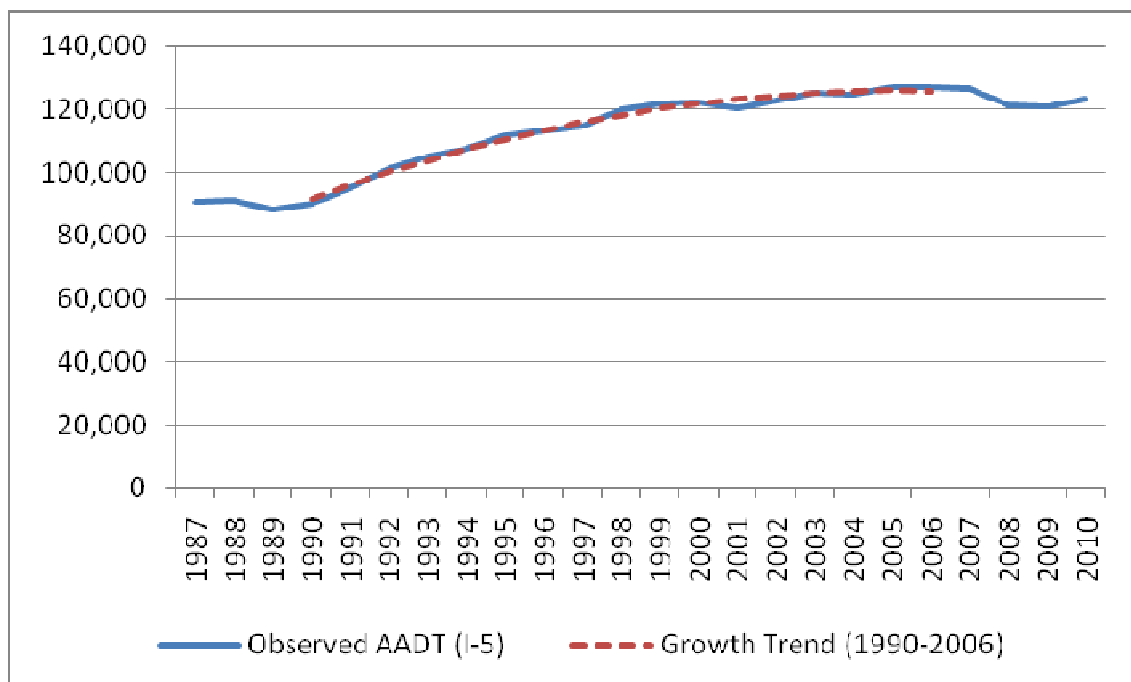
Summary

- Forecasting demand for the new, tolled CRC is not a trivial undertaking. It is not simply a matter of independently sourcing the socio-demographic input variables, cranking the handle and blindly trusting the model outputs (future-year traffic volumes). The study area – almost exclusively urban in nature – is characterised by a dense, already-congested road network with constrained capacity (two congested bridges) between key centres of attraction: Vancouver to the north and Portland to the south. There is the danger that the mathematical model responds to further (future) traffic growth by loading unrealistic volumes onto any new capacity introduced into the network, such as a significantly-widened CRC; despite the imposition of tolls. In this context, and with limited visibility of long-term economic trends and fuel price movements, it is important to remember that future driver behaviour may adapt and evolve in ways that deviate from the model's simplified predictions.
- Under these circumstances, traffic models need to be constructed intelligently with evidence-based assumptions. The outputs too should be compared with benchmarks to ensure their credibility. The technical documentation reviewed to date has been light in terms of evidence and benchmarks – a situation that should be resolved if financing is going to be secured later on attractive terms.
- The traffic and revenue (T&R) reports fall short when compared with typical 'investment grade' traffic studies. As they stand they are not suitable for an audience focussed on detailed financial or credit analysis. Comments were made earlier that might usefully guide the future work required to support the financing of the CRC project as it moves forward. It is acknowledged, however, that the reports to date have been prepared primarily to feed-into an Environmental Impact Statement process. Others will be better placed to comment on their suitability in that particular context.

