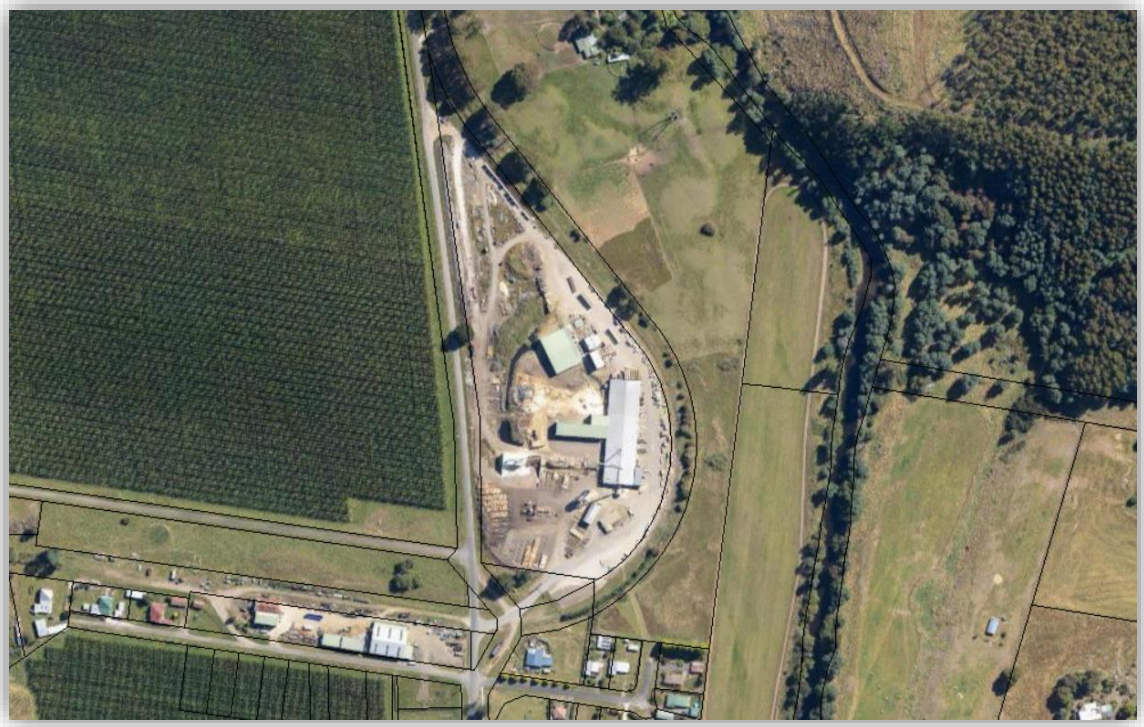
CMTP Pty Ltd

Branxholm Sawmill increased production and associated building works EER environmental noise assessment



Report No. 5859_AC_R_R2

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March 2024

Tarkarri Engineering

Air Quality • Acoustics • Environment • Vibration

DOCUMENT CONTROL

CMTP
BRANXHOLM SAWMILL
INCREASED PRODUCTION AND ASSOCIATED BUILDING WORKS
EER ENVIRONMENTAL NOISE ASSESSMENT

Report No.
5859_AC_R_R2
Prepared for
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Revision History

Revision No.	Date Issued	Reason/Comments
0	07/12/2023	Initial release
1	15/12/2023	Traffic noise
2	20/03/2024	Corrections, additional modelling

Distribution

Copy No._____	Revision No.	Location
1	2	Project/Client File
2	2	Client
3	2	Tarkarri Engineering Library

Keywords

dBA – *Decibels A-weighted.*

A-weighting – *Weighting of the audible frequencies reflective of the response of the human ear to noise.*

$L_{Aeq,T}$ – *Equivalent continuous A-weighted sound pressure level over a given time (T).*

$L_{A90,T}$ – *A-weighted sound pressure level exceeded for 90 % of a given time (T), typically referred to as background.*

L_{Amax} – Maximum fast-response *A-weighted sound pressure level a given time*.

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References

[1] Tarkarri Engineering report 5101_AC_R_CMTP Branxholm Sawmills - Branxholm sawmill environmental noise survey 2018, March 2018.

[2] SoundPLAN Acoustic modelling software - Braunstein & Berndt GmbH.

[3] ISO 9613-2:1996 Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation.

[4] CONCAWE The oil companies' international study group for conservation of clean air and water – Europe (est. 1963) report 4/81.

Executive Summary

Tarkarri Engineering was commissioned by CMTP to conduct an environmental noise, assessment of a proposed increase in production and associated building works at their Branxholm Sawmill site. This assessment forms part of the supporting documentation for an Environmental Effects Report to the Tasmanian Environment Protection Authority.

The production increase would see a new building constructed to the east of the existing sawmill building to house a new sawmill line.

Prediction of cumulative noise emission levels from existing noise sources and new noise sources associated with the production increase at the Branxholm Sawmill are within the day noise limit applicable under the site's current EPN at noise sensitive locations.

New noise sources associated with the new production area don't increase noise emission levels from the site within surrounding residential areas during the day.

1 Introduction

Tarkarri Engineering was commissioned by CMTP to conduct an environmental noise, assessment of a proposed increase in production and associated building works at their Branxholm Sawmill site. This assessment forms part of the supporting documentation for an Environmental Effects Report (EER) to the Tasmanian Environment Protection Authority (EPA). Project specific guidelines have been issued with relevant sections provided below for reference.

3 Noise emissions

- Describe any fixed or mobile equipment associated with the activity that emits noise including the new sawmill line, modified log debarking, timber sorting and staking systems, and existing kiln. Provide a description of each noise source, and outline the size, sound and power level, noise attenuation and hours of operation for each piece of noise emitting equipment.
- Show the expected locations of the noise sources on the site plan and the locations of any noise sensitive premises within 3km of the boundary of the Land on the area map (see Part B).
- Consider any dominant or intrusive noise characteristics.
- Describe and evaluate any noise attenuation and mitigation measures that have been implemented at the site.
- Outline the current and future predicted (increased production levels and during the operation of the new sawmill line) noise levels at the nearest noise sensitive premises in other ownership, for operations during daytime hours (between 0700 hours and 1800 hours) and night-time hours (between 1800 hours and 0700 hours). State whether both current and future predicted (increased production levels and during the operation of the new sawmill line) noise levels from the activity exceed/will exceed 55dB(A) during daytime hours (between 0700 hours and 1800 hours) or 40 dB(A) during night-time hours (between 1800 hours and 0700 hours).
- Noise levels should be expressed as the equivalent continuous A-weighted sound pressure level and adjusted for tonality, impulsiveness, modulation, and low frequency in accordance with the *Tasmanian Noise Measurement Procedures Manual*.
- Describe the potential impacts of noise generated by the activity.
- Discuss and evaluate the likelihood of environmental nuisance occurring as a result of noise emissions from the activity.
- Describe any additional noise attenuation and mitigation measures that will be considered.
- Provide details of any proposed noise monitoring activities.
- Is the proposal consistent with the *Environment Protection Policy (Noise) 2009*?
- Consider noise emissions from traffic resulting from the activity when assessing site's cumulative noise impact.
- Consider assessing L_{Amax} noise emissions when determining mitigation measures to avoid causing sleep disturbance from the night-time operation.

1.1 Legislative context

1.1.1 EPN noise emission limits

The following noise emission limits apply under the sites existing Environmental Protection Notice (EPN 10008/1 (r2)):

N3 Noise emission limits

1 Noise measurements from the activity when measured at any noise sensitive premises in other ownership and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:

1.1. 55 dBA between 0700 hours and 1800 hours (Day time); and
1.2. 40 dBA between 1800 hours and 0700 hours (Night time).

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 dBA.

3 The time interval over which noise levels are averaged must be between 10 minutes or an alternative time interval, specified in writing by the Director.

4 Measured noise levels must be adjusted for tonality, impulsiveness, modulation and low frequency in accordance with the *Tasmanian Noise Measurement Procedures Manual.*

5 All methods of measurement must be in accordance with the *Tasmanian Noise Measurement Procedures Manual*.

N4 Operating hours

1 Unless otherwise approved by the Director, activities associated with milling or machining of timber and loading/unloading of wood deliveries to The Land must not be undertaken outside the following times:

1.1. 0700 hours to 1800 hours Monday to Sunday.

2 Notwithstanding the above paragraph, the above activities must not be carried out on Public Holidays that are observed State-wide (Easter Tuesday excepted) without the written approval of the Director.

