

Auckland Unitary Plan

# Practice and Guidance Note

## Measuring and Assessing Noise

### Introduction

1. [Taking and measuring actual noise](#)
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## Introduction

Noise levels for zones and activities are contained in [E25 Noise and vibration](#) of the [Auckland Unitary Plan \(Operative in Part\) \(AUP \(OP\)\)](#). In accordance with this standard, noise levels are typically measured within the adjacent site's boundary (residential zones), within the notional boundary<sup>1</sup> of the adjacent site (rural zones), or at the incident level<sup>2</sup> on the façade of any building for some business zoned sites. Exactly where these noise levels are to be measured and assessed is set out in [Standard E25.6.1](#).

Standard E25.6.1 of the AUP (OP) requires noise levels from activities to be measured and assessed in accordance with New Zealand Standards NZS 6801:2008 Measurement of Environmental Sound and NZS 6802:2008 Acoustics - Environmental Noise except where more specific requirements apply.

Standard NZS6802 states the precise location where measurements should be made. The relevant sections of this standard are shown below.

**6.1.2** Reflections from surfaces near the microphone can affect the measured sound level, therefore measurements made outdoors should, whenever practicable, be carried out at least 3.5 m from any reflecting surface other than the ground, and 1.2 m to 1.5 m above the immediate ground level. Should there be any deviation from this height range, the reason for such deviation shall be recorded. Alternative measurement heights could be specified in other Standards. In all cases, if there are reflecting surfaces nearby, the distance of the microphone from those surfaces shall be recorded.

*C 6.1.2 ISO 1996-2, Annex B provides a method for assessing the possible effect of reflections.*

**6.1.3** Where measurements are needed close to a building, the preferred measurement positions are 1 m to 2 m from the external wall of the building and 1.2 m to 1.5 m above the floor levels of interest. In these cases the effect of the building reflection may be removed to give an approximation of the free field incident level by subtracting 3 dB from the measured value. Guidance on making measurements in other positions is provided in Annex B of ISO 1996-2.

*C6.1.3 If the windows can be opened, it is usually practicable to measure external noise at a location outside the building by supporting the microphone through the open window. Measurements may be adjusted for the façade effects.*

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<sup>1</sup> A line 20m from any side of a building containing an activity sensitive to noise, or the legal boundary where this is closer to the building

<sup>2</sup> The incident level is the free field level without reflected sound from the façade.

This Practice and Guidance Note (PGN) explains how to use NZS6802 when measuring and assessing noise under two different situations. They are:

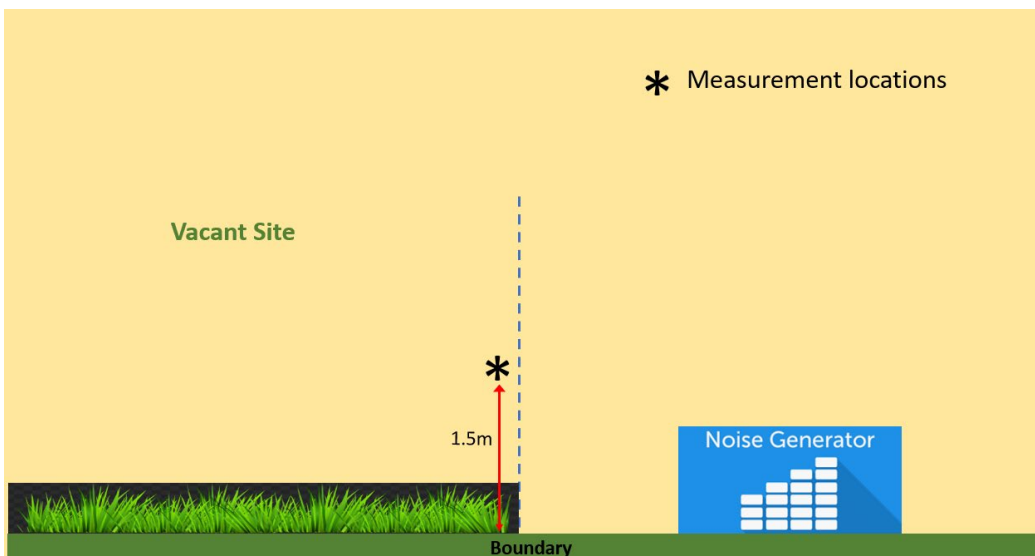
1. Where to take and measure noise to determine if a noise source is complying with the noise limits in the AUP (OP) (actual noise).
2. Where to assess noise (typically predicted or modelled noise) to determine who may be an affected person and to inform a substantive decision.

