



**Project:** 101-105 WILLOWBANK ROAD GISBORNE

**Prepared for:** RISM Constructions  
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**Report No.:** Rp 001 20220102

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## 1.0 INTRODUCTION

RISM Constructions (RISM) is proposing to rezone land at 101-105 Willowbank Road, Gisborne (the subject site) for use as a small commercial centre that could include a small supermarket, café, shops, medical centre, and commercial space.

Taylor's Development Strategists (TDS), on behalf of RISM, has retained Marshall Day Acoustics Pty Ltd (MDA) to undertake an environmental noise assessment for the proposed development.

The advice presented in this report has been considered in the context of feasibility for town planning purposes as the plans for proposed development are still in preliminary stages.

A glossary of acoustic terminology used in this report is presented in Appendix A.

## 2.0 PROJECT DESCRIPTION

### 2.1 Site location

The subject site is located at 101-105 Willowbank Road, Gisborne and is bounded by:

- Willowbank Road to the north, with residential dwellings beyond
- Brady Road to the east, with a childcare centre and residential dwellings beyond
- Residential dwellings to the south
- Residential dwellings to the west.

The nearest identified noise sensitive areas (receivers) considered in this assessment are detailed in Table 1. Noise levels at other receiver locations adjacent or near those in Table 1 will be comparable or lower to those presented in this assessment.

**Table 1: Nearest identified residential dwellings to subject site**

Address	Distance from subject site	Description
116 Willowbank Road	36 m north	Single storey residential dwelling
107 Willowbank Road	4 m west	Single storey residential dwelling
4a/b Francis Crescent	4 m south	Single storey residential dwelling
6a/b Francis Crescent	16 m south	Single storey residential dwelling
97-99 Willowbank Road	21 m east	Childcare centre

An aerial photograph of the subject site and surrounds is provided in Figure 1.

The subject site and immediate surrounds are zoned General Residential (GRZ1).

The relevant planning map is provided in Appendix B.

Figure 1: Subject site and surrounds (Source: Nearmap)



## 2.2 Proposed development

The proposed development involves the construction of two new two-storey buildings containing a small supermarket, café, shops, medical centre, and commercial space.

The proposed layout is shown in Appendix C.

### 2.2.1 Operating hours

The proposed operating hours for the medical centre are:

- Monday to Friday: 8:30 am – 5:30 pm
- Saturday: 12:00 pm – 3:00 pm
- Sundays and public holidays: 11:00 am – 1:00 pm.

The proposed operating hours for the supermarket are:

- Monday to Sunday and public holidays: 7:00 am – 7:00 pm.

The remaining spaces are yet to be confirmed.

### 2.2.2 Mechanical services

Mechanical services details, such as plant selections and specifications, are not available at this preliminary stage of town planning. Locations of plant based on very basic spatial requirements have been provided by Elev8 consulting services (Elev8).

A feasibility assessment of mechanical services noise is presented in Section 6.2, based on indicative equipment noise levels sourced from the MDA database. Verification of mechanical services noise emissions is required during the detailed design stage.

### 2.2.3 Deliveries and waste collection

Deliveries and waste collection vehicles are proposed to access the site via Willowbank Road to the north, and Brady Road to the east of the subject site, occurring to the west of Building A and to the south of Building B.

Both deliveries and waste collections will be undertaken during the evening period only.

## 3.0 LEGISLATION AND GUIDELINES

### 3.1 Victorian legislation and guidelines

A summary of the relevant Victorian legislation and guidelines is provided in Table 2. Further details are also provided in Appendix D.

**Table 2: Victorian legislation and guidelines**

Document	Overview
<i>Environment Protection Act 2017</i> (EP Act)	<p>The EP Act provides the overarching legislative framework for the protection of the environment in Victoria.</p> <p>The EP Act does not specify noise limit values but prohibits the emission of unreasonable or aggravated noise from non-residential premises.</p> <p>The EP Act provides general definitions of unreasonable and aggravated noise; definitions that are specific to commercial, industrial and trade premises are provided in supporting publications (see below).</p> <p>Part 3.2 of the EP Act outlines the general environmental duty (GED), which requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution to minimise those risks to prevent harm as far as reasonably practicable.</p> <p>Section 93 of the EP Act provides for the creation of an environmental reference standard to be used to assess and report on environmental conditions in the whole or any part of Victoria (see below).</p>
<i>Environment Protection Regulations 2021</i> (EP Regulations)	<p>The objectives of the EP Regulations are to further the purposes of, and give effect to, the EP Act. The Regulations also define outdoor sensitive areas, commercial, industrial and trade premises, as well as indoor, outdoor and live entertainment venues and events.</p> <p>Part 5.3 of the EP Regulations sets out requirements that are specific to environmental noise. Division 1 states that the prediction, measurement, assessment or analysis of noise within a noise sensitive area for the purposes of the EP Act or the EP Regulations must be conducted in accordance with the Noise Protocol (see below). Division 3 stipulates requirements that are specific to commercial, industrial and trade premises. Division 4 applies to music noise from entertainment venues and events.</p> <p>In particular, noise from these types of premises and venues is prescribed as unreasonable if it exceeds a noise limit or alternative criterion determined in accordance with the Noise Protocol (see below). Additional matters addressed in Divisions 3 and 4 include assessment time periods, minimum noise limit values, management of cumulative noise from multiple premises, noise sensitive areas where assessment requirements apply, definition of frequency spectrum as a prescribed factor, and a definition for aggravated noise.</p>

Document	Overview
EPA Publication 1826.4 <i>Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues</i> , dated May 2021 (Noise Protocol)	<p>The Noise Protocol defines the method for setting the noise limits for new and existing commercial, industrial and trade premises and entertainment venues in Victoria.</p> <p>It also outlines the steps that must be followed to undertake an assessment (measurement or prediction) of the effective noise level within a noise sensitive area or at an alternative assessment location. A comparison between the effective noise level and the relevant noise limit or the relevant alternative assessment criterion will determine whether the noise that is emitted from the premises is unreasonable under the Regulations.</p> <p>The noise limits for commercial, industrial and trade premises are determined on the basis of land zoning and background noise levels, and are separately designated for day, evening and night periods. Music noise limits for indoor venues are set based on the background noise levels.</p>
<i>Environment Reference Standard</i> , dated 25 May 2021 (ERS)	<p>The ERS is made under Section 93 of the EP Act. The ERS sets out environmental values for ambient sound that are sought to be achieved and maintained in Victoria and standards to support those values. The indicators and objectives within the standard provide a benchmark for comparing desired outcomes to the actual state of the environment and a basis for assessing actual and potential risks to the environmental values.</p> <p>The ERS is not a compliance standard, and the values listed within the ERS for different land uses are explicitly not noise limits nor design criteria. The primary function of the ERS is to provide assessment and reporting benchmarks for environmental values.</p> <p>The ERS is primarily relevant for aspects of the environment that are not the subject of prescriptive regulation.</p>
EPA Publication 1254.2 <i>Noise Control Guidelines</i> dated May 2021 (EPA Publication 1254.2)	<p>Provides advice for the management of noise from a range of activities and noise sources. The guidelines are primarily intended to be used by municipal officers to assist in the resolution of complaints or to avert a possible noise nuisance. Some elements of the guidelines have been prepared so that they could be incorporated into a permit condition of a development or embodied as a local law.</p>

To support the application and use of the legislation and guidance, a range of Victorian EPA publications provide additional advice on matters of interpretation and technical assessment requirements. The only relevant publication for this assessment is:

- EPA Publication 1997 Technical guide: Measuring and analysing industry noise and music noise dated June 2021 (EPA Publication 1997).

### 3.2 Supplementary guidelines

The legislation and guidelines set out in Section 3.1 address a wide range of noise sources and considerations.

In situations where objective noise assessments are required for sources that are not directly addressed by the legislation and guidelines, an effect and risk-based assessment is often carried out by referring to supplementary guidelines sourced from a range of sources such as interstate publications and established assessment precedents. Supplementary guidance relevant to the assessment of the proposal is provided in Table 3.

**Table 3: Supplementary guidelines**

Noise consideration	Supplementary guidance
Sleep disturbance during the night	<p>Based on a review of research into sleep disturbance, the NSW Road Noise Policy (NSW RNP) nominates maximum internal night-time noise levels at noise sensitive locations which are unlikely to disturb sleep.</p> <p>The policy notes that from the research on sleep disturbance to date it can be concluded that:</p> <ul style="list-style-type: none"> <li>• <i>maximum internal noise levels below 50–55 dB <math>L_{Amax}</math> are unlikely to awaken people from sleep</i></li> <li>• <i>one or two noise events per night, with maximum internal noise levels of 65-70 dB <math>L_{Amax}</math>, are not likely to affect health and wellbeing significantly.</i></li> </ul> <p>It is generally accepted that a partially open window provides approximately 10 dB noise reduction from outside to inside. Therefore, to reduce the risk of sleep disturbance, maximum noise levels at night should generally not exceed 65 dB <math>L_{Amax}</math> outside an openable window a residential dwelling.</p>

### 3.3 General Environmental Duty

The general environmental duty (GED) is outlined in Part 3.2 of the EP Act.

