



# 637 NICHOLSON STREET, CARLTON NORTH

## PLN19/0696: Response to Council RFI, Noise Impact Assessment

For

JACK YACOUB & ASSOCIATES

DOC. REF: V258-02-P ACOUSTIC REPORT (R0)  
5 MARCH 2020

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Project 637 Nicholson Street, Carlton North  
Subject PLN19/0696: Response to Council RFI, Noise Impact Assessment  
Client Jack Yacoub & Associates  
Document Reference V260-02-P Acoustic Report (r0).docx  
Date of Issue 5 March 2020

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## Table of Contents

|       |   |   |
|-------|---|---|
| 1     | Introduction & Proposal.....                          | 3 |
| 2     | Assessment .....                                      | 3 |
| 2.1   | Response to RFI 7b: Clause 58.04-3, Standard D16..... | 3 |
| 2.1.1 | Lift Shaft Locations .....                            | 3 |
| 2.1.2 | Noise Influence Area.....                             | 4 |
| 2.1.3 | Commercial Use Impacts Within Development .....       | 6 |
| 2.2   | Impacts Generated by the Development .....            | 7 |
| 2.2.1 | Proposed Commercial Uses.....                         | 7 |
| 2.2.2 | Proposed Car Stackers.....                            | 7 |
| 3     | Summary .....   | 9 |

# 1 Introduction & Proposal

Enfield Acoustics has been engaged by Jack Yacoub & Associates to prepare this acoustic report in response to the Council RFI, dated 25 October 2019, relating to planning application PLN 19/0696 for the Subject Land of 637 Nicholson Street, Carlton North.

Council has requested the following:

7. The proposal fails to meet a number of Clause 58 standards/objectives, as follows:
  - b. An acoustic report has been requested to ensure a reasonable level of amenity is provided to the dwellings due to the mixed-use nature of the building, proximity to trams and proximity of bedrooms to lift cores/services. This will enable an assessment against Clause 58.04-3 (Noise).
  
21. An acoustic report, prepared by a suitably qualified Acoustic Consultant, addressing the noise impacts of the proposal on surrounding residential properties as well as from the proposed commercial uses to the proposed dwellings within the development.

To this end, Enfield Acoustics has:

1. Carried out noise measurements proximate the Subject Land and assessed the proposal in accordance with Clause 58.04-3 to determine what noise controls need to be included on the plans for Council approval and endorsement; and
2. Reviewed the development plans and application material to determine the likely noise emissions to occur from the Subject Land.

This assessment has been carried out in reference to Plans prepared by Rosetti Architects, dated 7 February 2020.

## 2 Assessment

### 2.1 Response to RFI 7b: Clause 58.04-3, Standard D16

Derived from the Better Apartment Design Standards, the pertinent sections of Clause 58.04-3, Standard D16 are as follows.

#### 2.1.1 Lift Shaft Locations

Noise sensitive rooms (such as living areas and bedrooms) should be located to avoid noise impacts from mechanical plants, lifts, building services, non-residential uses, car parking, communal areas and other dwellings.

The above section of Standard D16 does not prohibit lifts from being located adjacent living areas and bedrooms and we note that it is common practice for lift shafts to be sited in this way

in residential developments. Mitigation of lift noise impacts is typically resolved by constructing walls in accordance with Part F5 of the National Construction Code (NCC), as follows:

- (a) A wall in a Class 2 or 3 building must—
  - (ii) have an  $R_w$  (airborne) not less than 50, if it separates a *sole-occupancy unit* from a plant room, lift *shaft*, stairway, *public corridor*, public lobby or the like, or parts of a different classification; and
  - (iii) comply with **F5.3(b)** if it separates—
    - (B) a *sole-occupancy unit* from a plant room or lift *shaft*.

In practice, the above simply requires that all lift shaft walls which adjoin a residential unit must be constructed using a discontinuous wall design. This requires that the concrete lift shaft is separated from any internal wall framing by a minimum of 20mm and without structural ties between the two elements. To our knowledge, such a construction has never resulted in adverse noise impacts and it is now standard practice in all multi-dwelling buildings.