**Important: This guidance is an overview summary only. The measurement and assessment of noise can be problematic and advice from appropriately qualified persons should be sought. Note that this PGN does not cover measurement of sound inside a building.**

## 1 Taking and measuring actual noise

### Vacant sites

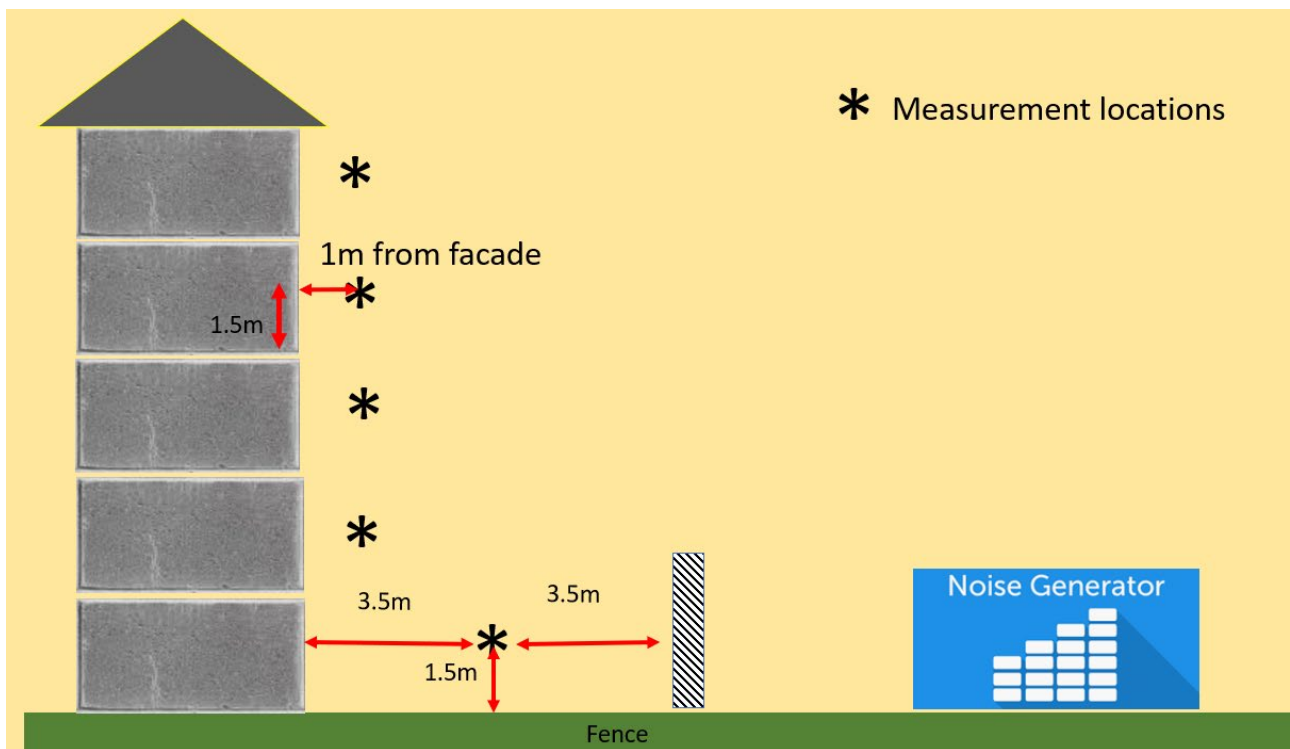
For a vacant site with no reflecting surfaces, noise should be measured 1.5m above ground within the boundary of the site adjacent to the noise emitting activity. The horizontal setback distance within the site boundary should reflect the worst-case receiver position. Where there is no acoustic screening this will typically be immediately within the boundary. This is shown in Figure 1 below.



