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# Memorandum

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| **To:** | Mike Calvert |
| **From:** | Paul Roberts |
| **Subject:** | North-East Papanui Outline Development Plan Transport Assessment |
| **Date:** | Tuesday 18th January 2017 |
| **Copy:** | |

Dear Mike,

Following on from our memorandum dated 8th December 2016, you have requested that QTP provide further assistance with the transport assessment you are preparing for the Outline Development Plan (**ODP**) for North-East Papanui, in respect of modelling the traffic impacts of an additional ODP road network option to that outlined in our earlier memo.

## 1 Further Option Modelled

1.1 The further option reported here (showing the principal road network only) is shown, overlaid upon the option used as the basis for our original assessment, in Figure 1-1.

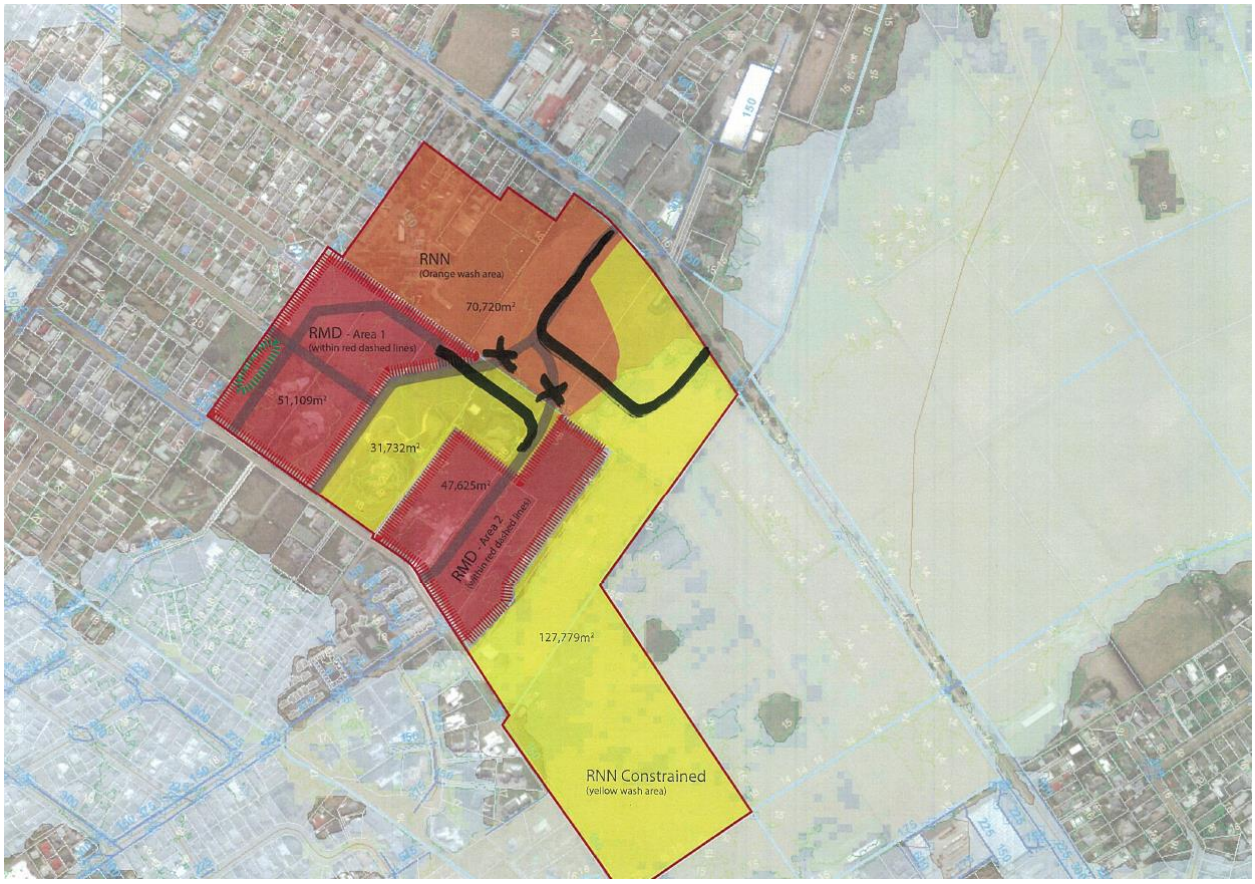


**Figure 1-1: Draft North-East Papanui Outline Development Plan landuse.**

1.2 Essentially therefore, this additional option would provide for no (vehicle) route connections through the ODP area between Cranford and Grassmere Streets, as a potential means of mitigating the traffic impacts of extraneous (or rather additional traffic, from any location) on Grassmere Street and its connecting residential streets to the south-east of the ODP area.

