

24 January 2024

Selwyn District Council
Attn: Andrew Henderson – Consultant Planner

Via Email: andrew.henderson@jacobs.com

Dear Andrew,

Request for Further Information – Burnham 2020 Ltd - RC235522

I refer to your letter of 29th November 2023 requesting further information under section 92(1) of the Resource Management Act 1991 in relation to the above.

A. Noise Assessment Questions

Please refer to Marshall Day's letter at **Attachment 1**.

B. Transport Assessment Questions

Please refer to Stantec's letter at **Attachment 2**.

We consider that this addresses in full, all the matters set out in the s92 request for further information. If you have any queries, please do not hesitate to contact me.

Kind regards,



Dan McGregor
Senior Project and Resource Advisor
Winstone Aggregates / Burnham 2020 Ltd
Mobile: 021 405 040
Email: dan.mcgregor@winstoneaggregates.co.nz

28 November 2023

Winstone Aggregates
 PO Box 17195
 Greenlane
 Auckland 1546

Attention: Dan McGregor

Dear Dan

RESPONSE TO SDC RFI - NOISE

Below we provide the query received on 15 November 2023 from Selwyn District Council's peer reviewer followed by our response:

Query 1

Heavy vehicles on roads

We note that there is some difference between the distance that the SEL was measured at (10 metres), and the distances to some of the facades where noise levels are predicted.

It is unclear how the levels of 56 and 49 dB L_{Aeq} , for 10 x HV movements in an hour at the façade of 168 and 146 Aylesbury Road, have been derived from an SEL of 84 dB measured at 10 metres from a truck. Can MDA please provide more information about how these levels were calculated.

MDA response: The individual truck movement SEL was corrected for number of truck movements, the reference time interval, distance (line source basis) and ground attenuation. Ground effect was calculated in accordance with ISO9613-2 with an assumed ground factor of $G=0.0$ at source and $G=0.5$ for the middle and receiver regions.

dB adjustments to source level	168 Aylesbury Rd	146 Aylesbury Rd
84 dB L_{AE} at 10 metres - single truck pass by	84	84
10 trucks	+ 10	+10
Conversion from 1 sec to 1 hour assessment period	- 36	-36
Distance adjustment (line source)	- 2 (18 metres)	-7 (48 metres)
Ground effect	0	-2
Resultant dB $L_{Aeq}(1hr)$	56	49

Query 2

Night-time vehicles on roads

Existing noise levels measured at some locations include both traffic and environmental noise such as leaves rustling and the like. The MDA report states at MP2 Noise levels begin to increase at 0500 to a high of 50 dB L_{Aeq} at 0800 hrs. (average 45 dB L_{Aeq} 2200 – 0700 hours)

Can MDA please add a column to tables 19 – 21 showing the expected range of existing noise levels in the relevant time period at each receiver.

Below we have replicated Tables 19 to 21 from the noise assessment and have added a column representing the indicative variation in existing noise levels over the period of interest. The daytime noise levels referred to relates to the operational hours when trucks are likely to be accessing the site.

Table 19: 146 Aylesbury Road - Relative change in daytime noise levels for different truck movements

No. of truck movements per hour	Truck noise level, dB $L_{Aeq}(1hr)$	Indicative range of existing daytime noise levels, dB $L_{Aeq}(1hr)$	Relative change, dB	Potential adverse noise effect	Below the 55 dB $L_{Aeq}(1hr)$ guideline value?
30 (average)	54	50 to 55	+3	Just perceptible / Slight	Yes
112 (maximum)	60		+10	Significant	No

Table 20: Burnham Camp - Relative change in daytime noise levels for different truck movements

No. of truck movements per hour	Truck noise level, dB $L_{Aeq}(1hr)$	Indicative range of existing daytime noise levels, dB $L_{Aeq}(1hr)$	Relative change, dB	Description of effect	Below the 55 dB $L_{Aeq}(1hr)$ guideline value?
30 (average)	54	55 to 60	0 to 2 dB	Negligible	Not applicable ¹
112 (maximum)	60		0 to 5 dB	Negligible to moderate	Not applicable ¹

Note ¹ : the existing ambient traffic noise level already equals or exceed the 55 dB L_{Aeq} guideline noise level.

