

CCL Ref: 14593-190919-anderson

19 September 2019

Ms Jane Anderson
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Dear Jane

**RC195448: Lincoln Developments Limited (Supermarket, Childcare and Subdivision):
Peer Review of Transportation Assessment**

Further to various correspondence, we have reviewed the Transport Assessment Report (**TAR**) provided in support of the above application by Stantec, and our comments are set out below. We confirm that we have read and reviewed all sections of the TAR, but in this letter we have only made comment on issues where we do not agree with Stantec or where we have provided additional information that we consider may be of benefit to the Council. If no comment is made, then this is because we agree with the relevant matters in the TAR.

For ease of reference, we have adopted the same numbering and headings as used by Stantec in the TAR.

TAR Section 1: Introduction

This part of the report does not contain any technical information and we have therefore not commented further.

TAR Section 2: Existing Transport Environment

Transport Infrastructure

With regard to the transport infrastructure in the immediate area, we highlight that this is largely newly-constructed (other than Birchs Road). Examination of aerial photographs shows that works commenced mid-2014, and accordingly we consider it is reasonable to expect that the roading networks are constructed to current guides/standards. In particular, based on our assessment of earlier iterations of the District Plan, we consider that the cross-sections for new roads set out in the current version of the Plan are the same as those that were in place at the time of road construction.

Current Traffic Patterns

The TAR sets out that Birchs Road carries around 6,500 vehicles per day, and cross-referencing this against the MobileRoad website confirms this quantum of traffic. As more development takes place in Lincoln, we expect that traffic flows on the road will increase, but as set out below, there is sufficient capacity within the roading network to absorb this increase without adverse efficiency effects arising.



Road Safety

As set out above, the roading infrastructure in the immediate area is newly-constructed and so it is unsurprising that the crash records indicate a good level of service is provided. However the TAR only includes records to the end of 2018, whereas 9 months of data is available for the current year, and we have therefore used the same system (CAS) to identify any reported crashes on the same section of road. This showed that no crashes have been recorded this year to date.

TAR Section 3: Lincoln Outline Development Plan

The particular Outline Development Plan considered in the TAR is ODP Area 3 within the District Plan (Section E37). This shows a secondary connection into the ODP area towards the south of the site (via Craig Thompson Drive) and this has been constructed for some time. However the primary connection is via a new road towards the north (linking to Birchs Road approximately 500m north of Craig Thompson Drive and opposite Carnaveron Drive), which will be the extension of O'Reilly Road. This is not yet constructed.

The TAR does not mention how the proposed road (Makybe Terrace) will fit within the ODP. However, it is noted that the O'Reilly Road extension will be “around 100m” north of the site. Based on our measurements, we consider that the Birchs Road / Makybe Terrace intersection will be 180m south of the Birchs Road / O'Reilly Road intersection. Since Birchs Road is a Collector Road and subject to a 50km/h speed limit, under the District Plan a separation distance between intersections of 123m is required, and therefore is met.

TAR Section 4: Proposed Development

This section of the report describes in detail the proposed development. We note that O'Reilly Road will be extended through the site, meaning that the proposal supports (rather than precludes) the ability for this to form the primary route in future to the wider ODP area. We also note (and support) the provision of a walking and cycling connection through Caulfield Crescent (west) at the head of the cul-de-sac although no further details are provided of this.

Although we appreciate that the plans within the TAR are indicative, we highlight that the stripes of the flush median markings within Makybe Terrace are the wrong way around, and the road markings shown on Makybe Terrace and Birchs Road do not meet current guidelines in terms of the spacing of the stripe and the distance over which the tapers are developed. No details are provided of any tie-ins of the proposed flush median on Birchs Road to the existing road geometry. To some extent these matters can be subsequently addressed through engineering approvals but it is unusual in our experience for applications to not provide a higher level of detail.

The TAR describes works on Birchs Road, such as widening to provide a flush median and a right-turn lane into the site and also Makybe Terrace. One outcome of this is that the two right-turn lanes will be located just 80m apart. While the access into the supermarket is not an 'intersection' per se, it will be marked in the same manner and therefore could potentially be confusing to drivers. However the Austroads Guide to Road Design Part 4 (Parts B.2.2) sets out that it is desirable for intersections to be separated from one another by five seconds of travel time in order to allow drivers to process the intersection and roading layout, and thus for the 60km/h operating speed of Birchs Road, a separation distance of 83m is required. In essence then, this is achieved and we therefore do not consider that marking the supermarket access on Birchs Road in this manner will result in driver confusion.