1.3 Although not shown on the above schematic, we would anticipate however that such an option would provide for cycle and pedestrian connectivity to maximise accessibility for these modes both to, from and through the entire ODP and wider neighbourhood.

## 2 Methodology

2.1 Consistent with the previous assessment, the additional option has been assessed using the v16a version of Council's Christchurch Assignment and Simulation Traffic (**CAST**) model. Likewise, our assessment has been conducted for the weekday morning and evening peak hours[1], and for both 2021, representing a potential 'short-term' prior to completion of the Christchurch Northern Connections (**CNC**). and for a 'medium-term' (2031 – with CNC) horizons.

2.2 For the sake of clarification, we also note that the modelling of the additional option is consistent with those previously-reported, insofar as it reflects CCC's current plan to retain the existing right turn movement out of Grassmere Street at Main North Road, despite the relative proximity to the new pedestrian and cycle crossing to be implemented as part of the Papanui Parallel Major cycle route (**MCR**). Given that the additional option may load up the right turn movement, safety issues may arise that would need to be addressed e.g. ban the right turns again. Therefore you have sought particular comment on this aspect in this summary reporting.

2.3 For the sake of expediency, we have however restricted the 2031 medium-term assessment of the additional option, to reflect only a scenario whereby the wider network reflects the CNC schemes presented in the Outline Plans submitted by the requiring Authorities (NZ Transport Agency and CCC) - rather than also assessing the impacts against both these schemes *and* those presented within the Notices of Requirement (these reflecting the approved Designations). The wider network impacts of the additional 'No Through-Route ODP Option' have thus been compared here to the equivalent scenario for the 'Through-Route ODP Option' described in our December 2016 memo.

[1] 07:30-08:30 and 16:30-17:30 respectively.

## 3 Modelled Effects of Additional ODP Network Option ('No Through-Route')

3.1 As with the previous assessment only selected model outputs have been chosen to illustrate here the results of the further assessment, with a summary section being provided at the end of this Memo.

### 3.2 Prior to Completion of CNC Projects

3.2.1 The following diagram illustrates the forecast daily traffic volumes resulting from this scenario (2021, *without* completion of the CNC projects).

