Tintern Grammar Senior School

Planning Stage Acoustic Report

M230671RP2 Revision A

Tuesday, 6 February 2024

Document Information

Project	Tintern Grammar Senior School
Client	McIldowie Partners
Report title	Planning Stage Acoustic Report
Project Number	M230671

Revision Table

Report revision	Date	Description	Author	Reviewer
0	20 December 2023	For issue	Artur Moreira	Lucy Torr
A	6 February 2024	For issue	Artur Moreira	Xun Li

Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing at typical levels of environmental noise. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Adjustments	Adjustments may be applied to effective noise levels noise sources to account for annoying noise character, duration and/or measurement position.
Aggravated noise	Noise defined by the Environment Protection Regulations to exceed the noise limits established under the Noise Protocol by more than 15 dB, or to exceed a noise level of 75 dB L_{Aeq} during the day period, 70 dB L_{Aeq} during the evening period or 65 dB L_{Aeq} during the night period.
Ambient noise	The overall environmental noise level at a given location caused by all noise sources in the area, both near and far, including all forms of traffic, industry, lawnmowers, insects, animals and the like. It is typically described by the L_{Aeq} metric.
Alternative assessment location	An alternative location used to quantify the noise from a commercial, industrial or trade premises at a noise sensitive area. An alternative location may be used where it is difficult to measure the noise at the noise sensitive area itself.
Background Level	The Background Level determined in accordance with the Noise Protocol, for different times of day.
Background noise	The underlying noise level at a given location, measured in the absence of a noise source under investigation and any other short-term noise sources such as intermittent traffic, industry, lawnmowers, insect, animals and the like. It is typically described using the L_{A90} metric.
C-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing at high levels of noise. Unlike the A-weighting, the C-weighting does not apply large negative weightings to low frequency noise levels, so it is commonly used for the assessment of low frequency noise.
Day period	Monday to Saturday (except public holidays), from 7 am to 6 pm as defined in the Environment Protection Regulations.
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of loudness.
Duration adjustment A_{dur}	If noise emissions from the commercial, industrial or trade premises do not occur continuously over the whole 30-minute period, a duration adjustment is applied to represent the level of noise over the 30-minute period.
Effective noise level	The level of noise, expressed as an $L_{Aeq,30min}$, emitted from the commercial, industrial or trade premises after relevant adjustments have been applied.
Environment Protection Regulations	The Victorian *Environment Protection Regulations* are subordinate legislation to the *Environment Protection Act 2017*. They give force to noise limits for commercial, industrial and trade premises.
EPA Victoria	Environment Protection Authority Victoria.
Evening period	Monday to Saturday, from 6 pm to 10 pm; and Sunday and public holidays, from 7 am to 10 pm, as defined in the Environment Protection Regulations.

