14 Schofields Road, Schofields

DA Acoustic Assessment
### DOCUMENT CONTROL REGISTER

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<td>David Krepp</td>
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1 INTRODUCTION

This report presents an analysis of noise impacts associated with the proposed residential development at 14 Schofields Road, Schofields.

In this report we will assess:

- Traffic noise from Schofields Road on the project site.
- Train noise from the railway line within proximity of the site to the west.
- Noise emission criteria of mechanical plant to surrounding properties.

Traffic noise intrusion into the development has been assessed in accordance with:

- Blacktown City Council DCP 2015
- Australian Standard AS2107:2000

Noise emission criteria from the development will be set based on:

- Blacktown City Council DCP 2015
- The Environmental Protection Authority Industrial Noise Policy.
- The PEOA Act 1997
- PEOA Act Regulation 2000

The noise assessment is based on the architectural drawings supplied by Krikis Tayler architects to this office.
2 SITE DESCRIPTION / PROPOSED DEVELOPMENT

The site is located at 14 Schofields Road, Schofields Hill and the development will comprise of multi-story residential buildings with a shared carpark.

Potential noise impacts on the site are primarily traffic noise from surrounding roadways, most notably from Schofields Road to the north of the site which carries medium volumes of traffic. The development is bounded as follows;

- To the North by Schofields Road, carrying medium volumes of traffic flow.
- Railway Terrace to the west of the site which carries medium volumes of traffic flow.
- Railway line within proximity to the site to the west.
- Woolworth shopping centre to the south of the site.
- On all other sides by residential properties

Figure 1 below, which is an aerial photo of the existing development.
3 NOISE DESCRIPTORS

Environmental noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of environmental noise, three principle measurement parameters are used, namely $L_{10}$, $L_{90}$ and $L_{eq}$.

The $L_{10}$ and $L_{90}$ measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement interval.

The $L_{10}$ parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the $L_{90}$ level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The $L_{90}$ parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the $L_{90}$ level.

The $L_{eq}$ parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. $L_{eq}$ is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of traffic noise.

Current practice favours the $L_{eq}$ parameter as a means of measuring traffic noise, whereas the $L_{10}$ parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the $L_{90}$ parameter is not used to assess traffic noise intrusion.
4 NOISE INTRUSION ASSESSMENT

Significant noise sources in the vicinity of the site are as follows:

- To the North by Schofields Road, carrying medium volumes of traffic flow.
- Railway Terrace to the west of the site which carries medium volumes of traffic flow.
- Railway line within proximity to the site to the west.
- Woolworth shopping centre to the south of the site.

Noise impacts should comply with the requirements of Blacktown City Council and AS2107:2000, as listed below.

4.1 INTERNAL NOISE CRITERIA

4.1.1 Blacktown City Council DCP 2015

There are no specific noise intrusion requirements set within the Blacktown DCP 2015. As such, we will reference Australian Standard AS2107:2000.

4.1.2 AS2107:2000

Australian Standard AS2107:2000 recommends the following internal noise levels within habitable spaces:

<table>
<thead>
<tr>
<th>Location</th>
<th>Room Type</th>
<th>Time Period</th>
<th>Criteria/Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwellings Near Major Roads</td>
<td>Bedroom</td>
<td>10:00pm – 7:00am</td>
<td>35 dB(A) $L_{eq\text{(Worst 1 hour)}}$</td>
</tr>
<tr>
<td></td>
<td>Living Areas</td>
<td>7:00am – 10:00pm</td>
<td>40 dB(A) $L_{eq\text{(Worst 1 hour)}}$</td>
</tr>
</tbody>
</table>

4.1.3 Summary of Noise Intrusion Criteria

This assessment shall be conducted in accordance with the most stringent criteria specified above, which is summarised below:

<table>
<thead>
<tr>
<th>Location</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Bedroom/Sleeping Areas</td>
<td>35 dB(A) $L_{eq\text{(Worst 1 hour)}}$</td>
</tr>
<tr>
<td>Residential Living Areas</td>
<td>40 dB(A) $L_{eq\text{(Worst 1 hour)}}$</td>
</tr>
</tbody>
</table>
4.2 ENVIRONMENTAL NOISE MONITORING

As part of this investigation, environmental noise from the surrounding perimeter roadways has been measured. The results of this measurement will be used to determine the treatments required to reduce noise levels to within the project acoustic objectives.