Table 21: Relative change in noise levels for 10 truck movements between 0500 and 0700 hrs

Location	10 movements per hour Truck noise level, dB $L_{Aeq}(1hr)$	Indicative range of existing noise levels anticipated between 0500 and 0700 hrs, dB $L_{Aeq}(1hr)$	Relative change, dB	Potential adverse noise effect
168 Aylesbury Road	56	45 to 55	5 to 10 dB	Noticeable to significant
146 Aylesbury Road	49	45 to 50	3 to 5 dB	Negligible to moderate
Burnham Camp	49	50 to 60	0 to 3 dB	Just perceptible / Slight

Please contact us if you have any queries.

Yours faithfully

MARSHALL DAY ACOUSTICS LTD



Jon Farren
Principal



Stantec New Zealand

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26 January 2024

Enquiries: Andrew Metherell
Project No: 310205199

Winstone Aggregates
Auckland

Attention: Dan McGregor

Dear Dan

**RE: Burnham Quarry
S92 response - Selwyn District Council Request for Information**

We have considered the Selwyn District Council request for information (letter dated 29 November 2023) on transport matters. We have responded to each item within this response letter.

1. Truck Movement Definition

- (i) Question: Please confirm that "truck movements" means a one-way movement (either into the site or out).

Response

"Truck movements" means a one-way movement (either into the site or out).

2. Pedestrian and Cyclist Activity

- (ii) Question: Table 4-2 of the ITA sets out pedestrian and cyclist numbers. Please confirm what day of the week these were undertaken. If they were undertaken during a weekday, please comment on the potential for Aylesbury Road to be used by recreational cycling groups during the weekend, and whether any further assessment is required to account for these.

Response

Pedestrian and cyclist movements referenced in Table 4-2 of the ITA were recorded on Tuesday 29th November 2022. The peak period surveys in July 2022 were carried out on Wednesday 27 July 2022. Our general observation during other weekday site visits in the area have not identified any particular large levels of activity, such as cycling groups, during other weekdays. It is acknowledged that any road in the District on the perimeter of a town could be used by recreational cycling groups, however these have not been observed on roads during weekdays.

Formal observation on weekends has not been carried out. The activity tracking app Strava provides a "Global Heatmap" broadly showing the relative dominance of routes (with no day to day distinction). The bicycle heatmap (Figure 2-1) shows that Aylesbury Road north of Two Chain Road has a comparatively low use when considered against well-known recreational cycling routes and routes with offroad paths, such as the Old Tai Tapu Road, and Rolleston-Lincoln route.

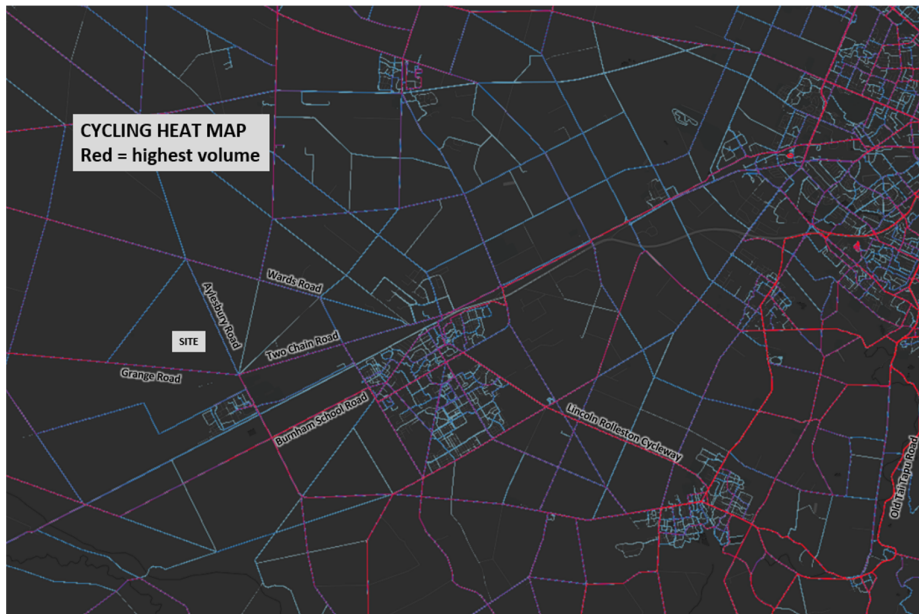


Figure 2-1: Strava Cycling Heat Map (December 2023)

The running/walking heatmap (Figure 2-2) shows that in the Burnham area the dominant route is the block Two Chain Road-Walkers Road-Runners Road-Aylesbury Road. This activity predominantly occurs in the road berm.