Extraneous noise	Extraneous noise refers to any noise that is not part of the noise emissions from a noise source and is not relevant to the typical background noise. Extraneous noise includes noise from aircraft, local traffic, construction works, insects, bird chirping, people talking, rustling leaves, and the effect of wind on the microphone diaphragm.
Frequency (Hz)	The number of times a sound pressure wave oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
GED	General Environmental Duty – As defined by Section 25(1) of the *Environment Protection Act 2017*, it requires that any person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.
Impulse adjustment A_{imp}	When noise is impulsive in character than an adjustment of +2 dB for just detectable impulse character of the noise, adjustment of +5 dB for prominent impulse character of the noise.
Intermittency adjustment A_{int}	An intermittency adjustment is applied to situations where noise from a commercial, industrial or trade premises increases noticeably in level on multiple occasions during a 30-minute period.
L_{A90}	A-weighted sound pressure level, measured using the Fast time-weighting, that is exceeded for 90% of the time interval considered. The L_{A90} metric is often used to quantify the background noise level in an environment.
L_{Aeq}	The equivalent continuous A-weighted sound pressure level. It is the value of the A-weighted sound pressure level of a continuous steady sound that has the same acoustic energy as a given time-varying A- weighted sound pressure level when determined over the same measurement time interval. The L_{Aeq} metric is used to quantify the effective noise level from a premises.
Low frequency noise	Noise that occurs at frequencies of below 200 Hz. Examples of low frequency noise include truck engine noise and bass music noise.
Noise Limit	The maximum effective noise level allowed in a noise sensitive area, as determined in accordance with the Noise Protocol.
Night period	Between 10 pm and 7 am of the following day as defined in the Environment Protection Regulations.
Noise Protocol	Environmental Protection Authority 1826.4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*. The current version is published by EPA Victoria on its website.
Noise sensitive area	Defined by the Environment Protection Regulations as the part of the land within the boundary of a parcel of land that is: within 10 m of the outside of external walls of dwellings (including a residential care facility but not including a caretaker's house), residential building or noise sensitive residential use, or within 10 m of the outside of external walls of any dormitory, ward, bedroom or living room of a caretaker's house, hospital, hotel, residential hotel, motel, specialist disability accommodation, corrective institution, tourist establishment, retirement village or residential village, or within 10 m of the outside of external walls of a classroom or any room in which learning occurs during the operating hours of a child care centre, kindergarten, primary school or secondary school.

Tonal adjustment A_{tone}	When noise is tonal in nature then an adjustment is applied depending on the prominence of the tonality. Examples of tonal noise may include reversing beepers or transformer hum.
Unreasonable noise	Noise that is unreasonable due to its character as defined under the Environment Protection Act or because it is prescribed to be unreasonable, for example because it exceeds a noise limit set forth under the Environment Protection Regulations.
Zoning Level	The Zone Level determined on the basis of land zoning around a noise sensitive area in an urban area in accordance with the Noise Protocol.

Table of Contents

1 Introduction

This report outlines the environmental noise requirements for the Tintern Grammar School, new relocated Facilities building. Tintern Grammar is located at 90 Alexandra Road, Ringwood East.

This report presents an environmental noise assessment, including:

- relevant legislation and guidelines
- the applicable noise limits
- mitigation and management measures
- an assessment of the noise emissions against the relevant requirements.

Environmental noise emissions from plant have been reviewed in accordance with The *Environment Protection Regulations* (the Regulations) and the Environmental Protection Authority (EPA) Victoria Publication 1826: *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol).

This report presents the assessment outcomes based on the updated drawing TP100 revision 7, dated 30 January 2024.

2 Project description

The proposed site for this project is located within the Tintern Grammar Campus, as is shown as Figure 1. The nearest noise sensitive areas (NSAs) are indicated in Figure 1 in red.

Figure 1 Site location

3 Legislation, policy and guidelines

3.1 Environment Protection Act 2017

3.1.1 General Environmental Duty

The *Environment Protection Act 2017* (the Act) sets out environmental obligations and protections for Victorians. The cornerstone of the Act is the General Environmental Duty (GED), which states:

> A person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.

In the context of the Act, 'reasonably practicable' measures mean putting in controls to eliminate the risk of harm to human health and the environment so far as reasonably practicable. If eliminating the risk of harm is not reasonably practicable, then the risk of harm must be reduced so far as reasonably practicable. A number of matters must be considered in deciding what is reasonably practicable in the circumstances:

- the likelihood of those risks eventuating
- the degree of harm that would result if those risks eventuated
- what the person concerned knows, or ought reasonably to know, about the harm or risks of harm and any ways of eliminating or reducing those risks
- the availability and suitability of ways to eliminate or reduce those risks
- the cost of eliminating or reducing those risks.

EPA Victoria Publication 1856: *Reasonably practicable* explains that, when dealing with a common risk or harm, it is possible to demonstrate that the risk has been reduced so far as reasonably practicable if well-established effective practices or controls have been adopted to eliminate or manage risk. Where well-established practices or controls do not exist, then it is necessary to show that effective controls have been assessed and adopted.

