

DESIGN ADVICE MEMO

ACOUSTIC



Memo No A01
Job Name Two Chain Road - Business 2A Rezoning
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Date 24 September 2021
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Noise Implications of Rural Land Rezoning on Adjacent Rural Lots, and Allowable Business Activities

1. Introduction

Powell Fenwick has been commissioned by Novo Group Ltd and Two Chain Road Ltd to provide assessment of the noise implications of a proposed zoning change in the Selwyn District. The zoning change is the subject of a private plan change application.

The site, 7-183 Two Chain Rd, is between Walkers Rd to the West, Two Chain Rd to the north, and Main South Rd (State Highway 1) and the Main South Line Railway to the south as shown in Figure 1 below.



Figure 1. Site in red shade. (Source: Canterbury Maps)

The site is presently zoned Rural Inner Plains. Two Chain Rd Ltd propose the zoning is changed to Business 2A. Land to the north and north-west is Rural Inner Plains zoned. To the West is Rolleston Prison, zoned Rural Outer Plains, to the south are Living 3/Z/1 zones. To the east are Business 2 and 2A zones.

The potential uses may be general business and/or industrial and logistical activities as permitted in the Selwyn District Plan. Activities taking place nearby include life-style blocks and rural dwellings to the north, north-west, and south-west, and Rolleston Prison to the West. Further to the west is the Burnham Military Camp. Immediately to the south is the Main South Line followed by State Highway 1 (SH1) and residential lots to the opposing side, approximately 70 m away. To the east in the Business 2 zone the closest activities include an equipment hire business, a concrete casting lot, a restaurant and a car dealership.

2. Criteria

Any future development of the site would be subject to the Operative District Plan rules, which include relevant rural and living zone noise standards.

The plan gives protection to rural dwellings in rule 9.16:

9.16 Activities and Noise

Any activity shall be conducted so as to comply with the noise limits and within the time frames stated in the following tables in order to be a permitted activity:

...

Table C9.3 - Noise limits assessed at the notional boundary of any dwelling, rest home, hospital, or classroom in any educational facility except where that dwelling, rest home, hospital or classroom is located within a Living zone.

Hours	Noise Limit
7.30am - 8.00pm	60 dBA L_{10} 85 dBA L_{max}
8.01pm - 7.29am	45 dBA L_{10} 70 dBA L_{max}

...

Protection is afforded to living zoned properties as follows:

10.6.1

Any activity which is not a residential activity, spiritual activity or educational activity, shall be a permitted activity if the following noise limits are not exceeded within the time-frames stated.

7.30am - 8.00pm	50 dBA L_{10}
8.00pm - 7.30am	35 dBA L_{10}
7.30am - 8.00pm	85 dBA L_{max}
8.00pm - 7.30am	70 dBA L_{max}

...

The following rule is relevant to noise generation from B2A activities near to rural zoning:

22.4.1.5

Applying at any point within the boundary of any site in the rural zone, excluding road, waterway and railway reserves:

7.30 am - 8.00 pm	60dBA L_{10}
8.00 pm - 7.30am	40dBA L_{10}
7.30 am - 8.00pm	80dBA L_{max}
8.00 pm - 7.30 am	65dBA L_{max}

We note that rule 22.4.1.5 is the more stringent of the two rural noise rules, having several lower limits and applying anywhere within a rural site rather than at a notional boundary as per rule 9.16. The commentary below where related to rural noise is therefore primarily based on rule 22.4.1.5.

3. Reverse Sensitivity

When considering reverse sensitivity effects, the relative levels of neighbouring noise generation and the target site noise sensitivity need to be considered. In this case the business activities permitted on the site would not be sensitive to all but the loudest sources of noise.

- The Inner Plains areas to the north would not be expected to generate significant noise except perhaps for seasonal farming activities. The nature of the lifestyle blocks would make it unlikely that loud activities would take place on any scale, and the existence of the rural dwellings would discourage unreasonable activities taking place.
- The residential areas or the Prison would not be expected to generate significant noise.
- Noise from military activities is governed by rule 10.11.1 which is intended to protect more sensitive residential activities, therefore business activities would be minimally affected.
- The Business 2 zone includes activities compatible in nature to the Business 2A zoning proposed therefore there is no particular sensitivity identified.
- The Main South Line in this section is subject to typically sixteen train movements per day. Based on previous train pass-by measurements and with the distance of 10 m to the railway track we anticipate noise levels of 75-80 dBA at the south boundary of the site during a train pass by. This is a tolerable noise level for short periods.
- The Midland Line at the eastern end of the site has similar train movements but only has a short section of adjacency, so effects will be similar to those of the Main South Line over only a minor area of the site.
- SH1 at approximately 40 m away, based on calculations considering vehicle movements of more than 20,000 per day, the chip seal road surface type, 100 km/h rated speed, and reflecting surfaces on the south of SH1, would generate noise in the order of 65 dB $L_{Aeq(24h)}$ at the south boundary of the site. (The measure is an equivalent continuous noise level, loosely an “average”, over 24 hours.) This is a tolerable continuous noise level for undertaking work related tasks outside and where there are offices near the south boundary, standard construction methods can reduce the noise level to < 40 dBA for acceptable internal noise outcomes.