The GED requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution (including noise) and waste, to minimise those risks to prevent harm as far as reasonably practicable. Commercial premises are therefore required to continue to review and eliminate or reduce the risk of harm from any emission of noise as far as reasonably practicable, even if they are compliant with the Noise Protocol.

The GED applies wherever there is a risk of harm, regardless of whether the noise emitted has caused complaints or caused harm to people or the environment.

The GED is applied first to eliminate or reduce the risk of harm to human health and the environment from noise so far as reasonably practicable. Any residual noise remaining after actions are taken to meet the GED is then managed as per the unreasonable noise definitions in Section 166 of the EP Act (i.e. complying with the Noise Protocol).

As part of the detailed design stage, RISM and TDS will investigate reasonably practicable measures for their impact on reducing the risk of harm due to noise. Examples of measures discussed to date include:

- Constructing a 2.4 m high solid fence to the west and south site boundary, providing acoustic screening to the nearest noise sensitive receiver;
- Strategically locating mechanical services plant on the roof to maximise the distance from receivers and to utilise the natural built form of the structures as screening;
- Selection of plant with low noise levels;
- Constructing screening around rooftop plant decks, if required;
- Conducting deliveries and waste collections at the quietest available position for the nearest noise sensitive receiver, as far as practicable;
- Limiting deliveries and waste collection so they do not occur during the night period; and
- Selection of quietest available vehicles.



### 3.4 Identification of noise sources and assessment methods

The noise sources associated with the operation of the proposed development have been identified and are summarised in Table 4, which details the relevant legislation or guideline applicable for the assessment of each of the identified noise sources.

The assessment considers noise from:

- Mechanical services;
- Deliveries and waste collection; and
- Early morning use of the carpark (amenity check for sleep disturbance).

**Table 4: Potential noise impacts**

Potential noise impact	Source of assessment criteria	Status
Mechanical services (e.g. heating and ventilation units, refrigeration equipment, exhaust fans, etc)	Noise Protocol	Legislation – mandatory Indicative assessment – expected to comply with typical mitigation measures
Deliveries & waste collection	EPA Publication 1254.2	EPA Guidelines – best practice
Early morning carpark	NSW RNP	Guideline (NSW Policy)

## 4.0 SUMMARY OF NOISE LIMITS

### 4.1 Existing noise environment

The assessment criteria applicable to the proposed development includes noise limits that are defined based on background noise levels in the absence of noise associated with the operation of the subject site.

An unattended noise monitor was left at the south of the subject site to measure background noise levels over a period of approximately two weeks, at the location shown in Figure 2.

**Figure 2: Unattended noise monitor location (Source: Nearmap)**



The lowest average hourly background noise levels for each day, evening and night-time period are summarised in Table 5 per the Noise Protocol, to inform the noise limits.

Analysis of the background noise level and details of the measurements are presented in Appendix E.

**Table 5: Noise Protocol – lowest daily average background noise levels, dB L<sub>A90</sub>**

Description	Day	Evening	Night
Lowest daily average background noise level	38	32	26

Note:

1. Average hourly level per Noise Protocol requirements
2. Day: 0700 to 1800 hrs Monday to Saturday;  
Evening: 1800 to 2200 hrs Monday to Saturday, 0700 to 2200 hrs Sunday and Public Holidays;  
Night: 2200 to 0700 hrs 7 days

### 4.2 EP Regulations noise limits

The EP Regulations noise limits applicable to noise from mechanical services and commercial vehicle activity are presented in Table 6. Derivation of the noise limits is presented in Appendix D.

**Table 6: EP Regulations noise limits, dB L<sub>eff</sub>**

Description	Day	Evening	Night
EP Regulations noise limit	50	41	36

## 5.0 NOISE MODELLING INPUTS

The noise sources associated with operation of the proposed development include:

- Mechanical services
- Deliveries and waste collection

Noise data related to the noise sources listed above are provided in the following sections.

### 5.1 Mechanical services

This feasibility assessment has been based on example selections of mechanical services plant and equipment typical to this type of development from experience at similar sites.

Elev8 have provided a list of equipment and an approximate layout, but due to the early stage of the project, equipment selections or noise data are not yet available.

The assessment is based on the equipment listed in Table 7 at the locations shown in Figure 3. The sound power data for the nominal equipment selections have been selected to represent the upper range of likely noise levels for the given equipment type as a conservative approach. It is likely that there are commercially available equipment options that are lower in noise levels than those used in this assessment.

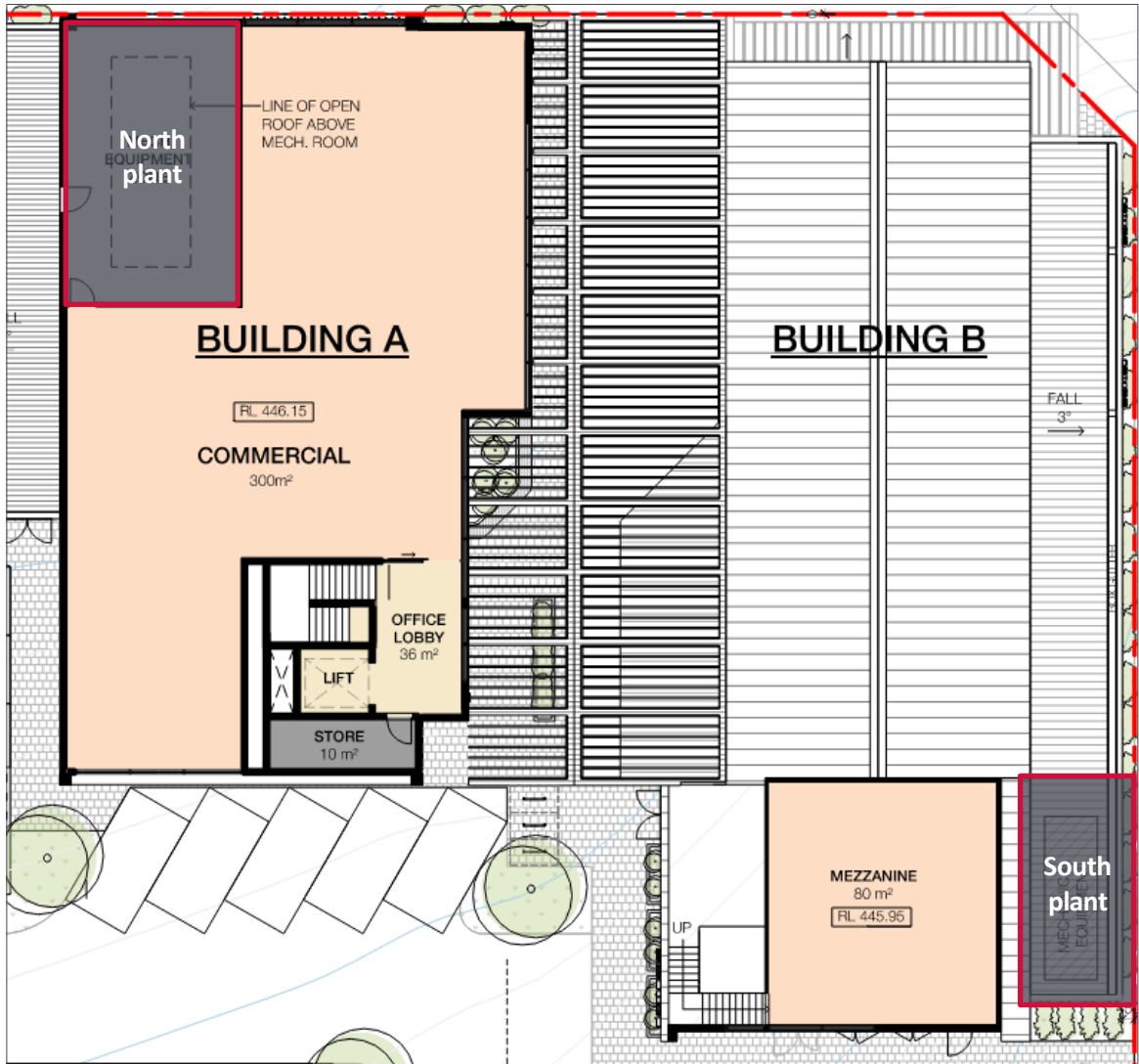
**Table 7: Mechanical services sound power levels**

Location	Plant item	Design sound power level, dB L <sub>w</sub>	Operating time
North plant	AC condensers x3	80	Day period
South plant	AC condensers x2	80	Day period
South plant	Kitchen exhaust fan	78	Day period
North plant	Refrigerator condenser	80	All periods
North plant	Refrigerator compressor	72	All periods
South plant	Make up air inlet louvre	78	Day period
South plant	Waste exhaust louvre	78	Day period

Mechanical services equipment will be selected during the detailed design stage of the project, at which point the project team will consider their GED with respect to noise emissions and select the quietest equipment options deemed reasonably practicable.