3.1.2 Unreasonable noise

The Act also prohibits the emission of unreasonable noise and aggravated noise. The Act provides a definition for 'Unreasonable noise' in two parts. Section 3(1)(a) states that noise that is unreasonable having regard to the following:

- its volume, intensity or duration
- its character
- the time, place and other circumstances in which it is emitted
- how often it is emitted
- any prescribed factor.

Section 3(1)(b) states that noise is unreasonable noise if it is prescribed to be so. Under the *Environment Protection Regulations*, noise that exceeds the noise limits established in accordance with EPA Victoria Publication 1826.4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol) is prescribed to be unreasonable noise.

Unreasonable noise occurs if noise meets the requirements of Section 3(1)(a) and/or Section 3(1)(b) of the Act.

3.2 Environment Protection Regulations

The *Environment Protection Regulations* (the Regulations) are subordinate legislation that support the Act. Under the Regulations, the assessment of noise from commercial, industrial and trade premises at noise sensitive areas must be carried out in accordance with the Noise Protocol, both in terms of establishing noise limits as noise sensitive areas and in terms of the measurement of noise from the subject premises.

The noise limits set under the Regulations apply to noise emitted from the site. The noise limits are not applicable to noise that may arise from the following sources relevant to this site:

- voices and noise from crowds
- lawnmowing
- sporting events
- intruder, emergency or safety alarms or sirens
- equipment used in relation to an emergency

The general environmental duty still applies to noise arising from the above sources but compliance with the noise limits set under the Regulations is not mandatory.

Noise sensitive areas are defined in the Regulations as:

- The area within 10 m of the external walls of dwellings (including residential care facilities but excluding caretaker's houses), residential buildings and noise sensitive residential uses.
- The area within 10 m outside the external walls of any dormitories, wards, bedrooms and living rooms of caretaker's houses, hospitals, hotels, motels, residential hotels specialist disability accommodation, corrective institutions, tourist establishments, retirement villages and residential villages.
- The area within 10 m outside the external walls of classrooms or other rooms in which learning occurs at childcare centres, kindergartens, primary schools and secondary schools.
- Within the boundary of tourist establishments, campgrounds and caravan parks that are located in rural areas.

The Regulations also define Day, Evening and Night periods for the assessment of noise, reproduced in Table 1.

Table 1 Applicable time periods

Time period	Details
Day	Monday to Saturday, 7 am to 6 pm
Evening	Monday to Saturday, 6 pm to 10 pm Sundays and public holidays, 7 am to 10 pm
Night	10 pm to 7 am any day

The Regulations define:

- Unreasonable noise as noise from commercial, industrial and time periods that exceeds the applicable noise limits from the Noise Protocol.
- Aggravated noise as noise commercial, industrial and time periods that exceeds:
  - 75 dB $L_{Aeq,30m}$ or the Noise Protocol noise limit by more than 15 dB during the day
  - 70 dB $L_{Aeq,30m}$ or the Noise Protocol noise limit by more than 15 dB during the evening
  - 65 dB $L_{Aeq,30m}$ or the Noise Protocol noise limit by more than 15 dB during the night.

3.3 Relevant guidelines

3.3.1 Noise Protocol

EPA Victoria has prepared the Noise Protocol to specify methodologies for establishing noise limits for operational noise sources and for assessing noise levels against the noise limits. Compliance with the noise limits defined by the Noise Protocol is required by Regulations and is expected to assist with meeting the GED during the operational phase of the Project.

The Noise Protocol defines different procedures for establishing noise limits depending on whether the noise sensitive receiver is located within a major urban area or rural areas. Major urban areas are defined as those locations within Melbourne's urban growth boundary or within defined areas around major regional centres, such as Ballarat. The Project is located in an urban area.

For urban areas, the Noise Protocol defines noise limits dependent on the following:

- Time of day. Different noise limits apply for the different time periods of Day, Evening and Night.
- Land zoning used to determine the Zoning Level.
- The measured background noise levels in the area in the absence of noise due to commercial, industrial or trade premises used to determine the Background Level.