1.1.2 Environment Protection Policy (Noise) 2009

The *Environment Protection Policy (Noise) 2009*, made under section 96K of the *Environmental Management and Pollution Control Act 1994*, sets a strategic framework for noise management in Tasmania by focussing on objectives and principles for noise control. The policy protects environmental values, with values to be protected under this policy the qualities of the acoustic environment that are conducive to:

- the wellbeing of the community or a part of the community, including its social and economic amenity; or
- the wellbeing of an individual, including the individual's:
    - health; and
    - opportunity to work and study and to have sleep, relaxation and conversation without unreasonable interference from noise.

2 Site description

The CMTP Branxholm Sawmill site is located approximately 400 m north of the centre of Branxholm along Warrentinna Rd. The site is bounded to the north, east and west by rural land with low density housing along Station Rd to the south-west and a sole property north-east of the site. The south is bounded by residential properties along Edwards Pl (approx. 80 m away).

The mill's main production involves the processing of softwood logs into sawn timber. Harvested logs are transported to site where they are debarked, sawn to relevant dimensions and air dried and/or fumigated. A gas fired kiln allows the drying process to be expedited.

The major existing noise sources identified at the site include the following:

- De-barker
- Scragg Saw.
- Chipper.
- Saw dust extraction blowers.
- front end loader.
- Drying kilns.

Other intermittent noise sources include truck movements (infrequent), forklift movements and Pneumatic nail gun.

All sources operate during the day period as required by the sites EPN with the exception of the drying kilns which operate overnight.

The production increase would see a new building constructed to the east of the existing sawmill building to house a new sawmill line. The existing sawmill building would house some of the new equipment and relocated maintenance workshop and employee lunchroom. The existing log debarking, timber sorting and stacking systems would undergo minor modification to improve efficiency to meet the higher required sawmill volume.

NB: The new processing area building is assumed to be constructed of a profiled metal facade. To provide additional containment of noise, the eastern and southern walls of the new building are assumed to be lined internally with 6 mm compressed fibre cement in this assessment.

Four observed measurement positions and on onsite unobserved measurement position have previously been utilised for environmental noise surveys of the mill[1] and these have been utilised here for the prediction of environmental noise emissions from the mill. Table 2-1 presents the position location information and Figure 2-1 an aerial view of the mill and surrounds with the positions marked. Figure 2-2 presents an proposed site plan for the mill with the new processing are building shown.

Environmental noise survey and model receiver positions		
Number	Location	Coordinates (MGA94, Zone 55 G)
1	Southern Boundary	561921, 5442636
2	Pearce St	562164, 5442422
3	Station Rd	561543, 5442682
4	Northern boundary	561811, 5443033

Table 2-1: Environmental noise survey and model receiver positions.

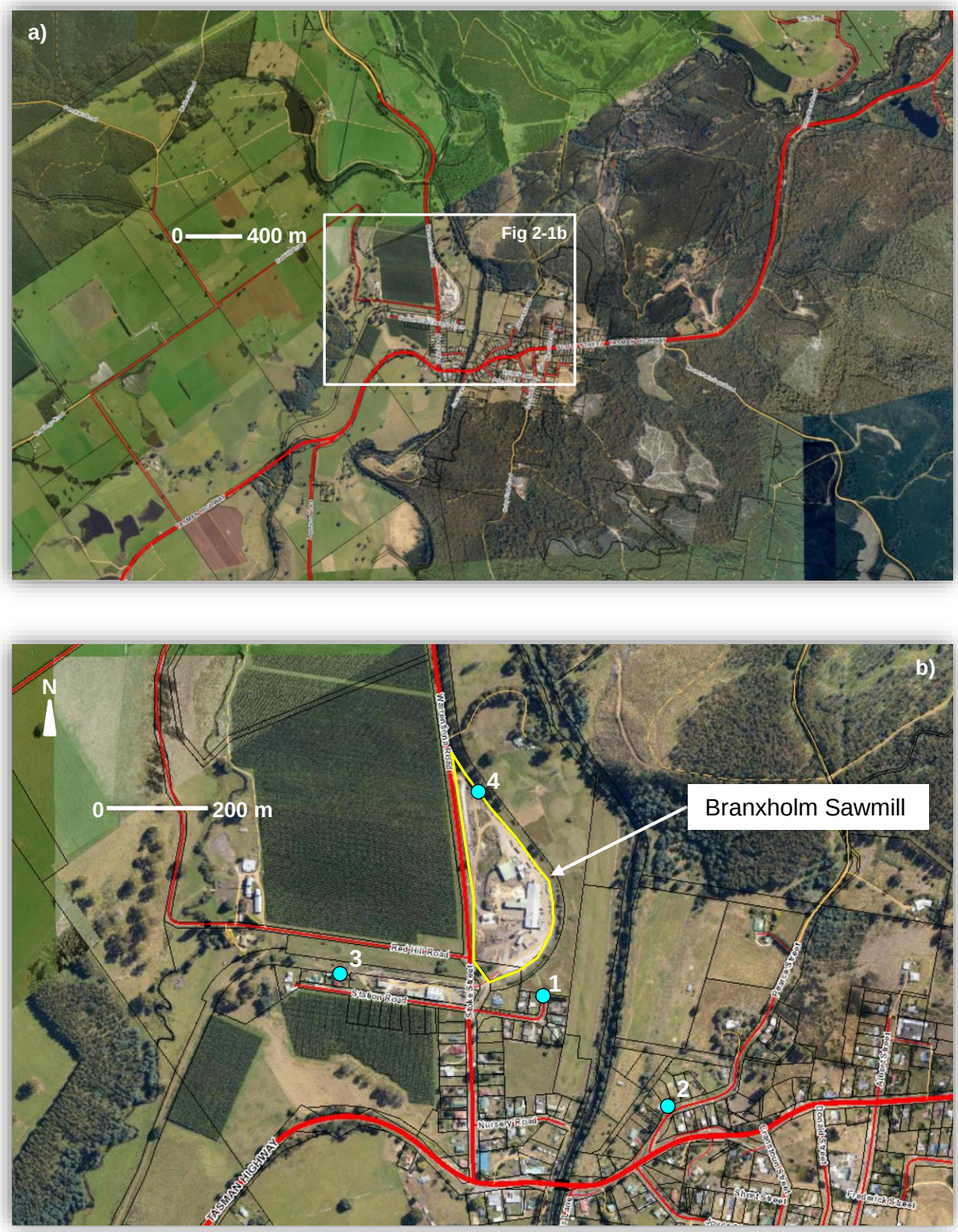

Figure 2-1: Aerial view of the Branxholm Sawmill site and surrounds with survey positions marked.

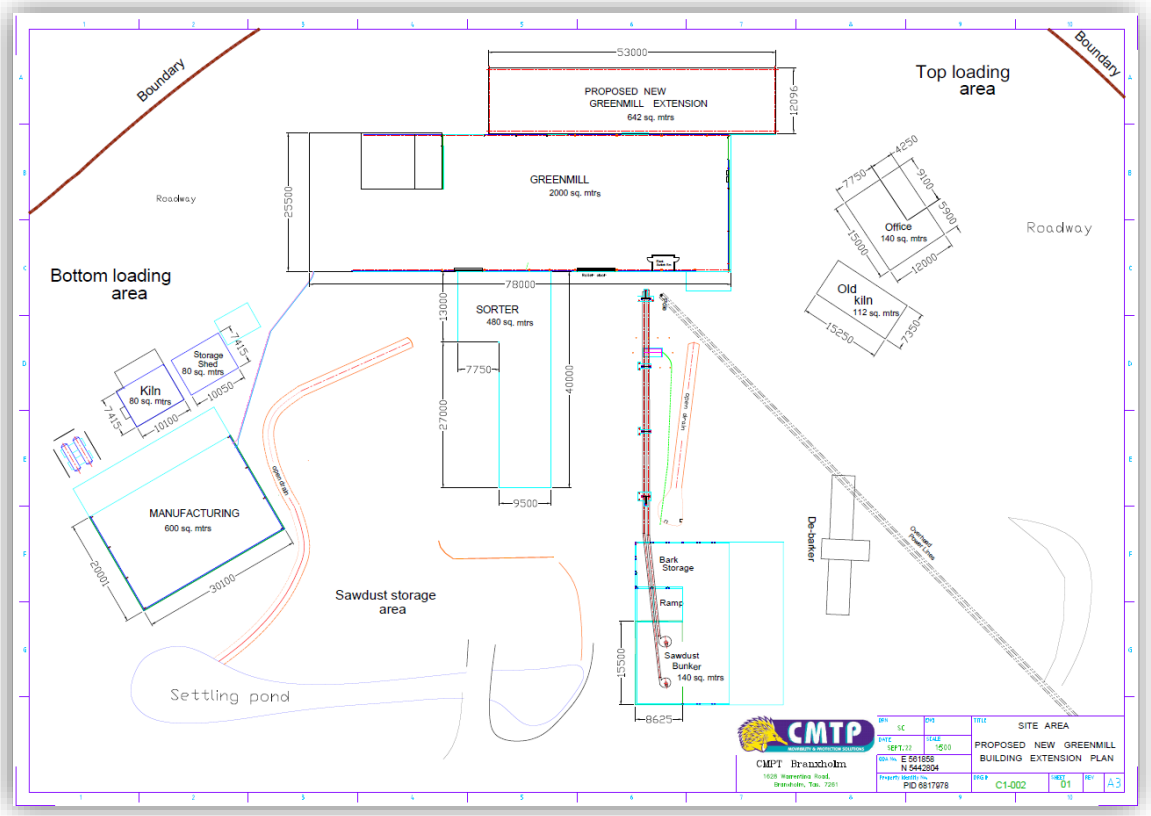

Figure 2-2: Proposed site plan for the Branxholm Sawmill.