To this end, Enfield Acoustics is satisfied that as long as the dwellings are constructed in accordance with the NCC (which is mandatory and requires approval by the project Building Surveyor), there would not be any adverse noise impacts within the development from lifts. There are no other service rooms proposed adjacent sole occupancy units.

## 2.1.2 Noise Influence Area

Buildings within a noise influence area specified in Table D3 should be designed and constructed to achieve the following noise levels:

- Not greater than 35dB(A) for bedrooms, assessed as an  $L_{Aeq,8h}$  from 10pm to 6am.
- Not greater than 40dB(A) for living areas, assessed  $L_{Aeq,16h}$  from 6am to 10pm.

Buildings, or part of a building screened from a noise source by an existing solid structure, or the natural topography of the land, do not need to meet the specified noise level requirements.

Noise levels should be assessed in unfurnished rooms with a finished floor and the windows closed.

**Table D3 Noise influence area**

| Noise source   | Noise influence area                                    |
|--|---|
| <b>Zone interface</b>  |   |
| Industry   | 300 metres from the Industrial 1, 2 and 3 zone boundary |
| <b>Roads</b>   |   |
| Freeways, tollways and other roads carrying 40,000 Annual Average Daily Traffic Volume | 300 metres from the nearest trafficable lane            |
| <b>Railways</b>  |   |
| Railway servicing passengers in Victoria   | 80 metres from the centre of the nearest track          |
| Railway servicing freight outside Metropolitan Melbourne                               | 80 metres from the centre of the nearest track          |
| Railway servicing freight in Metropolitan Melbourne                                    | 135 metres from the centre of the nearest track         |

*Note: The noise influence area should be measured from the closest part of the building to the noise source.*

On review of the Subject Land and surrounding land uses, we note that:

1. There are no industrial land uses within 300m of the Subject Land;
2. There are no major roads within 300m of the Subject Land which have AADTV greater than 40,000:
  - a. Nicholson Street is an RDZ1 and has an AADTV of 16,000
  - b. All other surrounding roads are local roads and/or have an AADTV less than Nicholson Street.
3. There are no rail corridors within 135m of the Subject Land.

We note that Standard D16 has no relevance to the mixed-use nature of the proposed development, though cited in the Council RFI. The proposed office use would not trigger the 'industrial' land use within Table D3. However, this does not absolve any commercial uses within the development from compliance with State Environment Protection Policy No. N-1 (SEPP N-1), which is discussed later in this document.

Based on the above, the Subject Land is outside of the Noise Influence Area and does not require further assessment with regard to noise impacts from road traffic, rail and industrial uses under the planning scheme.

A standard form of building construction is deemed acceptable in accordance with Standard D16.

Council has however specifically requested assessment which is inclusive of trams, noting that trams are not included under Standard D16.

Enfield Acoustics carried out noise testing along the Nicholson Street frontage during traffic and tram passbys on 4 March 2020, between 5pm and 6pm. We have also previously measured traffic and tram noise for the 622-642 Nicholson Street development during the night period which is sited directly opposite from the Subject Land. The results of noise measurements within

approximately 5m of that development indicated that levels of up to 67dB(A) and 65dB(A)  $L_{eq}$  (traffic and trams) can be expected during the day and night periods respectively. A level of 85dB(A)  $L_{max}$  (tram passbys) has also been recorded during the night period.

It is noted that the Subject Land development proposes the following floor layouts which will inherently attenuate some transport noise from Nicholson Street:

1. Residential use is only proposed from Level 3 and up;
2. Residential use is setback from the Nicholson Street frontage, with facades approximately 12m from the road curb; and
3. Bedrooms do not have balcony access, meaning that sliding doors are limited to living / kitchen areas only.

We estimate that noise levels would be approximately 5dB less at the residential facades of the Subject Land when compared to measurements carried out at ground level of the development.

To better respond to Council’s concerns regarding noise impacts on the proposed development, Enfield Acoustics has modelled the types of glazing systems which would result in compliance with Standard D16 and sleep disturbance impacts, regardless of their status in Table D3.