¹ For a full list of the technical modelling and forecasting documentation reviewed, see my Interim Report (30 May 2011).

Final Note

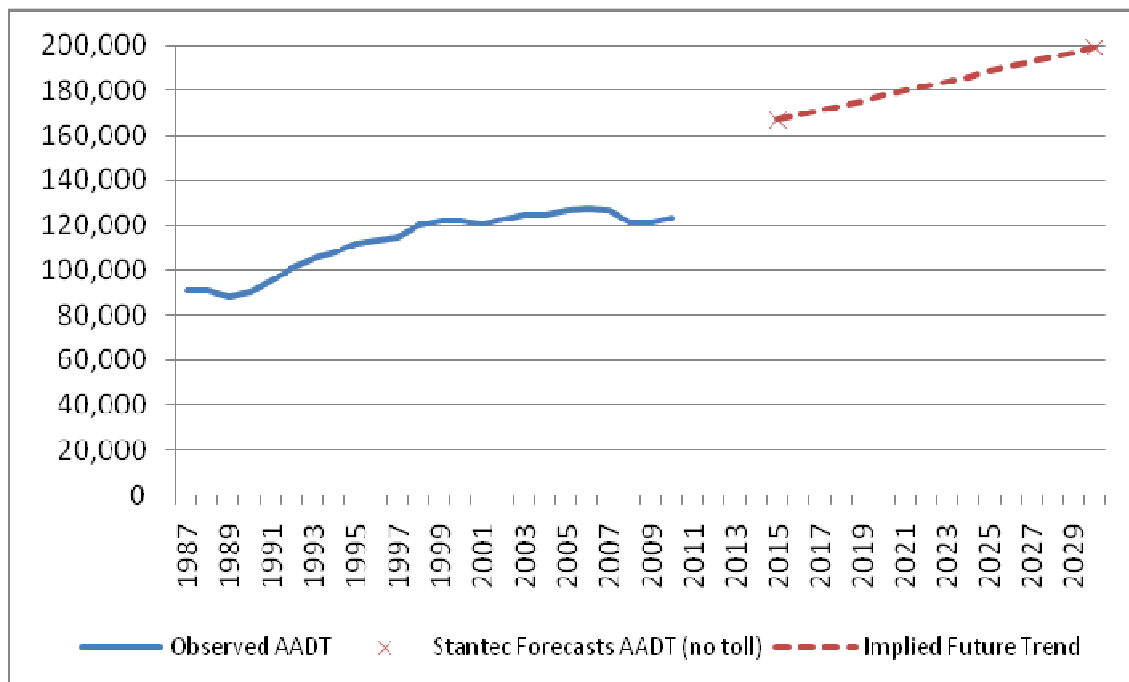
- The traffic modelling activities described in the reports are confusing and much of the work now appears to be dated. Although a number of the technical approaches described appear to be reasonable, many of the modelling-related activities seem to 'look backwards'; justifying model inputs and outputs produced some years ago. There is a clear need for a new, updated, forward-looking, comprehensive, 'investment grade' traffic and revenue study.
- No mention is made in the reports of historical traffic patterns in the area or volumes using the bridges. This is a strange omission. Traffic forecasts need to be placed in the context of what has happened in the past. If there is a disconnect (between the past and the future) – as appears to be the case here – a commentary should be provided which takes the reader from the past, through any transition period, to the future. No such commentary is provided in the material reviewed to date.
- Traffic volumes using the I-5 Bridge have flattened-off over the last 15-20 years; well before the current recessionary period. This is highlighted by the red dotted trend line in the chart below which was estimated up to and including the year 2006 (ie. it omits the recent 2007 – 2010 period characterised by fuel price hikes and economic recession). The clear inference is that the flattening-off is a long-term traffic trend; not simply a manifestation of recent circumstances. The CAGR for the period 1999 – 2006 reduces to 0.6%.