3 Existing noise

Table 3-1 presents summary environmental noise survey data from the most recent environmental noise survey of operations at the Branxholm sawmill[1].

Summary environmental noise survey measurement data, 2018								
Position	Period	$L_{Aeq,10min}$ (dBA)	$L_{A90,10min}$ (dBA)	Tonal Adj (dB)	$L_{Aeq,10min,adj}$ (dBA)	EPN limits (dBA)	Potential Breach	Comment
1	Day	52.7	49.5	0.3	53.0	55	No	Branxholm site dominant. Adjusted noise level below EPN noise emission limit.
	Night	30.1	28.1	0.2	30.3	40	No	Adjusted noise level below EPN noise emission limit.
2	Day	50.3	42.3	-	50.3	55	No	Traffic noise dominant
3	Day	47.3	43.1	0.5	47.8	55	No	Adjusted noise level below EPN noise emission limit.

4	Day	51.3	48.8	1.3	52.6	55	No	Branxholm site and leaf rustle dominant. Adjusted noise level below EPN noise emission limit.
	Night	38.0	36.1	0.4	38.4	40	No	Adjusted noise level below EPN noise emission limit.

Table 3-1: Summary environmental noise survey measurement data, 2018.

4 Environmental noise modelling

SoundPLAN[2] software was used for carrying out detailed noise emission spectra and contour modelling. This program allows for the modelling attenuation/amplification of noise. Parameters influencing sound propagation and attenuation include:

- Source type (point, line, plane).
- Relative source and receiver height.
- Topography and barriers.
- Industrial buildings as sources and/or barriers.
- Ground and air absorption.
- Distance attenuation.
- Atmospheric conditions (Pasquill stability, temperature, humidity and vector wind speed).
- Reflecting surfaces.
- Source directivity.

As all propagation and attenuation parameters are frequency dependent, all input source data has been based on 1/3-octave band sound power spectra.

Geo-referenced topographic land parcel data was obtained from LISTdata. LIDAR data for the area was obtained and used to develop 2 m contour intervals.

Equipment list and layout data for operations were provided by CMTP and a site visit to measure existing operations.

All source and geodata is referenced to the Map Grid of Australia (MGA).

4.1 Model input data

Input sound power (SWL) spectra were developed from on-site measurement of existing operations conducted 27 October 2023 and 12 March 2024; data provided by CMTP and from Tarkarri Engineering library data. Table 4-1 presents overall SWLs and equipment details while Table 4-2 presents 1/1-octave band SWL spectra. For ease of presentation equipment has been grouped into logical areas.

Overall sound power levels (dBA)		
Source	SWL	Comment
Existing		
De-barker	104	Noise generated by cutting head. From site measurements.
Front end loader (FEL)	98	From site measurements

Processing building	107*	Building radiated noise and openings. From internal measurement of existing reverberant field from noise sources including scragg saw, blower casings …etc. Building radiated noise calculated from modelled transmission loss.
Dust control systems	101	Discharge duct radiated noise, casing radiated noise and discharge noise from X3 dust control fans. From site measurements
Chipper	103	Throat, building radiated and conveyor head noise. From site measurements
Kiln	94	From manufacturers data (previously modelled). No safe access to noise sources
New		
New processing area building	98	Building radiated noise. From internal reverberant field measurements of existing processing building and modelled transmission loss.

* SWL for the existing processing building is slightly reduced with the new processing area building in place.

Table 4-1: Overall sound power levels and data source information.

1/1-octave band sound power levels spectra (dBA)										
Source	Frequency (Hz)									Total
	31.5	63	125	250	500	1k	2k	4k	8k	
Existing										
De-barker	62	76	88	94	99	99	97	95	86	**104**
FEL	63	73	82	87	90	94	92	85	70	**98**
Processing building	51	80	95	100	98	98	101	99	90	**107**
Dust control systems	71	75	89	96	93	94	93	90	84	**101**
Chipper	59	73	85	91	95	98	98	95	83	**103**
Kiln	-	62	75	83	90	89	87	81	67	**94**
New										
New processing area building	-	74	89	93	89	88	92	90	-	**98**

Table 4-2: 1/1-octave band sound power level spectra.

4.2 Atmospheric conditions

SoundPLAN[2] allows the use of the ISO 9613[3] and CONCAWE[4] prediction algorithms to model the attenuation /amplification of noise in the environment. In this study the following propagation conditions were considered:

- **ISO 9613** prediction algorithm with default settings.
- **CONCAWE worst case propagation**: CONCAWE models atmospheric attenuation using Pasquill stability indices in combination with vector wind speed and direction to determine appropriate frequency dependent attenuation/amplification This condition considers all receiver points to be downwind with a Pasquill stability class F and a vector wind speed of 2 m/s. Under these conditions noise contours will typically represent the highest predicted noise levels at any location.

NB: Under both algorithms a relative humidity of 70 %, air pressure of 1013.3 mbar and temperature of 10 °C was modelled.

4.3 Model scenarios

Two noise modelling scenarios were considered in this assessment as follows:

- Existing: Standard day operations with all existing noise sources operational.
- Existing and new: Standard day operations with all existing noise sources and the new processing area operational.

Figure 4-1 to 4-3 present model plan views with receiver and source locations marked. Figures 4-4 to 4-6 present model wire frame views from the south. Ground effects were modelled with a coefficient of 0.3.