We confirm that the proposed roads set out in Section 4.3 of the TAR will provide appropriate levels of provision. Makybe Terrace is shown as having an 18m legal width with 9m formed carriageway, and therefore would be a 'Local – Major' road under the District Plan. In our view, this is appropriate.

Caulfield Road is noted as having low traffic flows, but it will form an alternative through route to O'Reilly Road and therefore might potentially attract through traffic. However, we consider that this is unlikely due to the narrow carriageway width, and that most residents will be aware of the higher prevailing speed environment (and thus shorted travel time) using O'Reilly Road. In the event that Caulfield Road does experience increased traffic flows, we consider that measures could be retrofitted to dissuade drivers, such as traffic calming.

In respect of servicing of the supermarket, the proposed one-way system means that trucks will travel along the northernmost aisle, which they will share with members of the public. Although this is a little unusual for a new-build site, we are aware of numerous locations where the arrangement has been implemented and we are not aware of any resultant safety or efficiency issues.

In respect of the site layout, no swept paths have been provided. This may be because of the somewhat indicative nature of the layout (as per our comments above). However at this stage it is not possible to say whether the accesses are appropriate designed to prevent over-running by larger vehicles (or larger vehicles having to use the opposing traffic lane to manoeuvre). We consider that swept paths will be required in order to confirm that the accesses will operate safely and efficiently.

Finally, the plans of the childcare centre car park are inconsistent because two different car park layouts are shown, and it is not clear which is proposed:



Figure 1: Two Different Layouts for Childcare Centre Car Park Provided in Application

TAR Section 5: Traffic Generation and Distribution

No detailed information has been provided in respect of the “approximately half a dozen” supermarkets that have been used to derive the trip generation rate of the supermarket. However

based on other reviews of Stantec assessments, we confirm that this rate is supported by surveys of other Countdown supermarkets and is appropriate.

For the derivation of new, pass-by and diverted trips, Stantec has (rightly) assessed diverted trips as being new to this part of the network and therefore reduced the nett new trip generation rate by 32%. We consider that this is an appropriate reduction.

With regard to the café, we agree that a high proportion of these visitors will also use the supermarket. Consequently the approach of separately calculating the traffic generation of the café will lead to a robustly high trip generation for the site as a whole.

The childcare centre will have its greatest traffic generation in the morning peak hour, but we agree that overall, the traffic generation of the wider site will peak in the evening (since the supermarket is the dominant generator of traffic but does not attract many trips in the morning peak). Consequently we agree with the approach of only assessing the evening peak hour for the childcare centre. In our experience, the rates observed vary according to whether the childcare centre is sessional or all-day, and this does not appear to have been taken into account by Stantec. Stantec Figure 5-1 for example shows a small peak at lunchtime for the childcare centre but this does not occur if the childcare centre only offers all-day care. Consequently the worst-case traffic generation arises for a centre providing all-day care where a rate of 1 vehicle movement per child in the evening might arise (that is, a total of 100 vehicle movements rather than 60 vehicle movements as used by Stantec). However this difference is not material to the overall TAR conclusions.

For the traffic distribution, it is not clear why only one third of northbound vehicles on Birchs Road have been assumed to use the Makybe Terrace entrance. We would expect that northbound drivers will take the most direct route and therefore use Makybe Terrace rather than driving past this access in favour of entering further north. This will increase the traffic flows at the Birchs Road / Makybe Terrace intersection. We therefore have reservations about the statement that 70% of supermarket traffic would use the access off Birchs Road with only 30% using Makybe Terrace.

Figure 5.2 of the TAR shows a combination of traffic already on the network and generated by the site. This makes it difficult to ascertain the relative contributions of each of the proposed activities. It is also not clear whether Stantec has made allowance for other development (existing or consented) that would potentially use Makybe Terrace as a through route and not visit the proposed development.

We have taken these matters into account when considering the performance of the Birchs Road / Makybe Terrace intersection subsequently.

TAR Section 6: District Plan Compliance

We have reviewed the District Plan Standards and the compliance (or non-compliance with the District Plan).

With regard to the formation of Makybe Terrace, we consider that the absence of a parking lane over its full length is unlikely to result in adverse effects. This is because there are few activities that could generate a high level of on-street parking demand, and in practice, we consider it would be more desirable for parking to take place within the sites of the activities proposed rather than kerbside. That said, an occasional parked vehicle within a carriageway of 9m width would still mean that two traffic lanes were provided, and thus there would be no efficiency effects.



The proposal for the width of Caulfield Crescent matches the existing consented width, and therefore although it is a non-compliance, it provides a consistent roading environment.

In respect of the separation of vehicle crossings from intersections at the residential lots, we agree that there is a non-compliance. However this is a common occurrence, because it is commonly not possible to achieve required residential densities while also achieving the required separation distance. We recommend that a condition of consent is put in place that the vehicle crossings are located as far from the closest intersection as possible.