AADT = Average Annual Daily Traffic

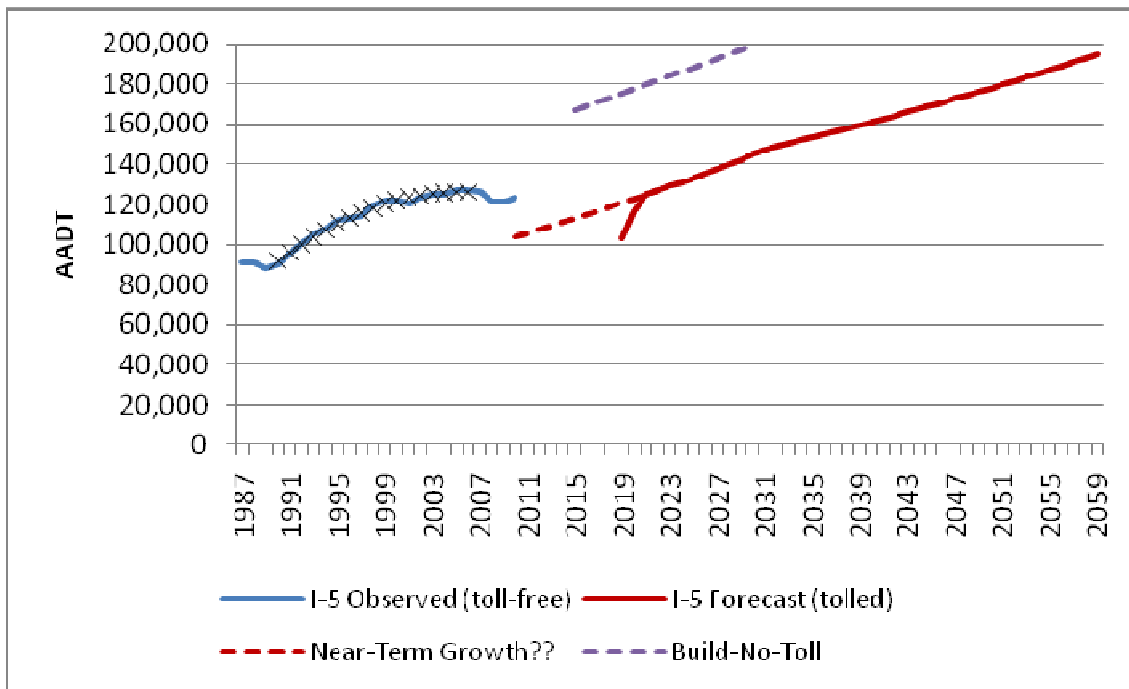
- The key question is this. Is the flattening-off on I-5 symptomatic of the demand for travel across the River moderating (a general trend that could continue into the future); or is it simply that the Bridge is operating for much of the day at or near capacity (in which case capacity enhancements could result in an uplift of future demand)? As the T&R reports omit any discussion of historical trends, this key question is left unanswered. This issue should be addressed going forward.

- The following chart shows the CRC forecasts for the build-no-toll scenario (for Years 2015 and 2030) together with the observed (historical) AADTs from the existing I-5 bridge pair. These forecasts suggest that:
 - The long-term future demand for the crossing would follow a trend (gradient) not unlike that experienced during the highest periods of historical growth.
 - Between today and opening of a new (toll-free) crossing – presumably upon opening of the new facility – traffic would ‘jump’ by 35%.

