



Project: **FARM CHIEF INVERCARGILL**

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## 1.0 SUMMARY

We have assessed noise from the proposed new Farm Chief farm machinery sales and servicing operation at 30 Wallacetown-Lorneville Highway, north of Invercargill.

Noisy activity on the site will typically include loading with forklifts and periodic testing of farm machinery in the workshop or outdoor areas. The proposed hours of operation are 7:00am-5:30pm.

We have predicted noise levels at the closest sensitive receivers and we anticipate the proposed activity will comply with the relevant noise limits at the nearby dwellings. We predict that noise will exceed the daytime limit by 4 decibels in the area in front of the Whitehouse Hotel. We have assessed the likely impact of this exceedance and conclude that, due to existing noise from State Highway 99, there would be no noticeable change in noise level.

We note that the type of noise sources proposed on the Farm Chief site are consistent with what one expects in a rural environment and that the noise effects will be reasonable for the area.

## 2.0 SITE DETAILS

The proposed new site is located at 30 Wallacetown-Lorneville Highway (Part Section 39 and 40 Block IX Invercargill Hundred). Figure 1 shows the proposed site layout and the surrounding area.

The proposed hours of operation on the site are 7:00am-5:30pm.

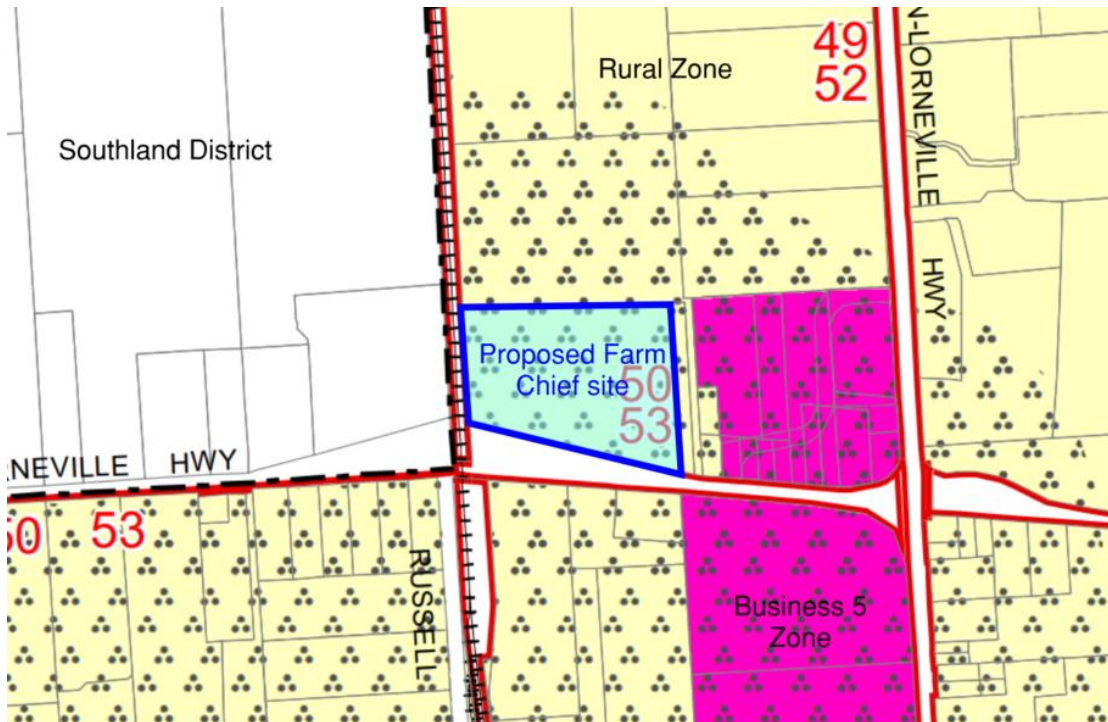
Figure 1: Site layout and surrounding area



## 2.1 The site is in a Rural zoned area

Figure 2 shows that the proposed site is located in the Rural Zone of the Invercargill City District Plan (District Plan). The area immediately to the west is a rail corridor, with the Southland District beyond. Sites to the east and south-east are zoned Business 5. State Highway 99 (SH99) is immediately to the south of the site, and SH6 is 250m east of the site.