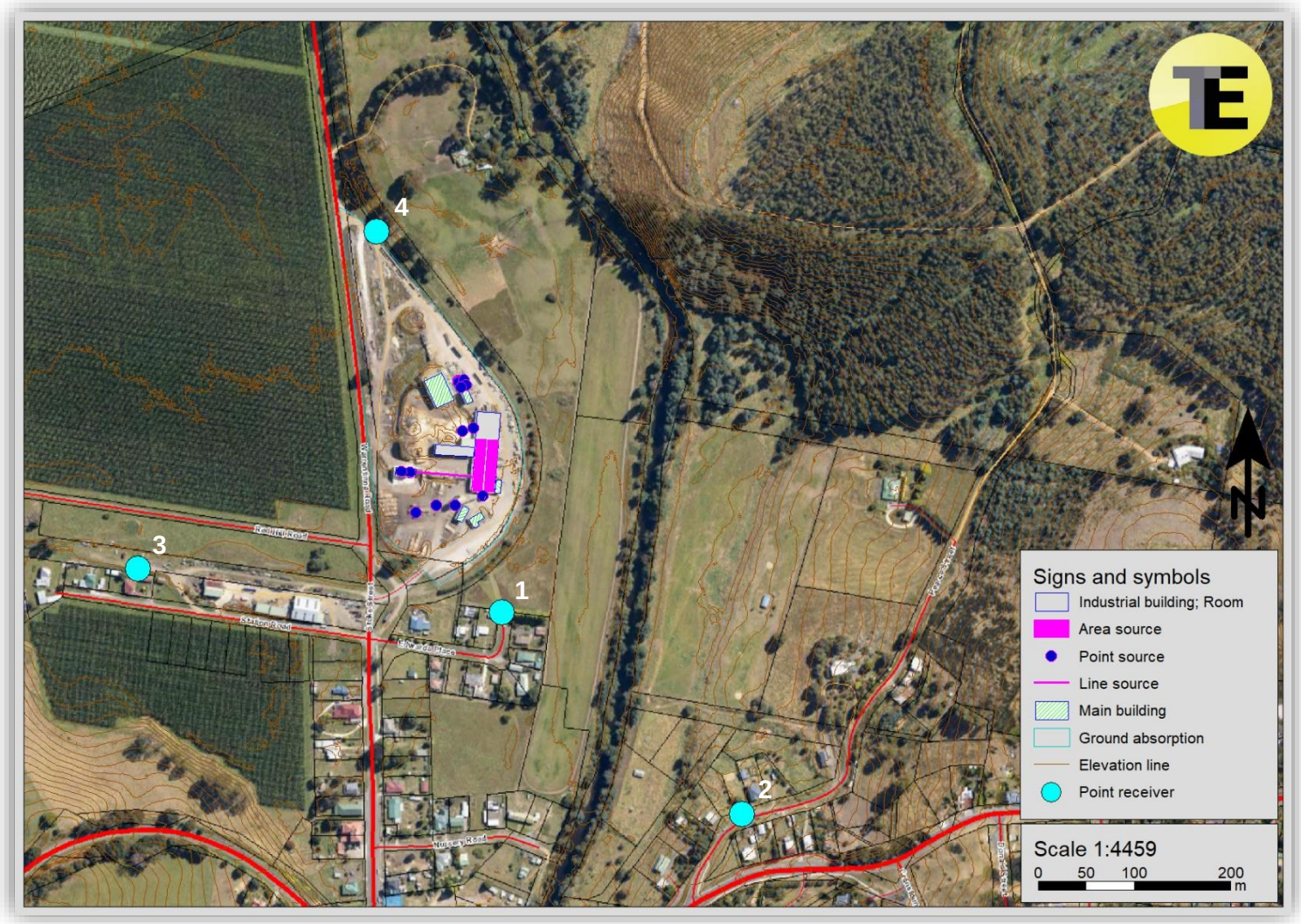

Figure 4-1: Model plan view.

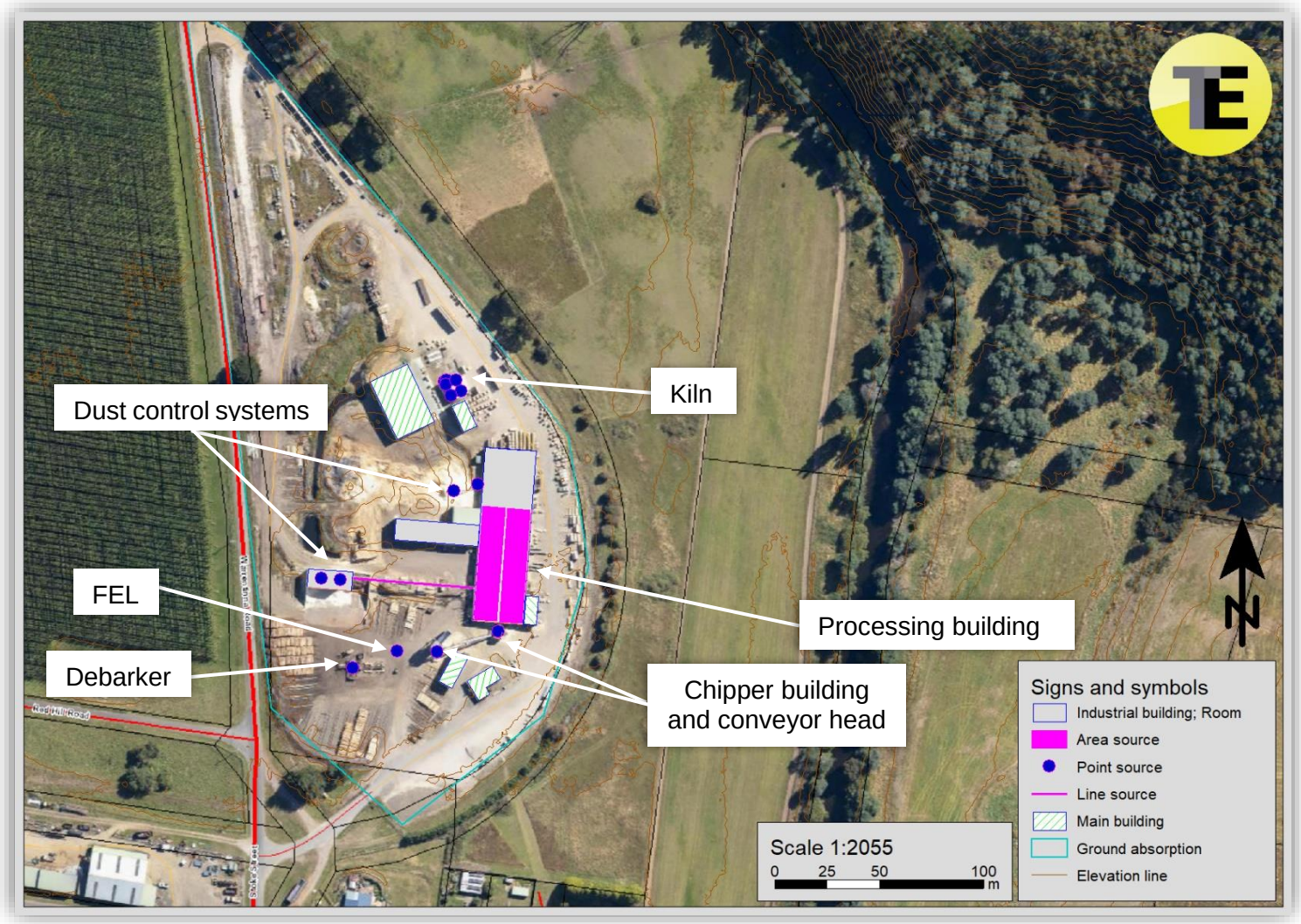

Figure 4-2: Model plan view, existing.

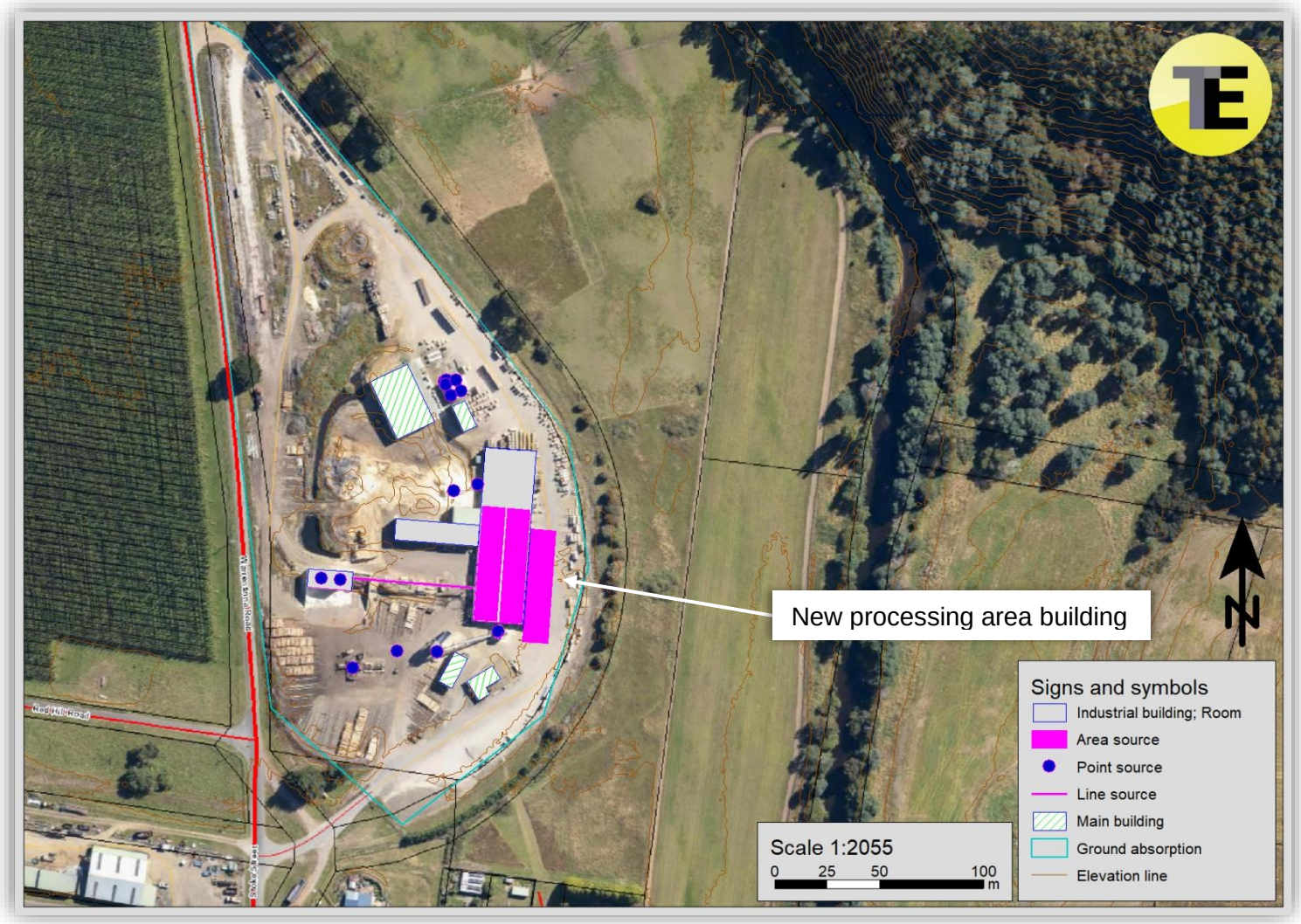

Figure 4-3: Model plan view, existing and new.

