

471 Cambridge Road Rezoning

Noise Assessment



Ref: 24001-3 471 Cambridge Road Rezoning - NA
27 February 2025

Executive Summary

Rezoning of three lots is proposed, at 471 Cambridge Road and 528 and 540 Pass Road, Mornington. The proposal comprises rezoning of these lots (the site) from Rural Living to General Residential. The site is adjacent a Green Waste Composting Facility (the composting facility) and Hydrowater Treatment Facility (the hydrowater facility) situated to the south of site. NVC has previously prepared a Noise Assessment and a Letter of Clarification in response to a previous RFI from Council. Council has issued a subsequent RFI, requesting software noise modelling across site (the aforementioned documents are all referenced in the body of this report). This document presents a revised Noise Assessment following the inclusion of software noise modelling of noise emissions from surrounding activities.

To the north of site is the Tasman Highway, a large, high-speed dual carriageway experiencing significant traffic volume at all times of day and night. The majority of site is situated above the level of the highway's surface, and thus experiences significant traffic noise due to clear line of sight.

To the south of site, within the General Industrial zone, are two existing EPA-controlled facilities; a Green Waste Composting Facility, and a Hydrowater Treatment Facility, with both sites located on the Mornington Park Waste Depot site. As these facilities are EPA-controlled activities, each operates under an environmental permit stipulating allowable noise emissions of 50 dBA at the worst-affected residential boundary. Details of these criteria are discussed in Section 2 of this report. Two additional industrial sites (not EPA-controlled) are located between site and the EPA-controlled activities, comprising landscaping supplies (DecorEarth) and firewood supplies (Firewood To U).

The operational details of the four activities are based on discussion between NVC and the operators, as well as NVC's experience with similar sites, previous on-site observations, and current and historical satellite imagery.

Unattended and attended noise measurements have been conducted on site adjacent the nearest site boundary, with observations during these measurements showing noise due to vehicles on the Tasman Highway was a consistent and dominant noise source. Noise from the industrial sites to the south of site was generally inaudible, with occasional brief periods where noise perceived to be from the screening at DecorEarth was just audible near the boundary of site.

Software noise modelling has been carried out, with key noise sources at the two EPA-controlled activities modelled to be operating continuously and simultaneously. Noise level were predicted to be nominally 27 to 30 dBA across site, resulting in noise from these activities being entirely inaudible across site. Additional modelling was carried out to include the addition of DecorEarth and Firewood To U to determine the potential for annoyance at future dwellings, with results showing noise levels across site reaching nominally 48 dBA on the southern portion of site (nearest to industrial activities). This is nominally 2 dB below the 50 dBA criterion for 'moderate annoyance' as outlined within the TAS Noise EPP, and thus the amenity residents is protected.

Additionally, to comply with the tightest relevant interior design sound level under AS 2107 of 35 dBA, a noise level reduction from outside to inside of 13 dB is required. Any modern facade construction will comfortably achieve this level of isolation, including with a partially ajar window, and thus no specific requirements for future residential dwelling facade construction are deemed necessary.

Therefore, following unattended and attended noise measurements, as well as software noise modelling of site, development for sensitive use at 471 Cambridge Road and 528 and 540 Pass Road, Mornington, will not interfere with, or constrain the existing Green Waste Composting Facility or the Hydrowater Treatment Facility, and thus Clause C9.5.2 of the Tasmanian Planning Scheme is satisfied.

Additionally, noise levels across site resulting from activities at the industrial sites of DecorEarth and Firewood To U are sufficiently low, such that the residential amenity of occupants of future residential dwellings is protected.

As such, rezoning of 471 Cambridge Road and 528 and 540 Pass Road, Mornington from Rural Living to General Residential is deemed appropriate regarding noise levels from the nearby industrial operations.

471 Cambridge Road Rezoning Noise Assessment

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1. BACKGROUND

Rezoning of three lots is proposed, at 471 Cambridge Road and 528 and 540 Pass Road, Mornington. The proposal comprises rezoning of these lots (the site) from Rural Living to General Residential. The site is adjacent a Green Waste Composting Facility (the composting facility) and Hydrowater Treatment Facility (the hydrowater facility) situated to the south of site. As such, the proponent has requested a Noise Assessment to accompany the DA. NVC has previously prepared a Noise Assessment¹ and a Letter of Clarification² in response to a previous RFI³ from Council. Council has issued a subsequent RFI⁴, requesting software noise modelling across site. This document presents a revised Noise Assessment following the inclusion of software noise modelling of noise emissions from surrounding activities, completed by NVC in February 2025.