Figure 2: District Plan zoning



Surrounding activities include:

- Rural farmland - on the existing site, to the north and west
- Business/industrial – Washingtons Exploration (drilling), Scania NZ (truck dealership), Dynamic Maintenance (pump and compressor maintenance)
- Retail/commercial – Super liquor, Whitehouse Hotel
- Road traffic – SH99 to the south of the site and SH6 250m east of the site

## 2.2 The closest receivers are approximately 100m away from the proposed activity

The nearby residential dwellings are located at 24 and 49 Wallacetown-Lorneville Road. The Whitehouse Hotel includes visitor accommodation, which is defined as a “noise sensitive activity” in the District Plan (see Section 3.1).

These receivers are located approximately 100m from the proposed Farm Chief outdoor testing area, where the noisy testing activity will typically occur.

## 2.3 Testing farm equipment is the noisiest proposed activity

Proposed testing of farm equipment would typically occur for five to ten minutes at a time and occur approximately 5 times a day. Despite this short duration, this activity is still the dominant noise source in our assessment.

Other more frequent or continuous noise sources, such as forklifts, staff/client vehicles entering the site, and some mechanical plant would have much lower noise levels, and therefore do not contribute to the assessed noise level.

We have based our assessment on the following equipment and sound power levels:

- Tractor (John Deere) towing impact roller L<sub>w</sub> 109 dB
- Silage wagon (measured at Farm Chief Rolleston) L<sub>w</sub> 106 dB
- Telehandler L<sub>w</sub> 91 dB
- Forklift L<sub>w</sub> 82 dB

The noise source sound power levels have been selected to represent a realistic worst-case noise level from these items of machinery. For example, the tractor is based on measurement of a tractor towing an impact roller. This activity requires the tractor motor to operate under greater load than is likely for most testing activity. Therefore, using this noise source represents a conservative assessment.

### 3.0 NOISE PERFORMANCE STANDARDS

The relevant noise rules for the proposed activity on the site are in the Invercargill District Plan (Part Three, General District Wide Matters).

#### 3.1 The daytime noise limit is 50 dB L<sub>Aeq</sub> at the neighbours' notional boundaries

The table in section Noise-R2 of the District Plan sets out noise limits for the various zones. Table 1 shows a summary of the relevant noise limits (the full table is presented in Appendix B). Table 1 only includes the daytime noise limits as the proposed hours of operation of the Farm Chief site occur during daytime hours.

**Table 1: Summary of District Plan noise limits**

Receiving Zone	Daytime (0700-2200) Noise limit (dB)	
	L <sub>Aeq</sub>	L <sub>Amax</sub>
<b>Rural Zone</b> – when measured at any point within the boundary of any other site within a Zone	65	85
<b>Rural Zone</b> – when measured at any point within the notional boundary of any Noise Sensitive Activity on a site within a Zone	50	80
<b>Business 5 – when measured...?</b>	65	85
<b>Not within Invercargill City</b> – when measured at any point within the boundary of any other site within a Zone	65	85
<b>Not within Invercargill City</b> – when measured at any point within the notional boundary of any Noise Sensitive Activity on a site within a zone	50	80

Of these limits, the most relevant for our assessment is 50 dB L<sub>Aeq</sub> at the notional boundary of a “Noise sensitive activity”. The definition of a noise sensitive activity includes dwellings and visitor accommodation i.e. closest neighbours and the Whitehouse Hotel.

#### 3.2 The RMA requires that noise is not unreasonable

Section 16 of the Resource Management Act (RMA) requires that the “best practicable option” (BPO) is adopted to ensure that noise does not exceed a reasonable level. To assess this, we have compared the predicted site noise against the existing ambient noise level from traffic (which we have predicted, not measured).

#### 4.0 PREDICTED NOISE LEVEL

We have predicted the noise emission from the proposed Farm Chief activity to the closest receivers.