For the purpose of this assessment, no noise measurements were undertaken at site and the background levels have been assessed as "neutral", therefore the noise limiting criteria will be equal to the Zoning Level. We note that this approach is generally conservative for the assessment of environmental noise in metropolitan Melbourne areas and provides protection against the potential for seasonal change in background noise levels over the course of a year. A Planning Map showing the defined zoning for the proposed development sites and surrounds is provided in Appendix A.

The noise limits applicable to noise emissions from the development at the nearest noise sensitive areas are presented in Table 2.

Table 2 Noise limits for mechanical plant in $L_{eq,30min}$ dB(A)

Time Period	Time	Zoning Level	Background Level, L_{90} dB	Noise Limit $L_{Aeq,30min}$ dB
Day	7 am to 6 pm Monday to Saturdays	50	Neutral	**50**
Evening	6 pm to 10 pm Monday to Saturdays 7 am to 10 pm Sundays and Public Holidays	44	Neutral	**44**
Night	10 pm to 7 am Everyday	39	Neutral	**39**

It should be noted that, since schools only operate during the Day time period presented in the table above, the mechanical services and Facilities equipment (saw, grinder, etc) for this site are only expected to operate during the Day time period.

3.3.2 Noise Control Guidelines

Waste collection

EPA Victoria Publication 1254.2 *Noise Control Guidelines* (Noise Control Guidelines) provides guidance on managing noise from industrial waste collection. Table 3 presents the schedule for garbage trucks.

Table 3 Schedule for garbage trucks

Frequency of collection	Days	Time
One collection per week	Monday to Saturday	6:30 am to 8 pm
	Sundays and public holidays	9 am to 8 pm
Two or more collections per week	Monday to Saturday	7 am to 8 pm
	Sundays and public holidays	9 am to 8 pm

In addition, the attention should be paid to the following:

- Refuse bins should be located at sites that provide minimal annoyance to residential premises.
- Compaction should be carried out while the vehicle is moving.
- Bottles should not be broken up at collection site.
- Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbance.
- Noisy verbal communication between operators should be avoided where possible.

Delivery trucks

The Noise Control Guidelines also provide guidance on managing noise from deliveries to non-residential premises as summarised below. Table 4 presents the schedule for deliveries to non-residential land uses.

Table 4 Schedule for deliveries to non-residential

Days	Time
Monday to Saturday	7 am to 10 pm
Sundays and public holidays	9 am to 10 pm

(1) Note: all ancillary motors or trucks should be turned off whilst making the delivery.

For deliveries outside the hours contained in the table above, the noise from the delivery should be inaudible in a habitable room of any residential properties regardless of whether any door or window giving access to the room is open.

4 Facilities building workshop equipment

The Facilities building will have workshop equipment noise emanating from the building, a site visit was made on 29 November 2023 to determine the level of noise emissions from equipment to be used in the Facilities building. Noise measurements were conducted for 2 – 3 minutes until noise measurements were steady. The measurement instruments are presented in Appendix B.

Table 5 presents measurement results and Appendix C shows the equipment measured.

Table 5 Noise measurement results

Equipment	Time	Measured noise level L_{Aeq}	Description
Table panel saw	9.31 am	81	At 3 metres form the equipment in the current Facilities building.
Metal cut off saw	9.35 am	91	
Thicknesser	9.39 am	88	
Grinder	9.41 am	94	

5 Environmental noise assessment

5.1 Building plant noise

Mechanical plant items such as condensers and exhaust fans for building ventilation are anticipated to be located externally to the facilities building. Noise mitigation measures to control noise emissions from the external plant will include:

- Design and selection of mechanical plant with low noise emissions,
- Locating and orienting the plant to maximise the distance to and minimise direct line of sight to noise-sensitive receivers.
- If necessary, incorporation of solid barriers around the plant or provision of acoustically treated enclosures/louvres.