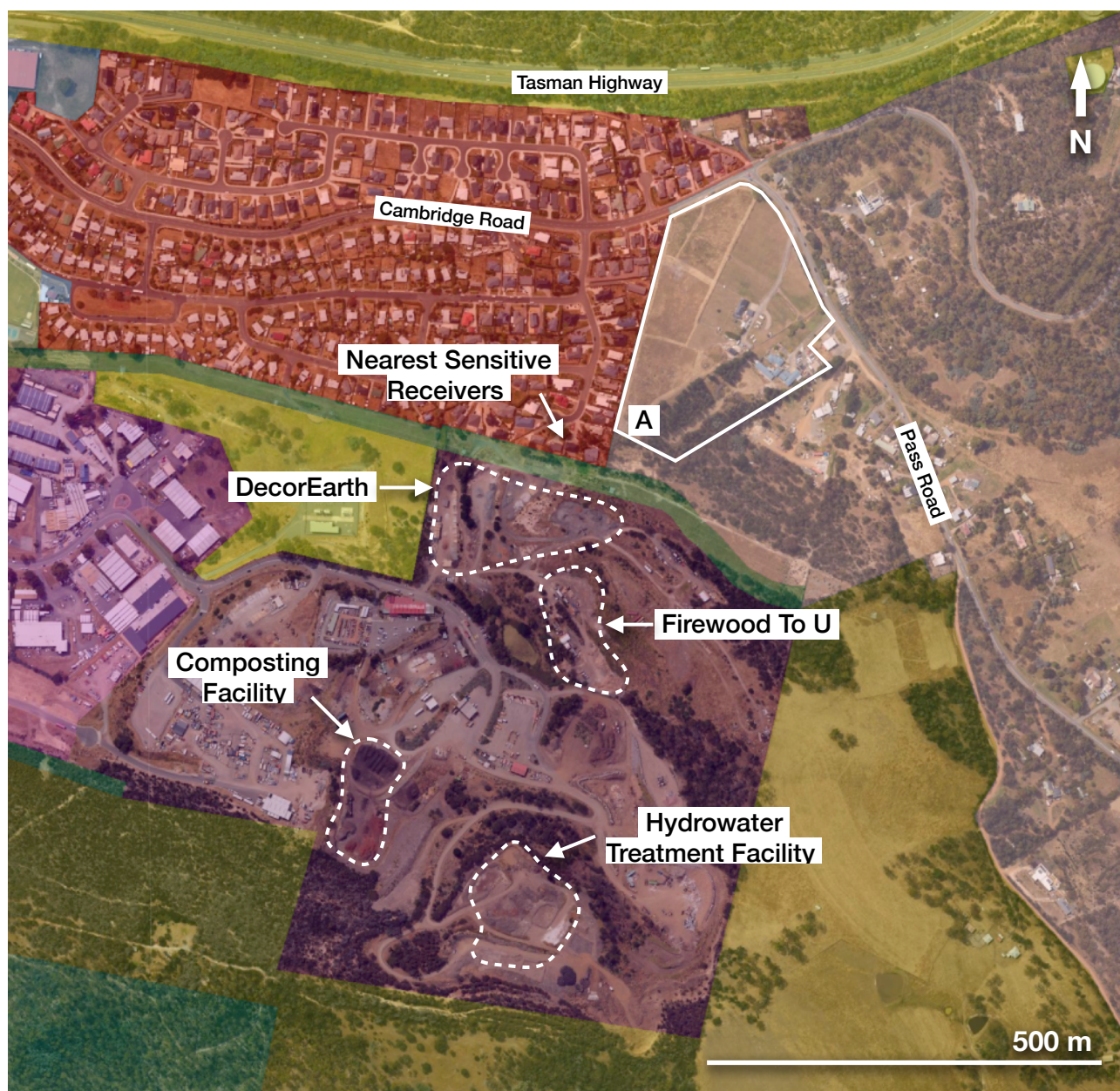


FIGURE 1.1: SITE AND SURROUNDING AREA

¹ '471 Cambridge Road - Noise Assessment', Ref: 24001 471 Cambridge Road - NA, NVC, 26/01/24

² '471 Cambridge Road - Letter of Clarification', Ref: 24001-2 Letter of Clarification, NVC, 08/04/24

³ Reference Number: PDPSAMEND-2023/038187, City of Clarence, 20/03/24

⁴ Reference Number: PDPSAMEND-2024/048902, City of Clarence, 22/01/25

1.1. SITE AND SURROUNDS

The proposed site comprises three existing lots located at 471 Cambridge Road, and 528 and 540 Pass Road, Mornington. The lots are largely vacant land, with 471 Cambridge Road being entirely vacant, and 528 and 540 Pass Road each containing a single residential dwelling. The lots feature a moderately steep gradient, the lowest point being adjacent Cambridge Road, with elevation increasing to the south-west.

The site is currently within a Rural Living zone (tan overlay in Figure 1.1), with General Residential (red) to the west and General Industrial (purple) zoning to the south. An Open Space zone is located immediately to the south of site, providing a buffer between the site and the General Industrial zone. The proponent is proposing to rezone the site from Rural Living zoning to General Residential zoning, in preparation for a residential subdivision.

The southern boundary of site is nominally 65 m from the nearest boundary of the General Industrial zone, and over 100 m from the nearest potentially active areas within these facilities (northern edge of DecorEarth).

To the north of site is the Tasman Highway, a large, high-speed dual carriageway experiencing significant traffic volume at all times of day and night. The majority of site is situated above the level of the highway's surface, and thus experiences significant traffic noise due to clear line of sight.

This noise assessment is intended to ensure that noise levels are sufficiently low, such that the operation of the existing facilities are not constrained, and the residential amenity of future residents is protected.

1.2. EXISTING SURROUNDING ACTIVITIES

To the south of site, within the General Industrial zone, are two existing EPA-controlled facilities comprising a Green Waste Composting Facility, and a Hydrowater Treatment Facility, with both sites located on the Mornington Park Waste Depot site. As these facilities are EPA-controlled activities, each operates under an environmental permit stipulating allowable noise emissions. It is noted that NVC has been made aware that a quarry has previously operated adjacent the Hydrowater Treatment Facility, however the EPA has been informed that as of 2022, the site is no longer operational and is being rehabilitated.

NVC has been unable to obtain details regarding the specific operations of the Green Waste Composting Facility, with some broad details obtained of the Hydrowater Treatment Facility. As such, NVC's experience with similar sites, as well as satellite imagery and previous observations on the Mornington Park Waste Depot site, have been used to determine appropriate on-site equipment, with a broad outline of the assumed operations provided below:

Green Waste Composting Facility

- Open air composting of green waste from residential sites and light commercial activities.
- It is assumed that material arrives on site largely processed, with no de-barking and/or chipping required.
- A single trommel screen is operated to separate fines from larger product sizes.
- Two front-end loaders are operated, one to move product around, and one to load the trommel screen as required.
- A single 20 T excavator operates to aid in stock piling of material and unloading of trucks.

Hydrowater Treatment Facility

- Processing and treatment of contaminated water, which may include Low Level Contaminated Soil.
- Two front-end loaders are operated, both to move product around and deposit reagents onto soils.
- A single 20 T excavator is used to blend / mix reagents and soils.

Additionally, two light industrial activities occur at the northern end of the General Industrial zone, namely *DecorEarth*, providing garden and landscaping supplies, and *Firewood To U*, a firewood processing and sales facility. These two activities, as well as the aforementioned EPA-controlled activities, are shown in Figure 1.1, with their approximate working areas denoted by the broken white outlines.

The operations carried out by DecorEarth and Firewood To U have been based on discussion between NVC and the operators, and are outlined below:

DecorEarth

- Processing and supply of landscape supplies for commercial and residential applications.
- Combination of light vehicles with trailers, as well as 10-yarder trucks for delivery to customers, as well as delivery of raw product to site.
- A sand screening plant operates towards the north of site.
- Typically up to two loaders operate on site, one to load customer trucks, and one for stockpiling and moving product around as required.

