

Good morning Andrea:

Further to our conversation yesterday, with regards to the new Building works at Delmar hospital.

I have visited the site yesterday and the 3 most neighboring houses located 68,70,72 Quirk St on Monday and got a good look at the method and type of installed air-conditioning units and ventilation ducts. I have to say that the photos taken by your son using drone were also very helpful to get whole picture of the roof.

General Information/Overview:

There are 3 major criteria that are expected from the Air-conditioning Units and ventilation ducts:

- The installation of the air-conditioning MUST NOT affect the street appearance of the building
- Air-conditioning unit MUST NOT produce noise that exceeds 5dB(A) above the ambient background noise level during that day.
- At night, noise from the air-conditioning unit is not to be heard in a habitable room of a neighbour's house;

Allowable noise levels as per Protection of the Environment Operations (Noise Control) Regulation 2017

Noise limits and time restrictions for usage of air conditioners are set by the above body. Councils are responsible for enforcing these limits at residential properties. If a cooling / heating system exceeds these limits, councils may issue the operator with a warning or notice. If the air conditioner continues to be used in excess of the noise and limits, councils are able to issue on-the-spot fines.

This is measured at the boundary between the owner and the neighbours 'properties.

The allowable noise level during 10pm to 7am (or 8am) is zero dB(A) above background noise.

Noise by definition is sound that is unwanted or unpleasant in some way. Due to the range of noise that can be heard by the human ear, a scale was developed called the 'decibel scale'

[dB(A)], which is used to represent how loud a particular noise is. Noise can also affect our performance, learning and stress levels and sleep.

This is measured at the neighbours nearest habitable room or window. Ensure your unit is inaudible from neighbours' homes if you require longer hours of operation. Some councils may impose other specific noise levels,

My Assessment of Delmar Hospital Air-conditioning System:

The situating of the air conditioner is the most important factor in ensuring noise is not going to be intrusive.

- Placing the unit on top of the roof in the open space of the property surrounded by the residential houses of high density is likely to create excessive noise that will travel in the open air quite a distance.
- The acoustic walls that has been installed on the higher 3 level building will serve no purpose what so ever. Adding acoustic wall to a rooftop unit is rarely an effective way to reduce noise in general.

The noise will bounce between the walls and travel via open sides and up. This seems to be more decorative to cover the units, as it will not fulfil any noticeable noise reduction purpose at all.

Roof Transmission Sound

Two roof-related sound paths must be considered in large rooftop units installations: Sound radiated from the outdoor portion of the unit, which is transmitted into the open space. • Sound radiated from the bottom of the unit, which is transmitted through the top opening (or openings) under the unit, plenum, and ceiling into the open space.

Structure-borne vibration paths are difficult to assess. For most airborne paths, we can predict what is required to meet the established sound criteria.

Rooftop units are the cost-effective solution for large, commercial developments, but they are not recommended for a sound-sensitive residential area. The money saved in on this roof top units is more than offset by the cost of acoustical treatment, therefore best to place rooftop units away from areas where sound is a concern.

The other major concern, apart from noise, when installing these mechanical ventilation units on the roof top is the street appearance of the building.

Visual Impact:

- The way the Air-conditioning units are positioned on the roof has quite a large and noticeable negative impact on the street presence and appearance of this building. The roof appears to be very busy and messy with all 'acoustic' walls, mechanical ventilation systems and plant built for these units. I have to openly admit that this is possibly the worst roof air-conditioning system placement I have ever come across.
- It appears that not much planning and design has been put into the placement of this system inclusive of the whole air conditioning system, which is unfortunate considering that this is a new \$16 million development. It appears that price was the main objective here with not much thought put on appearance or bulk and scale not mentioning noise impact toward neighboring properties.

Conclusion:

From my experience the Air conditioner noise levels would probably be a very high contentious topic with the neighbors, council and air conditioning contractors. Planning the location of the outdoor unit is very important. I also provide professional opinion to NSW Land and Environment court where I have seen similar scenario on too many occasions. Location of the outdoor A/C units is like a "red flag to a bull" where neighbors/council have taken the property owner to court, just like this.

The issue in this case is that this is a hospital that would be in operation 24hrs a day. This noise will be ever present. The problem is that when an environmental noise reaches elevated levels in our living spaces, it can have significant impacts on our health and well being by disturbing sleep and interfering with relaxation and communication as per above.

I believe that the direct neighbours will find it quite difficult should they leave window open at night as the noise from the Air-conditioning units becomes prominent and ongoing.

The solution as per my opinion would be to move the Air-conditioning units from the roof top and open space to the ground level where part of vibration and noise can be trapped. These type of air-conditioning units have been quite successfully installed within a building in a soundproofed enclosure or plant room. A good example is the recently built Curl Curl North Public School where I have been used as an adviser.

A proper soundproofing enclosure needs to be built around the air conditioning units, lining the inside of the enclosure with sound-absorbing material. Line the wall near the air con units with sound-absorbing material should be used on all 4 walls to absorb the noise, best would be acoustic foam that absorbs the soundwaves generated from the air conditioning unit.

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