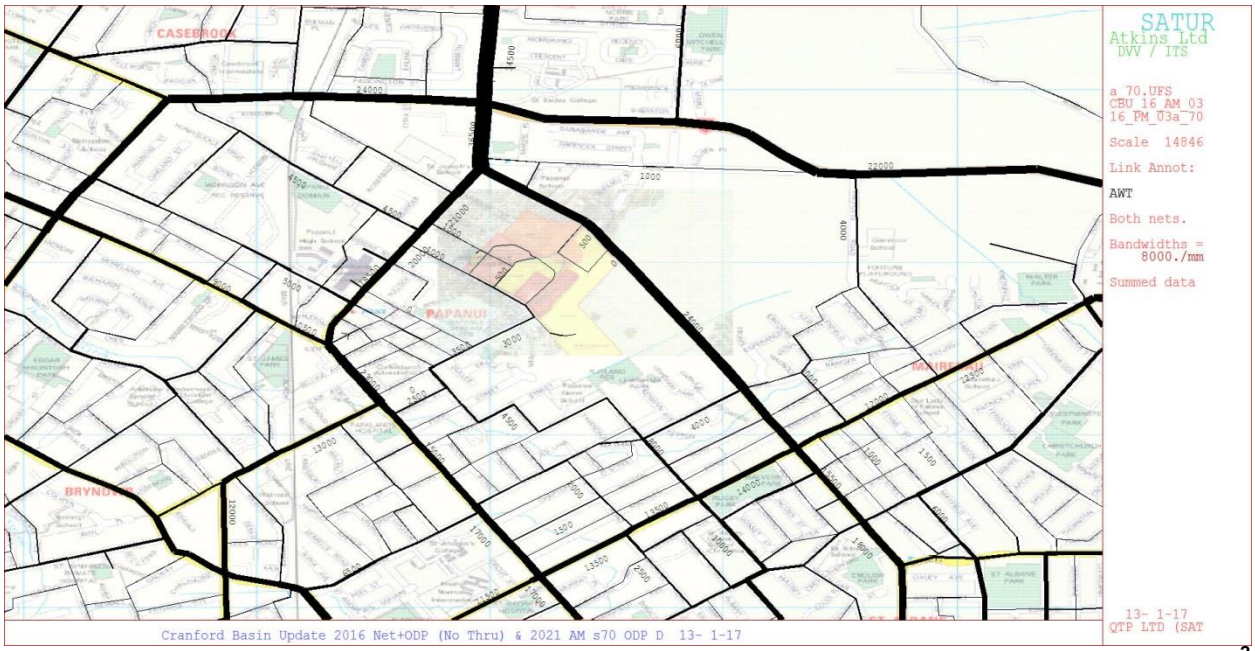


**Figure 3-1: Daily Traffic Volumes forecast with No Through-Route Option, 2021 (No CNC)[2]**

3.2.2 It may be seen that on Grants Rd is still forecast to carry around 3,500vpd under this scenario, up from around 1,600vpd (without the ODP), but lower than the approx. 4,400vpd forecast with the draft ODP (Through-Route) network, prior to completion of the CNC projects.

[2] Figures are shown rounded to the nearest 500vpd. As a matter of further relative detail, with respect to the link volumes shown *within* the ODP, please note that in practice these are likely to be somewhat higher than shown: In SATURN (the software platform used by CAST), it is standard practice that traffic in the simulation area 'loads' to / from zones directly to/from the model links, but via the nodes at either end of a link. Link traffic volumes do not, therefore, include zonal demands loading to the link, i.e. traffic leaving the link (at node A) or entering the link (at node B). This reflects that fact that in practice, traffic generally enters and leaves links at numerous locations, for example at driveways or to use on-street parking. The consequence of this is that where such zone loading occurs in the model (as within the ODP), illustrated link volumes are generally somewhat lower than actual volumes. This is not usually a significant issue because:

- ALL trips to / from zones are modelled at the nodes (usually representing intersections) at either end of the link. The modelling of intersections is the important aspect of accurately simulating the operation of urban networks.

- Zonal demands should typically be such that they are relatively small compared to the through-traffic using any particular link. (Where large traffic generation exists at specific locations (for example, at car parks) the precise location of zone loading can be modelled using 'spigot' nodes and links.

3.2.3 The differences between the draft ODP (Through-Route) network option and the No-Through Route option are perhaps illustrated more clearly in the diagram below:


**Figure 3-2: Changes in Daily Traffic Volumes, between No Through-Route and Through-Route Options (Draft ODP Scenario, 2021, No CNC)** [3]

3.2.4 Figure 3-2 shows that the forecast traffic volume increases on Grants Rd would be reduced by around 1-1,300vpd, compared to the ODP Through-Route Option, or about 25-30%. There are however relative *increases* forecast on Main North Road, Shearer Ave and some residential streets to the South-east of the ODP area. This arises because the lack of a through-route hinders the ability for both local (ODP and surrounding residential neighbourhoods) and traffic further afield to use a through vehicle route to access either Cranford or Grassmere Streets and Grants Rd (depending on their origin and/or destination).

3.2.5 This is also apparent when the changes in delays (between No Through-Route and Through-Route Options are considered, as shown below (PM only for illustration). The reduced permeability of the No Through Route Option, for both local and non-local traffic results in increased use of Main North Rd in particular, and this has a disproportionate (adverse) effect on delays for traffic exiting Grassmere St and Shearer Ave.

[3] Note that in this diagram the green bars represent a reduction (decrease) in traffic and red bars represents an increase (despite the red being annotated as negative). The changes should therefore be interpreted as absolute values, based on the colour.


