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File Ref: AC23063 – 03 – R1

26 May 2023

Drummond Contracting Ltd
c/- David Harford
David Harford Consulting Ltd
PO Box 603
ASHBURTON 7700

Email: david@dhconsulting.co.nz

Dear David,

Re: Drummond Contracting, 49 Mitcham Road, Ashburton
Assessment of Environmental Noise Effects

Acoustic Engineering Services (AES) have been engaged to provide acoustic engineering advice in relation to a retrospective Resource Consent application for Drummond Contracting Ltd, located at 49 Mitcham Road, in Ashburton. The Applicant requires an assessment of the environmental noise emitted by this activity, with regard to section 104 (1) of the Resource Management Act 1991 (RMA), which requires the actual and potential effects of the activity on the environment to be considered.

Our analysis is based on our correspondence and the following documentation:

- Planning summary for Resource Consent titled *Daniel Drummond Contracting Ltd* received from David Harford via email with subject line *Daniel Drummond Contracting Ltd- 49 Mitcham Road Ashburton- Acoustic Assessment* and dated the 6th of March 2023.

- Site plan titled *Proposed agriculture contracting yard – 49 Mitcham Road, Ashburton*, received from David Harford via email with subject line *Daniel Drummond Contracting Ltd- 49 Mitcham Road Ashburton- Acoustic Assessment* and dated the 6th of March 2023.

- Map of site and surrounding area legal descriptions titled *Location Plan,* derived from LINZ data and dated the 3rd of March 2023.

Please find our analysis and recommendations below.

1.0 SITE AND PROPOSAL

Drummond Contracting Ltd is located at 49 Mitcham Road. The site and all those adjacent on the West side of Mitcham Road are located within the Rural A zone as defined within the Ashburton District Plan. The nearby sites on the East side of Mitcham Road are located within the Rural B zone.

The site and surrounding area are shown below in figure 1.1.

Figure 1.1 – Site and surrounding areas

The legal description and other details of the relevant surrounding properties are as follows:

1. Lot 1 Deposited Plan 563991 (29 Mitcham Road)
2. Lot 2 Deposited Plan 40373037 (37 Mitcham Road)
3. Lot 1 Deposited Plan 358547 (48 Mitcham Road)
4. Lot 1 Deposited Plan 1395 (70 Mitcham Road)
5. Lot 2 Deposited Plan 347628 (75 Mitcham Road)
6. Lot 1 Deposited Plan 360842 (87 Mitcham Road)

The site is used to store contracting equipment, and limited amounts of hay and baleage not grown on the property for clients. The Applicant's live and will continue to live on the property as part of the site activity. The activity on site relevant to this retrospective Resource Consent application will occupy approximately 6,400 m^2 of the 10.1 hectare site.

We understand that equipment stored on site is limited to up to six tractors plus hay mowers, hay rakes, balers, baleage wrappers, and carting trailers. The limited amounts of baleage stored on the site are in individually wrapped bales, stacked a maximum of three high (total height of 4 metres). Hay bales are stored in a covered stack, a maximum of six bales high (total height of 6 metres). Both stacks are temporary, and material will be removed from site during the year as required by clients. The applicant has also noted that some baleage and haystacks belonging to the owner of the property are stored with the client's material and are for their own use on the site during the winter period.

The majority of activity on site occurs between the summer months of October and April. Activity occurs on site from 0700 to 2400 hours during the summer months. There is no pattern to the arrival and departure of contracting vehicles, but from correspondence with the applicant we understand that during the summer period tractors and equipment will typically leave the contracting yard during the morning and return during the evening which will generate up to twelve contracting vehicle movements per day. A maximum of 26 vehicle movements per day is anticipated during the summer period when including staff, servicing, and delivery vehicles.

During the remainder of the year activity will be limited to tractors and trailers delivering hay and baleage between 0700 to 1900 hours, with a maximum of four contracting vehicle movements per day and a total of 8 vehicle movements when including staff, servicing, and delivery vehicles.

A maximum of five staff are employed on the site and staff movements are dependent on whether contracting machinery is stored on site or at client properties overnight. Subcontractors may be required to visit the site during peak period to pick up and drop off equipment.

Access to the site is via the existing unsealed driveway. We understand the existing driveway entrance will be upgraded so that the entrance gateway is recessed a minimum of 3 metres up the driveway from its current position to enable vehicles to park clear of the Mitcham Road carriageway.