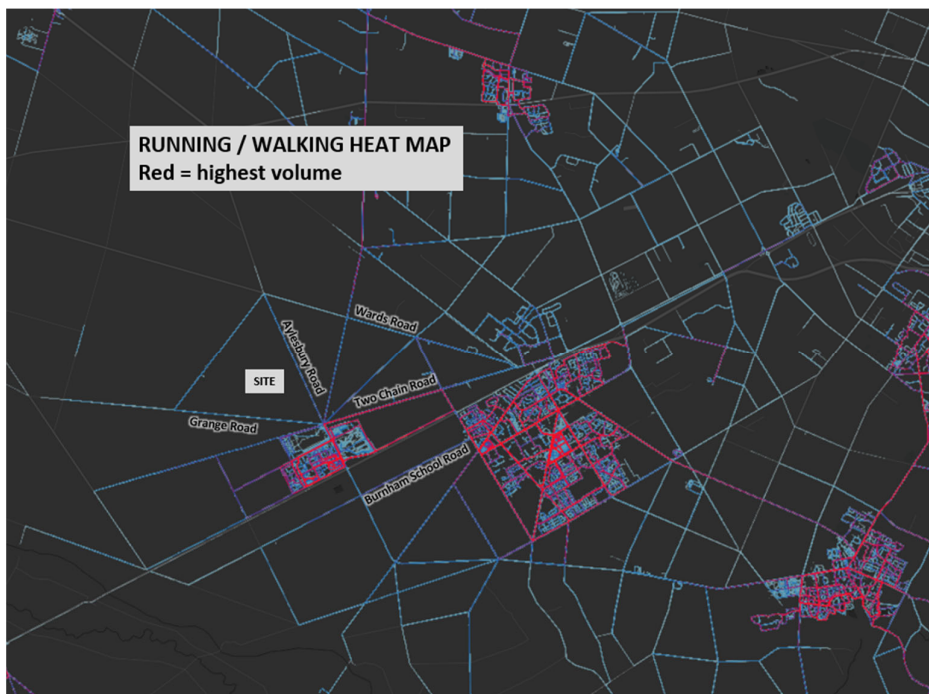


Figure 2-2: Strava Running/Walking Heat Map (December 2023)

No further assessment is proposed of Aylesbury Road in respect of weekend use by cyclists and pedestrians for the following reasons:

- the activity will be accessing an arterial road (that by definition is anticipated to accommodate higher volumes of through traffic),
- the road does not form part of an identified cycle or walking network, and is not highlighted as an important recreational route in the heatmap,
- weekday counts show low levels of pedestrian and cycle activity, and
- the quarry activity will generally generate lower levels of traffic on a weekend.

3. Level Crossing

- (iii) Question: Please advise whether any of the measures at the level crossing listed in paragraph 6.1 have been installed already or whether they are confirmed to be installed in future. If there is no commitments to them being installed, please comment on whether these measures should be carried out as part of the proposed quarry roading improvement.

Response

Based on our December 2023 site visit most of the recommended measures have not been installed. The only measures installed related to a sign that has been reinstated following construction that occurred at the time of the LCSIA. Whilst the measures are desirable for general safety and risk management, it is not considered a responsibility of the quarry activity to ensure these measures are in place because:

- The measures are predominantly of a maintenance nature, and have been identified as measures recommended for the existing environment.
- Changes to the SH1 / Aylesbury Road intersection, which are planned by Waka Kotahi, reduce the need for the major changes (acceleration lane).
- The level crossing is on an arterial road, and the quarry activity represents a small percentage change in traffic volumes ahead of a roundabout, at which time it can be expected further or different measures may be considered by the road and rail authorities to support the changed road layout.

4. Auxiliary Lanes at Site Access

- (iv) Question: Figure 10-1 does not suggest that auxiliary turning lanes will be provided at the site access. Please provide an assessment of the warrants for auxiliary turning lanes, taking into account the proportion of heavy vehicles as appropriate.