**Figure 3-3: Net Change in Link Delays from Draft ODP Concept Plan (Through Route) to No Through-Route Option (2021 PM Peak Hour, No CNC)**

3.2.6 We noted previously that it was somewhat subjective whether the forecast impacts (in terms of forecast changes in volumes on the local road network surrounding the ODP area) should be considered minor, or more than minor, with our recommendation being **not** to allow for zoning that could exacerbate existing efficiency and associated safety issues on the road network at 2021, without either mitigating these effects or undertaking more detailed analysis to confirm our initial findings. This opinion would be stronger should a 'No Through-Route Option' be adopted for the ODP, as particularly prior to completion of the CNC projects, the forecast delays at both Grassmere St and Shearer Ave *are* likely to give rise to adverse safety issues, given full development of the ODP.

### 3.3 With Completion of CNC Projects

3.3.1 The following diagram illustrates the forecast daily traffic volumes resulting from this scenario (2031, *with* completion of the CNC projects per the Outline Plan Schemes).

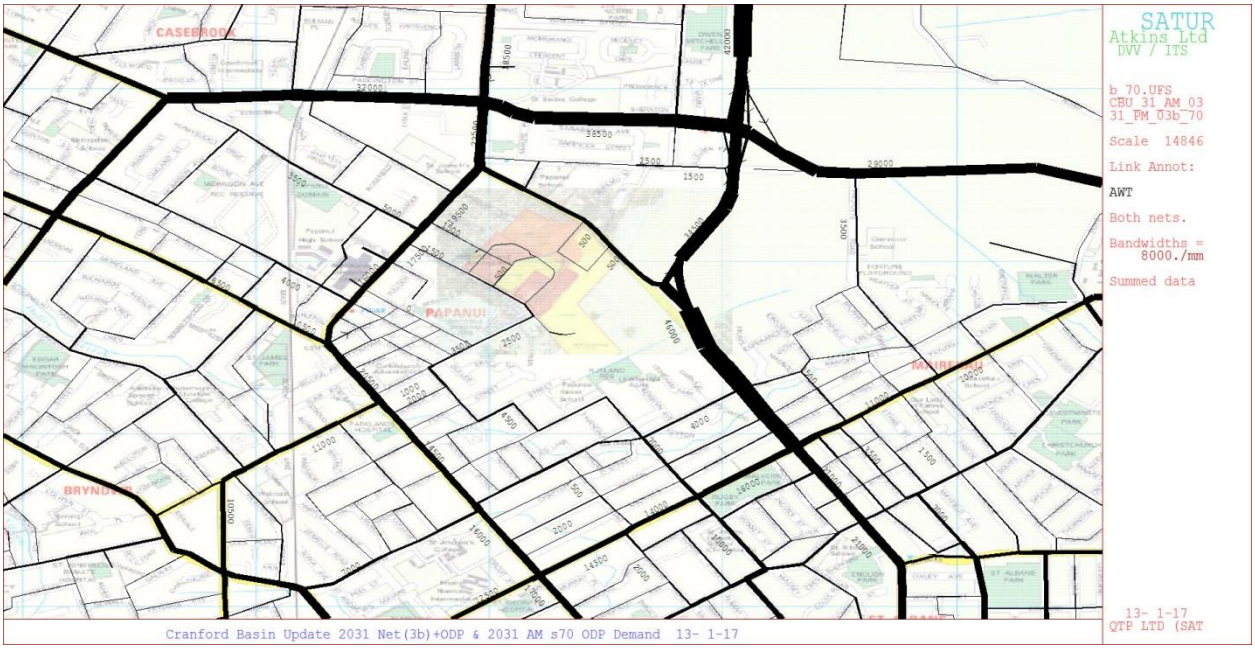


**Figure 3-4: Daily Traffic Volumes forecast with No Through-Route Option, 2031 (With CNC)[4]**

3.3.2 It may be seen that on Grants Rd is still forecast to carry around 3,300vpd under this scenario, up from around 1,700vpd (without the ODP) - but around 2,000vpd lower than the approx. 5,300vpd forecast with the draft ODP (Through-Route) network.

3.3.3 The differences between the draft ODP (Through-Route) network option and the No-Through Route option are illustrated more clearly below.

[4] See Footnote 2.

