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Christchurch City Council

From: Julie Ballantyne
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Project/File: 310206133
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Reference: Ryans Rd Development - Review of Modelling Approach

You've asked us to review the Ryans Road development assessment and comment on the appropriateness of the modelling approach. You noted this is not a peer review, and in addition, we are not providing commentary on the results or impacts.

The modelling is reported in Appendix 5 of the Integrated Transport Assessment by Novo Group, dated March 2025. Appendix 5 contains a report by QTP also dated March 2025. To be cost effective, we have only reviewed Appendix 5, which contains the details of the modelling.

The approach is to apply the CAST SATURN model, followed by SIDRA modelling of specific intersections.

CAST Modelling

In terms of the CAST modelling:

- V23 of the CAST model has been used, which we believe is the latest. This has a base year of 2018. V23 is specified as only having a minor update compared to v21.
- Local area comparisons of modelled vs observed were carried out for 2018, considering turning movements at the main intersections around the development. Checking modelled flows against observed is good practice.
- As a result of the local area checks, a new project model was created with a 2024 base year. Again, this is a good approach.
- While the performance of the new 2024 base model is checked in detail against localised traffic counts, the comparison to travel times and delays is less robust. The comparison is based on spot observation of queues, and Google and TomTom travel times, although no comparison of modelled vs observed for 2024 travel times is provided. This is primarily a peer review issue but does influence our review of the approach.
- There is a potential issue related to underestimating the future growth, and this is explained separately below. We note that at Pound/Ryans, the 2038 traffic flows without development (Table 5.4) are about the same as 2024, which seems unlikely. This is reinforced in paragraph 5.12 of the QTP report, which notes high recent observed growth on Pound Rd, a lack of capacity on SH1, and currently anticipated background growth in the south-west.

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Potential Underestimate of Future Year Flows

We are aware that forecasts from CAST have shown extremely low and unrealistic growth, and in some cases, flow reductions. This is based on analysis for other studies where Stantec compared 2021 CAST modelled flows, which are a forecast, to different future years. This comparison was undertaken for various areas around Christchurch City and Waimakariri. To understand why future year flows were lower than the 2021 forecast, a check of land use input to the equivalent CTM was undertaken. This revealed locations with more households in 2021 than future years. It seemed that 2021 was “out of step”, and there is no clear reason for this given that we understand the base years of the v18, v21 and v23 versions of CAST are all 2018.

While it is not clear from the QTP reporting, it is possible that this issue of insufficient future year growth has occurred in the Ryans Rd assessment. The reason we believe this may have occurred is the QTP reporting does not discuss any across-the-board adjustment of the future year demands. Although it is specified that the trip generation for Dakota Park, Waterloo Park, and IH-zoned land south of Main South Rd has been increased.

The issue of less certainty on the future year forecasts is referred to in paragraph 3.4.12 of the QTP report, which states that 2028 is a “fairly-dated forecast scenario” – and we note that this will also apply to 2038. This is further reinforced in paragraph 3.7.3 which states that 2038 forecasts are still essentially based on a business growth model produced by CCC circa 2017. This paragraph is referring to low generation rates for sites adjacent to the development, but it is likely this is relevant to a much wider area. While the QTP report notes that the forecasts are dated, it does not explain why the CAST 2021 forecasts, and land use in CTM, are higher than future years.

The potential issue that the future year traffic flows in CAST are underestimated is a fundamental concern. This does not mean that the approach of using CAST and SIDRA is inappropriate – it is appropriate to use a SATURN model and SIDRA. But if extremely low, or negative, future year growth has not been adjusted in the modelling, then that would be a significant weakness/ flaw in the analysis.

SIDRA Modelling

SIDRA modelling has been undertaken for key intersections surrounding the development. This is considered appropriate if the model has been calibrated, and assuming queues in the CAST model are not extending from one intersection and blocking the next – we cannot ascertain if there is any “blocking back” from the reporting.

The SIDRA models have not been calibrated and default parameters used. This is stated in paragraph 5.7.12 of the QTP reporting. The report continues to state that the effects of additional traffic, general growth and development, could potentially be higher than shown (see paragraph 5.7.13). The uncalibrated SIDRA models therefore do not match observed, nor CAST estimates of delay. The uncalibrated SIDRA results are therefore unreliable and should not be used.