We agree with Stantec that having a separation service exit from the site will assist in managing heavy vehicle movements around the site. The provision of one vehicle crossing on each site frontage will not, in our view, create any safety or efficiency effects and in practice for an activity such as a supermarket, having more than one access is common. A further outcome is that the traffic generated is spread over a wider area rather than being focussed into one point of access.

However under Rule 5.2.1.2, where a site has access onto a Collector Road and a Local Road, access can be gained onto “*either*” road. The site gains access onto **both** roads. The wording of the Rule in the District Plan means it is unclear as to whether the proposal is therefore compliant in this regard.

Stantec notes that the vehicle crossing widths are greater than expected. We do not consider that the additional 0.5m width at the Makybe Terrace crossing will be noticeable, but the Birchs Road crossing is proposed to be 15m wide. While this may be needed for heavy vehicles, the majority of vehicles will be cars, and wider crossings typically result in higher entry speeds to a site. In view of this, we recommend that the access is designed to appear visually narrower for car drivers, but that formal over-run areas are provided to enable larger vehicles to enter without damage to kerbs or landscaping. One way that this could be achieved is through forming a raised area immediately adjacent to the formal crossing of 50mm in brushed concrete or similar (akin to the collar seen around small roundabouts). Drivers of smaller vehicles will avoid driving over this, but larger vehicles can over-run as needed.

With regard to queuing space, Stantec has allocated the required 25.5m length to the two site entrances. As noted above though, we do not consider that there will be a bias towards the access on Birchs Road of the scale Stantec describes. Further, the approach taken by Stantec has been to allocate the required 25.5m (for a 176-space car park) between the two accesses but this is not the approach specified in the District Plan which sets out that “*where the parking area has more than one access the number of parking spaces may be apportioned between the accesses in accordance with their potential usage*” (our emphasis). That is, it is the number of spaces served by each access that determines the queuing space required at each.

Under Stantec’s assessment, 70% of the spaces would be served from Birchs Road (hence 123 spaces which require a queuing space of 20.5m) and 53 spaces would be served by Makybe Terrace, meaning 15.5m queuing space is required. Stantec notes that 20m is provided at Birchs Road and 8m is provided at Makybe Terrace, and therefore in our view, the layout does not comply with this rule at Makybe Terrace.

That said, when taking into account the likely greater usage of Makybe Terrace, we consider that the queuing space provided at Birchs Road will be appropriate and confirm that 15.5m is required at Makybe Terrace (allowing for both to serve between 51 and 100 spaces). Additional queuing space can be provided at the Makybe Terrace access by removing a small number of spaces (and for clarity, the proposal will still comply with the District Plan parking ratios).

As noted above, it is unclear which of the two layouts for the childcare centre car park is proposed. We agree with Stantec that queuing space of 10.5m is required and note that this is

provided by one of these layouts but not the other. However within the layout that does not show the required amount of queuing space, the obstructions are due to vehicles exiting staff parking spaces and this will not occur at times when caregiver vehicles are entering the car park. Accordingly, provided that these spaces are clearly shown for staff, we are able to support the non-compliance.

The application highlights that no assessment has been made of the sightlines available at the residential lots, which we assume is because the driveway locations are not fixed. We confirm that in our view it is likely there are locations where driveways could be placed at each lot where the sightlines would be appropriate for the prevailing speeds. However these would not necessarily be compliant with the sightlines required under the District Plan, which are based on the speed limit, not the actual vehicle speeds. As such, we do not consider that certain lots could be developed as of right as a result of the current application because the sight distance non-compliances have not been identified nor assessed, nor the driveway(s) confirmed to be in the location where the effects are less than minor.

Also in respect of sightlines, the plans show landscaping within the sight triangles. This should either be kept at a low level or trees 'limbed up' in order to ensure that the planting does not obstruct the sightlines, and this should form a condition of consent.

The size of the car parking spaces are described as being compliant with the District Plan, but the length is shown at 5.0m (or 4.5m with the vehicle overhanging landscaping) and the District Plan requires a length of 5.4m (or 5.0m where the vehicle overhangs landscaping). However the combination of stall length and aisle width is sufficient that the length of the spaces can be increased to achieve compliance.

Finally although it is noted that there is a requirement for a separation between accesses and intersections, there are existing driveways on the western side of Birchs Road. As a result of the proposed Makybe Terrace, these driveways become non-complying with Rule E13.2.2, but this has not been identified nor the effects assessed. Headlight glare from vehicles exiting Makybe Terrace and the Birchs Road supermarket access may also be an issue for these residents.