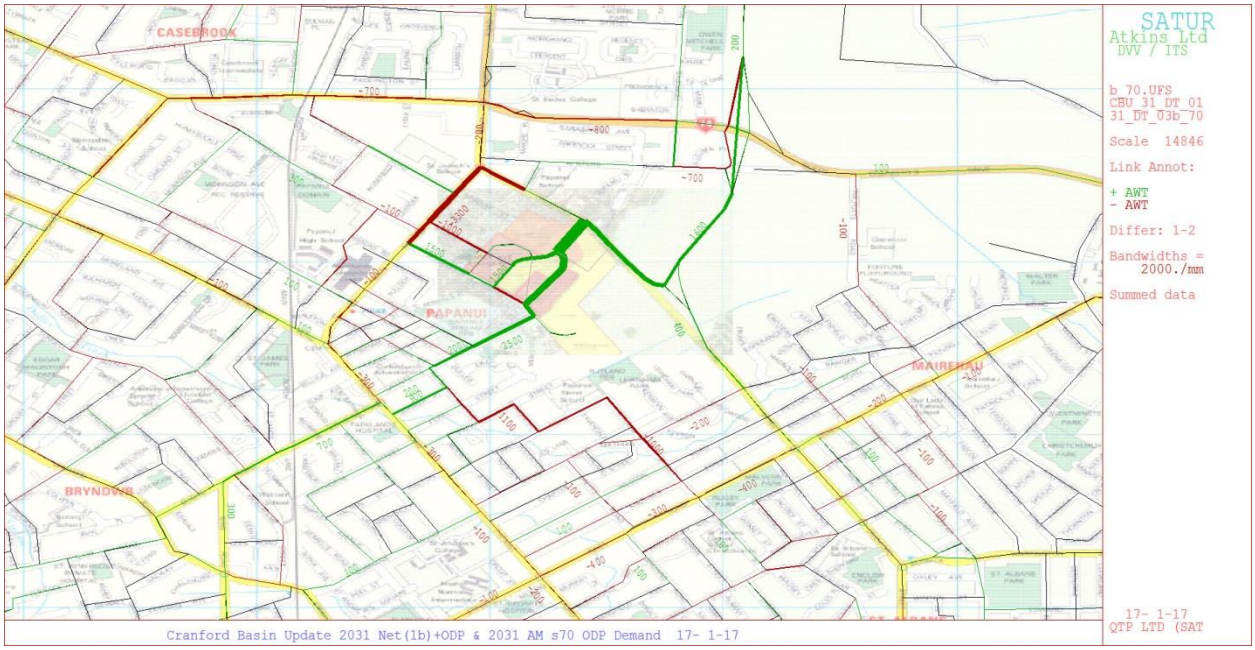


**Figure 3-5: Changes in Daily Traffic Volumes, between No Through-Route and Through-Route Options (Draft ODP Scenario, 2031, With CNC)[5]**

3.3.4 Figure 3-5 shows that the forecast traffic volume increases on Grants Rd would be reduced by around 2-2,500vpd, compared to the ODP Through-Route Option. There are however forecast to be relative *increases* forecast on Main North Road, Shearer Ave and residential streets to the South-east of the ODP area. This arises because the lack of a through-route affects the ability for both local (ODP and surrounding residential neighbourhoods) and traffic further afield to use a through vehicle route to access either Cranford or Grassmere Streets and Grants Rd (depending on their origin and/or destination).

3.3.5 In a similar manner to Figure 3-3, the changes in delays (between No Through-Route and Through-Route Options have been considered for this 2021 'With CNC' scenario, as shown below (PM only for illustration).

5 Note that in this diagram green represents a reduction (decrease) in traffic and red an increase (despite the red being annotated as negative. The changes should therefore be interpreted as absolute values, based on the colour).