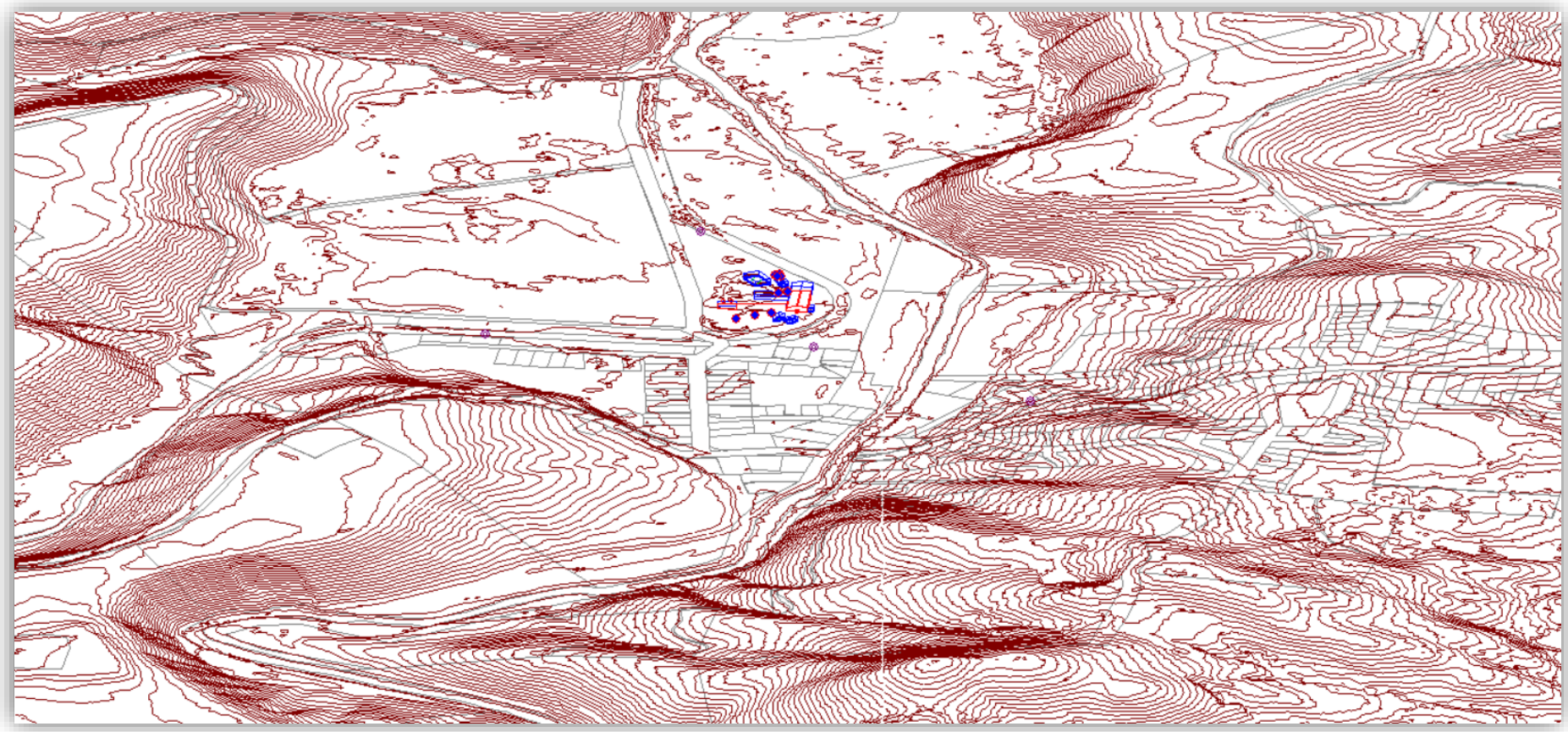

Figure 4-4: Model wire frame view from the south.

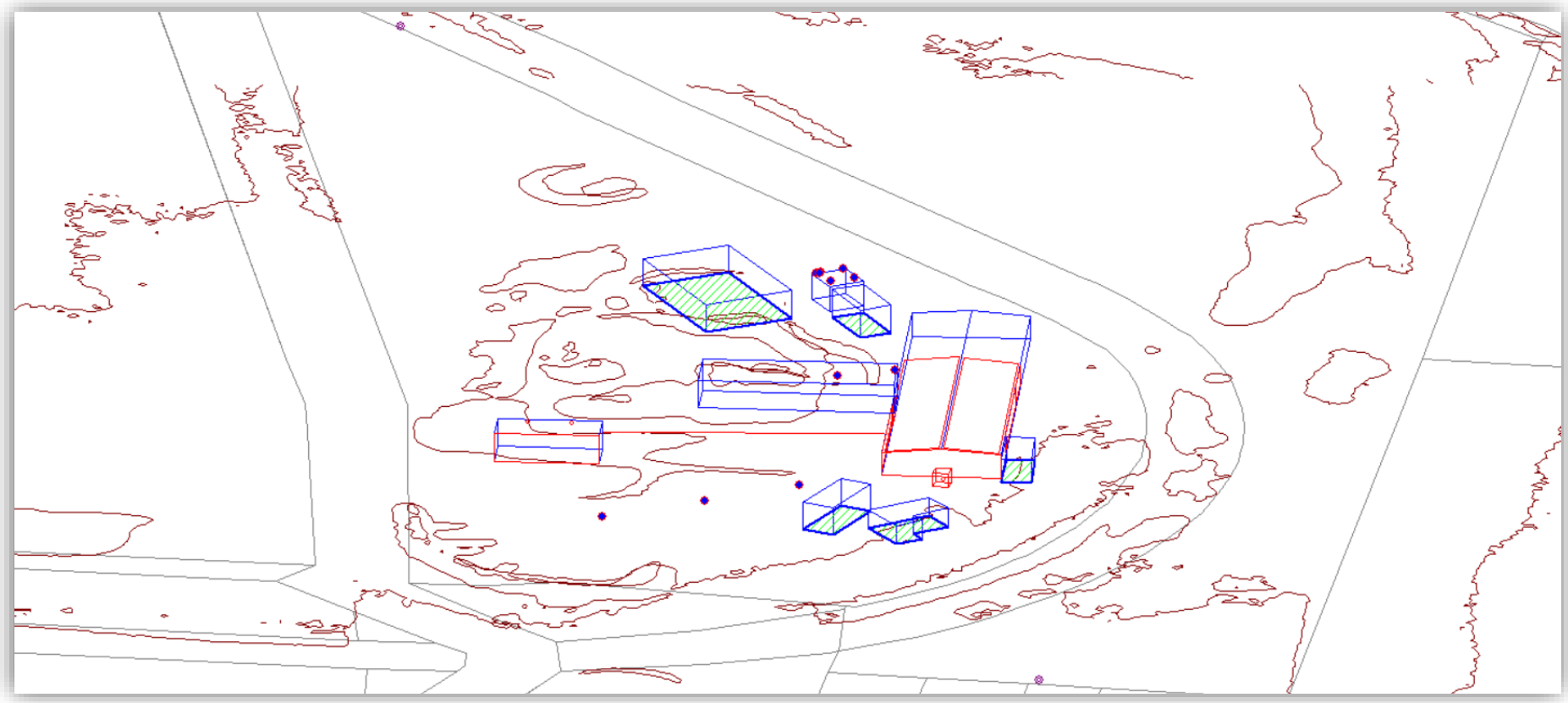

Figure 4-5: Model wire frame view from the south, existing.