The above treatments will be specified and incorporated into the design during the detailed design stage to reduce noise emissions so far as reasonably practicable, and to ensure noise emissions are compliant with the applicable noise limits set out in Table 2. The external plant selected for the development should be reviewed when the design and acoustic specifications of units are available.

5.2 Facilities building equipment noise

The emissions levels from equipment used in the facilities building (saw, grinders, etc) have been assessed at the nearest noise sensitive area.

Three-dimensional digital noise models have been developed for the site and surrounds using the ISO 9613-2 prediction algorithm, as implemented in SoundPlan Version 8.2 environmental noise modelling software, which takes into account:

- distance attenuation
- topography, as sourced from DELWP Spatial Datamart on 7 December 2023.
- ground absorption, with a ground absorption factor of 0.9 (90% absorptive and 10% reflective) assumed for the site and surrounds
- noise sensitive receiver locations as presented in Section 2
- air absorption based on a temperature of 10ºC and a relative humidity of 70%
- meteorological conditions, with ISO 9613-2 advising that the application of this algorithm results in predicted noise levels representative of downwind propagation to receivers or propagation under a well-developed moderate ground-based temperature inversion.

Noise character adjustments

The Noise Protocol sets out adjustments that must be applied to the predicted noise level from a noise source where, when assessed at a noise sensitive receiver, certain noise character is present. In the context of this assessment, the following has been assessed with respect to character adjustments:

- **Duration adjustment (potential reduction):** Unless stated otherwise, noise sources have been assumed to operate continuously for an entire 30-minute period such that no reduction has been applied.
- **Impulse adjustment (potential increase):** The noise from the site is expected to be steady in nature. Therefore, no adjustment has been applied for impulsive noise.
- **Intermittency adjustment (potential increase)**: The noise from the site is expected to be steady in nature. Therefore, no adjustment has been applied for intermittency.
- **Tonal adjustment (potential increase):** The noise from the site is not expected to be tonal in nature. Therefore, no adjustment has been applied for tonality.

Prediction model inputs – preliminary treatments

The following construction elements inputs were used in the environmental noise model:

- Ceiling and walls of the Facilities building are going to be Colourbond 0.48mm (achieving a minimum R_W 20)
- Roller doors are typical roller doors 0.48mm (achieving a minimum R_W 13 as a system) fully closed with a minimum 200mm overlap with the opening, and
- External door does not present large gaps, grids or holes and is fitted with perimeter and bottom seals achieving at least R_W 25.
- Facilities building ceiling is composed by a 1.0 NRC material (e.g. 100mm thermal/sound insulation),

Assessment

The noise emissions from the development were predicted based on the current architectural drawings, see Figure 2 below and Appendix D, and assuming that all workshop equipment is operating at the same time continually within 30 minutes period.