We recommend the following window and door systems are fitted:

| Building Location   | Acoustic Rating   | Form of construction  |
|---|---|---|
| Living areas facing Nicholson Street with balcony sliding doors | $R_w$ 32-35   | Double glazed unit: 6mm glass / 12mm air / 6.38mm glass<br>Acoustic seals to all openable windows and doors |
| Bedrooms facing Nicholson Street, sliding windows               | $R_w$ 35  | Double glazed unit: 6mm glass / 12mm air / 6.38mm glass<br>Acoustic seals to all openable windows           |
| All other glazing and building elements                         | No specific requirement due to shielding, normal construction applies |   |

### 2.1.3 Commercial Use Impacts Within Development

The proposed use as offices presents as a relatively low risk in terms of adverse noise impacts. Offices typically generate noise emissions lower than some residential activities (<50dBA) and it is intrinsic that any concrete slab construction separating the office and residential floors will adequately attenuate office noise levels.

Air-conditioning and services equipment anchored to the concrete soffit of the office level however has the potential to generate vibration and structure-borne noise. While exact plant specifications are unknown at this time, Enfield Acoustics is satisfied that this issue is resolved on the planning permit via a condition requiring all plant equipment and ducting fixed to the Level 2 soffit to be isolated by suitably selected rubber and spring mounts.

Additional commentary on the likely impacts from the proposed office use are provided later in this document as the noise limits are the same for off-site impacts.

## 2.2 Impacts Generated by the Development

### 2.2.1 Proposed Commercial Uses

Commercial uses are required to comply with State Environment Protection Policy No. N-1 (SEPP N-1). The SEPP N-1 noise limits have been calculated to be as follows:

- 58dB(A) during the Day period, 7am-6pm
- 52dB(A) during the Evening period, 6pm-10pm
- 47dB(A) during the Night period, 10pm-7am

While use of the offices is expected to be limited during the Night period, there are no particular office activities that would be expected to generate significant impacts off-site.

The application and plans propose office use on Levels 1 and 2 of the development. While the exact tenancies are not known at this time, it is typically accepted that office use does not generate significant noise emissions and that the risk of adverse impacts is further mitigated when hours are generally confined to normal business hours.

The only commercial noise emissions from the development that would potentially generate impacts off-site are from mechanical plant servicing the office spaces. While actual plant items are not normally specified during planning phase, outdoor air-conditioning units can reasonably be expected to be larger than domestic split air-conditioning units. The Plans indicate that outdoor plant will be located on the roof towards the south boundary. The office tenancies may also be provided as cold shells, with plant equipment to be supplied by the tenant at a later date. There are no developments proximate the Subject Land which would overlook the rooftop and therefore this is inherently expected to provide adequate mitigation, however our advice is that outdoor mechanical plant is reviewed during detailed design and procurement phases.

Enfield Acoustics is satisfied that a condition on the permit requiring the Subject Land to comply with SEPP N-1 resolves this matter, given the risk of non-compliance is relatively low for this application.

### 2.2.2 Proposed Car Stackers

The application also proposes a 22 space car stacker system on Level 1 (plus pit) at the rear of the site. With respect to State Environment Protection Policy No. N-1 (SEPP N-1), car stackers may be considered exempt from the policy given the use is residential. We also note that SEPP N-1 assesses 30-minute 'average energy' noise emissions and that car stacker use is typically infrequent and actual noise emissions normally occur within 10-seconds. In practice, this simply means that car stackers inherently comply with even the most stringent noise limits set by SEPP N-1 because the duration of use is so minimal that any 30-minute noise emission is relatively low. By way of example, a car stacker that emitted a maximum instantaneous level of 60dB(A) at a residential premises would result in a 30-minute noise level of approximately 30-35dB(A), an overall noise level which is considered to be negligible and certainly less than any ambient noise that would occur in a residential area.

‘Sleep Disturbance’ criteria derived from the NSW Road Traffic Policy can be used as a method of assessing the likelihood of noise impacts for shorter duration or transient events. The Sleep Disturbance criteria is often cited in VCAT matters as being appropriate where noise emissions would otherwise intrinsically comply with longer term energy-average assessments such as SEPP N-1 criteria. The Sleep Disturbance assessment trigger typically recommended in areas with a similar context to the Subject Land is 65dB(A) outside of dwelling facades (or 55dBA inside when windows are assumed to be open).