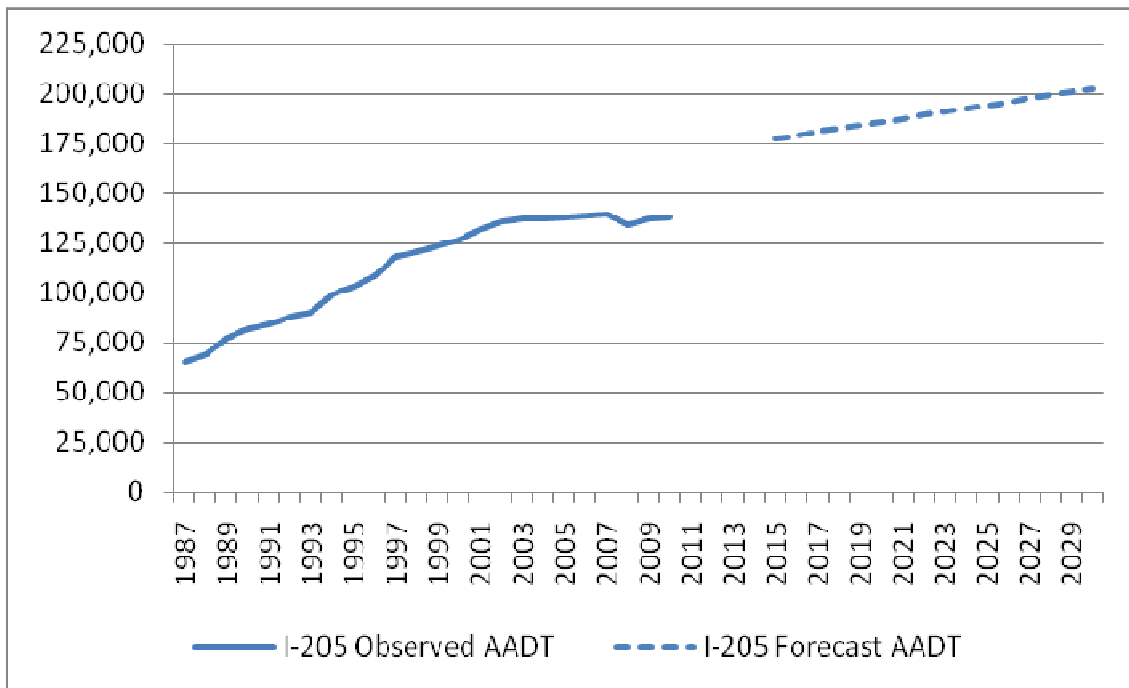


Given the comments made earlier about flattening growth, these appear to be big assumptions and, under normal circumstances, would require very strong, evidence-based arguments to support such a ‘story’. The CRC T&R reports, however, only present the numbers (not the story).

- There is evidence to suggest that near-term traffic growth – from today to project opening – has been estimated on the basis of interpolation between modelled results from 2005 and 2015. However, straight-line interpolation from a model calibrated back in 2005 would fail to capture recent traffic trends. The forecasts do not appear to have been revisited/revised in the light of recent trends. This is another issue that will have to be resolved in any future report.
- The next chart shows the CRC traffic projections (I-5 Forecasts) themselves. The dotted red line extrapolates back from 2019 (the first year for which forecasts are provided) to get some idea of the growth trajectory assumed for the intervening years (2010 – 2019).



- The chart above highlights two issues:
 - The vertical separation between the blue and red lines represents 16%. Effectively this says that the imposition of tolling (in accordance with the DEIS tariff schedule) would reduce traffic demand by around 16%.
 - The vertical separation between the dotted lines lies between 30% and 40%. This says that traffic demand would be 30% - 40% higher in a build-no-toll scenario than in the tolled (DEIS) scenario.
- This begs two critical questions:
 - Do we buy-into the story that says that tolling on the new crossing will suppress demand by only 16%?
 - Bear in mind that a peak toll of \$2 for commuters means a weekly expenditure of \$20 (\$2 * 2 crossings/day * 5 days/week).
 - Do we buy-into the story that says that subsequent demand on the new (tolled) crossing will grow at rates commensurate with the highest rates of growth observed on the (toll-free) Bridge over the past 25 years?
- A further worrying issue concerns the forecasted implications for traffic diversion to the (toll-free) I-205 crossing (see chart below).