There are therefore no reverse sensitivity concerns with the establishment of Business 2A zoning on the site. The permitted activities will be less sensitive than rural activities that presently exist. With regards to the railway and highway noise, acoustic screening using fences or bunds would not be necessary.

4. Noise Generation

When considering noise generation effects, the relative levels of site noise generation and the neighbouring site noise sensitivity need to be considered.

The Inner Plains areas to the north would be the more sensitive receiving environment due to the residential activities - in comparison to the Living zones across the railway and highway, as the north side of Two Chain Rd would not be subject to the same rail and road noise.

Rural zones are given specific noise protection from Business zoned activities as Rule 22.4.1.5 is additionally stringent compared to noise received in rural zones from other rural activities in rule 9.16. In particular the day-time maximum noise criteria is 5 dB lower, and the night-time centile level and maximum criteria are also 5 dB lower than the values in rule 9.16. Further, the limits apply at the boundary of the rural site not the notional boundary and therefore this is additionally protective. (The benefit of the assessment position at the boundary rather than 20 m from the dwelling would depend on the specifics of the location of the noise source and the dwelling.)

There are existing Business 2A zones established immediately adjacent Inner Plains areas, including inland port activities, north of Rolleston town centre, north-east of this site (e.g. Izone and IPort Business Parks). Council has therefore previously accepted that activities within the B2A zone can operate effectively adjacent to the Rural Inner Plains Zone under the existing operative district plan noise standards.

Most business activities, if operating overnight, would take place at reduced levels. Those fronting the south side of Two Chain Rd may need to control noise output in order meet the 40 dB L_{A10} / 65 dB L_{Amax} boundary noise limits, although the road corridor width of 40.23 m (two chains) does provide a useful buffer.

Compliant noise generation from the site, at those night-time compliance limits when received *within* rural dwellings, would be below the World Health Organisation Guidelines for Community Noise 1999 internal design noise level guidance of 30 dB $L_{Aeq(8h)}$, and in the order of or less than 45 dB L_{Amax} which is a threshold relevant to avoidance of sleep disturbance events.

Other relevant neighbouring areas are briefly commented on as follows:

- The Prison would not be expected to be particularly noise sensitive and would also benefit from the noise assessment position being at the boundary.
- The Business 2 zone includes activities compatible in nature to the Business 2A zoning proposed therefore there is no particular sensitivity identified.
- Residential activities in Living zones will be subject to elevated noise levels from State Highway 1 traffic, in the order of 65 dB L_{Aeq} during the day-time and 55 dB L_{Aeq} during the night-time, accounting for a reduction due to the existing noise screening fence/bund. Comparing this to potential business activity noise at the allowable limits of 50 dB L_{A10} and 35 dB L_{A10} it is apparent that business activity noise, even if operating continuously up to the Living zone limits, would still be a minor contributor to the noise environment at the residential dwellings.

We note the Selwyn District Plan approach of applying underlying zoning to rail and road corridors. Presently these are zoned as Rural Inner Plains. This underlying zoning might be read as requiring noise compliance at the boundaries of those sites. However this is not standard acoustic assessment practice as infrastructure such as rail and road are considered, within reason, to be insensitive to noise generation from neighbouring sites. We would therefore consider the relevant points of assessment to be across the railways or roads e.g. at the south side of the Two Chain block the noise assessment position would be across SH1 at the boundaries of the residential lots.

In terms of business activities that would be permitted to take place, a range of business activities could be expected to be carried out, including general warehouse style activities, with consideration of noise mitigation if required.

Emphasis should be placed on locating, enclosing and/or screening of the louder activities, particularly if any of the activities may be carried out during the night-time assessment period. Night time activities would be more limited, particularly with regards to activities undertaken outside if near to the north rural boundary. The site has sufficient width to provide flexibility when considering the location of a range of tenant activities.

Any noisy activity should have a noise assessment carried out at initial planning stages to mitigate noise effects and compare noise outcomes to compliance limits.

5. Summary

Powell Fenwick was commissioned to comment on the viability, with regards to noise effects, of business activities taking place at a Two Chain Rd site in Selwyn District that is presently zoned Rural Inner Plains, but is proposed to be changed to Business 2A zone.

The permitted business activities would have less sensitivity to environmental noise than the existing rural activities, and would be tolerant of all identified sources of noise including the Main South Line and State Highway 1.

The Selwyn District Plan limits for business zoned noise generation at rural zoned properties of 60 dB L_{A10} applicable during the day-time assessment period, and 40 dB L_{A10} applicable during the night-time period are sufficiently permissive to allow for a range of business activities at the proposed plan change site.

The Selwyn District Plan limits for noise generation from any zone at living zoned properties of 50 dB L_{A10} , applicable during the day-time assessment period, and 35 dB L_{A10} applicable during the night-time period, are also sufficiently permissive for a range of business activities given the setback of around 70 m. Noise at these low levels is not expected to be significant given the elevated noise levels from SH1 and the Main South Line between the activities.

This conclusion would be subject to the nature of the specific activities and the operating hours, and appropriate acoustic input at planning and design stages to mitigate any potential noise effects.