Response

In order to consider the need for turn lanes at a standard priority intersection, reference has been made to the Austroads "Guide to Traffic Management Part 6 Intersections Interchanges and Crossings Management" Section 3.3.6 warrants for turn lanes. The appropriate turning treatment depends on a combination of speed, and volumes of through traffic and turning movements. Analysis has been undertaken for both a Christchurch City (Figure 4-1) and Selwyn District (Figure 4-2) traffic distribution focus as included in the ITA. The resulting combinations of traffic volumes are plotted on the graphs below.

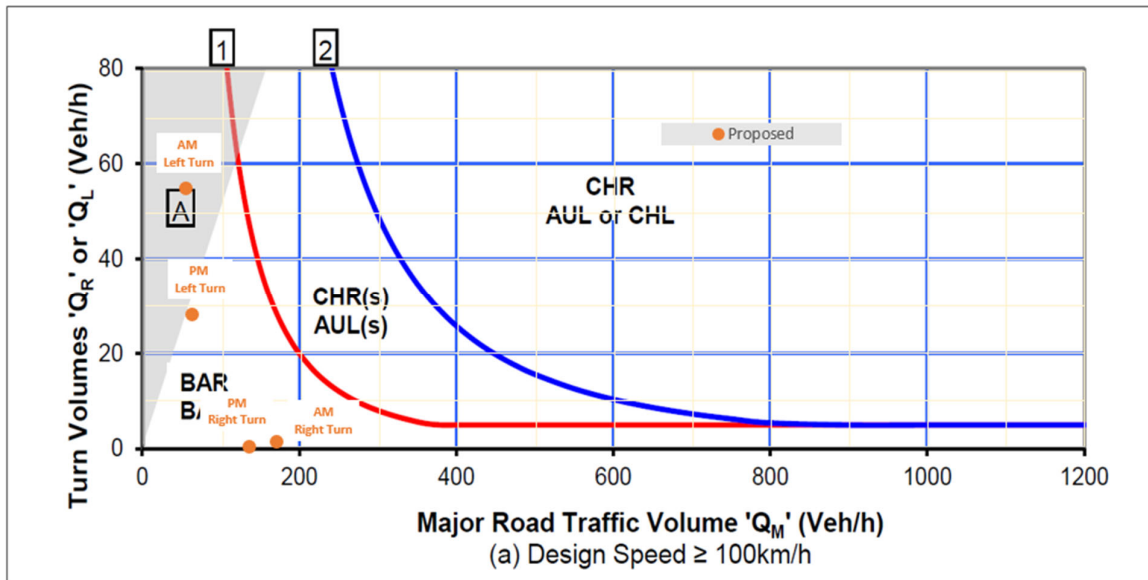


Figure 4-1: Christchurch Focus Warrant Diagram

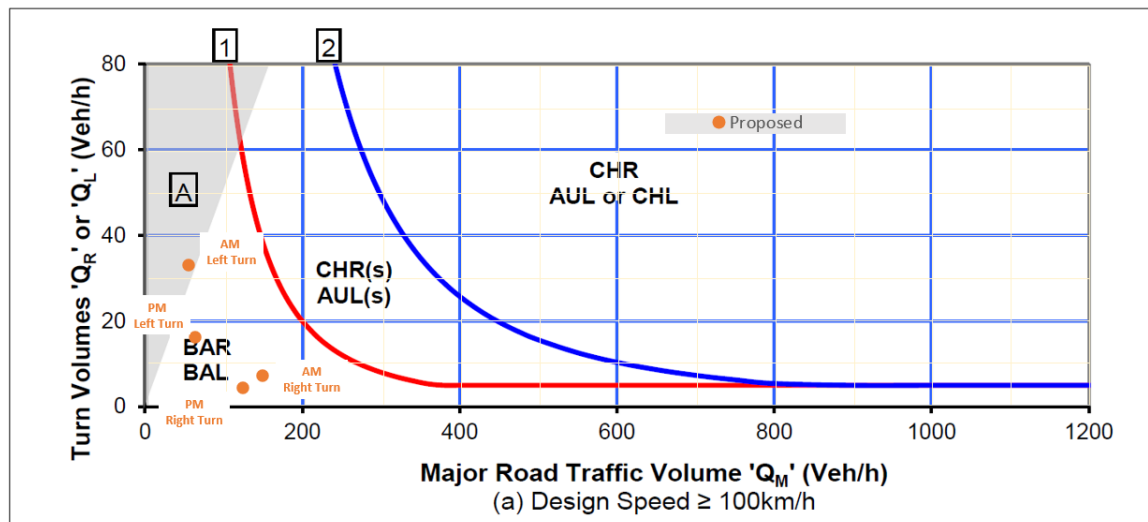


Figure 4-2: Selwyn Focus Warrant Diagram

As can be seen, under both the Selwyn and Christchurch focus traffic distribution scenarios, basic right-turn treatments and basic left-turn treatments will be warranted. This indicates that a simple layout which satisfies the requirements of rural basic turns is required.

Given the low traffic volume of the road, the increase in heavy vehicle traffic does not warrant auxiliary turning lanes at the site entrance.

5. Left Turn Effects at SH1 / Aylesbury Road

- (v) Question: Given that trucks will be exiting Aylesbury Road and turning left onto the highway, please comment on whether there will be an adverse road safety effect arising from laden, slow-moving trucks pulling out into higher-speed traffic.

Response:

As set out in the Section 6.2 of the ITA, there are currently plans from Waka Kotahi to install a roundabout at the intersection as part of the Road to Zero project on SH1 from Templeton to the Selwyn River. The intersection will reduce free flow circulating speeds to approximately 30km/h so that the speed differential between trucks exiting the roundabout and other vehicles will be small, minimising adverse safety effects of heavy vehicles turning onto State Highway 1. The project is planned for the 2024-2027 period.

With the existing road layout, quarry generated traffic volumes are to be restricted, and as set out in the ITA at Section 10.5.2 will make a very small change to the volume of movements turning onto SH1.

Nevertheless, the potential for managing speed differentials of vehicles pulling out onto State Highway 1 from Aylesbury Road has been considered with reference to Austroads "Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management" Section 3.3.5. The guideline outlines that no numerical warrant exists for the use of acceleration lanes. However, they could be provided under the following conditions:

- insufficient gaps exist for vehicles to enter a traffic stream
- turning volumes are high (e.g. 300 to 500 veh/hour)
- the observation angle falls below the requirements of the minimum gap sight distance model (for example, inside of horizontal curves)
- heavy vehicles pulling into the traffic stream would cause excessive slowing of major road vehicles.

The following provides assessment against these matters:

- An analysis of the left turn lane capacity shows that there are sufficient gaps for left turns will be able to enter the traffic stream without high delay at the stop line. This confirms that the intersection operates with adequate left turn capacity most of the day, and in the evening peak, the capacity constraints relate to through and right turning vehicles when staff depart the military camp.
- The turning volumes out of Aylesbury Road are currently less than 300 veh/hour in peak times (Burnham Quarry Transport Assessment Report - Section 4.3) and are expected to stay lower than 300vph allowing for growth over the next 10 years under typical quarry conditions.
- The right-angle observation angles are good at the intersection, with clear sight lines well above minimum gap sight distance requirements.
- Rural Intersection Activated Warning Signs (RIAWS) are provided on SH1, which are placed in advance of the intersection to slow traffic speeds from 100km/h to 70km/h when vehicles are either waiting to turn from SH1 or from the side road. In that respect, speed differentials are reduced to prevent excessive slowing of vehicles.

From a practical implementation perspective, the current northern edge of the formed State Highway 1 runs along the boundary of land owned by Kiwi Rail as shown in Figure 5-1. It is understood that an acceleration lane would require changes to the land ownership and designations so that the State Highway could use Railway Purposes land. Given the complexities, and intention that a roundabout will be constructed, this would not be a matter that the Applicant can influence, and is unlikely to occur.



Figure 5-1: SH1 Road Corridor and Boundaries

For the above various reasons, no acceleration lane is considered necessary.

6. SH73 / Bealey Road intersection

- (vi) Question: Please provide comment on the adequacy of the SH73 / Bealey Road intersection under an increased truck loading.