- The implications for traffic growth on I-205 are significant. In the central case scenario (Scenario 1A), demand on I-205 jumps by 28% on opening of the new CRC. That's an additional 40,000 vehicles/day. And, from today to 2030, demand on I-205 will have increased by 47% (65,000 vehicles/day). Comments about capacity on the I-205 Bridge were made in earlier reports and these concerns remain. Can the I-205 Bridge really accommodate this projected level of diversion? If not, this suggests some weaknesses in the underlying traffic modelling that should be examined.
- In the absence of very strong arguments backed by empirical evidence, at this stage in the analysis the CRC traffic and revenue forecasts simply look too high.

High-Level Spreadsheet Model

- Earlier this month, a spreadsheet model was passed to the State Treasury. This spreadsheet represents a high-level summary of the traffic model and resulting toll revenue forecasts. It was designed to enable users to change some of the key input assumptions incorporated in the original traffic model to assess their likely revenue impact. The model has subsequently been extended to incorporate additional functionality and associated graphic outputs.
- The model's input screen is shown on the following page. It allows for the impact of assumptions other than those employed in the CRC traffic model to be tested in terms of resulting traffic demand and toll revenues. Yellow boxes represent inputs. Key outputs are highlighted in red.

CRC: Model the Model

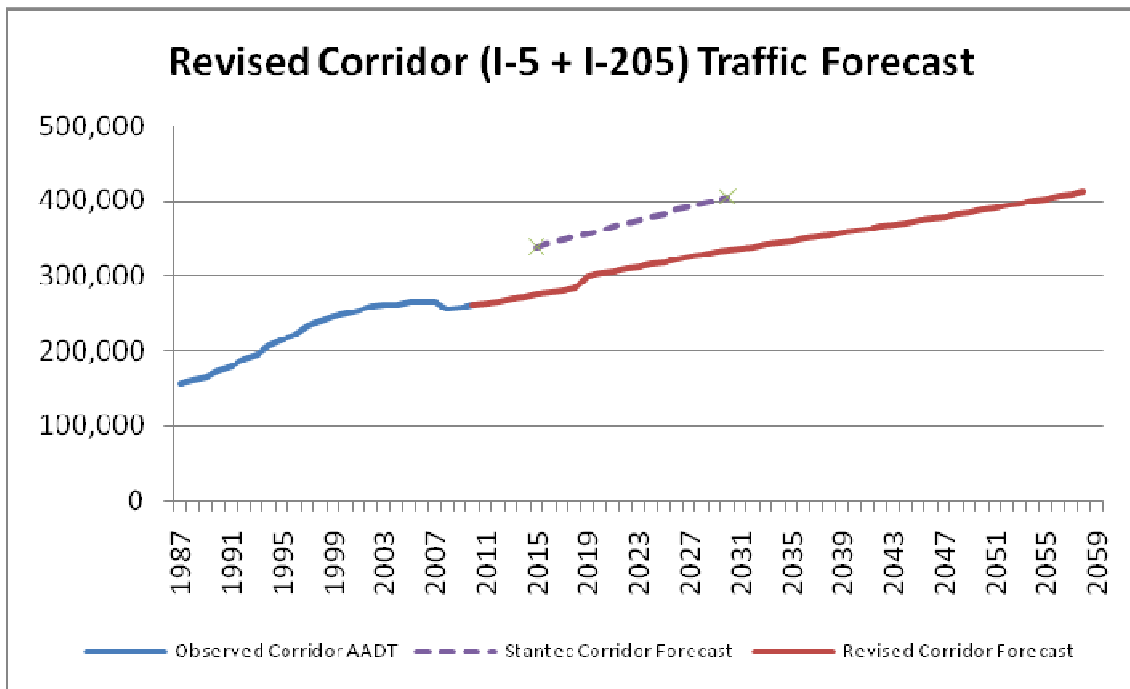
Assumptions

Transitional Period (2010-2019) Growth	1.00%	pa								
Induced Growth (on New CRC opening)	5.0%									
<i>River Crossings Growth</i>										
Near-Term Growth (2019 - 2030)	1.00%	pa								
Medium-Term Growth (2030 - 2040)	0.75%	pa								
Long-Term Growth (2040 - 2059)	0.75%	pa								
Ramp-Up Assumptions:	<table border="1"> <thead> <tr> <th><u>Year 1</u></th> <th><u>Year 2</u></th> <th><u>Year 3</u></th> <th><u>Year 4</u></th> </tr> </thead> <tbody> <tr> <td>90%</td> <td>100%</td> <td>100%</td> <td>100%</td> </tr> </tbody> </table>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	90%	100%	100%	100%	
<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>							
90%	100%	100%	100%							
% Haircut on Truck Usage:	-10%	** enter as '-'								
New CRC 'Capture' (of corridor total)	40.0%									
Required Revenue Haircut =	-25%									

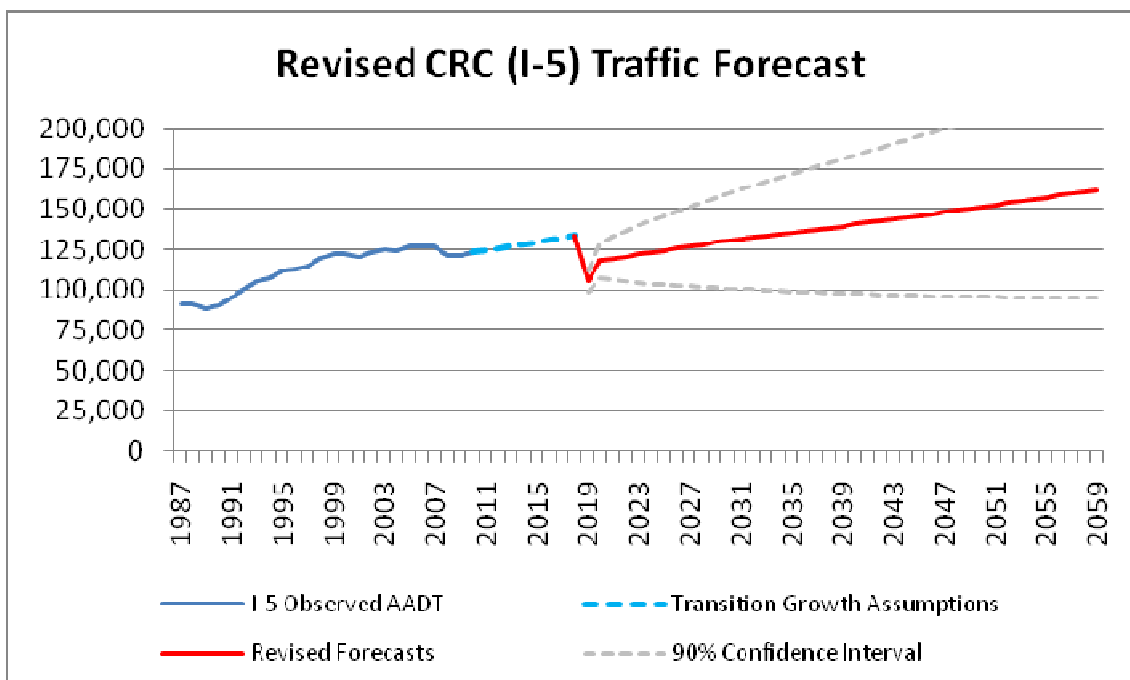
	<u>First 20 Yrs (2019-39)</u>	<u>Last 20 Yrs (2040-59)</u>
Percentage of Revenue	35%	65%

Revised Corridor AADT Forecast is:	17%	Lower than the Stantec Corridor Forecast
------------------------------------	------------	--