In our initial briefing, you commented on delays in Table 5.4 for Pound/Ryans SIDRA modelling. In particular, the 2024 AM peak where the right turns out of Ryans Rd East and Ryans Rd West have similar volumes and opposing flows, but the delay for the turn from Ryans Rd East is much higher (129 secs vs 48 secs). Our traffic engineers have reviewed this, and we believe the difference in delay is likely due to the heavy vehicle proportions. Page B29 (page 154 of the PDF) shows very high

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proportions of heavy vehicles for Ryans Rd East, with zero heavies for Ryans Rd West. This will mean the East approach requires larger gaps in the traffic flow, producing larger delays.

The observed delays on the Pound Rd south approach at the intersection with Yaldhurst are not replicated in the SIDRA modelling (see Table 5.5) because default gap acceptance parameters have been used. This brings the SIDRA analysis into question.

Specific Comments

We provide some observations that fall into the out-of-scope “peer review” category. This is not a comprehensive list, but points that stood out during our review.

- Paragraph 3.4.12 of the QTP report states that traffic growth in the area between 2021 and 2024 has likely been higher than anticipated by the CAST generic models produced in 2021. We note that the observed traffic count at Pound/Yaldhurst appears to be from 2021 (see Fig 3.3), which may mean this location is underestimated in the 2024 project model.
- Figures 3.12 and 3.13 show the change in traffic from 2024 to 2038 (without development) for the AM and PM peak hours respectively. The AM peak has very low growth on Pound Rd; in fact, southbound flows north of Ryans Rd seems to be less in 2038 than 2024, which seems extremely unlikely given growth around the Airport precinct and high levels of current congestion on Russley Rd.
- It is concluded that there are no significant capacity issues at the three priority controlled site access points (one on Grays Rd and two on Ryans Rd). We note this is based on simplistic proportion of the development to three model zones based on hectares. This is appropriate given the current lack of detail, but further review of the performance of the access roads would be merited as the development plans progress.
- Mitigation measures are included which are to be funded by the RCAs. The justification is the network issues are from general traffic growth and not just the development (it is acknowledged the development adds traffic). The mitigation measures include a new roundabout at Pound/Ryans, minor marking improvements to the roundabout at Pound/Yaldhurst, and a new road and signalised intersection plus marking changes and banned turns at Yaldhurst/Russley. Considering the mitigation measures, we note:
 - Without mitigation measures, the left turn from Ryans Rd to Russley Rd is LOS E in the PM peak.
 - Pound Rd at Ryans Rd performs well with and without the development, so the justification that CCC needs to build a roundabout seems a stretch. Ryans Rd East and West approaches do perform poorly with the stop-controlled intersection for the through and right turns, but the turns with the high delay are only a couple of vehicles in both the with and without development scenarios. The justification provided relates to an increased crash risk.
 - The right turns are banned from Yaldhurst Rd at the intersection with Russley/Masham. While the movement from Yaldhurst East approach to Russley North is accommodated via a new link road and signalised intersection, it is unclear where the turn from Yaldhurst West approach to Masham is accommodated. These flows are small in magnitude, and Figure 5.2 indicates residential access is accommodated by a U-turn at Steadman Rd.

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Summary

The adopted approach for the Ryans Rd development assessment was to apply the CAST SATURN model followed by SIDRA modelling of key intersections. This approach is generally sound, although the lack of comparison of 2024 modelled travel times vs observed is weak. We do believe there are two fundamental weaknesses.

Firstly, it is possible, although we cannot be certain based on the reporting, that the future year growth is underestimated. This is associated with the land use forecasts and the 2021 base somehow being out-of-step. If the forecast growth is extremely low, this should be identified by the modellers and an adjustment included to ensure reasonable and representative growth is incorporated.

Secondly, the SIDRA models are uncalibrated and use default parameters. The results therefore do not replicate observed and are meaningless.

I'm happy to discuss any aspect of our review with you. I note I'm travelling to Adelaide for the AITPM conference on 2 September. I am available from now to 1 September, in the morning of 4 or 5 September, or from 17 September onwards.

Regards,

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