As a minimum, equipment that does not exhibit any undesirable characteristics, such as tonality, should be selected.

Figure 3: Preliminary mechanical services plan with representative locations



## 5.2 Deliveries and waste collection

RISM has informed that waste collection and deliveries would occur between 1900 hrs and 2000 hrs, Monday to Sunday.

The proposed times are within the recommended times detailed in EPA 1254 (refer Appendix D). Regardless, an objective assessment has been considered given the proximity to residential receivers.

It is assumed that a waste collection and a delivery (medium rigid vehicle (MRV)) would not occur simultaneously.

Table 8 details the likely worst-case delivery and waste collection scenarios that could be expected to occur during a 30-minute period.

Figure 4 presents the modelled truck route and activity point.

**Table 8: Delivery truck and waste collection scenarios**

Description – Deliveries	Description – Waste collection
1 x Single medium rigid vehicle (MRV) and loading bay activity	1 x waste truck collection
Movement through site along nominal path indicated in Figure 4 at 10 km/h	Movement through site along nominal path indicated in Figure 4 at 10 km/h
Enters site, unloads, and exits within the same 30-minute period	Enters site, collects, and exits within the same 30-minute period

**Figure 4: Nominal truck route**

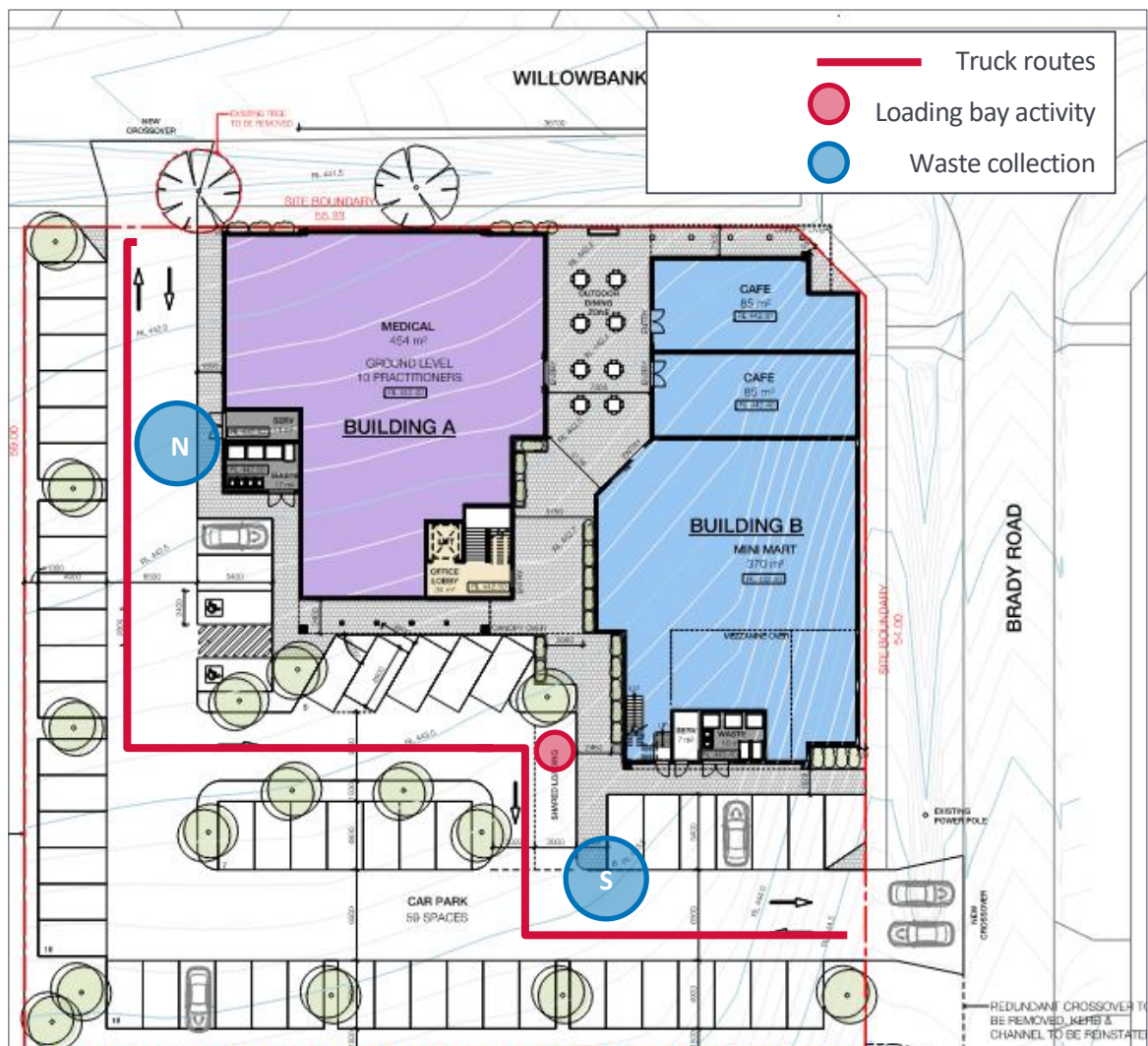


Table 9 presents the sound power level for the delivery and waste collection activity.

Table 9: Sound power level data, dB L<sub>w</sub>

Description	Octave band centre frequency, Hz							
	A	63	125	250	500	1000	2000	4000
Delivery – Medium rigid vehicle (MRV)	96	100	94	95	90	90	90	86
Loading bay activity	80	88	87	81	75	74	70	66
Waste truck	101	103	99	97	96	96	95	91
Waste collection	96	99	99	93	91	90	91	87