Tractors and equipment will predominantly be serviced on site by specialist servicing companies for minor repairs or maintenance. Major equipment and tractor repairs will occur off site.

The proposed site plan is as shown in figure 1.2 below.

Figure 1.2 – Proposed site layout

2.0 ACOUSTIC CRITERIA

The Resource Management Act requires consideration of the significance of any adverse effects associated with the proposal. Guidance as to the significance of any adverse noise effects may be obtained from several sources.

2.1 Ashburton District Plan

As outlined in section 1.1 above, the site and nearby properties on the West side of Mitcham Road are located in a Rural A Zone. The nearby properties East of Mitcham Road are located in a Rural B Zone. The applicable noise limits for the different zones are outlined in Rule 11.8.1 *Noise Standards for Zones* of the Ashburton District Plan, as reproduced below.

> *11.8.1 Noise Standards for Zones*
>
> *a) The noise level from activities within any other site shall not exceed the limits set out in Table 11-1 below:*

Table 11.1: Noise Limits

	Daytime (0700 – 2200 hours inclusive)		*Night-time (all other times)*	
	$L_{Aeq\ (1\ hour)}$	L_{AFmax}	$L_{Aeq\ (1\ hour)}$	L_{AFmax}
When measured at or within the boundary of any site zoned:				
Rural A and B	*65 dB*	*85 dB*	*45 dB*	*70 dB*
When measured at the notional boundary of any residential unit on an adjoining site zoned:				
Rural A and B	*50 dB*	*75 dB*	*40 dB*	*65 dB*

The Rule notes the daytime noise limits are intended to provide amenity for outdoor activities. Night-time noise limits are intended to allow for sleep amenity.

2.2 New Zealand Standard 6802

NZS 6802:2008 outlines a guideline daytime limit of 55 dB $L_{Aeq\ (15\ min)}$ and a night-time noise limit of 45 dB $L_{Aeq\ (15\ min)}$ for "the reasonable protection of health and amenity associated with the use of land for residential purposes". A 75 dB L_{AFmax} night-time limit is also recommended for dwellings.

2.3 World Health Organisation

Guidelines for Community Noise (1999), a document produced by the World Health Organisation based on extensive international research recommends a guideline limit of 55 dB $L_{Aeq\ (16\ hours)}$ to ensure few people are seriously annoyed in residential situations. A guideline limit of 50 dB $L_{Aeq\ (16\ hours)}$ is recommended to prevent moderate annoyance. Guideline night-time limits of 45 dB $L_{Aeq\ (8\ hours)}$ and 60 dB L_{AFmax} are recommended to allow occupants to sleep with windows open.

These guidelines are measured at the façade of dwellings and other noise sensitive locations and the L_{Aeq} limits apply for 16 hours in the daytime, and 8 hours for the night-time.

2.4 Existing ambient noise

The site is located approximately 475 m Northwest of State Highway 1. To provide an indication of the nature of the existing ambient noise environment in the vicinity of the site, a site visit was conducted by Josh McDougall of AES on the 3rd of April 2023 between 1330 and 1500 hours. Ambient noise measurements were conducted in general accordance with NZS 6801:2008 *Acoustics – Measurement of Environmental Sound*.

Measurements were taken at the boundary of 48 Mitcham Road, at the entrance to 75 Mitcham Road, and in the centre of the contracting yard. During the measurement periods it was noted that the background noise levels were dominated by traffic on State Highway 1. Ambient noise levels measured at the three locations were between 46 dB $L_{Aeq(15\ min)}$ and 49 dB $L_{Aeq(15\ min)}$. We expect ambient noise levels to be lower during the night-time period. Maximum noise levels in the region of 82 to 84 dB L_{AFmax} were measured at the roadside boundary of 48 Mitcham Road from vehicles passing on the road.

2.5 Discussion regarding appropriate noise levels

We observe that the Ashburton District Plan L_{Aeq} noise limits which apply at the notional boundary of the closest dwellings are generally more stringent than the upper guideline values in the WHO guidance and NZS 6802 for the protection of sleep and residential amenity.

We therefore expect that if the daytime District Plan limit of 50 dB $L_{Aeq(1\ hour)}$ is met at the notional boundary of any nearby dwellings, noise effects will be acceptable. Noise of this order is also generally consistent with the daytime ambient noise levels measured in the area.