Firewood To U

- Processing and supply of chopped firewood.
- Two log splitters operate in the centre of site, each one powered by a 6-cylinder diesel engine.
- Up to two loaders operate within the yard, moving product and loading vehicles for delivery off site.
- Combination of light vehicles with trailers, as well as 10-yarder trucks for delivery to customers, as well as delivery of raw product other site.

2. CRITERIA

The *Tasmanian Planning Scheme - State Planning Provisions* (the Scheme) does not contain any criteria specific to noise for residential development within a General Residential zone. As such, there are no requirements specific to noise to satisfy clause 8.0 *General Residential Zone* under the State Planning Provisions.

However, section C9.0 *Attenuation Code* of the Scheme contains criteria for use standards within an attenuation zone, which is applicable given the proximity to the facilities to the south of site. In particular, Clause C9.5.2 details criteria specific to sensitive use within an attenuation area, as summarised below.

Objective:	That sensitive use located within an attenuation area does not interfere with or constrain the operation of an existing activity listed in Tables C9.1 or C9.2.
Acceptable Solutions	Performance Criteria
A1 No Acceptable Solution.	P1 Sensitive use within an attenuation area, must not interfere with or constrain an existing activity listed in Tables C9.1 or C9.2, having regard to: (a) the nature of the activity with potential to cause emissions including: (i) operational characteristics of the activity; (ii) scale and intensity of the activity; and (iii) degree of hazard or pollution that may be emitted from the activity; (b) the nature of the sensitive use; (c) the extent of encroachment by the sensitive use into the attenuation area; (d) measures in the design, layout and construction of the development for the sensitive use to eliminate, mitigate or manage effects of emissions of the activity; (e) any advice from the Director, Environment Protection Authority; and (f) any advice from the Director of Mines.

Table C9.1 of the Scheme outlines attenuation distances for various activities, with the relevant activities and their respective attenuation distances summarised in Table 2.1, below.

TABLE 2.1: ATTENUATION DISTANCES

Activity	Attenuation Distance	
	Level 1 Activity	Level 2 Activity
Composting works — vegetation only	250 m	500 m
Waste depot — putrescible waste	300 m	750 m

Each of the aforementioned facilities within the General Industrial zone to the south of site operate under their own permits which outline criteria pertaining to noise emissions.

The Mornington Waste Depot's Green Waste Composting Facility operates under a permit (ELMS No. 6275) which specifies criteria specific to noise under section N1, as follows:

- (a) *Noise emissions from the activity when measured at any domestic premises in other ownership and expressed as the adjusted time average A-weighted sound pressure level must not exceed:*
 - 50 dB(A) between the hours of 0800 and 1700,
 - 45 dB(A) between the hours of 1700 and 2200, and
 - 40 dB(A) between the hours of 2200 and 0700.
- (b) *Where the combined level of noise from the activity and the normal ambient noise exceeds the noise levels stated above, for the appropriate time of day, this condition will not be considered breached unless the noise emissions from the activity are audible and exceed the ambient noise levels by at least 5 dB(A). Noise level measurements must be taken in the presence of ambient noise normally existent in the area.*
- (c) *The time interval over which noise levels are to be averaged must be between 10 and 20 minutes.*

The Hydrowater Treatment Facility operates under a permit (EPN No. 11468/1) which specifies criteria specific to noise under section N1 as follows:

1. *Noise emissions from the activity when measured at any noise sensitive premises in other ownership and expressed as the equivalent A-weighted sound pressure level must not exceed:*
 - 1.1. 50 dB(A) between the hours of 0800 and 1800,
 - 1.2. 45 dB(A) between the hours of 1800 and 2200, and
 - 1.3. 40 dB(A) between the hours of 2200 and 0800.
2. *Where the combined level of noise from the activity and the normal ambient noise exceeds the noise levels stated above, this condition will not be considered to be breached unless the noise emissions from the activity are audible and exceed the ambient noise levels by at least 5 dB(A).*
3. *The time interval over which noise levels are to be averaged must be 10 minutes or an alternative time interval specified in writing by the Director.*

Additionally, Table 1 of the Noise EPP⁵ specifies a list of Acoustic Environmental Indicator levels for which the environmental values specified in the Noise EPP "...will be protected for the majority of the human population where the acoustic environment indicator levels are not exceeded..." A section of that table is reproduced here in Table 2.2.

TABLE 2.2: ACOUSTIC ENVIRONMENTAL INDICATOR LEVELS - TAS NOISE EPP

Specific Environment	Critical Health Effect	LAeq dBA	Time hrs	LAmix dBA
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

⁵ Tasmanian Environmental Protection Policy (Noise) 2009 (the Noise EPP)

For acceptable noise levels within a dwelling, AS 2107:2016⁶ is referenced, which outlines internal design sound level ranges for residential dwellings, as summarised below in Table 2.3.

TABLE 2.3: AS 2107 DESIGN SOUND LEVEL RANGES

Item	Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range	Design reverberation time (T) range, s
7	RESIDENTIAL BUILDINGS (see Note 5 and Clause 5.2)		
	Houses and apartments in inner city areas or entertainment districts or near major roads—		
	Apartment common areas (e.g. foyer, lift lobby)	45 to 50	—
	Living areas	35 to 45	—
	Sleeping areas (night time)	35 to 40	—
	Work areas	35 to 45	—

To NVC's knowledge, the EPA-controlled facilities operate during the day time only, and thus the adopted project criteria, sufficient to protect future residential amenity and ensure the existing operations are not constrained, are as follows:

50 dBA at worst-affected boundary to site for all EPA-controlled activities.

50 dBA at future outdoor living areas for all activities combined.

If not achievable, to protect the indoor amenity of future residents, the following applies:

35 dBA internally for future residential dwellings.

⁶ 'Recommended design sound levels and reverberation times for building interiors', Standards Australia

3. NOISE MEASUREMENTS

3.1. UNATTENDED NOISE MEASUREMENTS

Unattended noise measurements were conducted on site at location A (see Figure 1.1) between the 12th and the 19th January 2024 to quantify noise emissions at the nearest site boundary between site and the General Industrial zone to the south. Measurements used a Svan Type 1 sound level meter, logging in A-weighted decibels with a *Fast* response time. The data set comprised overall levels, one-third octave spectra and full statistical data at 10-minute intervals, with spectra and overall level data also recorded at 1-second intervals. The measurement location was chosen as being the nearest site boundary to the facilities within the General Industrial zone. This location was approximately 100 m and 430 m from the General Industrial zone and Tasman Highway respectively.