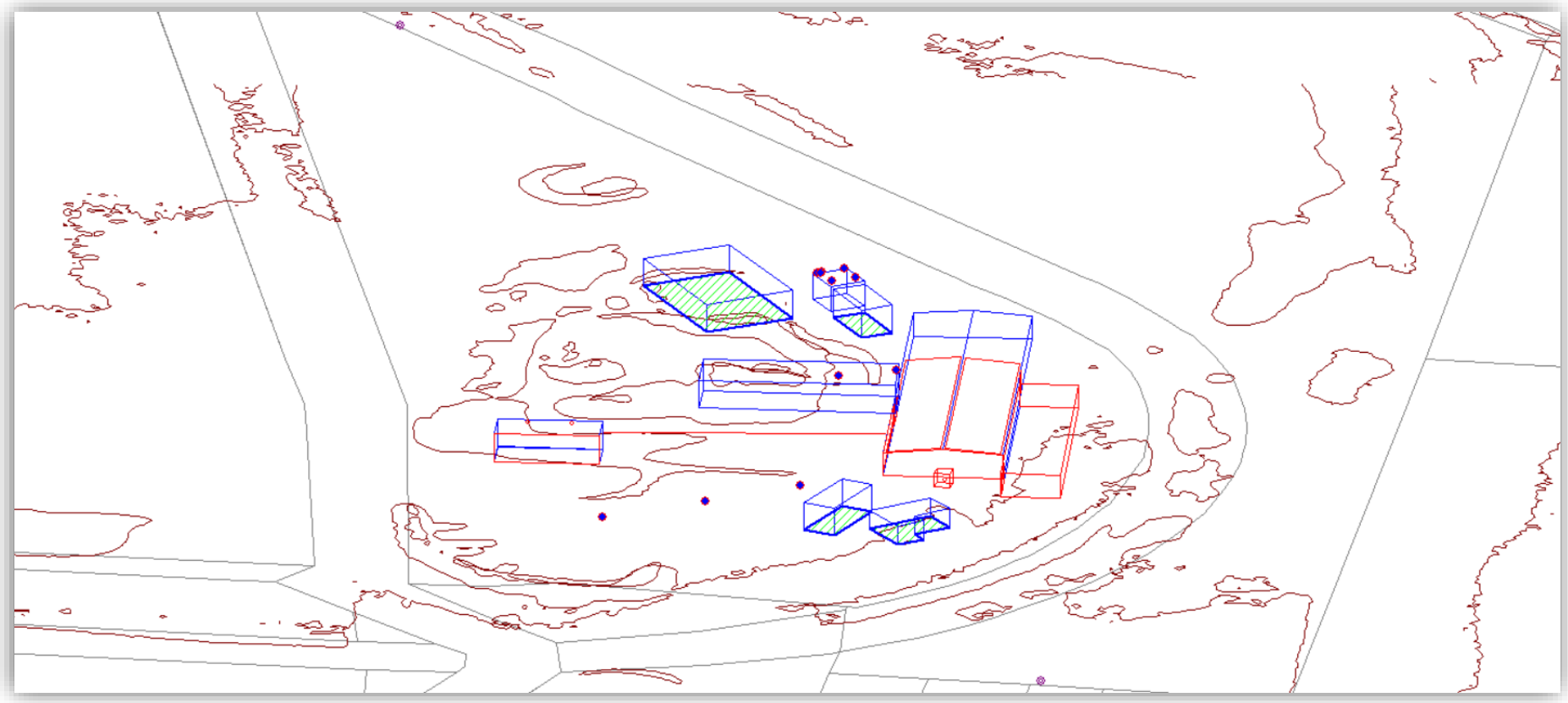

Figure 4-6: Model wire frame view from the south, existing and new.

4.4 Modelling results and discussion

4.4.1 Predicted noise emission contours

Using the environmental noise model, noise contour maps were generated to assist in the visualisation of noise propagation from the site to the surrounding environment. The contours shown consider the following:

- under ISO 9613, existing.
- under CONCAWE worst case, existing.
- under ISO 9613, existing and new.
- under CONCAWE worst case, existing and new.

The contour representing the sites existing day/evening EPN noise emission limit of 55 dBA is highlighted in turquoise.

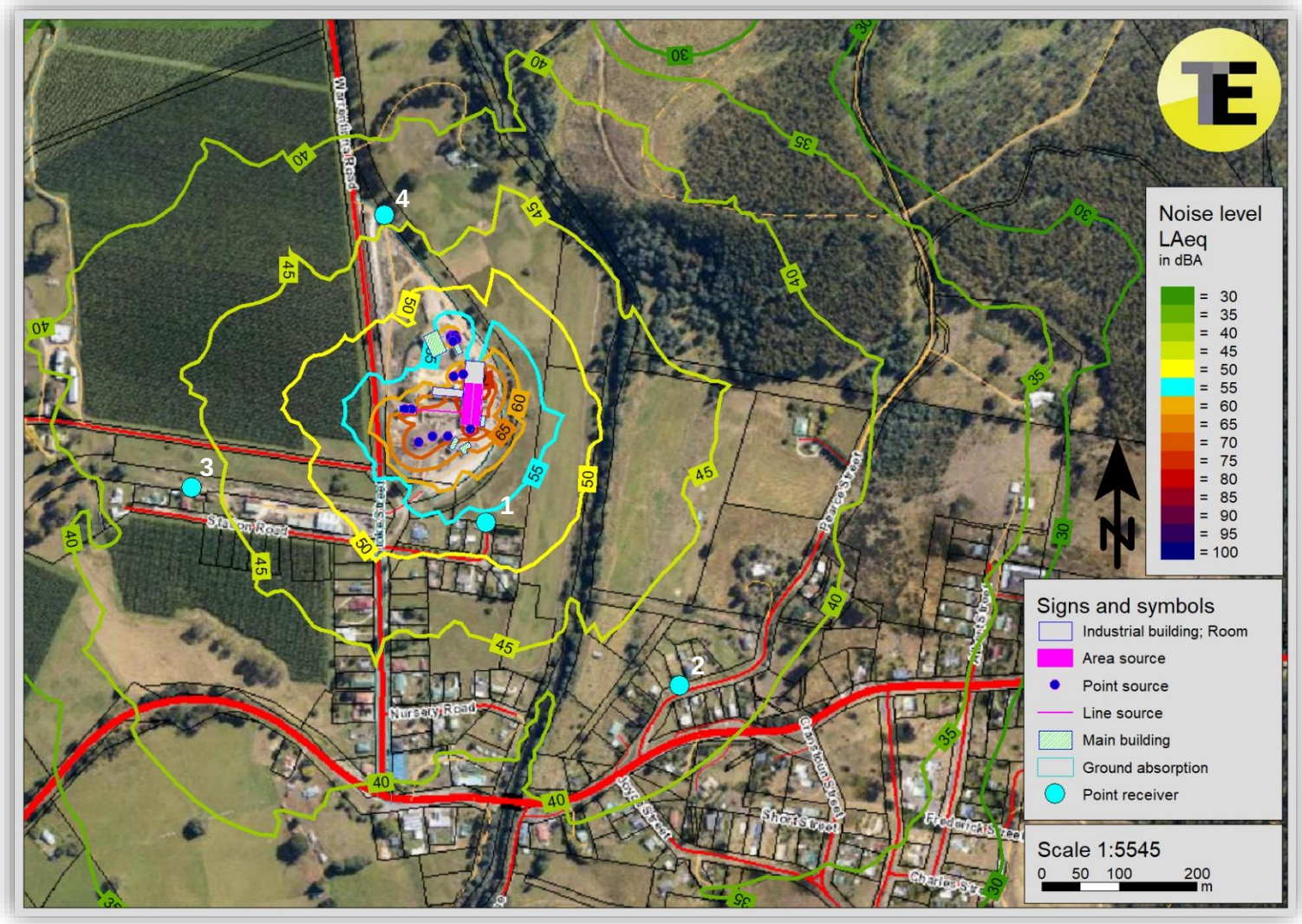

Figure 4-7: Predicted noise emission contours, under ISO, existing.