During the night-time, we expect that noise levels of less than 40 dB $L_{Aeq(1\ hour)}$ at the notional boundary of nearby dwellings will also be acceptable, consistent with the District Plan. Maximum noise levels of up to 70 dB L_{AFmax} are also expected to be acceptable. We note that this is higher than the District Plan limit of 65 dB L_{AFmax} but is still lower than the guideline limit of 75 dB L_{AFmax} outlined in NZS 6802:2008.

The dwelling at 48 Mitcham Road is opposite the site access, but will also be exposed to noise from vehicles passing on Mitcham Road which is not captured by the District Plan noise limits. At this location, we consider that if noise levels remain below 45 dB $L_{Aeq(1\ hour)}$ at the dwelling facade, and maximum noise levels are within 2 dB of those expected from typical vehicles passing on Mitcham Road ($\leq$ 76 dB L_{AFmax}) the noise effects would be acceptable. This assessment should include the offsite contribution from the heavy vehicle travelling on Mitcham Road.

3.0 NOISE GENERATED BY THE ACTIVITY

Worst-case noise emissions from activity associated with the operation of the contracting yard have been calculated in three-dimensional acoustic prediction software SoundPLAN V8.2. The most recently available DEM data for the area was used to create a terrain model, with existing buildings imported from the LINZ property database.

Based on the operational details provided by the Applicant, the most significant potential noise sources are expected to be:

- Use of the driveway by heavy vehicles
- Vehicles operating in the main machine yard
- Use of the workshop

We expect that there will be other noise sources associated with the contracting yard; however, these will generate lower noise levels than those identified above.

3.1 Noise measurements

Measurements were conducted in order to determine noise from the vehicles and equipment associated with the operation of the Drummond Contracting Ltd site. Based on information provided by the Applicant the following vehicles were determined to generate the most noise:

- Merlo TF 42.7 telehander
- Merlo TF 35 telehander

- Fendt 415 tractor with mowers
- Valtra 121 tractor with Massey Ferguson 2250 Baler

Noise measurements of the vehicles and equipment were conducted during the midday period on a Monday. Details of the measurements completed in general accordance with NZS 6801:2008 *Acoustics – Measurement of Sound* and are as follows:

Date and time: 1330 – 1500 hours on the 3rd of April 2023

Personnel: Joshua McDougall, Acoustic Engineering Services

Weather: Fine, light winds, mild temperature (10 - 18 °C)

Instrumentation: Brüel & Kjær Type 2250 Class 1 Sound Analyser
(Serial Number 3025183, last calibrated 20 April 2021)
Brüel & Kjær 4231 Acoustic calibrator
(Serial Number 3011404, last calibrated 17 February 2023)

Convergence Instruments NSRTW_mk3 wireless sound level meter datalogger
(Serial Number 5123A-WGM110, last calibrated 21 June 2022)

Field calibration: The analyser was calibrated before measurements, and the calibration checked after measurements. No significant changes were noted (<0.1 dB).

Settings: A weighting (dBA), fast response.

Our SoundPlan noise model was calibrated to give results consistent with these measurements. Our assumptions are described in more detail in sections 3.2 to 3.5 below, with cumulative noise predictions in section 3.6.

3.2 Noise from the driveway

The main vehicle access is from the driveway off Mitcham Road. Based on correspondence with the Applicant we understand the most significant noise generating vehicles expected to use the driveway include:

- Tractors towing a baler or trailer
- Merlo telehandlers
- Pickup trucks

As outlined above, a range of vehicles are expected on site. Based on the results of our measurements we have considered a worst-case heavy vehicle movement scenario of a tractor towing a trailer with a sound power level of 105 dB L_{wA} travelling at 10 km/hr using the driveway to access the site.

As described above, based on correspondence with the applicant we understand up to 26 vehicles could occur during a single day, with 12 being tractors and other contracting equipment.

Based on these traffic volumes we have considered a worst-case daytime period where 6 heavy vehicle movements occur in a single hour (where a vehicle movement is the arrival or departure of a vehicle using the driveway). We have also assumed a worst-case night-time period where two heavy vehicle movements occur in a single hour.

3.3 Noise from the main machine yard

We understand from correspondence with the applicant that no rural equipment except the vehicles (Tractors, Merlo telehandlers, and pickup trucks) are operated in the machine yard. Therefore, based on our measurements we have considered a worst-case scenario where a single tractor with sound power level of 96 dB L_{wA} idles for a 15-minute period within a given hour during the daytime period and 90 seconds during the night-time period.