The overall measured noise trend across the measurement period is shown in Figure 3.1, below. With Table 3.1 summarising the measured levels on weekdays.

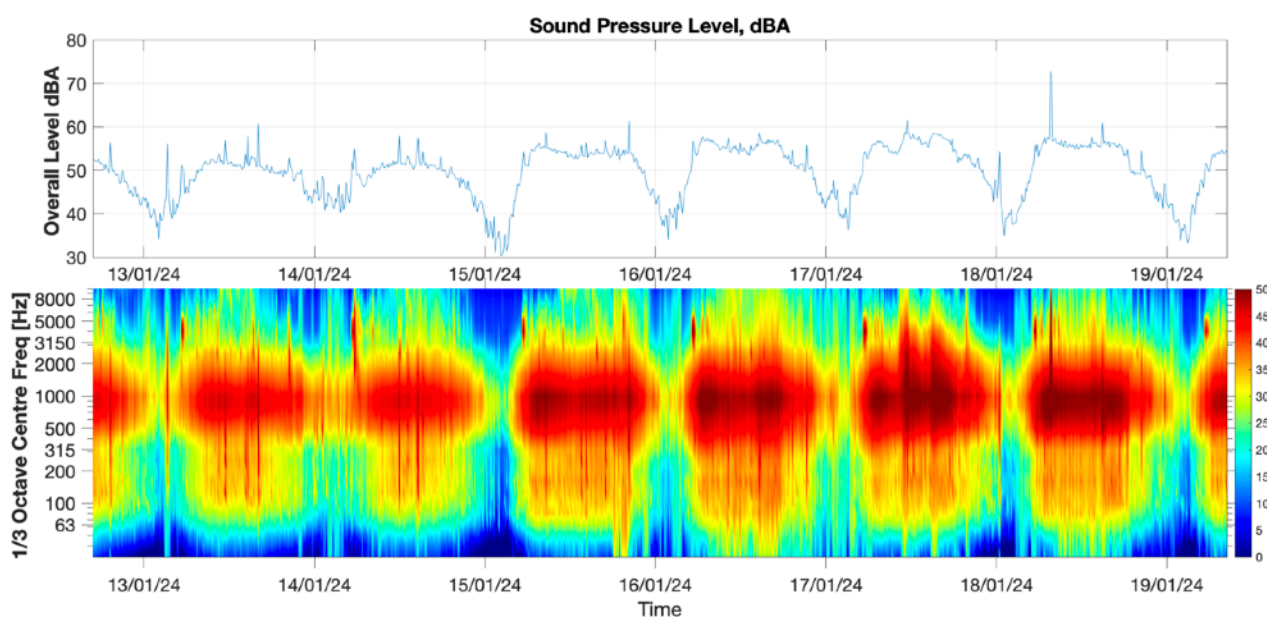


FIGURE 3.1: MEASURED NOISE SPECTROGRAM - LOCATION A

TABLE 3.1: SUMMARY OF MEASURED NOISE LEVELS

Time Period	Sound Pressure Level, dBA		
	L10	L90	LEQ
Day Time (7AM to 10PM)	56	52	54
Night Time (10PM to 7AM)	48	36	45

The following observations made whilst on site are deemed relevant to the assessment:

- Noise from the Tasman Highway was dominant and clearly audible as broad-band tyre noise, typical of vehicles travelling at high-speed.
- The portion of site worst-affected by noise emissions from the General Industrial zone is the southern boundary which is also the area of site that is at the highest elevation. Due to the high elevation, there is direct line of sight to the Tasman Highway, and traffic noise is entirely dominant.
- Noise from operations within the General Industrial zone was intermittently just audible during collection of the logger on 19th January 2024. The source of the noise was unclear, though it was perceived to be a 'rattle' due to screening of hard product.
- Some vehicle noise from traffic on Cambridge Road and Pass Road was audible.
- Noise from birds was intermittently audible.

3.2. ADDITIONAL NOISE MEASUREMENTS AND ANALYSIS

Additional attended measurements were conducted on the 12th and 19th of January 2024 in the intervening land between site and the General Industrial zone to quantify site noise emissions from activities from the three identified EPA controlled facilities.

Analysis of attended noise measurements made within the land between site and the General Industrial zone (location B - see Figure 3.4) was conducted for a period when processing equipment deemed to be from the industrial area was audible. This analysis identified a strong tone within the 63 Hz one-third octave frequency band, which is not visible in the long-term noise data from Location A as shown in Figure 3.1. This noise was also inaudible at location A, and the tone is not seen in attended measurement data here. It is noted that the specific location and source of this noise was unclear.

Figures 3.2 and 3.3 show the noise spectrograms (each over a period of nominally two minutes) of measurements conducted respectively at locations A and B.