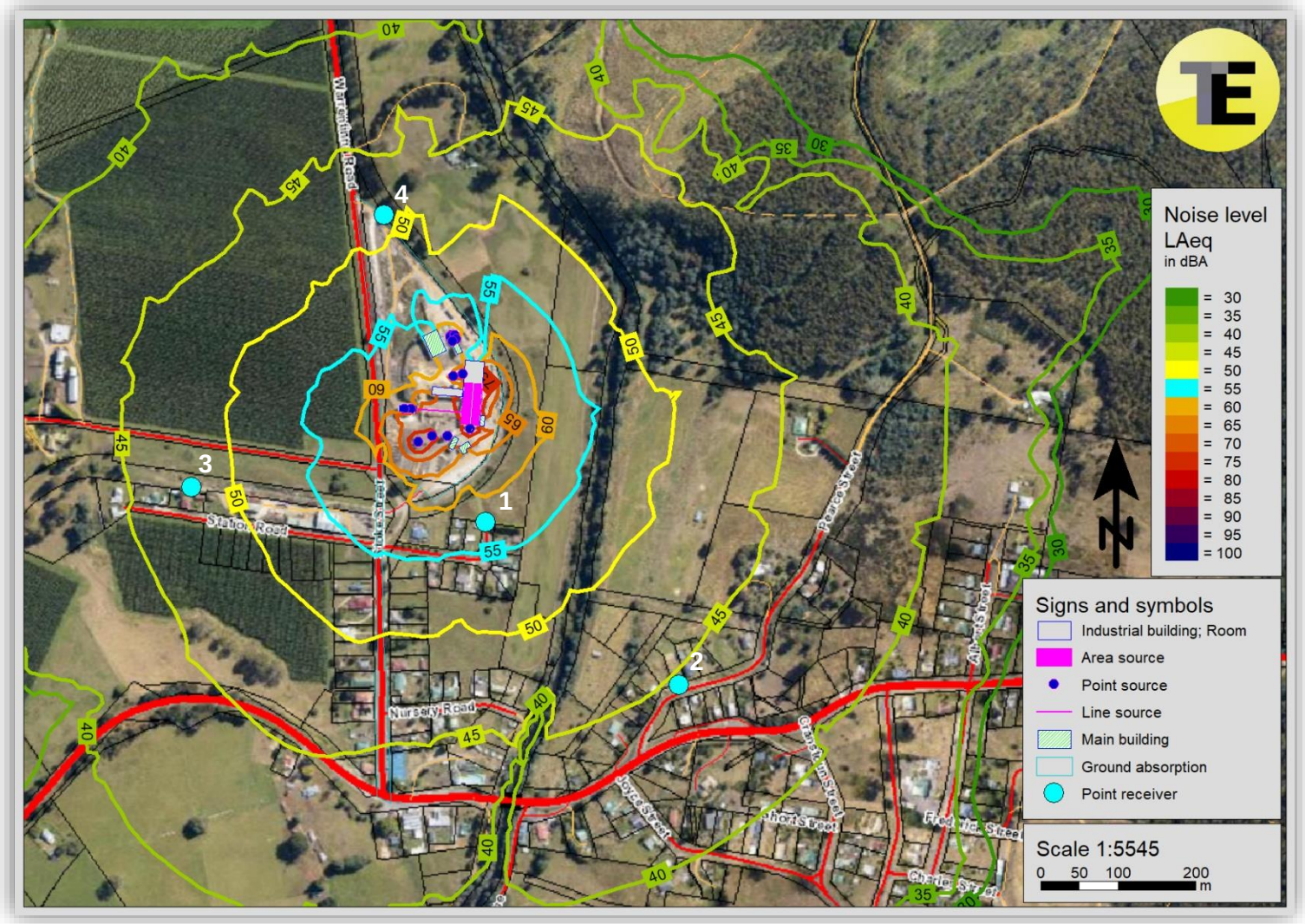

Figure 4-8: Predicted noise emission contours, under CONCAWE worst case, existing.

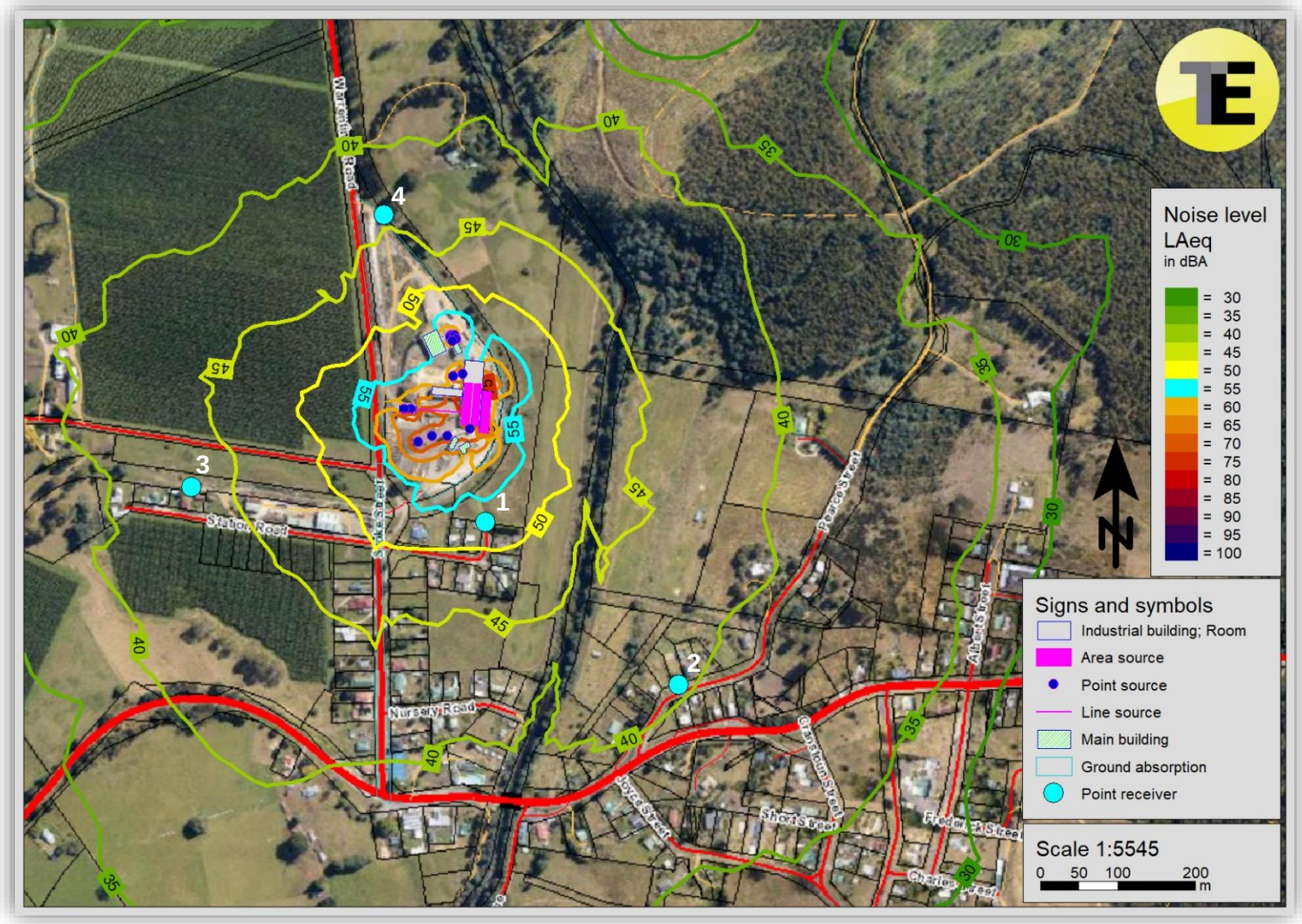

Figure 4-9: Predicted noise emission contours, under ISO, existing and new.