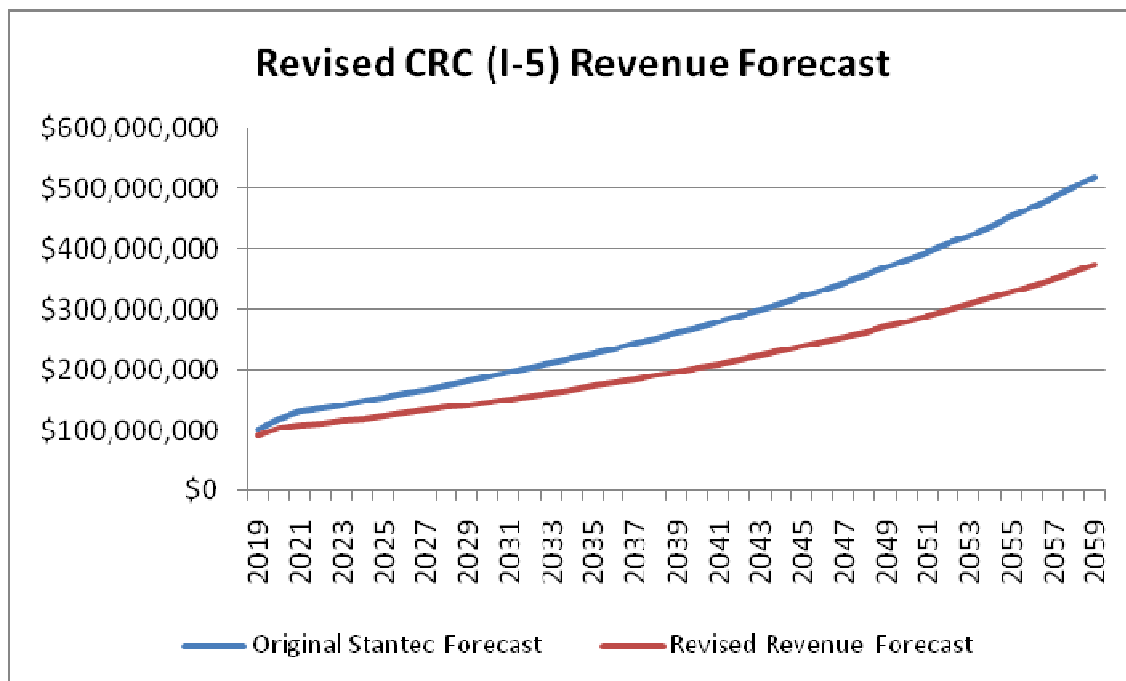
- Output graphics from the spreadsheet model are shown on the following pages. The first chart shows the revised 'corridor' traffic forecasts (ie. traffic crossing both bridges) that results from adopting the assumptions shown above, and compares it to the original forecasts.



- The next chart shows the resulting revised I-5 (CRC) traffic forecasts and the associated (empirically-derived) confidence intervals.



- The final chart shows the revised CRC toll revenues and compares them to the original forecasts.



Key take-aways from the high-level spreadsheet model include the following:

- Any revisions to the CRC traffic and revenue forecasts, adopting assumptions arguably more in-line with recent trends, are likely to be significant. Initial runs of the model suggest first-cut revenue haircuts of around 25%. Any proposals supporting modest (token) revenue adjustments should therefore be treated sceptically.
- As currently formulated, the spreadsheet model may still be over-estimating CRC demand. Modal shift to transit, for example, is not incorporated in the model. Of more significance, however, is the fact that no attempt has been made to adjust future demand in response to year-on-year tariff escalation. It remains to be seen if such frequent adjustments to the toll schedule are publicly/politically acceptable – and the extent to which demand may be impacted by these tariff hikes.
- The confidence intervals associated with the outputs from the original traffic model are large (however this is in-line with the outputs from all traffic models and simply represents the uncertainty associated with the future).
- The main contributors to future toll revenue uncertainty appear to be (a) initial ‘market capture’ on CRC opening, and (b) near-term growth assumptions following CRC opening. Future research should focus attention here. In contrast, issues surrounding – for example – future truck usage, induced growth and long-term growth appear to be less critical concerns.

End.