##### 4.1 We have assessed a worst-case scenario and applied a duration adjustment

We have predicted the noise level based on the worst-case scenario of activity on the site. This includes a forklift operating continuously throughout the day and a tractor operating under high load (highest sound power source) being tested for a 15-minute period. It is unlikely that a tractor would be operated at this load continuously for 15 minutes during testing.

The predicted level for a worst-case 15 minute period is dominated by noise from the tractor, which is the loudest of the equipment to be tested. This higher noise sources from testing equipment would occur for considerably less than a quarter of the day.

The contribution of noise from the forklift is more than 20 decibels below the noise of the tractor. Therefore, even assuming a forklift operating continuously, the maximum duration adjustment of 5 decibels, in accordance with NZS 6802:2008 'Acoustics – Environmental noise', can be applied.

##### 4.2 Noise levels comply with 50 dB LAeq at all residential dwellings

Table 2 shows that the predicted rating noise levels are below the daytime noise limits at the notional boundary of the two closest dwellings.

The predicted level at the notional boundary of the Whitehouse Hotel exceeds the daytime noise limit. The potential effects of this exceedance are discussed further in Section 5.3.

**Table 2: Predicted rating noise level**

Receiver	Predicted rating noise level <sup>1</sup> (dB LAeq)
24 Wallacetown-Lorneville Road	48
49 Wallacetown-Lorneville Road	45
Whitehouse Hotel (39 Wallacetown-Lorneville Road)	54

<sup>1</sup> Includes a 5 dB duration adjustment

We do not anticipate that the noise sources will include any special audible characteristics (SAC) that would require an adjustment in accordance with NZS 6802:2008.

#### 5.0 NOISE ASSESSMENT

We have considered the effect of the proposed noise levels at the nearby receivers. We have not conducted noise monitoring to establish the existing noise environment. However, we have predicted traffic noise levels at the closest receiver and investigated the existing activity in the area (farm, business and road traffic activity).

##### 5.1 The character of the proposed noise is appropriate

The character of the proposed noise sources is consistent with the rural environment. This is confirmed by a District Plan exemption (Noise-R3) for "operational equipment...associated with primary production". This exemption specifically lists the type of machinery we have used in our assessment. The Council have determined that this exemption should not apply to this site (because it is being tested, not used for farming), but it does indicate that this type of equipment noise is expected in the Rural Zone.

Furthermore, because the land is currently used as farmland, the proposed Farm Chief activity is likely to be similar to the existing activity undertaken on the site and on surrounding sites.

## 5.2 Predicted Farm Chief noise levels are lower than existing road traffic noise

We have predicted the average noise level from SH99 at the dwellings based on the existing traffic flow and road surface. Table 3 shows that the predicted average daytime road traffic noise would be greater than the Farm Chief rating level at the nearby receivers.

Details of these calculations are included in Appendix C.

**Table 3: Predicted road traffic noise and rating noise level**

Receiver	Predicted Road traffic noise <sup>1</sup> (dB LAeq 7am-6pm)	Predicted rating noise level <sup>2</sup> (dB LAeq)
24 Wallacetown-Lorneville Road	50	48
49 Wallacetown-Lorneville Road	61	45
Whitehouse Hotel (39 Wallacetown-Lorneville Road)	69	54

<sup>1</sup> Average during daytime period

<sup>2</sup> Includes a 5 dB duration adjustment

We predict that noise from some equipment testing would be audible at 24 Wallacetown-Lorneville Road during periods of activity. However, this testing would occur for relatively brief periods throughout the day. Outside of these periods, the predicted Farm Chief noise level is considerably lower than the levels shown in Table 2.

Based on this, we consider that the potential noise effects would be acceptable at the nearby dwellings.

## 5.3 We predict no change in noise level at the Whitehouse Hotel

The predicted levels at the Whitehouse Hotel are up to 4 decibels above the daytime noise limit for the area. While this technically exceeds the daytime noise limit, we anticipate that there would be no noticeable change to the noise environment at this location for the following reasons.

### 5.3.1 Road traffic noise will be dominant

We have assessed the Farm Chief noise at the northern boundary of the Whitehouse Hotel site, which abuts SH 99. The calculated average road traffic noise in this area is 69 dB LAeq (24 hour).