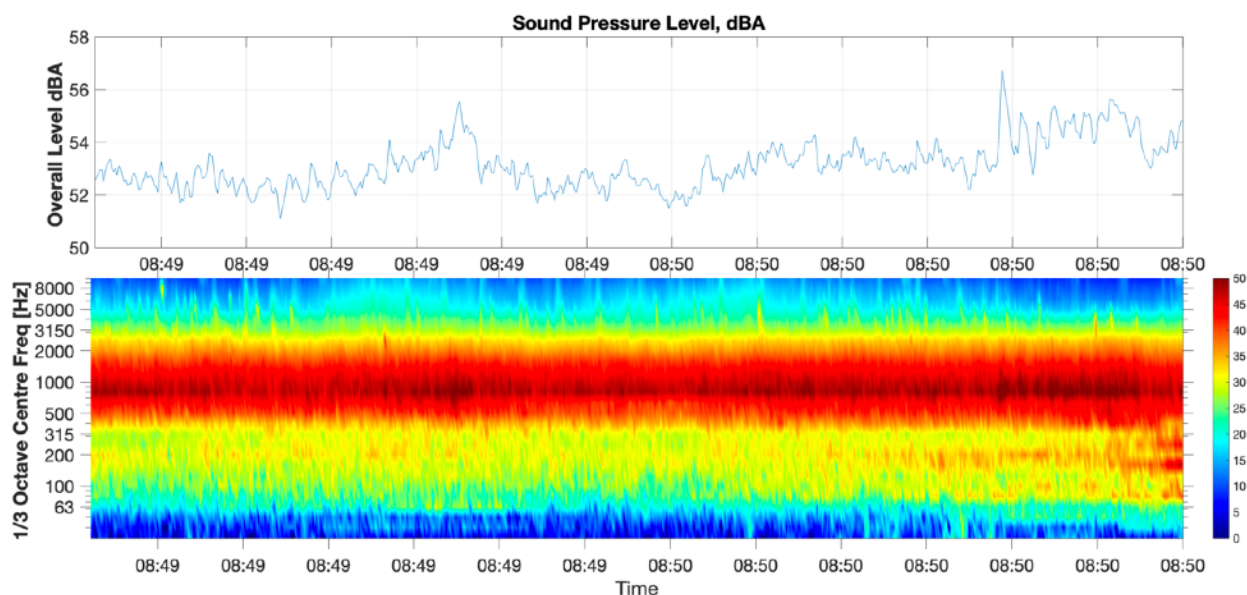


FIGURE 3.2: NOISE SPECTROGRAM - LOCATION A (PLANT INAUDIBLE)

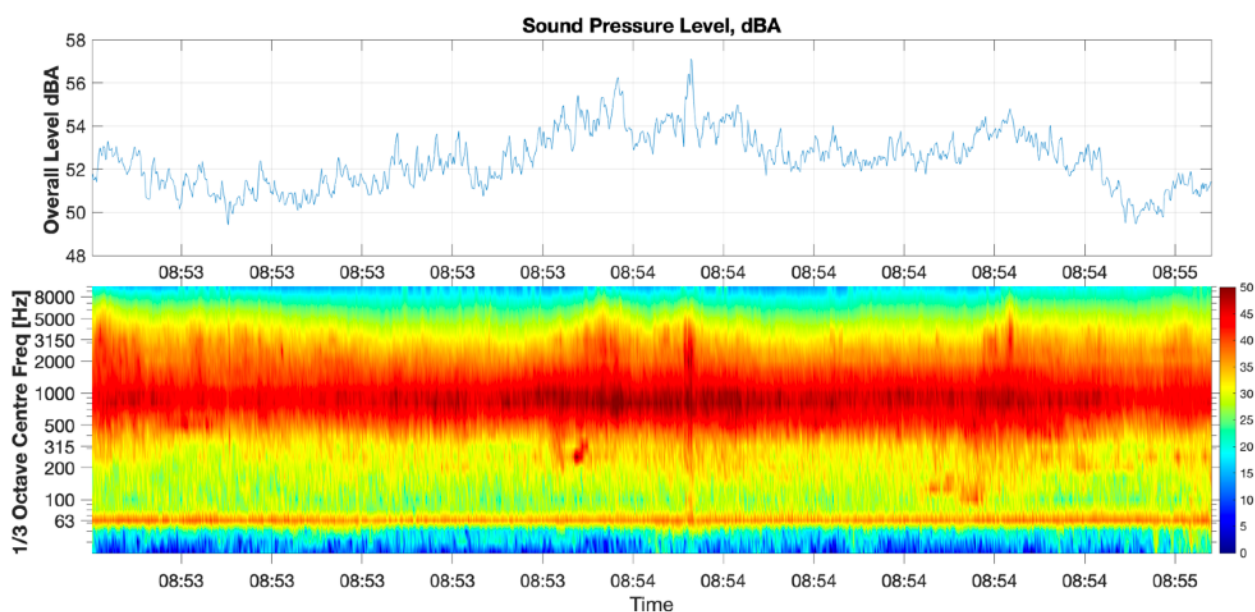


FIGURE 3.3: NOISE SPECTROGRAM - LOCATION B (PLANT CLEARLY AUDIBLE)



FIGURE 3.4: MEASUREMENT LOCATIONS

4. NOISE MODELLING

Noise levels across the site have been predicted using *iNoise*⁷ software, which implements the ISO9613⁸ algorithms for environmental noise. The predictions account for geometric divergence, barrier attenuation, atmospheric absorption, reflections/screening from buildings, and ground absorption. The following assumptions have been made in the predictions:

- 1 m topographical contours (from LiDAR data) have been used for the site and activity areas, with 5 m contours used for the remainder of the model.
- The ground across site and the surrounding area comprises significant vegetation and dirt roads, and thus the ground has been assumed to have a ground factor of 0.5 (50% reflective) over the entire model.
- All building façades and barrier construction are modelled with a reflection factor of 0.8 (80% reflective).
- As per the Tasmanian Noise Measurement Procedures Manual, noise levels have been predicted at 1.2 m above ground level.
- The type and quantity of modelled noise sources have been taken from discussion with the operators (DecorEarth and Firewood To U) where possible.
 - Note that NVC was not able to obtain operational details of the Composting and Hydrowater facilities. Therefore, NVC's experience with similar facilities, as well as satellite imagery, has been used to determine expected noise sources.
- All source sound power levels and spectra have been taken from NVC measurements where available, with manufacturer specification referred to where measurement data is not available.
- All front-end loaders are modelled to be operating continuously, with each loader continuously manoeuvring along the designated movement paths shown in Figure 4.1, below.
 - Loaders are representative of nominally 240 kW wheel loaders, with an operating weight of nominally 23 T.
- Trucks representative of fully loaded B-Doubles have been modelled to be accessing DecorEarth and Firewood To U. Discussion between the operators and NVC suggest this is extremely conservative, with light vehicles and 10-yarder trucks typically accessing site.
 - Nominally two and three trucks hour have been modelled to access Firewood To U and DecorEarth respectively. Each truck accessing site has been modelled as two truck movements, representative of accessing and exiting site.
- NVC has been informed that the log splitters are driven by 6-cylinder diesel engines. A diesel engine typical of a 500 kW generator has been used to model the log splitter engines. This is substantially more powerful than the engines likely to be used, and is considered extremely conservative.
- The trommel screen operating within the Green Waste Composting Facility is based on measurements conducted of a large industrial trommel screen processing bark / wood chips. Given the likely scale and product throughput, this is deemed to be reasonable source data.
- The source data for the vibratory screen has been taken from measurements conducted by NVC of a sand screening plant. NVC has been informed by DecorEarth that the screen operating on the DecorEarth site is primarily used to screen sand.