Noise levels measurements conducted at the location as detailed in Figure 1 above.

4.2.1 Unattended Noise Measurements

Unattended noise measurements were obtained using an Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The noises monitors were calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator. No significant drift was detected. All measurements were taken on A-weighted fast response mode. There were no significant periods of adverse weather conditions during the measurement period.

The noise monitor was set up facing Schofields Road, with a 180 degree view of the road, from the 5th to the 13th December 2016. Refer to Appendix 1 for unattended noise monitoring data.

4.2.2 Attended Noise Measurements

Attended noise measurements were carried out to supplement unattended noise monitoring between the hours of 4:00pm-5:30pm on the 5th December 2016. Measurements were undertaken using a Norsonics Type 140 precision sound level analyser, set to A-weighted fast response. The precision sound level analyser was calibrated before and after the measurements using a Norsonics 1251 precision sound level calibrator. No significant drift was recorded.

4.2.3 Environmental Noise Levels

The following table presents the resultant noise levels from undertaken measurements.

<table>
<thead>
<tr>
<th>Location</th>
<th>7am to 10pm dB(A)</th>
<th>10pm-7am-dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At proposed Northern Façade (Facing Schofields Road)</td>
<td>71 dB(A) L&lt;sub&gt;eq&lt;/sub&gt;(Worst 1 Hour)</td>
<td>68 dB(A) L&lt;sub&gt;eq&lt;/sub&gt;(Worst 1 Hour)</td>
</tr>
<tr>
<td>At proposed western Façade (Facing Railway Terrace)</td>
<td>66 dB(A) L&lt;sub&gt;eq&lt;/sub&gt;(Worst 1 Hour)</td>
<td>63 dB(A) L&lt;sub&gt;eq&lt;/sub&gt;(Worst 1 Hour)</td>
</tr>
<tr>
<td>At proposed southern Façade (Facing Woolworths)</td>
<td>64 dB(A) L&lt;sub&gt;eq&lt;/sub&gt;(Worst 1 Hour)</td>
<td>61 dB(A) L&lt;sub&gt;eq&lt;/sub&gt;(Worst 1 Hour)</td>
</tr>
</tbody>
</table>
4.3 ELECTRICAL SUBSTATION MEASUREMENTS

As part of this investigation, noise from the substation to the north of the proposed development have been measured. The results of these measurements will be used to determine the treatments required to reduce noise levels to within the project acoustic objectives.

Measurements included attended levels measurements conducted along the proposed northern boundary as detailed in Figure 1 above.

4.3.1 Measurement Location

Electric substation measurements were taken at a distance of approximately 10 metres to the south of the substation block, as detailed in figure 1.

4.3.2 Attended Measurements

Measurements were taken using a Norsonic-140 precision sound level analyser, set to A-weighted fast response. The sound level meter was calibrated before and after the measurements using a RION NC73 precision sound calibrator and no significant drift was recorded. Measurements were taken on 31st July, 2017 between 10:00pm and 11:00pm. There were no periods of adverse weather during the measurement.

4.3.3 Measured Substation Noise Level

The measured substation noise level and spectrum at a distance of 10 metres from the substation are detailed below. Measurements were taken during a relative lull in the traffic noise originating from Railway Parade.

Table 4 – Substation Noise Spectrum – at 10 metres

<table>
<thead>
<tr>
<th>Location</th>
<th>63Hz</th>
<th>125Hz</th>
<th>250Hz</th>
<th>500Hz</th>
<th>1kHz</th>
<th>2kHz</th>
<th>4kHz</th>
<th>8kHz</th>
<th>A-wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>10m from substation</td>
<td>50</td>
<td>64</td>
<td>44</td>
<td>41</td>
<td>41</td>
<td>33</td>
<td>27</td>
<td>23</td>
<td>48*</td>
</tr>
</tbody>
</table>

*We note that a 5 dB correction will be used in this assessment to allow for tonal noise.
4.4  RECOMMENDATIONS

Environmental noise intrusion into the proposed development was assessed using the measured external noise levels reported above as a basis.

Calculations were performed taking into account the orientation of windows, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted. Acoustic treatment required to ensure compliance with the assessment criteria are detailed in this section.