### 5.3 Mitigation controls

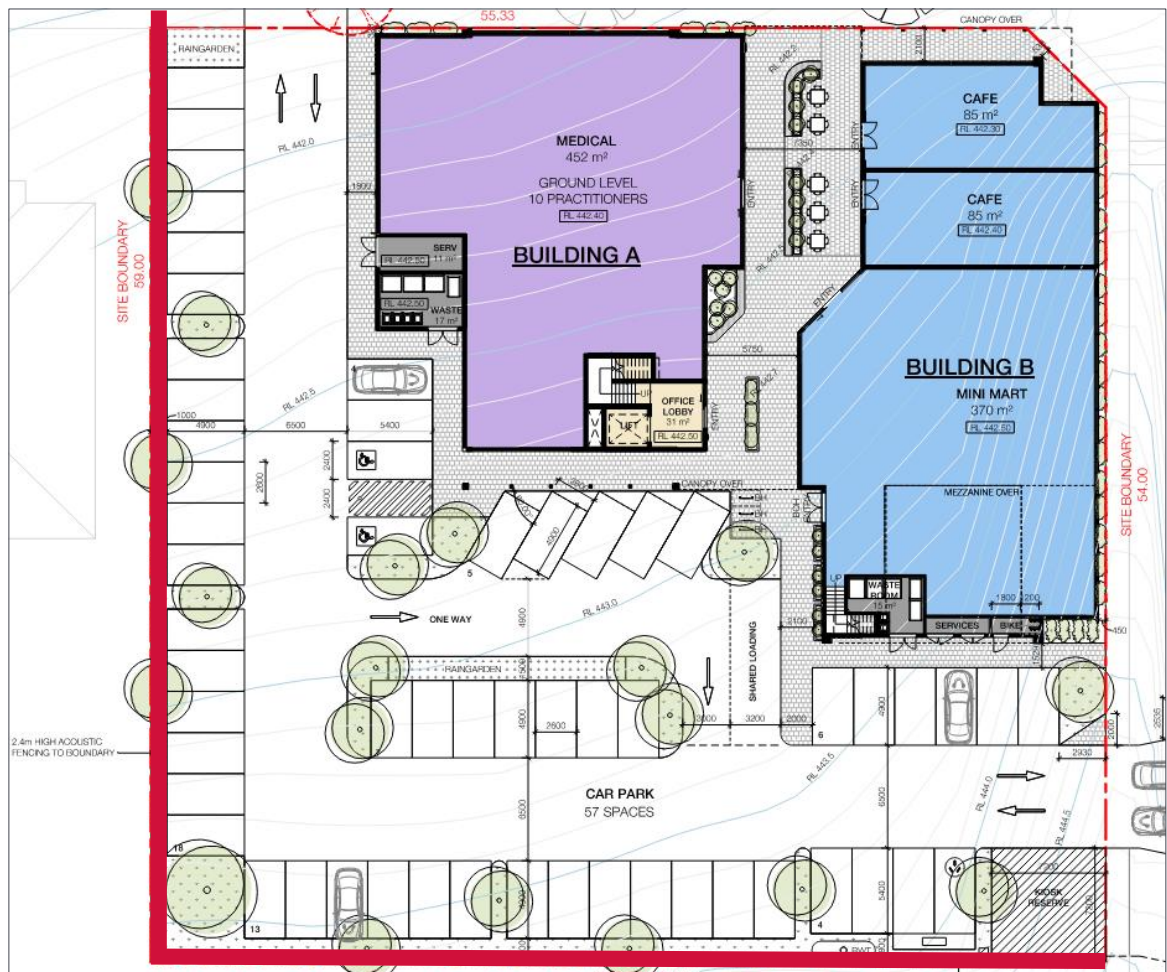
#### 5.3.1 Physical noise controls

##### *Perimeter noise barrier*

A solid barrier is required to allow the noise limits to be met under this assessment.

A barrier at 2.4 m high and to the extents shown in Figure 5 has been assumed to exist around the subject site.

Figure 5: Perimeter noise barrier



To provide the adequate noise attenuation the construction material of the barrier needs to be verified to have a minimum surface density of 12 kg/m<sup>2</sup> and be completely solid without any holes or gaps.

Some suitable materials for this purpose include 25 mm thick plywood timber panelling or any other approved material which meets the above surface density specification.

#### *Mechanical services screening*

The current architectural plans suggest that the required screening could be achieved without the need for specific noise barriers. The plant decks are located on recessed platforms, as well as a parapet to the southern plant deck, that provide shielding from the built form.

To account for acoustic screening in the noise modelling, two acoustic screens have been modelled on the roof to the extents shown in Figure 6 to allow for the screening. The screening extends a minimum of 1 m above the highest point on any given unit. The construction of the screening may vary but would need to meet a minimum surface density requirement of 12 kg/m<sup>2</sup>. The inside of the screening should be lined the full length with a suitable weatherproof sound absorbing material. The screen would need to meet the roof (or platform) with no gaps.

The final noise levels associated with mechanical services at the subject site will be dictated by several factors that are not known at this stage, including:

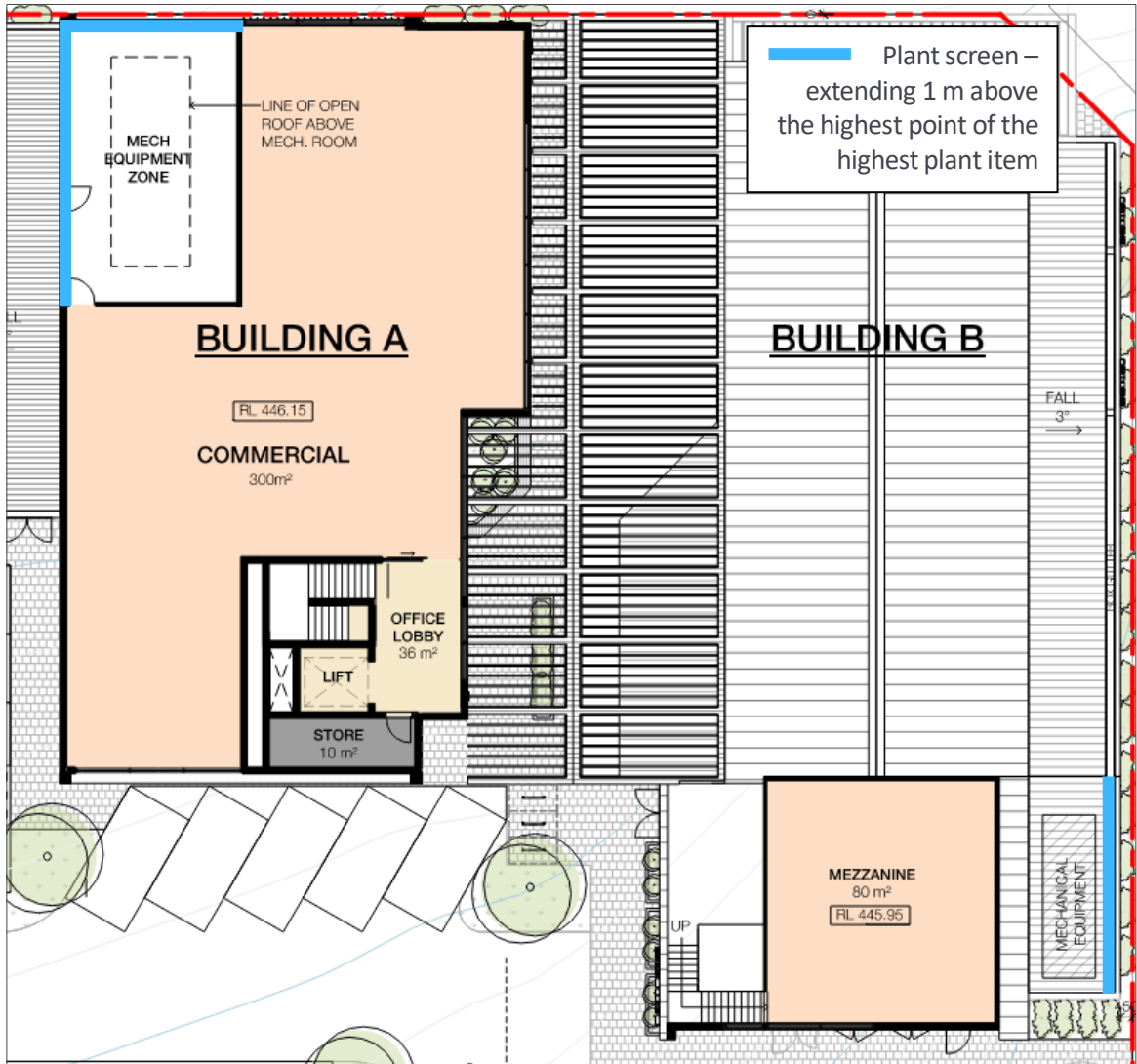
- Final equipment selections
- Final locations of equipment, including fans (for example, in-line fans located within the building would typically result in lower external noise than external fans located at the rooftop)
- Inherent screening from the natural built form of the building structures
- Confirmed hours of operation of discrete plant items.

Therefore, a more detailed acoustic assessment of the finalised mechanical services design should be conducted during design stage.

To this end, the following type of wording could be incorporated in any approval:

*Once mechanical services design has progressed to a suitable level of detail, an acoustic assessment of the mechanical services design should be conducted by a suitably qualified and experienced acoustic consultant. Reasonably practicable noise controls should be investigated and implemented, and any noise controls required for compliance with the relevant legislative criteria should be included in the final design.*

Figure 6: Indicative mechanical services plant screen





## 6.0 NOISE ASSESSMENT

### 6.1 Method

This section presents predicted noise levels from the proposed development.

To predict noise levels to nearby residences, the following factors have been considered:

- The amount of noise being generated within the subject site
- The distance between the sources and receivers and the presence of obstacles such as buildings or screens that obstruct the noise path
- The ground between the source and receiver and the presence of hard reflective surfaces that may enable additional noise paths.

A 3-dimensional digital model of the site and surrounding built environment has been created using proprietary noise modelling software SoundPLAN (version 8.2), implementing ISO 9613<sup>1</sup>. ISO 9613 is a general environmental noise calculation standard that is used extensively throughout Australia, New Zealand, and Europe since its publication in 1996. The implementation of ISO 9613 within proprietary noise modelling software enables multiple sound transmission paths, including reflected and screened paths, to be accounted for in the calculated noise levels.

ISO 9613 is designed to assume favourable meteorological propagation conditions, which are described as a slight wind from source to receiver, or a moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights.

Geometry data for the model has been sourced from public aerial photography, visual inspections of the area, and building heights defined on the basis of assumed standard heights per floor level. The geometries in the model are simplified representations of the built environment that have been configured to a level of detail that is appropriate for noise calculation purposes.

The terrain has been modelled using publicly available data.