3.4 Noise from the workshop

We understand the workshop will be used for machinery repairs and maintenance. We have considered a worst-case scenario where a power tool such as a power saw with a sound power level of 100 dB L_{wA} is operated outside, for 15 minutes within a given hour during the daytime period. We have also considered a single piece of equipment with a sound power level of 90 dB L_{wA} being operated outside for 10 minutes within a given hour during the night-time period. These are expected to be conservative assumptions.

3.5 Acoustic mitigation

From correspondence with the applicant, we understand that the proposal is to build an L-shaped barrier out of balage stacks and plant vegetation along the site boundary adjacent to Mitcham Road. Because foliage and vegetation are not considered effective noise barriers and the balage stacks are not a permanent noise barrier, we have conducted our analysis based on the assumption that neither of these features provide acoustic mitigation.

Additional acoustic mitigation measures are not considered practical to implement as the critical noise generated by activity on the site occurs when vehicles exit or enter the site driveway.

3.6 Predicted noise emissions

Based on the scenarios outlined in section 3.0 – 3.5 above, cumulative daytime and night-time noise levels have been calculated in accordance with NZS 6802:2008. The predicted noise emissions received at neighbouring sites are given in table 3.1 below with District Plan exceedances highlighted in orange. We note that any noise from contracting equipment and vehicles when not on the site has not been included in the following analysis, and is considered in section 3.7 below.

We note that our calculations do not include any duration adjustment, even where this would be possible under NZS 6802. This is conservative for daytime predictions, because the levels presented above are representative of peak periods, and levels are expected to be lower at other times. An energy average adjustment in accordance with section 6.4.6 of NZS 6802:2008 is therefore likely to apply on all days.

Table 3.1 – Predicted noise emissions

Site reference	Neighbouring site	Acoustic criteria (daytime)	Predicted noise rating level (daytime)	Acoustic criteria (night-time)	Predicted noise level (night-time)
When assessed at the boundary of the site					
1	Lot 1 Deposited Plan 563991	65 dB $L_{Aeq(1\ hour)}$ 85 dB L_{AFmax}	39 dB $L_{Aeq(1\ hour)}$	45 dB $L_{Aeq(1\ hour)}$ 70 dB L_{AFmax}	34 dB $L_{Aeq(1\ hour)}$
			63 dB L_{AFmax}		63 dB L_{AFmax}
2	Lot 2 Deposited Plan 40373037		36 dB $L_{Aeq(1\ hour)}$		<30 dB $L_{Aeq(1\ hour)}$
			55 dB L_{AFmax}		55 dB L_{AFmax}
3	Lot 1 Deposited Plan 358547		48 dB $L_{Aeq(1\ hour)}$		42 dB $L_{Aeq(1\ hour)}$
			79 dB L_{AFmax}		79 dB L_{AFmax}
4	Lot 1 Deposited Plan 1395		40 dB $L_{Aeq(1\ hour)}$		33 dB $L_{Aeq(1\ hour)}$
			59 dB L_{AFmax}		59 dB L_{AFmax}
5	Lot 2 Deposited Plan 347628		45 dB $L_{Aeq(1\ hour)}$		37 dB $L_{Aeq(1\ hour)}$
			66 dB L_{AFmax}		66 dB L_{AFmax}
6	Lot 1 Deposited Plan 360842		33 dB $L_{Aeq(1\ hour)}$		<30 dB $L_{Aeq(1\ hour)}$
			56 dB L_{AFmax}		56 dB L_{AFmax}
When assessed at the notional boundary of the nearest residential unit					
1	Lot 1 Deposited Plan 563991	50 dB $L_{Aeq(1\ hour)}$ 75 dB L_{AFmax}	38 dB $L_{Aeq(1\ hour)}$	40 dB $L_{Aeq(1\ hour)}$ 65 dB L_{AFmax}	32 dB $L_{Aeq(1\ hour)}$
			61 dB L_{AFmax}		61 dB L_{AFmax}
2	Lot 2 Deposited Plan 40373037		34 dB $L_{Aeq(1\ hour)}$		<30 dB $L_{Aeq(1\ hour)}$
			53 dB L_{AFmax}		53 dB L_{AFmax}
3	Lot 1 Deposited Plan 358547		48 dB $L_{Aeq(1\ hour)}$		42 dB $L_{Aeq(1\ hour)}$
			79 dB L_{AFmax}		79 dB L_{AFmax}
4	Lot 1 Deposited Plan 1395		39 dB $L_{Aeq(1\ hour)}$		32 dB $L_{Aeq(1\ hour)}$
			59 dB L_{AFmax}		59 dB L_{AFmax}
5	Lot 2 Deposited Plan 347628		43 dB $L_{Aeq(1\ hour)}$		36 dB $L_{Aeq(1\ hour)}$
			64 dB L_{AFmax}		64 dB L_{AFmax}
6	Lot 1 Deposited Plan 360842		32 dB $L_{Aeq(1\ hour)}$		<30 dB $L_{Aeq(1\ hour)}$
			55 dB L_{AFmax}		55 dB L_{AFmax}