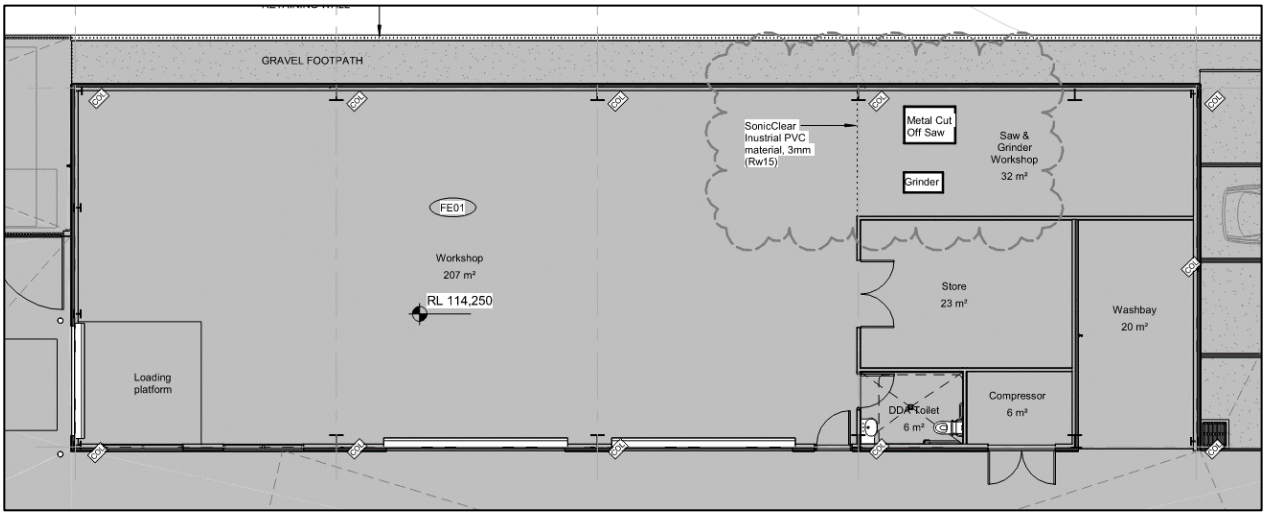


Figure 2 Proposed floor plan (workshop) including location of Metal cut off saw and Grinder

It should be note that the prediction assumed that a full enclosure would be in place around the Metal cut off saw and the Grinder, and that this enclosure contained materials with minimum R_W15 (as per the architectural drawings and Figure 3) and that the Grinder and the Metal Cut Off Saw would only be operated within this enclosure.

Figure 3 Flexshield 3mm solution

Since this school facility only operate during the Day time period, the mechanical services and Facilities equipment (saw, grinder, etc) for this site are only expected to operate during the Day time period. The predicted overall noise levels for the current proposed architectural configuration, is presented in Table 6.

Table 6 Predicted noise levels

Sensitive receiver	Time period	Predicted noise level, L_{Aeq} dB	Noise limit, L_{Aeq} dB	Compliant
84 Gracedale Ave	Day	48	50	Yes

It should be noted that the cumulative noise level from the building service plant discussed in Section 5.1 and noise level in the table above needs to be assessed when the plant details are available.