Several assumptions were required to undertake the noise modelling, including:

- The ground effect attenuation has been based on completely hard ground on the subject site
- The noise levels produced are based on the noise data detailed in Section 5.1 and Section 5.2
- The mitigation controls presented in Section 5.3 are implemented in the noise model.

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<sup>1</sup> ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*

## 6.2 Mechanical services

Table 10 presents the predicted mechanical services noise levels based on the example equipment selections, locations and barriers during the day and evening period. Achieving the more stringent evening limit, infers compliance with the day limit.

Table 11 presents the predicted mechanical services noise levels during the night, assuming only the refrigeration equipment continues to operate.

**Table 10: Predicted residual mechanical services noise levels evening, dB L<sub>eff</sub>**

Location	Predicted noise level	Noise limit - evening	Complies?
116 Willowbank Road	39	41	✓
107 Willowbank Road	33	41	✓
4a/b Francis Crescent	37/38	41	✓
6a/b Francis Crescent	36/36	41	✓
97-99 Willowbank Road	35	41	✓

**Table 11: Predicted residual mechanical services noise levels night, dB L<sub>eff</sub>**

Location	Predicted noise level	Noise limit - night	Complies?
116 Willowbank Road	32	36	✓
107 Willowbank Road	27	36	✓
4a/b Francis Crescent	32/31	36	✓
6a/b Francis Crescent	31/30	36	✓
97-99 Willowbank Road	29	36	✓

The current architectural plans suggest that the required screening could be achieved without the need for specific noise barriers. The plant decks are located on recessed platforms, as well as a parapet to the southern plant deck, that provide shielding from the built form.

The effectiveness of the built form as screening should be verified during the detailed design stage, at which time any further acoustic screening required can be determined if necessary.

Further, if much quieter units are selected during detailed design and placed strategically, then localised screening around rooftop plant may not be required.

### 6.3 Deliveries and waste collection

Deliveries and waste collections are proposed to occur during the recommended times detailed in EPA 1254 (refer Appendix D). Regardless, an objective assessment has been considered given the proximity to residential receivers.

Table 12 presents the predicted noise levels for waste collection and deliveries based on the representative scenario described in Section 5.1

**Table 12: Predicted delivery and waste noise levels, dB L<sub>eff</sub>**

Location	Predicted noise level – waste	Predicted noise level – delivery	Noise limit Evening	Complies? (Waste / delivery)
116 Willowbank Road	32	24	41	✓ / ✓
107 Willowbank Road	41	34	41	✓ / ✓
4a/b Francis Crescent	37/38	31/32	41	✓ / ✓
6a/b Francis Crescent	34/35	29/30	41	✓ / ✓
97-99 Willowbank Road	38	32	41	✓ / ✓

Reviewing the source contributions from the two proposed delivery locations at the highest affected receiver, it is recommended that the deliveries occur primarily to the south of the subject site as shown in Figure 4, under which case lowest noise levels at the highest affected receiver would be achieved.

### 6.4 Sleep disturbance

As the operating hours of the supermarket commence at 0700 hrs, it is likely that a small number of staff would arrive shortly before this to commence operation of the store.

This would result in staff cars entering the carpark during the night period which would increase the risk of sleep disturbance to surrounding receivers.

A high-level assessment considering short-term maximum noise levels associated with cars in carparks (car engine, doors closing etc.) has been undertaken and considered against the nominated sleep disturbance targets.

Predicted maximum noise levels from the above activities are provided in Table 13.

**Table 13: Maximum noise levels**

Location	Predicted noise level, L <sub>Aeq</sub>	Target, L <sub>Amax</sub>	Complies?
116 Willowbank Road	46	65	✓
107 Willowbank Road	60	65	✓
4a/b Francis Crescent	58/54	65	✓
6a/b Francis Crescent	49/53	65	✓
97-99 Willowbank Road	55	65	✓

The sleep disturbance targets are achieved at all receiver locations, primarily due to the perimeter fencing included in the noise modelling.

## 7.0 SUMMARY

RISM Constructions (RISM) is proposing to rezone land at 101-105 Willowbank Road, Gisborne (the subject site) for use as a small commercial centre that could include a small supermarket, café, shops, medical centre, and commercial space.

This report details a town planning stage environmental noise assessment of the development, considering noise from mechanical services, deliveries, and waste collection.

Noise limits and target noise levels have been developed for the subject site, based on relevant Victorian environmental noise policies and supplementary guidelines.

Background noise levels have been measured at the subject site over a period of approximately two weeks to inform the legislated noise limits.

Noise controls have been suggested for incorporation during the detailed design stage to reduce noise from the subject site as far as reasonably practicable at nearby noise-sensitive receivers.

Equipment selections were not available at this early stage, and so a feasibility study has been undertaken based on example equipment selections that are anticipated to be at the higher end of commercially available options in terms of noise emissions.

Utilising these selections and conservative estimations of inherent screening from the built form of the two structures, compliance with the legislated noise limits has been predicted, taking into account the inclusion of localised noise screening around the rooftop plant decks.

During detailed design, the client will investigate selection of the lowest noise equipment available, to meet their GED obligations. Additionally, conceptual ideas for the best location of mechanical services equipment have been raised with the client, to maximise distance between source and receiver and also to capitalise on natural shielding from the built form of proposed structures.

With a thorough investigation as detailed above, it is likely that localised screening around rooftop plant may not result in any additional screening benefit.

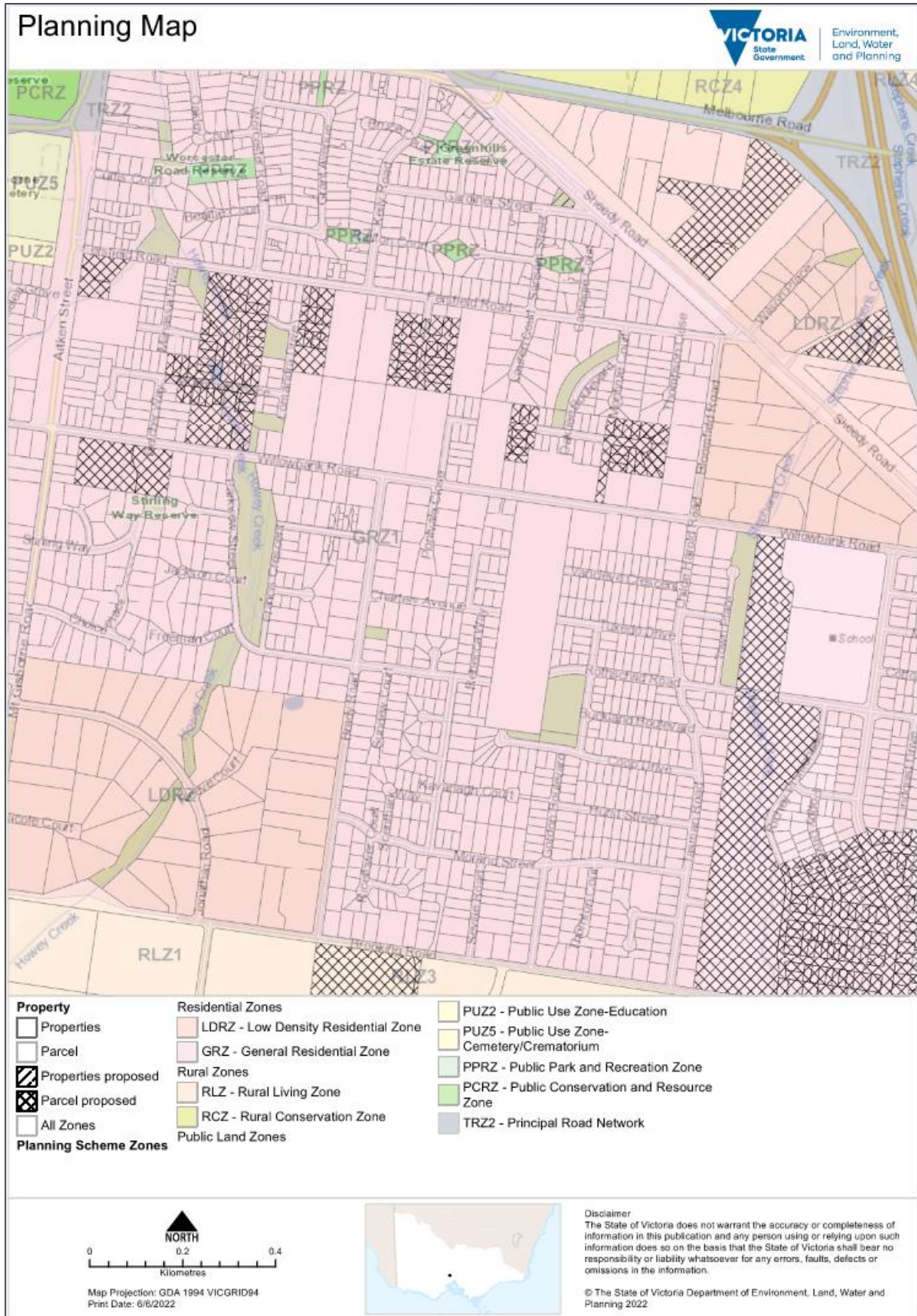
A 2.4 m high acoustically rated perimeter fence is to be constructed around the subject site to control noise from waste collection, deliveries, and early morning use of the carpark.