Response

Bealey Road joins SH73 on the outside of a bend in SH73. The intersection operates within an open road speed limit area and is give way controlled (Figure 6-1). A minor local road (Station Road) is located on the opposite northeastern side of the intersection. The left turn from SH73 east is provided with a left turn lane. Traffic volumes are moderate on SH73, with traffic volumes as follows:

- SH73 east 7,500vpd (13% heavy)
- SH73 northwest 6,400vpd (14% heavy)
- Bealey Road 1,350vpd (15% heavy)

We have visited the intersection and comment as follows:

- Sight lines to and from the intersection are good (photographs in Figure 6-2 and Figure 6-3);
- Heavy vehicle traffic currently makes all movements at the intersection, with no concerns with vehicle tracking identified;
- Vehicles turning to and from the intersection generally do so independently of other vehicles using the intersection;

- Approach speeds from the west on Bealey Road are slow as a result of the nearby level crossing.



Figure 6-1: Bealey Road Approach to SH73



Figure 6-2: Sightline looking east from Bealey Road



Figure 6-3: Sightline looking northwest from Bealey Road

As set out in section 9.3 of the ITA, quarry related turning traffic at the intersection will be a very low contribution with the Christchurch focus distribution scenario, likely less than 5 vpd. With the Selwyn focus distribution scenario turning traffic volumes are still only typically 33vpd at full production, which will be split across four turning movements. For example, based on Figure 9-4 of the ITA the turning volumes on a long-term average day will be approximately:

- 10vpd (or 1vph) left from Bealey Road, and 10vpd (or 1vph) right from SH73 northwest, and
- 6vpd (or 0.5vph) right from Bealey Road, and 6vpd (or 0.5vph) left from SH73.

Given the intersection already accommodates approximately 15% heavy vehicle turning movements, the change in performance will be negligible.

7. Bealey Road / Aylesbury Road intersection

- (vii) Question: Please provide comment on the adequacy of the Bealey Road / Aylesbury Road intersection under an increased truck loading, taking into account the railway level crossing.

Response:

The intersection operates within an open road speed limit area, and Aylesbury Road joins Bealey Road at a stop controlled intersection adjacent to the railway, as shown in Figure 7-1. Sightlines are good in both directions as shown in Figure 7-2 and Figure 7-3.

Traffic volumes on Aylesbury Road are recorded by Selwyn District Council as being approximately 750vpd. The Level Crossing has bells and lights, with flashing lights provided facing the Aylesbury Road approach. No specific road widening is provided at the intersection. Speeds across the railway level crossing were observed to be slow. A truck and trailer observed turning into Bealey Road from Aylesbury Road indicated it can make the movement whilst maintaining lane discipline. Whilst a truck and trailer was observed making the left turn from Bealey Road into Aylesbury Road, the vehicle tracking path was not able to be seen. Based on computer based vehicle tracking, it is likely that a truck and trailer will cross the centreline on Aylesbury Road over a short distance/time, and some evidence of edge break was observed on the inside of the road, likely from vehicles making that movement and / or drainage design. The very low traffic volumes on Aylesbury Road indicate low frequency of coincident vehicles turning left into Aylesbury Road whilst another vehicle is turning from Aylesbury Road.

As set out in the response relating to SH73 / Bealey Road, the additional traffic volumes are likely to be minimal with the expected Christchurch City traffic distribution focus. With the Selwyn District distribution focus, it is forecast that there will be approximately 1.5vph turning right, and 1.5vph turning left between Bealey Road (east) and Aylesbury Road when the quarry is fully operational. It is considered these traffic volumes will be accommodated at the intersection without adverse safety effects.



Figure 7-1: Aylesbury Road approach to Bealey Road intersection



Figure 7-2: Aylesbury Road approach Sightline looking East



Figure 7-3: Aylesbury Road approach Sightline looking West

8. Aylesbury Road Widening

- (viii) Question: Please advise whether any improvements (widening) of Aylesbury Road are required between Two Chain Road and the military camp. In this regard, the proposal is to widen Aylesbury Road to 8.0m, but Figure 3-1 shows that parts of Aylesbury Road ('near camp') is less than 8m in width. Would it be more appropriate for the whole road between the site and the highway to simply be upgraded as necessary to provide an 8.0m carriageway width rather than having narrower sections?

Response

The proposal to widen is based on the need to upgrade the 5.8m section of road that the development has greatest reliance and impact on. Widening to 8m enables 1.1m width to be added to both sides whereas a narrow edge widening will be less efficient, and not up to the Council preferred standard (per District Plan). While a narrower widening may be possible, we have sought to satisfy the Council standard where the major widening is warranted.