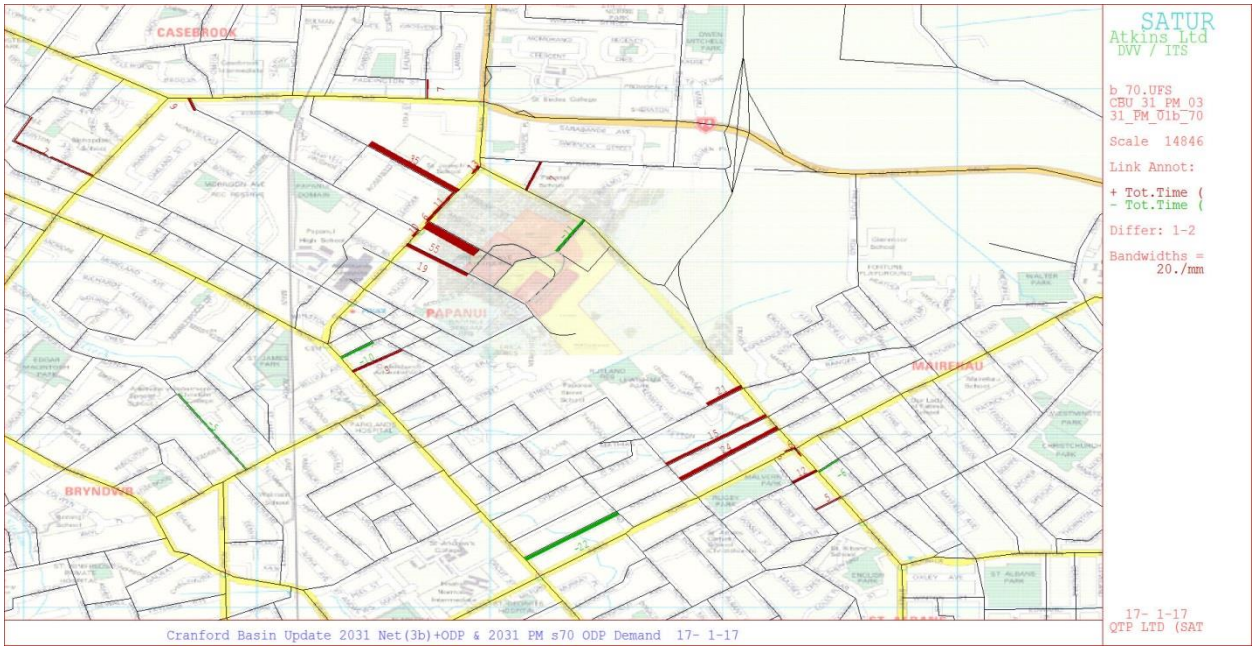


**Figure 3-6: Net Change in Link Delays from Draft ODP Concept Plan (Through Route) to No Through-Route Option (2031 PM Peak Hour, With CNC)**

3.3.6 These comparisons thus reveal a similar story to that shown by Figure 3-2 and Figure 3-3, with the benefits (of a reduced traffic volume on Grants Road) being countered by increased traffic volumes and delays elsewhere (compared to the 'Through-Route ODP network).

3.3.7 The (adverse) effects of reduced permeability are therefore still predicted to apply, despite the presence of the CNC projects. While the latter do serve to reduce somewhat the adverse effects of a No Through-Route Option (relative to the Through Route Option this analysis suggests that safety issues are still likely to arise at Grassmere St and Shearer Av intersections, should a No Through Route Option for the ODP be pursued.

## 4 Summary and Conclusions

4.1 This Memo has considered the potential transport effects of a further network option for the draft ODP, being one that does not provide a (vehicle) route through the ODP area.

4.2 Overall this assessment confirms that such an option does have the potential to reduce (additional) traffic forecast to otherwise occur on Grants Rd (with the ODP and the Through Route Option previously examined).

- In the absence of the CNC projects, if the ODP area were to be fully developed by 2021, this reduction would be around 900vpd (meaning Grants Rd might be expected to carry around 3,500vpd as opposed to around 4,400vpd with the Through-Route Option).
- With the CNC projects, with the ODP fully developed, by 2031 this reduction would be around 2-2,500vpd (meaning Grants Rd might be expected to carry around 3,300vpd as opposed to around 5,300vpd with the Through-Route Option).

4.3 However, there are also relative increases forecast on Main North Road, Shearer Ave and some residential streets to the South-east of the ODP area, because the lack of a through-route hinders the ability for both local (ODP and surrounding residential neighbourhoods) and traffic further afield to use a through vehicle route to access either Cranford or Grassmere Streets and Grants Rd (depending on their origin and/or destination).

4.4 This has a disproportionate (adverse) effect on delays for traffic exiting Grassmere St and Shearer Ave. Particularly prior to completion of the CNC projects, the forecast delays at both Grassmere St and Shearer Ave are likely to give rise to adverse safety issues, given full development of the ODP.