Deliveries and waste collections are proposed to occur within the time periods recommended by the relevant EPA guidance. Considering the close proximity to residences, an objective assessment against the evening period noise limits was conducted, and for the majority of scenarios, compliance with the noise limits was established. Additional noise controls have been recommended to reduce noise levels to below the noise limits.

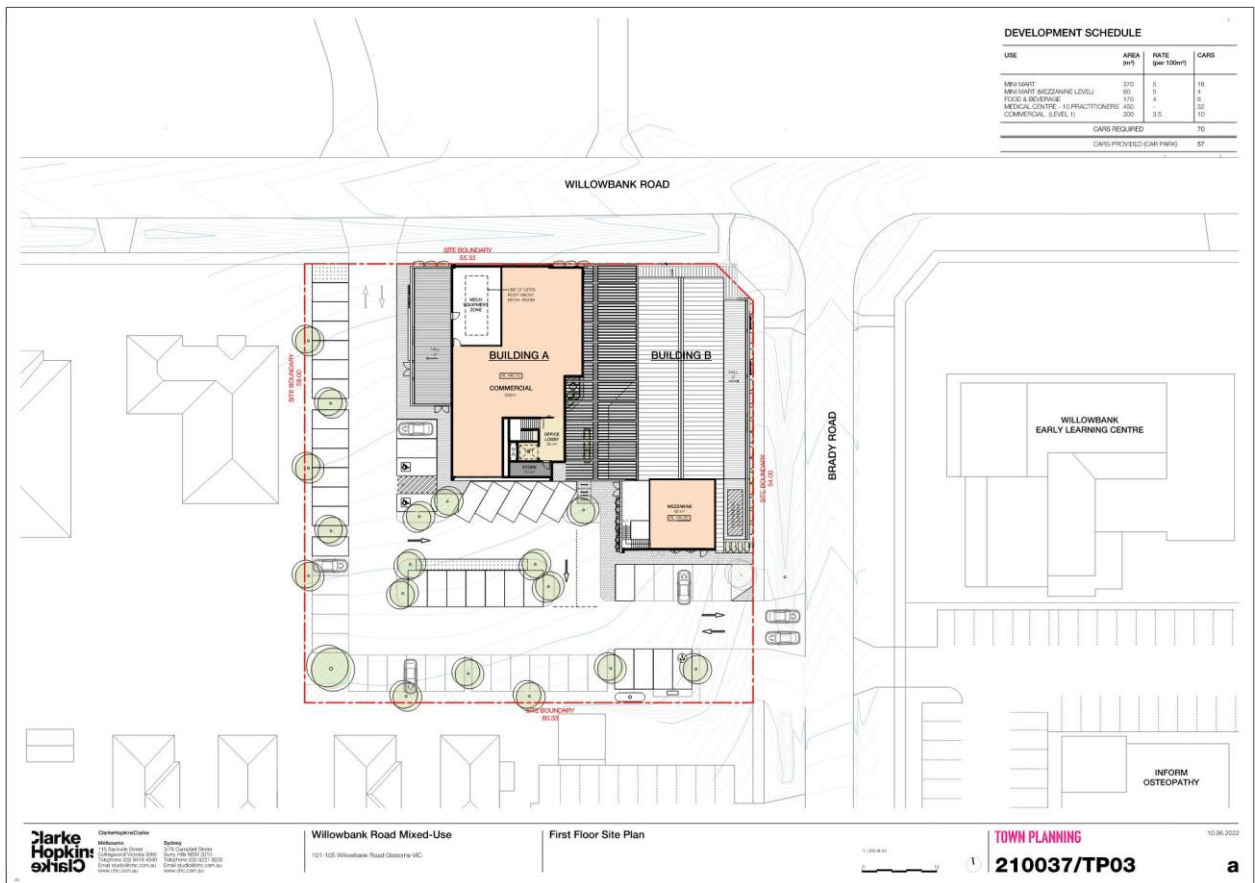
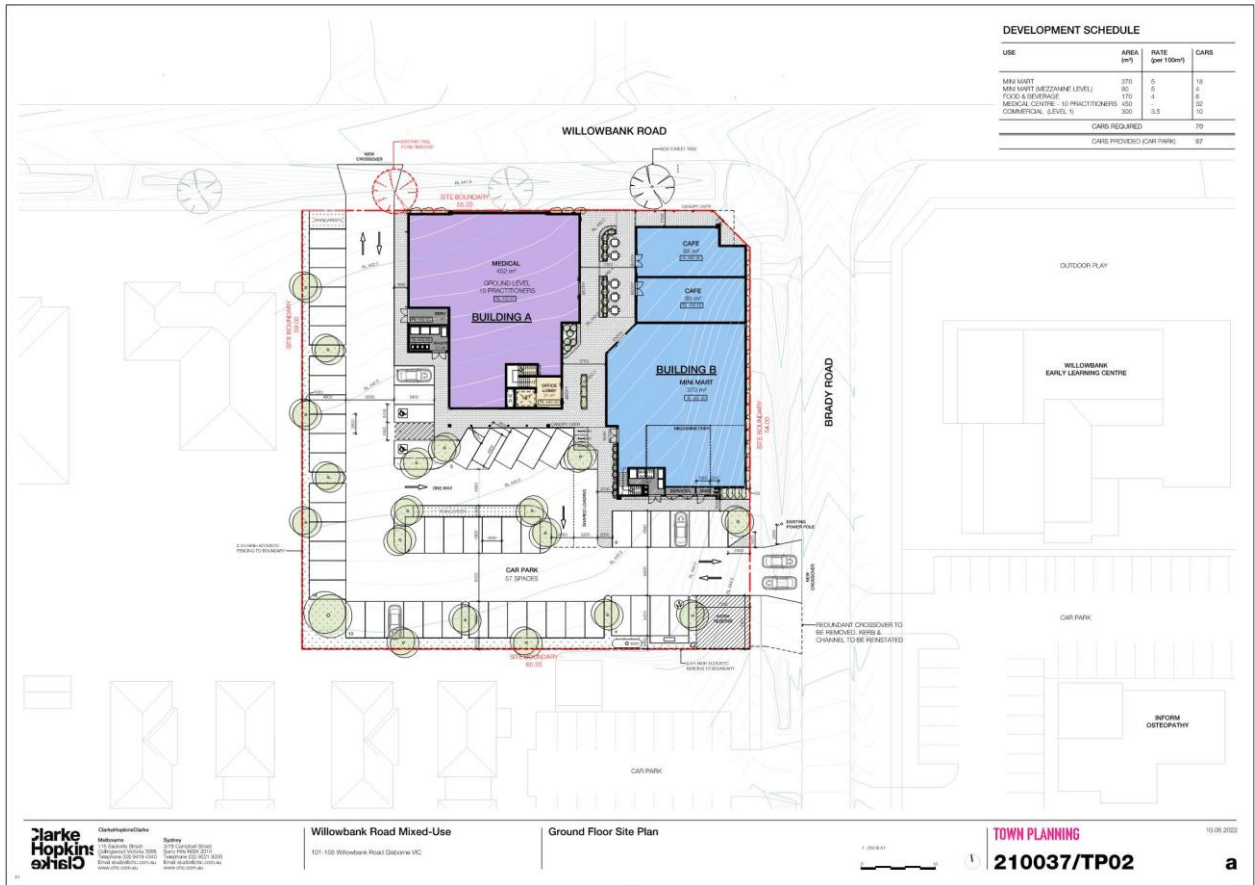
## APPENDIX A GLOSSARY OF TERMINOLOGY