It is not proposed to carry out widening further south where a full two lane width (greater than 7m seal) already exists. That section is also arterial road and has a high traffic contribution from other traffic generators, and as such traffic effects from the quarry development do not warrant it.

9. Aylesbury Road Pavement Assessment

- (ix) Question: In addition to the widening, given the large increase in heavy vehicle numbers, can any further detail be provided regarding the pavement strength of the Aylesbury Road, and whether it is sufficient?

Response:

As Aylesbury Road is an Arterial Road, it is considered the pavement strength is not the responsibility of the Applicant. The road widening will enable the road to better accommodate the heavy vehicle demands of the activity. The Operative District Plan at Section 2 (Issue 2) sets out that road effects are addressed by Road User Charges. The site access design will be designed to accommodate the pavement loads, which from experience with other quarries in the Selwyn District is the greatest risk area and can be addressed by the Applicant at the time of construction the access.

10. SIDRA Model Parameters

- (x) Question: Please advise whether the Sidra modelling uses Users Class 2 or 6 ('heavy vehicles' or 'large trucks') for modelling the effects of the quarry traffic.

Response:

The SIDRA modelling uses the "Heavy Vehicles" classification to represent trucks, with quarries typically having a balanced profile of short through to long heavy vehicles..

11. SH1 / Aylesbury Road Intersection Upgrade

- (xi) Question: Although a roundabout at the SH1 / Aylesbury Road intersection has been "proposed" (paragraph 10.5.1), it is also at a very early stage (paragraph 6.2). What would be the outcomes if the roundabout was not to proceed, or be delayed? Are any other short-term measures required to improve the capacity of the existing priority intersection, such as extending the right-turn bay to allow for longer vehicles to queue here? In this regard, it would be helpful to understand the changes in the queue lengths for the existing right-turn bay (Table 10-3 only addresses the side roads).

Response:

As set out in Section 10.5.2 the applicant proposes to limit the traffic generated by the quarry to 250 vehicle movements per day (on any one day) prior to the upgrade of the SH1 / Aylesbury Road intersection to a roundabout. This will manage the effect to the level set out in the report and additional SIDRA Intersection analysis provided in response to (xiii).

The right turn bay 95% queue with the quarry operating at 33% of capacity is modelled at 2.3 vehicles (16.4m), in the 2030 AM peak (Christchurch focus average day) and 2.6 vehicles (19.1m) with the 2030 AM peak (Christchurch focus busiest day). This is an increase from 2.2 vehicles (15.7m) without the quarry, The changes in queuing will be imperceptible.

As a practical consideration of an occasional queuing event, in the event that a truck and trailer and two cars are queued from SH1 east waiting to turn right into Aylesbury Road, the total queue length will be approximately 39m. This is contained in the full width section of the existing right turn bay.

No changes to the intersection are considered necessary in the interim.

12. SH1 / Aylesbury Road Performance Prior to Roundabout Upgrade

- (xii) Question: Please can a further table be provided, similar to Table 10-4, which shows the effects of one third of the quarry traffic (i.e. the intersection performance under the proposed interim threshold).

Response:

A short-term assessment of traffic performance at the intersection is summarised in Table 12-1 below.

Table 12-1: SIDRA Assessment at 33% of Quarry Capacity, No SH1/Aylesbury Road Upgrade

Scenario	Performance delay in s/veh (95%ile queue in veh), and LOS (colour)		
	Year 2030	Year 2030 (Quarry at 33% capacity)	
	No Quarry	Average Day Quarry (Christchurch Focus)	Average Day Quarry (Selwyn Focus)
AM Peak			
Aylesbury Road North Approach	53 (3)	54 (3)	61(4)
Burnham Road South approach	>180 (28)	>180 (29)	>180(31)
Inter Peak			
Aylesbury Road North Approach	16 (2)	17(2)	17(2)
Burnham Road South approach	27 (1)	27(1)	28(1)
PM Peak			
Aylesbury Road North Approach	>180 (>30)	>180(>30)	>180(>30)
Burnham Road South approach	83 (3)	88(3)	91(4)

The rationale for the interim threshold is set out in the ITA at Section 10.5.2. As described in the ITA, the intersection is expected to continue to perform with high delays at peak times particularly associated with the peak time of movement in and out of the Burnham Military Camp. The limits proposed sought to minimise the changes in traffic volume particularly during the most critical PM peak period. The change in performance due to the quarry is unlikely to be noticeable given the overall level of performance with longer queues forecast.