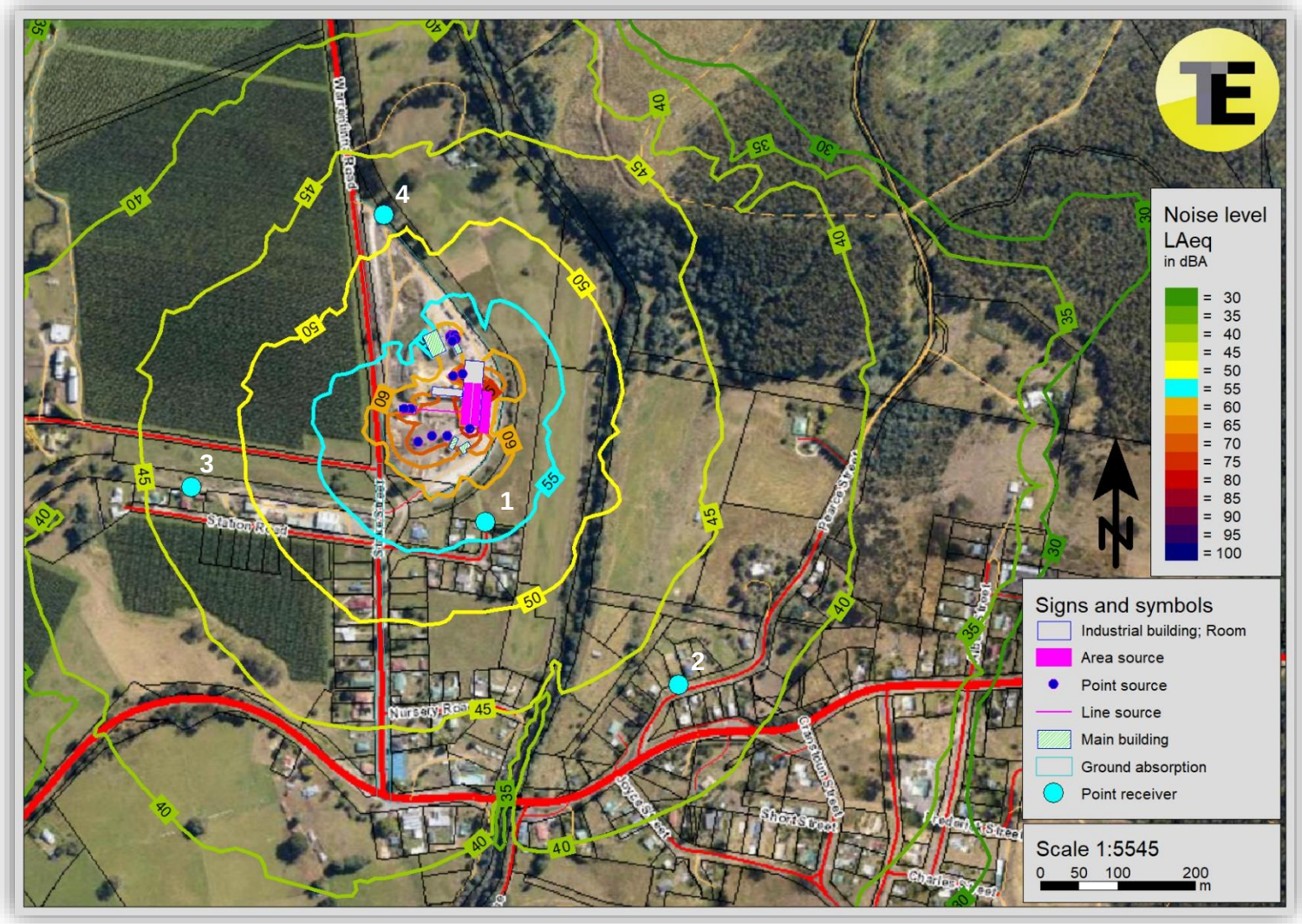

Figure 4-10: Predicted noise emission contours, under CONCAWE worst case, existing and new.

4.4.2 Predicted noise emission levels

Table 4-3 presents predicted L_{Aeq} noise emission levels at the receiver locations for each of the model algorithms. Where predicted noise levels exceed the sites day noise emission limit of 55 dBA they are highlighted. dBC levels are also provided to allow consideration of low frequency noise. Table 4-4 presents a breakdown of the contribution of existing noise sources at the site and new noise sources associated with the new processing area.

Predicted sound pressure levels								
Receiver	Existing				Existing and new			
	ISO		Worst case		ISO		Worst case	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1	54	*63*	58	*66*	53	*63*	57	*65*
2	42	*54*	45	*54*	40	*53*	43	*54*
3	44	*56*	48	*58*	43	*56*	47	*58*
4	44	*55*	49	*58*	44	*55*	49	*58*

Table 4-3: Predicted noise emission levels.

NB: The CONCAWE worst case model algorithm appears to over predict in the near field to the mill, in particular at receiver 1 where the ISO algorithm predicts within 1 dB of the noise survey level measured (see section 3) while the CONCAWE algorithm over predicts by 5 dB (noting that this applies when the de-barker is disregarded in the model with survey results not including noise from the de-barker). At the remaining receivers the COCNAWE prediction is considered reasonable. As such for assessment purposes predicted levels immediately to the south of the mill will be taken from the ISO algorithm while to the east, west and north at more distant sensitive locations will be taken from the CONCAWE predictions.

Predicted source area sound pressure levels (dBA) existing and new					
Algorithm	Source area	Receiver			
		1	2	3	4
ISO	Existing	52	40	43	43
	New	39	27	27	29
	Total	**53**	**40**	**43**	**44**
Worst case	Existing	56	43	47	47
	New	45	31	30	32
	Total	**57**	**43**	**47**	**49**

Table 4-4: Predicted source area noise emission levels.

From the above:

- Predicted noise levels from both the existing and new and existing model scenarios are bellow the day EPN noise emission limit for the site of 55 dBA.

  NB: Operations through the night period involve only the drying kiln. This has been shown to be compliant with the EPN noise emission limit for the night (40 dBA). See section 3 for the results of the most recent environmental noise survey[1] where this is demonstrated.

- The new processing area is well contained. Predicted levels from the building are well below the contribution from existing noise sources such that the new processing area has a negligible impact on the overall noise levels from the mill within the community.

- dBC levels are less than 15 dB higher than dBA levels under both model scenarios. This suggests that excessive low frequency isn't and won't be an issue from the site. Some tonality is predicted from the existing dust control fans (adjustments of 0.5 to 1 dB), however, the new processing area isn't expected to add additional tonality. Significant impulsive and modulating noise sources are not present and nor expected to be present at the site.

5 Conclusions

- Prediction of cumulative noise emission levels from existing noise sources and new noise sources associated with the production increase at the Branxholm Sawmill are within the day noise limit applicable under the site's current EPN at noise sensitive locations.
- New noise sources associated with the new production area don't increase noise emission levels from the site within surrounding residential areas during the day.
- Significant intrusive noise characteristics are not predicted to be present from the new noise sources associated with the new production area. Some tonality is currently present from the existing dust control systems at the mill.

The above assessment conclusions demonstrate the noise nuisance from operations at the Branxholm Sawmill site following the production increase is highly unlikely. The proposed development is also consistent with the protection of environmental values under the *Environment Protection Policy (Noise) 2009* as outlined in section 1.2.

Addendum: Heavy vehicle traffic noise

Internal traffic was not considered in the operational model. Up to 48 truck movements a day are expected at the site following the production increase (existing level is 24 movements per day), this is less than 1 truck per 10-minute period on average. This, and the short paths lengths on site for an individual movement are such that significant influence on $L_{Aeq,10min}$ levels is not expected while low site speeds (10 km/h) would preclude high maximum noise levels being generated.

Heavy vehicle movements to and from the site are required to go through the township of Branxholm along Stoke St. This source of noise and its potential impact on residences along Stoke St is considered here.

NB: Light vehicle traffic to and from the mill site is not considered here with no change in volumes expected as a result of production increase.

Criteria

The *Tasmanian State Road Traffic Noise Management Guidelines* don't provide assessment criteria for minor council roads (category 5 roads under the guidelines) such as Stoke St. Given this the local roads criterion from the *NSW Road Noise Policy* is adopted here as a measure of potential noise nuisance. The criterion is as follows:

- 55 dBA $L_{Aeq,1hr}$ for the day period.

This criterion 'aims to provide protection primarily inside and immediately around permanent residences' and is …'consistent with current international practice for managing traffic noise impacts.'

Prediction

Utilising the environmental noise model described in section 4 heavy vehicle traffic through the township was modelled as a line source with the following assumptions:

- Low speed heavy vehicle sound power level spectrum with an overall of 102 dBA (from Tarkarri Engineering Library data).
- Worst case assumption of 4 movements per hour for existing operations and 8 movements for operations following the production increase.
- 40 km/hr speed.
- Traverse from the northern end of the mill site to the intersection between Stoke St and the Tasman Highway.
- Facade correction of + 2.5 dB in accordance with the *NSW Road Noise Policy*.
- Ground absorption coefficient for the road surface of 0.3.

The resulting predicted $L_{Aeq,1hr}$ value ranges from heavy vehicle movements are as follows for residential buildings along Stokes St.

- Existing: 40 – 47 dBA
- Post production increase: 44 – 50 dBA

The predicted levels presented above show an increase in traffic noise levels post the production increase that is consistent with the increase in heavy vehicle movements. Both existing and the future levels are well below the local criteria under the *NSW Road Noise Policy*. This indicates

that significant annoyance in unlikely from the increased heavy vehicle traffic to and from the mill. This is consistent with the protection of environmental values under the *Environment Protection Policy (Noise) 2009* as outlined in section 1.2.