<b>Ambient</b>	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
<b>A-weighting</b>	A set of frequency-dependent sound level adjustments that are used to better represent how humans hear sounds. Humans are less sensitive to low and very high frequency sounds.
<b>dB</b>	Decibel. The unit of sound level.
<b>Frequency</b>	Sound occurs over a range of frequencies, extending from the very low (e.g. thunder) to the very high (e.g. mosquito buzz). Measured in units of Hertz (Hz).  Humans typically hear sounds between 20 Hz and 20 kHz. High frequency acuity naturally reduces with age most adults can hear up to 15 kHz.
<b>L<sub>A10</sub></b>	The A-weighted sound level exceeded for 10% of the measurement period, measured in dB. Commonly referred to as the average maximum noise level.
<b>L<sub>A90</sub></b>	The A-weighted sound level exceeded for 90 % of the measurement period, measured in dB. Commonly referred to as the background noise level.
<b>L<sub>Aeq</sub></b>	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.
<b>Effective noise level</b>	The effective noise level from commercial, industrial or trade premises determined in accordance EPA Publication 1826.4 <i>Noise limit and assessment protocol for the control of noise from commercial, industry and trade premises and entertainment venues</i> . This is the L <sub>Aeq</sub> noise level over a 30-minute period, adjusted for the character of the noise. Adjustments are made for tonality, intermittency and impulsiveness.
<b>L<sub>w</sub></b>	Sound Power Level. The calculated level of total sound power radiated by a sound source. Usually A-weighted i.e. L <sub>WA</sub> .
<b>Octave band</b>	The interval between one frequency and its double. Sound is divided into octave bands for analysis. The typical octave band centre frequencies are 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz and 4 kHz.
<b>R<sub>w</sub></b>	<u>Weighted Sound Reduction Index</u> A single number rating of the sound insulation performance of a specific building element. R <sub>w</sub> is measured in a laboratory. R <sub>w</sub> is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete.
<b>Sound Insulation</b>	When sound hits a surface, some of the sound energy travels through the material. ‘Sound insulation’ refers to ability of a material to stop sound travelling through it.
<b>SPL or L<sub>p</sub></b>	<u>Sound Pressure Level</u> A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 µPa RMS) and expressed in decibels.

APPENDIX B PLANNING MAP



## APPENDIX C EXCERPT OF PLANS



## APPENDIX D LEGISLATION AND GUIDELINES

### D1 Environment Protection Act 2017

The *Environment Protection Act 2017* (EP Act) came into effect on 1 July 2021 and incorporates several subordinate documents relating to assessment of noise.

The EP Act also introduces a general environmental duty (GED), which requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution (including noise) and waste, to minimise those risks to prevent harm as far as reasonably practicable.

The legislative documents that prescribe noise limits are the *Environment Protection Regulations 2021* (EP Regulations) and EPA Publication 1826.4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol).

### D2 Environment Protection Regulations 2021

The EP Act does not specify noise limit values or technical aspects of environmental noise but sets out legal requirements to comply with the EP Regulations described below. Clause 166 of the EP Act essentially places the onus of achieving compliance with noise limits on the commercial premises.

The EP Regulations are made under section 465 of the EP Act and impose obligations in relation to environmental protection, including noise. The EP Regulations state that a person who conducts a prediction, measurement, assessment, or analysis of noise within a noise sensitive area must do so in accordance with the Noise Protocol. In particular, noise from industrial, commercial and trade premises or entertainment venues or events is prescribed as unreasonable if it exceeds a noise limit or alternative criterion determined in accordance with the Noise Protocol.

Key matters addressed in the EP Regulations include:

- Definition of commercial, industrial and trade premises, which is essentially any premises that is not a residential premises, a road or a railway. It is noted that noise from common building services equipment (such as shared condensing units and kitchen exhaust fans) is assessable
- Definition of an indoor music entertainment venue
- Definition of noise sensitive areas where the noise limits are assessed, which broadly include:
  - a residential building
  - temporary accommodation
  - hospital corrective institution
  - retirement or residential village
  - A room for learning in a child care centre, kindergarten or school
  - A tourist establishment, campground or caravan park
- Assessment time periods
- Noise sources that must not be taken into account
- Minimum noise limit values
- Management of cumulative noise from multiple premises.



Table 14 presents a summary of the relevant Divisions and Regulations from Part 5.3 Noise.

**Table 14: Summary of Part 5.3 - Noise**

Section	Description
Division 1 Regulation 113	States that <i>a person who conducts a prediction, measurement, assessment or analysis of noise within a noise sensitive area for the purposes of the Act or these Regulations, must conduct the prediction, measurement, assessment or analysis in accordance with the Noise Protocol.</i>
Division 2	Applies to noise from residential premises
Regulation 114	Provides a set of “prescribed items” and “prohibited times” for determining unreasonable noise from residential premises.
Regulation 115	Describes aggravated noise from residential premises as noise from the Regulation 114 “prescribed items” during “prohibited times” likely resulting in harm to human health or the environment.
Regulation 114	Provides a set of “prescribed items” and “prohibited times” for determining unreasonable noise from residential premises.
Regulation 115	Describes aggravated noise from residential premises as noise from the Regulation 114 “prescribed items” resulting in harm to human health or the environment
Division 3	Applies to noise from commercial, industrial and trade premises
Regulation 116	Defines the day, evening and night period as follows: Day: 0700 to 1800 hrs, Monday – Saturday Evening: 1800 to 2200 hrs, Monday – Saturday 0700 to 2200 hrs, Sunday and Public Holidays Night: 2200 to 0700 hrs the next day, Monday – Sunday
Regulation 117	In this Division, when the level of noise emitted from commercial, industrial and trade premises is assessed, the following sources of noise that could be expected at the proposed facility must not be taken into account: <ul style="list-style-type: none"> <li>– Voices</li> <li>– Construction or demolition activity on building sites</li> <li>– Intruder, emergency or safety alarms or sirens</li> <li>– Equipment used in relation to an emergency</li> <li>– Non-commercial vehicles (except for maintenance activities).</li> </ul>
Regulation 118	Defines noise as being unreasonable if it exceeds the Noise Protocol limits or the alternative assessment criteria that apply at an alternative assessment location. Defines the lowest base noise limits as follows: Major urban area: Day: 45 dB $L_{eff}$ Evening: 40 dB $L_{eff}$ Night: 35 dB $L_{eff}$ Rural area: Day: 45 dB $L_{eff}$ Evening: 37 dB $L_{eff}$ Night: 32 dB $L_{eff}$  The noise limit for commercial, industrial and trade premises for the night period must not exceed 55 dB $L_{eff}$ .

Section	Description																
Regulation 119	If multiple existing or proposed premises emit noise that contributes to the effective noise level at a noise sensitive receiver, all reasonable steps must be taken by the premises' management to ensure the combined noise level does not exceed the noise limit.																
Regulation 120	This regulation essentially identifies that tonal aspects of noise must be considered when considering unreasonable noise for section 3(1)(a)(v) of the EP Act. The Noise Protocol provides a method of assessing tonal characteristics of noise from commercial, industrial and trade premises, with additional guidance on low frequency noise available in EPA Victoria Publication 1996 <i>Noise guideline – assessing low frequency noise</i> .																
Regulation 121	Noise emitted from commercial, industrial and trade premises is prescribed to be aggravated noise if it exceeds the noise limits by more than 15 dB, or the following if lower: <ul style="list-style-type: none"> <li>- 75 dB <math>L_{eff}</math> during the day,</li> <li>- 70 dB <math>L_{eff}</math> during the evening, or</li> <li>- 65 dB <math>L_{eff}</math> during the night.</li> </ul>																
Division 4	Applies to noise from entertainment venues and outdoor entertainment events, including music noise from entertainment venues or events.																
Subdivision 1, Regulation 122	Identifies there are particular provisions applicable to noise from live music venues set out in the Victorian Planning Provisions that differ to those applicable to other venues in the EP Regulations and the Noise Protocol. The EP Regulations include a note that primary responsibility for noise attenuation rests with the agent of change.																
Subdivision 2	Applies to indoor entertainment venues																
Regulation 123	Defines the day, evening and night period for indoor entertainment venues as follows: Day and evening: 0700 to 2300 hrs, Monday – Saturday 0900 to 2200 hrs, Sunday and Public Holidays 0900 to 2300 hrs, Sunday and Public Holidays (when preceding a public holiday) Night: 2300 to 0700 hrs the next day, Monday – Friday 2300 to 0900 hrs the next day, Saturday or any day preceding a public holiday 2200 to 0700 hrs the next day, Sunday and Public Holidays.																
Regulation 124	Noise associated with the arrival and departure of people attending the indoor entertainment venue must not be taken into account. Conversely, the following noise must be taken into account: noise from human voices and activities within the entertainment venue that are associated with the music sources in the case of a place of worship, the performance or playing of music that is not related to recognised religious observance.																
Regulation 125	Defines noise as being unreasonable if it exceeds the Noise Protocol limits or the alternative assessment criteria that apply at an alternative assessment location. Defines the lowest base noise limits for the day and evening as 32 dB $L_{Aeq}$ , and the octave band base limit for the night period as follows:																
	<table border="1"> <thead> <tr> <th>Frequency, Hz</th> <th>63</th> <th>125</th> <th>250</th> <th>500</th> <th>1k</th> <th>2k</th> <th>4k</th> </tr> </thead> <tbody> <tr> <td>Base noise limit, dB <math>L_{A10}</math></td> <td>40</td> <td>30</td> <td>20</td> <td>20</td> <td>15</td> <td>10</td> <td>10</td> </tr> </tbody> </table>	Frequency, Hz	63	125	250	500	1k	2k	4k	Base noise limit, dB $L_{A10}$	40	30	20	20	15	10	10
Frequency, Hz	63	125	250	500	1k	2k	4k										
Base noise limit, dB $L_{A10}$	40	30	20	20	15	10	10										