13. Recommended Conditions of Consent Question

- (xiii) Question: The ITA suggests a number of minor improvement schemes (such as localised widening to allow for the movement of heavy vehicles), but some are 'suggested' rather than 'recommended' or 'required'. Please confirm that those measures that will form volunteered conditions of consent if the quarry was to be approved.

Response:

The ITA has set out in the Conclusion section of the Executive Summary the provisions and recommendations recommended to enable traffic related effects to be no more than minor. From a transportation effects perspective, it is considered the matters set out can be included as conditions of consent.

As set out in the AEE at 6.3, suggested conditions of consent have not been provided as part of this application. The AEE notes that suggested conditions will be provided to the Councils following receipt of any submissions arising from the public notification of the application.

14. Employee Travel

- (xiv) Question: Please comment on employee travel, in terms of numbers of vehicles, times of travel, directions of travel, and whether these vehicles have any effect on the modelling carried out.

Response:

Winstone has advised that approximately 16 people will work on-site. Staff will typically arrive at the start of the work day, with most spread across the period of 6am to 8am. Departure times will relate to quarry closing times. The large majority of Winstone staff live in Christchurch or Rolleston, although staff dwelling locations will vary over time.

The staff movements will not coincide with peak quarry truck movements, and will generally occur before the morning peak period associated with Burnham Military Camp. In the evening peak period the movements may be more likely to coincide with the surrounding road network peak, although there are a range of alternative routes. Given the arterial status of Aylesbury Road and the various routes available to make the journey to/from work, traffic movements will not have a noticeable impact on key intersections in the area, making up small percentage changes and being within existing day to day variation that would occur. No specific allowance has been made or is considered necessary for the modelling carried out.

15. Clarification on Description of Road Location

- (xv) Question: Please clarify the wording of paragraph 10.9 that refers to widening the "narrow section of Aylesbury Road between Two Chain Road and Aylesbury Road" - presumably the second reference to Aylesbury Road is not correct and should read 'site access'?

Response:

We confirm the typo as referred to in the RFI. The wording should read "the narrow section of Aylesbury Road between Two Chain Road and the site access".

16. Management of Local Road Usage

- (xvi) Question: The report states that Kerrs Road and Sandy Knolls Road should not be used, but the proposed condition of consent notes the "Implementation of a Transportation Route Management Plan that achieves as far as practicable ... no use of unsealed sections of Kerrs Road or Sandy Knolls Road". Please clarify the wording, as the Plan would seem to include a degree of flexibility.

Response:

The Transportation Management Plan can put in place measures that direct driver behaviour to achieve the recommended outcomes. However it is recognised that a quarry activity has many people from different organisations using the site, and there will be the potential that on occasion, some non-compliance could occur. As public roads that are legally enabled to accommodate traffic, such occasional non-compliance is expected to have negligible impact on the transport network and measures to address identified non-compliance will further minimise that. Quarry consent conditions, if required, can adopt suitable terminology and this will be considered in suggested conditions of consent following receipt of any submissions arising from the public notification of the application.

17. Traffic Volume Monitoring

- (xvii) Question: How is it proposed to robustly monitor the proposed thresholds of 45 vehicles per day on Two Chain Road, 10 heavy vehicle movements per day turning between Aylesbury Road (north) and Two Chain Road (east), and 10 heavy vehicle movements per day at the Wards Road / Aylesbury Road intersection?

Response:

There are several methods of monitoring available. Based on the likelihood and expected low consequence of some use, it is considered occasional monitoring surveys would be most suitable whilst the quarry establishes, and then less frequently once established. This would most likely involve an independent transport engineer recording by video method the access traffic movements, and movements at the same time at the intersections of interest. Manual matching of vehicles can be carried out to determine which vehicles are quarry related.

Please do not hesitate to contact the undersigned if you have any queries.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'AA Metherell'.

Andrew Metherell
Christchurch Traffic Engineering Team Lead
Stantec New Zealand