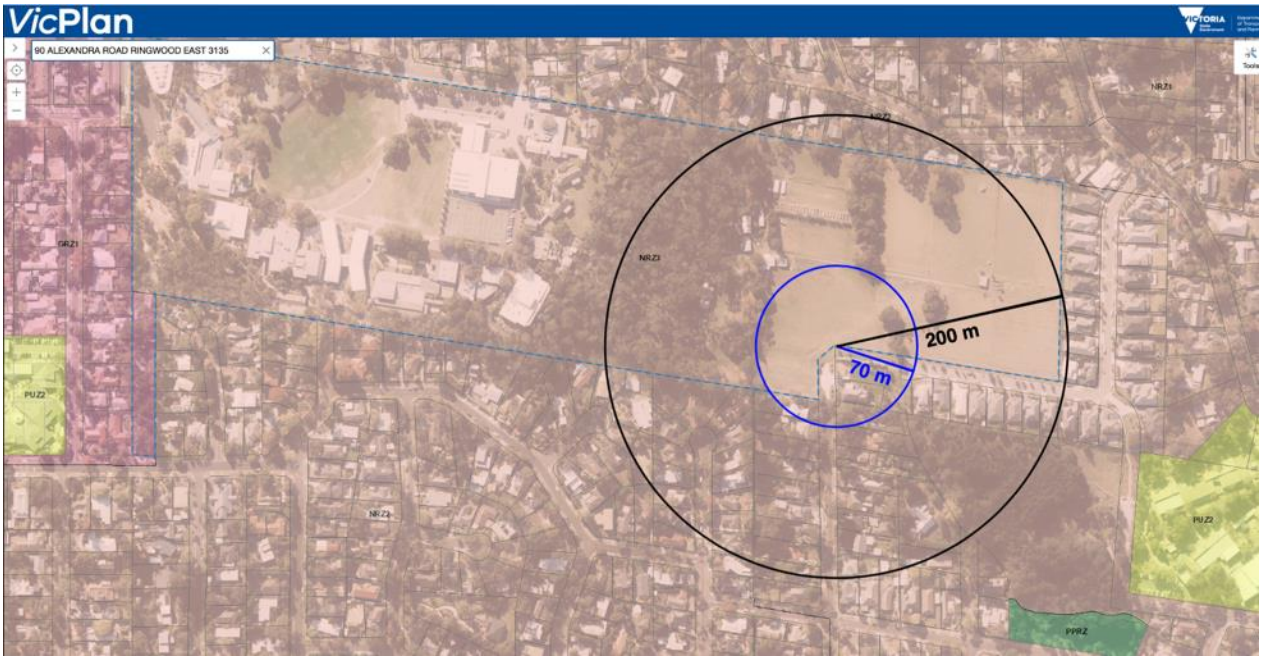
6 Conclusion

This report provides an environmental noise assessment for the Tintern Grammar School, new relocated Facilities building.

Relevant environmental noise limits for the development have been established in accordance with the requirements of the Environmental Protection Authority 1862: *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*. Noise mitigation strategies to control noise emissions from the development are discussed in Section 5 which include consideration of acoustic treatments for mechanical plant and the Facilities workshop equipment. Section 5.2 provides mitigation advice for the Facilities workshop equipment that must be implemented to achieve the EPA noise limits.

Deliveries and waste collection at the development should comply with the schedules and recommendations from the Noise Control Guidelines summarised in Section 3.3.2.

Appendix A—Planning map



Appendix B—Instruments for measurements

Table B1 presents the details of the instruments used for noise measurements.

Table B1 Instruments used for noise measurements

Instrument	Manufacturer and model	Serial number	Laboratory calibration valid to
Sound level meter	Casella	2145425	February 13 2025
Acoustical calibrator	Bruel & Kjaer Type 4231	2528316	April 19 2024

All items of equipment carry a current certificate of calibration from a National Association of Testing Authorities accredited laboratory. Field calibrations conducted before and after the measurement period deemed the measurements valid.