However, I note that such triggers are only relevant where the number of noise events is significant. This is because it is normal for infrequent elevated noise levels to occur in any circumstance, which does not cause annoyance or any health related impacts. For example, occasional vehicle passbys on local roads typically generate maximum noise levels at residential facades ranging 70-80dB(A) and such levels have already been measured along Nicholson Street during tram passbys. Further, the NSW Road Traffic Policy concludes:

*From the research on sleep disturbance to date it can be concluded that:*

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

In our experience, car stackers are used relatively infrequently, in particular during the night, and therefore rarely constitute any need for detailed quantitative noise assessments. With respect to the Sleep Disturbance targets, it is our view that they represent a conservative assessment for something that occurs infrequently.

Enfield Acoustics has visited the recently constructed 93 Warrigal Road, Hughesdale development which has the same car stacker model installed as proposed on the Subject Land (CSI Uniparker). Noise and vibration measurements were conducted on that site as a benchmark to quantify the types of impacts that may occur on the Subject Land as follows:

1. Airborne noise measurements carried out outside of the carpark at 93 Warrigal Road, approximately 30m from the car stacker (while garage roller door was opened) resulted in just audible levels of noise. Hydraulic pump noise was not measureable at this location because the level was less than ambient noise.
2. Airborne noise measurements carried out within 5m of the car stacker at 93 Warrigal Road resulted in reverberant (inside concrete enclosed carpark) noise emissions of 60dB(A)  $L_{eq}$  and 79dB(A)  $L_{max}$ . The measurements included all operations of the car stacker including horizontal shunting, lifting and lowering of the platforms.
3. Vibration measurements carried out on the structural slab adjacent the post supporting the car stacker resulted in velocity levels less than 0.01 mm/s across the frequency spectrum. These levels are comfortably below acceptable vibration thresholds for both office and residential use and would be expected to generate a structure-borne noise level of <35dB(A)  $L_{max}$  directly above. Given the level

proposed directly above the car stacker on the Subject Land is non-residential, it is intrinsic that no adverse impacts would occur at residential levels.

Use of the car stacker is expected to comfortably comply with both SEPP N-1 and sleep disturbance triggers. The measurements carried out at 93 Warrigal Road are consistent with other previous measurements carried out by our firm during car stacker operations. On this basis and with consideration for the proposed floor layouts for the Subject Land, the risk of adverse impacts from use of the car stacker is considered to be negligible.

### 3 Summary

Enfield Acoustics has reviewed the development proposal for 637 Nicholson Street and conclude that in response to Council's RFI:

1. While proposed floor layout do site bedrooms adjacent lift shafts in some areas, our view is that this is standard practice and we are satisfied that the noise impacts will be mitigated where the building is constructed on accordance with the National Construction Code.
2. The Subject Land is outside of the Noise Influence Area for industrial, road and rail impacts and therefore standard forms of façade construction are deemed acceptable. Regardless, it is acknowledged that Nicholson Street has appreciable traffic volumes and tram passbys and therefore recommendations have been made regard to glazing systems fronting Nicholson Street, generally being a system that meets a performance rating of Rw35 (or 6.38/12/6 double glazing); and
3. Proposed office use within the development will need to comply with SEPP N-1, although the only material risk regarding this is mechanical plant installed, both anchored to the Level 2 soffit and outdoor air-condition units. Enfield Acoustics is satisfied that a condition on the permit requiring the Subject Land to comply with SEPP N-1 resolves this matter and the risk of non-compliance is low based on both the proposed use and site context.
4. Car stackers proposed have been benchmarked at another similar site and measured to emit relatively low levels of both noise and vibration. Given the use directly above the car stacker is proposed to be office, we do not recommend that any further noise mitigation is required.

Enfield Acoustics is satisfied that a permit can be approved for the proposed development and use on the basis of noise impacts.