⁷ iNoise V2024.2 Pro Rev 1, DGMR Software

⁸ 'ISO 9613 - Attenuation of sound during propagation outdoors', International Organization for Standardization, 1993

Table 4.1, below provides a summary of the modelled noise sources. Note that the modelled height is the height above ground level.

TABLE 4.1: SUMMARY OF MODELLED NOISE SOURCES

Location	Equipment	Qty.	SWL (dBA)	Modelled Height (m)
Green Waste Composting Facility (EPA-controlled)	Front-end Loader (240 kW)	2	106 ea.	1
	20 T Excavator	1	106	1
	Trommel Screen	1	100	2
Hydrowater Treatment Facility (EPA-controlled)	Front-end Loader (240 kW)	2	106 ea.	1
	20 T Excavator	1	106	1
DecorEarth	Front-end Loader (240 kW)	2	106	1
	Vibratory Screen	1	113	1.5
	Trucks (Fully Loaded B-Double)	1	101	1
Firewood To U	Front-end Loader (240 kW)	2	106 ea.	1
	20 T Excavator	1	106	1
	7 T Excavator	1	98	1
	Log Splitter (500 kW Engine)	2	116	0.5
	Trucks (Fully Loaded B-Double)	1	101	1

Figure 4.1, below, shows the location of modelled noise sources, with the red and yellow lines representing the modelled locations of front-end loaders and trucks respectively.



FIGURE 4.1: LOCATION OF MODELLED NOISE SOURCES

5. RESULTS

The results of the software noise modelling have been split into two sections; Section 5.1 presents the results and provides discussion on noise emissions from the EPA-controlled activities (Green Waste Composting and Hydrowater Treatment facilities), whilst Section 5.2 presents results and discussion around the noise emissions from all activities to assess for potential nuisance for occupants of future residential dwellings.

5.1. EPA-CONTROLLED ACTIVITIES

The results of the software noise modelling for the two EPA-controlled activities (Green Waste Composting and Hydrowater Treatment facilities) are presented in Table 5.1, below.

The relevant criteria are applicable at the nearest boundary of site, and thus predicted noise levels are representative of location A (site boundary and location of aforementioned noise measurements).

TABLE 5.1: PREDICTED NOISE LEVELS - EPA-CONTROLLED ACTIVITIES

Source	Predicted Sound Pressure Level (dBA)
	Location A
Green Waste Composting Facility	21
Hydrowater Treatment Facility	26
TOTAL - EPA-Controlled	27

As shown in Table 5.1, above, noise levels from the EPA-controlled activities combined are significantly below the 50 dBA criterion. Predicted noise levels are sufficiently low such that they will be entirely inaudible on site in the presence of any other external noise source. The following key findings are relevant to the results of the noise modelling for EPA-controlled activities:

- The topography of site and the intervening land between site and the Mornington Park Waste Depot site results in significant acoustic screening. The Green Waste Composting Facility and the Hydrowater Treatment Facility are located such that there is a ridge in between these activities and site that runs from east to west, nominally 100 m to the south of site. This ridge provides significant screening, resulting in predicted noise levels from the EPA-controlled activities that will be entirely inaudible across the entirety of site.
- The large distances between site and the working areas of the EPA-controlled activities provides significant attenuation via air absorption and distance, further reducing the predicted noise levels.

Figure 5.1, below, presents the predictive noise contours across site, as a result of the noise emissions from the EPA-controlled activities, whilst operating continuously and simultaneously.