Our analysis therefore indicates that there is a level of activity in both the daytime and night-time periods that would comply with the District Plan $L_{Aeq(1\ hour)}$ and L_{AFmax} noise limits at all properties except 48 Mitcham Road (site reference 3) which is opposite the access. At the notional boundary of this dwelling both the day and night-time L_{AFmax} limits and night-time $L_{Aeq(1\ hour)}$ limit would be exceeded. The night-time dB L_{AFmax} limit would also be exceeded at the site boundary of this property. We have discussed the associated noise effects relating to this non-compliance in section 3.7 below, including the "off-site" contribution of vehicle movements on the access.

3.7 Off-site noise generated by the activity

Sections 3.0 – 3.6 consider noise from the "on-site" portion of the activity – relevant for comparison to the District Plan limits. However, Council may have wider discretion to consider noise off the site, to consider other aspects of the activity that may not comply with the District Plan.

When including the off-site component of the heavy vehicle movements on Mitcham Road, noise levels of 49 dB $L_{Aeq(1\ hour)}$ during the daytime period are expected at the façade of the residential dwelling located at 48 Mitcham Road (site reference 3). Noise levels of 44 dB $L_{Aeq(1\ hour)}$ and 76 dB L_{AFmax} are expected during the night-time period at the façade of the dwelling located at 48 Mitcham Road.

The predicted L_{Aeq} noise levels are consistent with the criteria recommended in section 2.5, and the maximum (dB L_{AFmax}) levels are of a similar order at this dwelling façade to those from vehicles travelling on Mitcham Road (74 dB L_{AFmax}). A 2 dB increase in L_{AFmax} noise levels is typically considered imperceptible and so, provided the number of night-time vehicle movements is low, and generally occurs at times when there is likely to be other traffic on the road, then the noise effects associated with the assessed level of activity will be acceptable.

4.0 CONCLUSIONS

Noise from sources associated with the Drummond Contracting Ltd site have been considered. The main noise sources associated with the operation of the Drummond Contracting site will be use of the driveway by heavy vehicles, vehicles operating in the main machine yard, and use of the workshop.

Our analysis indicates that noise levels from the operation of this yard can generally comply with the Ashburton District Plan limits at nearby properties with appropriate limitations on night-time activity. The property at 48 Mitcham Road is an exception, as it is on the other side of the road from the site access, and maximum noise levels from vehicles on the driveway will exceed the Ashburton District Plan limits at the site and notional boundaries.

However, this dwelling is also exposed to noise events from vehicles passing on Mitcham Road and the maximum (dB L_{AFmax}) levels from vehicles accessing the site are of a similar order at the façade to noise from those events. If there are only two night-time heavy vehicle movements on the access in an hour, noise levels at this dwelling façade will also remain below 45 dB $L_{Aeq\ (1\ hour)}$ which is consistent with the WHO night-time criterion for protection against sleep disturbance where dwelling occupants have windows open for ventilation. We therefore consider that noise effects would be acceptable provided the following controls on night-time activity are implemented. These could be developed further into conditions of consent.

- There shall be no more than two heavy vehicle movements an hour between 10 pm and 12 am on the driveway.
- While some level of maintenance activity can occur in the night-time period, this should be limited to lower noise activities, with no sustained use of high-noise power tools, and undertaken within the workshop, with doors closed where practicable.
- Vehicles must not idle for extended periods in the yard during the night-time period (10 pm – 7 am).

Please do not hesitate to contact me if you wish to discuss further.

Kind Regards,

Joshua McDougall
BE Hons (Mech)
Acoustic Engineer
Acoustic Engineering Services