Based on this, noise from the Farm Chief activity would be considerably lower than the existing road traffic noise. It is possible that noise from the Farm Chief activity would be occasionally audible.

### 5.3.2 Noise limits are designed to protect outdoor amenity

The District Plan states that “Daytime noise limits are intended to provide amenity for outdoor activities”. Figure 3 shows the area between the Whitehouse Hotel building and SH99. Aerial photos indicate that this area is used as a car park for patrons. It is unlikely that this area is used for “outdoor activities”, so the 4 decibel exceedance of the noise limit at the carpark is unlikely to generate any adverse effects.



Figure 3: Assessment area in front of the Whitehouse Hotel



## APPENDIX A GLOSSARY OF TERMINOLOGY

<b>A-weighting</b>	<p>A set of frequency-dependent sound level adjustments that are used to better represent how humans hear sounds. Humans are less sensitive to low and very high frequency sounds.</p> <p>Sound levels using an “A” frequency weighting are expressed as dB <math>L_A</math>. Alternative ways of expressing A-weighted decibels are dBA or dB(A).</p>
<b>Emission</b>	Sound that is generated by, and propagates away from a source.
$L_{Aeq}$	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.
$L_{Amax}$	The A-weighted maximum sound level. The highest sound level which occurs during the measurement period. Usually measured with a fast time-weighting i.e. $L_{AFmax}$
$L_w$	Sound Power Level. The calculated level of total sound power radiated by a sound source. Usually A-weighted i.e. $L_{WA}$ .
<b>Noise</b>	A subjective term used to describe sound that is unwanted by, or distracting to, the receiver.
<b>Notional boundary</b>	<p>A line 20 metres from any side of a dwelling, or the legal boundary where this is closer to the dwelling.</p> <p>This definition is from NZS 6802:2008.</p>
<b>Rating level</b>	<p>A derived level used for comparison with a noise limit. Takes into account any and all corrections described in NZS 6801 and NZS 6802, e.g. duration, special audible character, residual sound etc.</p> <p>This definition is from NZS 6802:2008.</p>

APPENDIX B DISTRICT PLAN NOISE RULES

**NOISE-R2 Noise Levels from Activities:**

1. All activities are to be designed and operated so that the following noise limits are not exceeded:

	Day time 0700 - 2200		Night time 2200 - 0700	
	L <sub>Aeq</sub>	L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>Amax</sub>
<b>When measured at any point within the boundary of any other site within a Zone:</b>				
Residential 1, 1A,1B, 2, 3, 4 and Otatarā	55dB	80dB	40dB	70dB
Rural	65dB	85dB	45dB	70dB
Business 1, 2, 3, 4, 5 and 6	65dB	85dB	50dB	75dB
Hospital and Airport Protection	55dB	80dB	45dB	75dB
Industrial 1	65dB	85dB	50dB	70dB
Industrial 2, 3 and 4	65dB	85dB	65dB	85dB
Smelter	No limit		No limit	
<b>When measured at any point within the notional boundary of any Noise Sensitive Activity on a site within a zone:</b>				
Rural	50dB	80dB	45dB	65dB
<b>When measured at any point not within Invercargill City:</b>				
At or within the boundary of any site	65dB	85dB	45dB	70dB
At the notional boundary of any dwelling	50dB	80dB	45dB	65dB

APPENDIX C ROAD TRAFFIC NOISE CALCULATION

Table 4: Road traffic noise calculation details

Input		
Vehicle flow rate (ADT)	5217 ( <a href="https://mobileroad.org/">https://mobileroad.org/</a> )	
Speed (km/h)	80	
% Heavy vehicles	8%	
Distance to receiver	Whitehouse Hotel	10m
	24 Wallacetown-Lorneville Road	215m
	49 Wallacetown-Lorneville Road	30m
Fraction of absorbing ground	Whitehouse Hotel	0
	24 Wallacetown-Lorneville Road	0.8
	49 Wallacetown-Lorneville Road	0.8
Road surface type	Grade 5 or 6 chip	