Internal noise levels will primarily be as a result of noise transfer through the windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound. Noise transfer through the masonry elements will not be significant and need not be considered further.

The constructions necessary to achieve the noise levels are detailed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to environmental noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

4.4.1  Glazed Windows and Doors

The recommended glazing constructions are outlined below in the following table. The glazing thickness recommended are those needed to satisfy acoustic requirements and do not take into account other requirements such as structural, safety or other considerations.

Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria listed below.

Table 4 - Minimum Glazing Recommendations

<table>
<thead>
<tr>
<th>Façade Location</th>
<th>Room Type</th>
<th>Glazing Assembly</th>
<th>Acoustic Seals Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Façade facing Schofields Road and Substation</td>
<td>Living Room</td>
<td>10.38mm laminated</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Bedroom</td>
<td>10.38mm laminated</td>
<td></td>
</tr>
<tr>
<td>Western Façade facing towards Railway Terrace</td>
<td>Living Room</td>
<td>6mm Float</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Bedroom</td>
<td>6mm Float</td>
<td></td>
</tr>
<tr>
<td>Southern Façade facing Woolworths</td>
<td>Living Room</td>
<td>6mm Float</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Bedroom</td>
<td>6mm Float</td>
<td></td>
</tr>
<tr>
<td>All Other facades</td>
<td>Living Room</td>
<td>6mm Float</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Bedroom</td>
<td>6mm Float</td>
<td></td>
</tr>
</tbody>
</table>

In addition to meeting the minimum glazing thickness requirements given, the design of the window mullions, perimeter seals and the installation of the windows/doors in the building openings shall not reduce the STC rating of the glazing assembly below the values nominated in
the table below. Note that mohair type seals will not be acceptable for the windows requiring acoustic seals.

The window/door suppliers should provide evidence that the systems proposed have been tested in a registered laboratory with the recommended glass thicknesses and comply with the minimum listed STC requirements. Also, the glazing installer should certify that the window/doors have been constructed and installed in a manner equivalent to the tested samples.

Table 5 - Minimum STC of Glazing (with Acoustic Seals)

<table>
<thead>
<tr>
<th>Glazing Assembly</th>
<th>Minimum STC of Installed Window</th>
<th>Acoustic Seals Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>6mm float</td>
<td>29</td>
<td>Yes</td>
</tr>
<tr>
<td>6.38mm laminated</td>
<td>31</td>
<td>Yes</td>
</tr>
<tr>
<td>10.38mm laminated</td>
<td>35</td>
<td>Yes</td>
</tr>
</tbody>
</table>

4.4.2 External Walls

External walls of masonry or light weight construction will be acoustically acceptable without additional acoustic treatments.

4.4.3 Roof / Ceiling Construction

The proposed concrete or light weight roof/ceiling constructions are acoustically acceptable without additional acoustic treatments.

4.4.4 Ventilation Requirements

With respect to natural ventilation of the dwelling, the NSW Department of Planning document “Development near Busy Roads and Rail Corridors - Interim Guideline” dictates that:

- “If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.”

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (ie – allowable level in bedrooms becomes 45dB(A), and 50dB(A) in living rooms).

For residential tenancies facing directly onto Schofields Road to the north, are required to be closed for internal noise amenity goals to be achieved, within both living rooms and bedrooms. All remaining windows on all remaining facades may be open for natural ventilation and achieve internal noise goals.

Supplementary fresh air (using either mechanical ventilation or fresh air though one of the other facades) is recommended to ensure ventilation requirements of AS1668 are achieved. Any ventilation system should be acoustically designed to ensure that the acoustic performance of the
acoustic treatments outlined above is not reduced and does not exceed Council criteria for noise emission to nearby properties.
5 NOISE EMISSION ASSESSMENT

5.1 BACKGROUND NOISE MONITORING

Measured background noise levels are presented below. Refer to Appendix 1 for noise logging data.