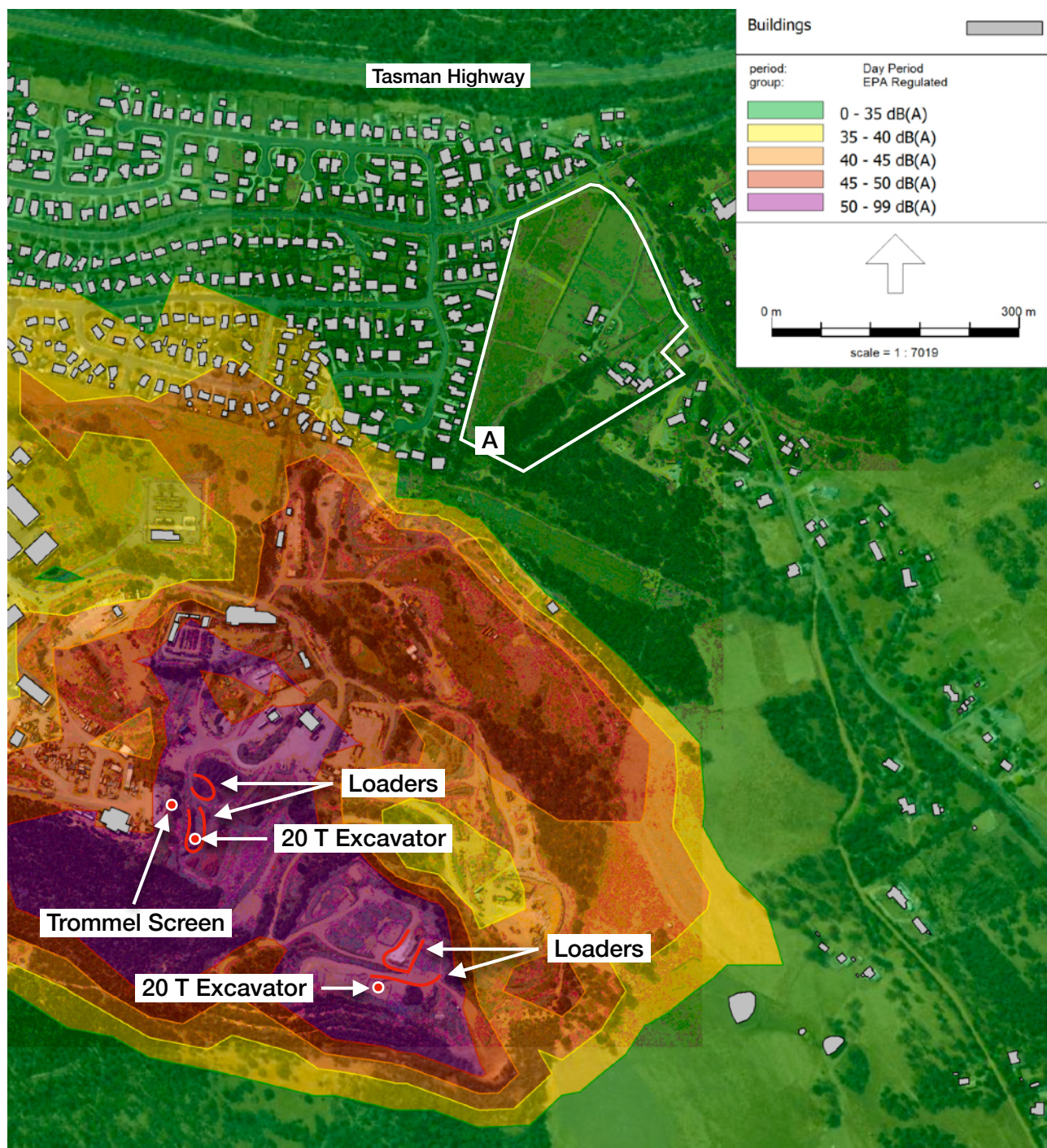


FIGURE 5.1: PREDICTIVE NOISE CONTOURS - EPA-CONTROLLED ACTIVITIES

5.2. ALL ACTIVITIES

To assess the likelihood of intrusive noise across site and the likelihood of annoyance for occupants of future residential dwellings, the combined noise emissions from all four activities are assessed. Noise levels have been predicted at three locations across site, representative of the southern, middle, and northern portions of site (see Figure 5.2, below, for the receiver locations).



FIGURE 5.2: MODELLED RECEIVER LOCATIONS

Table 5.2, below, presents the results of the software noise modelling, assuming all noise sources are operating simultaneously.

TABLE 5.2: PREDICTED NOISE LEVELS - ALL SOURCES

Source	Predicted Sound Pressure Level (dBA)			
	Location A	Location 1 (Southern Portion)	Location 2 (Middle of Site)	Location 3 (Northern Portion)
All Sources	46	48	43	42

As shown by the predicted noise levels in Table 5.2, noise emissions from the surrounding activities are predicted to be below the 50 dBA criteria as outlined in Section 2 of this report. The following key findings are relevant to the results of the noise modelling of all activities combined:

- Given the location of the non-EPA-controlled activities (DecorEarth and Firewood To U) is atop the ridge line that runs east to west, the effect of topographical screening is greatly reduced compared to the EPA-controlled activities.
- Software noise modelling shows a localised increase in predicted noise levels at location 1. This is shown in the predicted noise levels in Table 5.2, above, where the predicted noise level at Location 1 is significantly greater than those predicted at locations 2 and 3.

Figure 5.3, below, presents predictive noise contours across site, resulting from all noise sources combined, to allow assessment of the likelihood of annoyance for occupants of future residential dwellings on site.

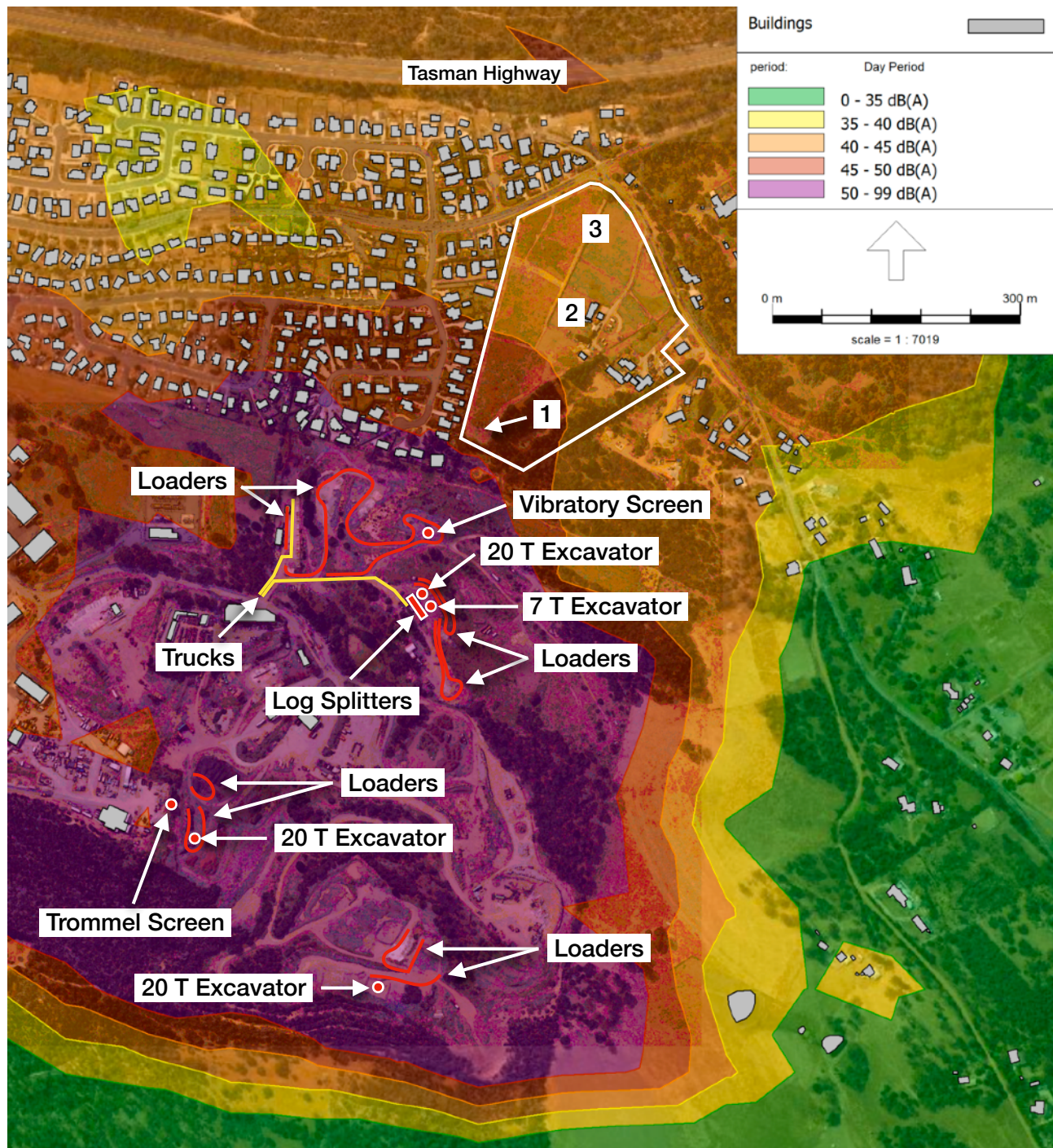


FIGURE 5.3: PREDICTIVE NOISE CONTOURS - ALL SOURCES

6. ASSESSMENT

Unattended and attended noise measurements have been conducted on site at the site boundary nearest to the two EPA-controlled activities, as well as software noise modelling of operations at these activities. The findings of these noise measurements and noise modelling are summarised below:

- Software noise modelling shows that noise levels resulting from the activities at the Green Waste Composting Facility and the Hydrowater Treatment Facility are nominally 27 dBA at the nearest boundary of site. At this level, noise from these activities will be entirely inaudible across the entirety of site, and thus development for sensitive use on site will not constrain the activities.
- Measured noise levels at location A (the nearest site boundary) are shown to exceed the day time criterion of 50 dBA due to traffic noise on the Tasman highway, and localised noise sources such as birds and insects.
 - Based on a combination of unattended measurements at location A, and sequential measurements at locations A and B, it is deemed that noise emissions from the industrial facilities to the south of site are generally inaudible on site, with traffic noise (primarily from the Tasman Highway) consistently dominant.
 - The software noise model supports this, with noise levels at location A predicted to be nominally 46 dBA. As such, the measured noise levels are in line with the observations made on site which suggest that noise levels at this location are controlled by vehicles on the Tasman Highway, as well as localised noise sources such as birds and insects.
 - It is noted that whilst on site, noise perceived to be from the screen operated by DecorEarth was on occasion just audible. This correlates with the noise modelling results, with noise from the vibratory screen predicted to be the dominant noise source from the industrial sites.
 - During the day time, the L90 (10th percentile noise level) is 52 dBA and the L10 (90th percentile noise level) is 56 dBA. This difference of only 4 dB (a perceptible but not clearly noticeable difference) indicates that noise levels are generally very stable across the day time period, which is typical of traffic noise from busy / high volume roads, such as the Tasman Highway.
- As the L90 in the area is 52 dBA and the industrial facilities are generally inaudible, and occasionally barely audible, noise emissions from these facilities are expected to be below 52 dBA at the nearest site boundary. Software noise modelling confirms this, with predicted noise levels at the measurement location (location A) of nominally 46 dBA from all modelled noise sources combined.
- Figure 5.3, above, shows that the entirety of site is predicted to see noise levels significantly below the 50 dBA criterion when all noise sources from all four modelled activities are operating continuously and simultaneously.
- Given a predicted noise level of 48 dBA at the worst-affected location on site (location 1), to comply with the tightest relevant interior design level under AS 2107 of 35 dBA, a noise level reduction from outside to inside of 13 dB is required. Any modern facade construction will comfortably achieve this level of isolation, including with a partially ajar window, and thus no specific requirements for future residential dwelling facade construction are deemed necessary.

Therefore, noise modelling demonstrates that residential / sensitive use on the three existing lots at 471 Cambridge Road, and 528 and 540 Pass Road, Mornington is unlikely to interfere with or constrain the existing Green Waste Composting or the Hydrowater Treatment facilities to the south of site, and thus Clause C9.5.2 of the Tasmanian Planning Scheme is satisfied.

Additionally, noise measurements and software noise modelling show that noise levels across site from all four surrounding activities are significantly below the 50 dBA criterion for 'moderate annoyance' outlined within the TAS Noise EPP. As such, no specific recommendations are required for the development of future residential dwellings on site.

Therefore, rezoning of 471 Cambridge Road and 528 and 540 Pass Road, Mornington from Rural Living to General Residential is deemed appropriate regarding noise levels from the nearby industrial operations.

Appendix – Acoustic Glossary

<i>Ambient Noise</i>	All noise associated with a measurement, and typically ignoring the particular noise under investigation. Typically measured as Leq and will usually comprise noise from many sources.
<i>Background Noise</i>	Background noise describes the underlying level of noise present in the ambient noise. It may be described as the average of the minimum noise levels measured, and is typically measured by the statistical L90 level.
<i>Decibel [dB]</i>	The scale used for describing sound. It is a logarithmic scale that uses a reference sound pressure of 20 µPa, or reference sound power of 10 ⁻¹² Watts.
<i>dBA</i>	A-weighted decibel. The human ear does not perform linearly and is better at hearing high frequency rather than low frequency sounds, ie. low frequency sound at the same dB level as a high frequency sound will be perceived as quieter. To replicate the human ear response a frequency weighting, denoted as an A-weighting, is applied to the sound. A sound measured in this way is then an A-weighted sound pressure level with units dBA. Practically all noise is measured using the A-weighting.
<i>Leq</i>	Energy averaged sound pressure level over a period of time, usually 10 to 15 minutes. Units of decibels, typically A weighted (LAeq). Because the decibel scale is a logarithmic ratio, the higher noise levels have far more sound energy, and therefore the Leq level tends to indicate an average which is strongly influenced by short-term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closer to the LAeq noise level than any other descriptor.
<i>Frequency</i>	Frequency is synonymous with pitch and has the units of Hertz (Hz) or cycles per second. A bass drum produces a low frequency sound, and a small bell a high frequency sound. The frequency range for human hearing is approximately 30Hz to 16kHz.
<i>L10, L90...</i>	Ln is the sound pressure level that is exceeded for n% of the time. Hence the L10 describes the noisier events during the interval, and L90 the quieter events. The L90 is often used to describe the background level. A significant variation between the L10 and L90 would indicate an environment where there is a strong variation in noise levels, and the background is not the dominant source. As the variation between the L10 and L90 decreases, the background becomes a more dominant.
<i>Lmax</i>	The instantaneous maximum level using the time response and frequency weighting set for the meter (typically Fast response, A weighted).
<i>Inversion</i>	A condition typically occurring on clear, still nights which is characterised by the air near the ground being colder than air at higher altitudes. The increasing speed of sound with altitude bends the sound back towards the ground causing a focussing of the sound in a small area. The inversion effect can cause increases in noise levels of 5 to 10 dB with greater increases in exceptional circumstances.