TAR Section 7: Traffic Effects

We confirm that Sidra Intersection is the appropriate analysis software to use for evaluating the queues and delays at the Birchs Road / Makybe Terrace intersection. As set out above, we have reservations about the extent of traffic expected at the intersection and have therefore recreated the model runs and assessed the resilience of the intersection to higher volumes. We found that even if the through traffic on Birchs Road was increased by 50%, and traffic on Makybe Terrace was doubled, queues remained low and although delays for the right-turn movement out of Makybe Terrace increased to 28 seconds, this is not unreasonable given the traffic growth applied.

Consequently, although we do not agree with some of the underlying assumptions for traffic distribution, ultimately the outcome is unchanged, that the intersection can accommodate the anticipated flows.

Traffic flows at the supermarket access will be lower than at the Birchs Road / Makybe Terrace intersection and therefore those accesses must necessarily operate satisfactorily if the intersection operates satisfactorily.

Carriageway Consulting Conclusions

Based on our review, we consider that:

- The roading network in the vicinity of the site is newly-constructed and has an excellent road safety record;
- The proposal does not preclude, and in practice supports, the ability to give effect to ODP Area 3 within the District Plan (Section E37);
- The application contains only sketch layouts of the works proposed to facilitate the transportation networks. The stripes of the flush median markings within Makybe Terrace are the wrong way around, and the road markings shown on Makybe Terrace and Birchs Road do not meet current guidelines in terms of the spacing of the stripe and the distance over which the tapers are developed. No details are provided as to the walking and cycling connection at the head of the Caulfield Crescent cul-de-sac;
- There is sufficient spacing between the Birchs Road / Makybe Terrace intersection and the Birchs Road / Supermarket access that driver confusion between them is unlikely to arise;
- Traffic flows on Caulfield Crescent *may* increase as a result of the proposal because it forms a through route, but this is unlikely and if it does occur, can be addressed subsequently;
- No swept paths have been provided to demonstrate that the layout operates appropriately;
- Two different plans have been provided for the layout of the childcare centre car park and it is not clear which is proposed;
- The traffic generation rate and extent of pass-by traffic used for the supermarket is appropriate;
- The traffic generation rate for the childcare centre is likely to be too low, although this does not affect the overall outcomes;
- It is likely that a greater proportion of traffic travelling to the supermarket will use Makybe Terrace rather than the direct access off Birchs Road. Again, this does not affect the overall outcomes;
- There are additional non-compliances with the District Plan that have not been identified, including the size of the parking spaces, and the separation of the existing driveways on Birchs Road from the proposed Makybe Terrace;
- The requirement for queuing space has been applied incorrectly, and is not achieved at the supermarket (Makybe Terrace) access, but can be addressed by removing a small number of parking spaces. It may not be achieved at the childcare centre (although it appears likely to be mitigated);
- Although the roads do not meet the District Plan requirements, the differences are supportable in our view and do not result in an inconsistent roading environment for drivers;
- The Birchs Road supermarket access is wide in order to accommodate delivery vehicles, but should be visually narrowed to ensure that drivers of smaller vehicles do not enter the site at high speed;
- No assessment has been made of sight distances at the residential lots and therefore it appears no consent is sought for any non-compliance. However it also appears that compliance with the District Plan cannot be achieved at some lots.
- Notwithstanding our concerns regarding some of the underlying assumptions for traffic distribution, the Birchs Road / Makybe Terrace intersection and site accesses are able to accommodate the expected traffic flows with low queues and delays, even if higher traffic volumes are used in the analysis.

Overall, we consider that the application has some omissions and discrepancies, and in some matters has little detail. In this regard we consider that the following information is required:

- Detailed drawings of the measures proposed on Birchs Road taking account of engineering guides and standards;
- Detailed drawings of Makybe Road taking account of engineering guides and standards;
- Swept paths for heavy vehicles entering and exiting the supermarket;
- Confirmation of which parking layout is proposed for the childcare centre and an assessment of this;
- Identification of all non-compliances with the District Plan, and assessment of these. This may necessitate changes to the layout, such as the parking space dimensions and queuing space. Details of the measures required to visually reduce the width of the Birchs Road supermarket access are also required;
- Whether the application is intended to seek land use consent for the residential lots, taking into account that there are likely to be non-compliances in respect of sight distances that have not been assessed.

However, and subject to this additional information, at this stage we consider that it is unlikely that there are any significant adverse effects that would arise in respect of road safety and efficiency on the external roading network as a result of the proposed development.

Please do not hesitate to contact me if you require anything further or clarification of any issues.

Kind regards

Carriageway Consulting Limited



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