Appendix C—Photographs of equipment

Table panel saw

Metal cut off saw

Thicknesser

Grinder

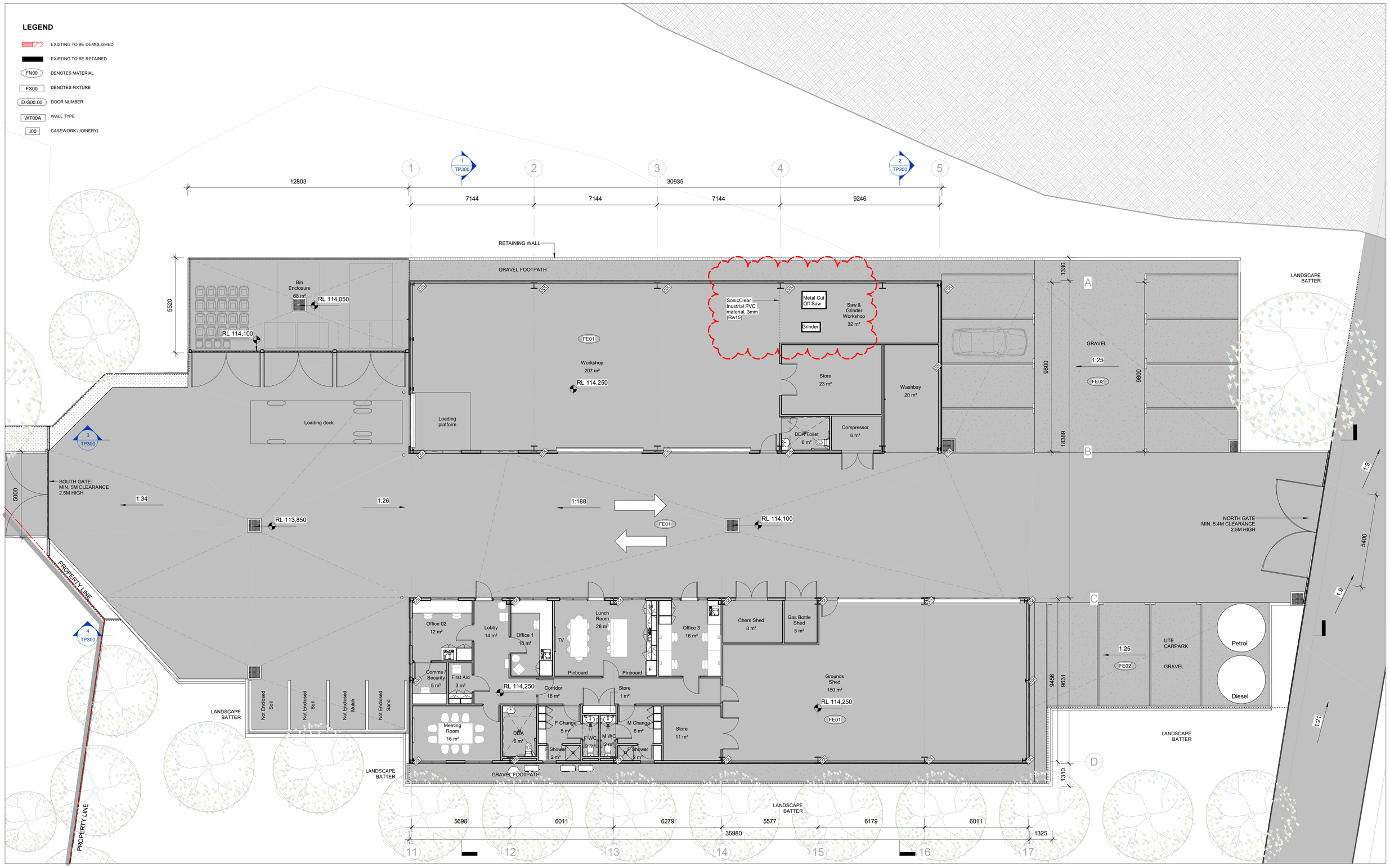
Figure C1 Photograph of measured equipment at the current Facilities Building

Appendix D—Proposed plan

ADVERTISED PLAN

LEGEND

- EXISTING TO BE DEMOLISHED
- EXISTING TO BE RETAINED
- FN00 DENOTES MATERIAL
- FX00 DENOTES FIXTURE
- D.G00.00 DOOR NUMBER
- WT00A WALL TYPE
- J00 CASEWORK (JOINERY)



REV	DESCRIPTION OF CHANGE	DATE
7	Issued for Town Planning	30.01.24
6	Issued for Town Planning	20.12.23
5	Issued for information	01.12.23
4	Issued for information	10.11.23
3	Issued for information	27.10.23
2	Issued for information	19.10.23
1	Issued for information	28.09.23

DO NOT SCALE OFF DRAWINGS. USE FIGURED DIMENSIONS ONLY. CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING SHOP DRAWINGS

DRAWINGS TO BE PRINTED IN COLOUR.

NORTH POINT

CLIENT

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NOTES

PROJECT
TINTERN GRAMMAR - FACILITIES

DRAWING STATUS
TOWN PLANNING

PROJECT ADDRESS
90 ALEXANDRA ROAD, RINGWOOD EAST VIC 3135

TITLE
PROPOSED - FLOOR PLAN

FILE
Autodesk Docs://3252 - Tintern Grammar - Facilities/3252-TTG-Facilities.rvt

JOB NO:	SCALE:	REV DATE:	DRAWN:	CHECK:
3252	As indicated	30.01.24	GN	TC

DRAWING NUMBER:
TP100

REVISION:
7