<table>
<thead>
<tr>
<th>Location</th>
<th>Period/Time</th>
<th>Background Noise Level dB(A) L90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schofields Road, Schofields</td>
<td>Day (7am-6pm)</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Evening (6pm-10pm)</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Night (10pm-7am)</td>
<td>32</td>
</tr>
</tbody>
</table>

5.2 ACOUSTIC OBJECTIVES

Acoustic objectives will be based on;

- Blacktown DCP 2015
- The EPA Industrial Noise Policy

5.2.1 Blacktown DCP 2015

Blacktown DCP has the following with reference to noise emissions of residential properties;

Section 6.9.3 – Visual and Acoustic Privacy

No electrical, mechanical or hydraulic plant or equipment shall generate a noise level greater than 5dB(A) above the ambient L90 sound level at the boundaries of any allotment at any time of day.

5.2.2 EPA Industrial Noise Policy

The EPA Industrial Noise Policy has two criteria which need to be satisfied namely Intrusiveness and Amenity. These are described below:

- **Intrusiveness Criteria** - This guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the $L_{eq}$ descriptor not exceed the background noise level by more than 5 dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

- **Amenity Criteria** - This guideline is intended to limit the absolute noise level from all “industrial” noise sources such as mechanical plant to a level that is consistent with the general environment.
The EPA’s Industrial Noise Policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

5.2.2.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the $L_{eq}$ descriptor do not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Section 5.1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

<table>
<thead>
<tr>
<th>Location</th>
<th>Period/Time</th>
<th>Background Noise Level dB(A) $L_{90}$</th>
<th>Intrusiveness Noise Emission Goal dB(A) $L_{eq(15min)}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 Schofields Road, Schofields</td>
<td>Day (7am-6pm)</td>
<td>44</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Evening (6pm-10pm)</td>
<td>37</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Night (10pm-7am)</td>
<td>32</td>
<td>47</td>
</tr>
</tbody>
</table>

5.2.2.2 Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA Industrial noise policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface. This site is categorised by surrounding receivers as suburban.
For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

Table 8 - Amenity Noise Emission Goals

<table>
<thead>
<tr>
<th>Location</th>
<th>Period/Time</th>
<th>Amenity Noise Emission Goal</th>
<th>Goal dB(A) L_{eq(Period)}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nearby Residences</td>
<td>Day (7am-6pm)</td>
<td></td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Evening(6pm-10pm)</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Night(10pm-7am)</td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

5.2.3 Protection of the Environment Operations Act 1997

The Protection of the Environment Operations Act stipulates that a site should not emit “offensive noise” to a residential receiver, where “offensive noise” is defined as background + 5dB(A), once penalties for tonality, intermittence etc have been taken into account.

In our opinion, compliance with the Industrial Noise Policy is satisfactory to demonstrate that a particular noise is not offensive.

5.2.4 Protection of the Environmental Operation Act Regulation 2000

Protection of the Environmental Operations regulation limits the noise levels associated within the operation of domestic air conditioning criteria during night time periods which is presented below:

Protection of the Environmental Operations (Noise Control) Regulation 2000-Sect 52

52 Air Conditioners

(1) A person must not cause or permit an air conditioner to be used on residential premises in such a manner that it emits noise that can be heard within a habitable room in any other residential premises (regardless of whether any door or window to that room is open):

   (a) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or
   (b) before 7 am or after 10 pm on any other day.
5.2.5 **Mechanical Plant**

Mechanical plant items are not typically selected at DA stage.

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Acoustic treatments should be determined in order to control plant noise emissions to the levels set out in Section 5.2 of this report.

All plant can be satisfactorily attenuated to levels complying with noise emission criteria through appropriate location and (if necessary) standard acoustic treatments such as noise screens, enclosures, in-duct treatments (silencers/lined ducting or similar.)
6 CONCLUSION

Noise intrusion impacts on the proposed residential development at 14 Schofields Road, Schofields have been assessed.

Provided that the acoustic treatments set out in Section 4.3 of this report are adopted, environmental noise impacts on the development will comply with the requirements of:

- Blacktown DCP 2015

External noise emission criteria has been setup in Section 5 of this report based on the requirements of the:

- Blacktown DCP 2015
- EPA Industrial Noise Policy
- The PEOA Act 1997 and

Detailed acoustic treatment will be determined at CC Stage (if required).

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

[Signature]

Acoustic Logic Consultancy Pty Ltd
Ben White
Appendix 1
Unattended Noise Data
14 Schofields Road, Schofields
Thursday December 8, 2016

Noise Level (dB(A))

Time

L10
Leq
L90