Section	Description
Regulation 126	If two or more indoor entertainment venues contribute to the effective noise level in a noise sensitive area, the noise limit that applies in relation to each venue must be determined in accordance with the Noise Protocol.
Regulation 127	Prescribes music noise from an indoor entertainment venue as being aggravated noise if the effective noise level exceeds the day and evening noise limit by 15 dB or more, or the night period limit by 20 dB or more.
Subdivision 3	Applies to indoor entertainment venues and outdoor entertainment events.
Regulation 128	Specifies that a permit is required for an outdoor entertainment venue for operations with a duration of over 8 hours, or outside standard operating hours (1200 to 2300 hrs on any day) or for more than 6 outdoor concerts in a financial year
Regulation 129	Specifies that a permit is required for an outdoor entertainment event for the following: The event is outside standard operating hours (1200 to 2300 hrs on any day) A concert is engaged between 0700 to 1200 hrs Monday to Saturday, or 0900 to 1200 hrs Sunday A concert is engaged for over 8 hours. A concert is defined as an operation at an outdoor event or venue if the music noise level exceeds 55 dB $L_{Aeq,15min}$ in a noise sensitive area, or 45 dB $L_{Aeq,15min}$ when measured indoors, at least once in a 24 hour period.
Regulation 130	Defines music noise as being unreasonable if it exceeds the Noise Protocol limits applicable to the venue or event, or is audible outside of the permitted hours or emitted without a permit (if required).
Regulation 131	Defines music noise as aggravated noise if is assessed to exceed 80 dB $L_{Aeq,15min}$ in a noise sensitive area at any time.
Division 5	Applies to noise from wind turbines.

### D3 EPA Publication 1826 – Noise Protocol

The regulatory framework includes a reference document EPA Victoria Publication 1826 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (the Noise Protocol). The Noise Protocol outlines the EPA’s required approach to the determination of noise limits and to the measurement, prediction and analysis of noise.

#### D3.1 Part I Section A – Determining noise limits for commercial, industrial and trade premises

The Noise Protocol provides two methods for deriving the relevant noise limits, the Urban area method and the Rural area method. The Urban area method is applicable to the current study.

Using the Urban area method, noise limits are calculated taking into account land ‘zoning types’ within a 70 m and 200 m radius of a noise sensitive building. Zoning types are categorised as type 1, 2 or 3 as defined in Annex A of the noise protocol. A prescribed formula is used to calculate a corresponding Zoning Level. In general, zone type designations are as follows:

- Type 1 for residential, rural, open space or similar zones;
- Type 2 for commercial, business, office and industrial 3 [light industry] zones; or
- Type 3 for industrial 1 and 2 [general industry] and similar zones.

Greater areas of type 2 and 3 land within a 200 m radius of a noise sensitive site result in higher Zoning Levels than a site with respectively larger areas of type 1 land.

The Noise Limit is equal to the ‘zoning level’ unless the background level at the noise sensitive site is categorised as low or high according to the Noise Protocol. If the background level is low or high, the Noise Limit is calculated from a formula taking into account the Zoning Level and the Background Level.

The limits are separately defined for the day, evening and night periods. The time periods are defined in the EP Regulations and summarised in Table 15.

**Table 15: Noise Protocol Part I time periods**

Period	Day of week	Start time	End time
Day	Monday-Saturday	0700 hrs	1800 hrs
Evening	Monday-Saturday	1800 hrs	2200 hrs
	Sunday, Public holidays	0700 hrs	2200 hrs
Night	Monday-Sunday	2200 hrs	0700 hrs

The relevant noise limits applicable to this development are derived in Table 16.

**Table 16: Noise Protocol part I noise limits**

Period	Zoning level	Background noise level, dB L <sub>A90</sub>	Background relative to zoning level	Noise Protocol limit
Day	50	38	Neutral	50
Evening	44	32	Low	41
Night	39	26	Low	36

#### D4 Industrial Waste Collection

EPA Victoria Publication 1254.2, *Noise Control Guidelines* (EPA Publication 1254) provides the following recommendations for industrial waste collections:

- 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 the collection site
- Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances
- Noisy verbal communication between operators should be avoided where possible.

EPA Publication 1254 recommends that collections should be restricted to the following times:

One collection per week

*6:30am-8pm Monday to Saturday*

*9am-8pm Sunday and Public Holidays*

Two or more collections per week

*7am-8pm Monday to Saturday*

*9am-8pm Sunday and Public Holidays.*

#### D5 Deliveries

The EPA Publication 1254 also states the following concerning store deliveries:

*Where a residential area will be impacted by noise from deliveries, the deliveries should be inaudible in a habitable room of any residential premises (regardless of whether any door or window giving access to the room is open) outside the hours contained in the schedule*

*Schedule: Deliveries to shops, supermarkets & service stations*

*7am-10pm Monday to Saturday*

*9am-10pm Sunday and Public Holidays.*

#### D6 Sleep Disturbance

The NSW *Road Noise Policy 2011* produced by the NSW EPA, provides guidance on potential for sleep disturbance. While the Policy applies strictly only in NSW, the provisions of the document are often referred to in Victoria for general guidance on potential sleep disturbance.

The NSW policy notes that from the research on sleep disturbance to date it can be concluded that:

- *maximum internal noise levels below 50–55 dB  $L_{Amax}$  are unlikely to awaken people from sleep*
- *one or two noise events per night, with maximum internal noise levels of 65–70 dB  $L_{Amax}$ , are not likely to affect health and wellbeing significantly.*

## APPENDIX E NOISE MEASUREMENTS

### E1 Equipment details

The equipment used for the unattended survey is detailed in Table 17 and was placed at 1.5 m above local ground level at the locations presented in Section E2.

**Table 17: Equipment type**

Item	Description
Equipment type	Automated/unattended integrating sound levels
Make & model	Rion NL-31
Unit serial number	00503819
Instrumentation class	Class 1 (precision grade) in accordance with AS/IEC 61672.1:2019 <sup>2</sup>
Instrumentation noise floor	Less than 20 dB
Time synchronisation	Internal GPS clocks
Wind shielding	Proprietary windshield supplied by the manufacturer
Calibration drift	No adverse drift

### E2 Equipment location

An unattended noise monitor was left to the south of the site to measure background noise levels over a period of two weeks, at the location shown in Figure 2 of Section 4.1 and Figure 7.

The majority of activity associated with the site is emanating from distant Calder Highway traffic, as well as intermittent local traffic and childcare noise.

**Figure 7: Noise monitor location**



<sup>2</sup> AS/IEC 61672.1-2019 *Electroacoustics - Sound level meters Specifications*, which is identical to IEC 61672.1:2.0 *Electroacoustics - Sound Level Meters - Part 1: Specifications* published in 2013

### E3 Background noise levels

A summary of the unattended noise monitoring data, based on the 1-hour period required by Part I of the Noise Protocol, is presented in Table 18. Periods of inclement weather have been removed from the analysis.

**Table 18: Unattended noise monitoring summary, dB<sub>LA90</sub>**

Date	Period average		
	Day	Evening	Night
Friday, 20 May 2022	42	40	41
Saturday, 21 May 2022	42	41	36
Sunday, 22 May 2022	-	37	26
Monday, 23 May 2022	44	45	34
Tuesday, 24 May 2022	46	45	38
Wednesday, 25 May 2022	47	41	39
Thursday, 26 May 2022	48	-	44
Friday, 27 May 2022	42	42	37
Saturday, 28 May 2022	38	41	29
Sunday, 29 May 2022	-	42	31
Monday, 30 May 2022	49	32	31
Tuesday, 31 May 2022	44	-	35
Wednesday, 1 June 2022	-	-	-
Thursday, 2 June 2022	46	-	-
<b>Minimum</b>	38	32	26