**Figure 1: Measuring actual noise on a vacant site**

## Non-vacant sites

Where there are reflecting surfaces (e.g. a building on one side and a boundary fence/wall), then the measurement should be taken 3.5m from each reflecting surface (if possible) and 1.5m above ground level. Hence while the AUP (OP) noise standard says this reading should be made within the boundary (for example E25.6.2 Maximum noise levels in residential zones), NZS 6802 describes where exactly within the boundary the noise level should be measured. If the existing building is more than one level high, then noise should be measured 1.5m above each floor level (as per NZS6802, 6.1.3). Further, if there is a reflecting surface within 3.5m horizontally of the point where a noise measurement is required, then a shorter distance of at least 1m horizontally may be used with 3dB subtracted from the measured noise level (NZS6802, 6.1.3). These various measurement locations are shown in Figure 2 below.



**Figure 2: Measuring actual noise on non-vacant sites**

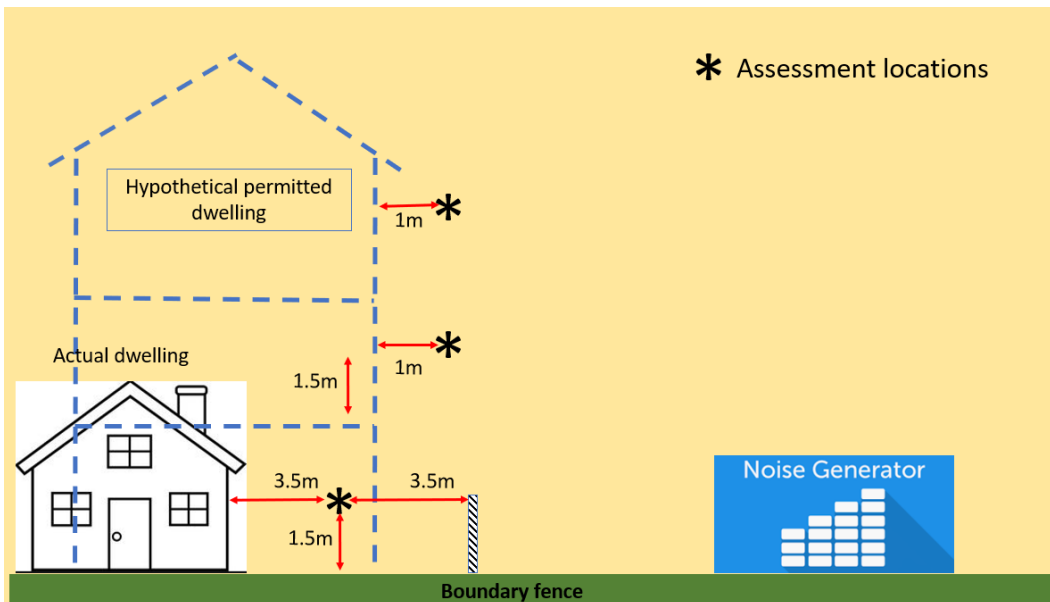
Note that if the existing building is single level only, then only one vertical noise measurement is required - i.e. 1.5m above ground level. As there are no other levels in the building, additional floor level readings are not relevant. This could mean that a site with an existing single-story dwelling, where noise measured at a vertical height greater than 1.5m above ground level exceeds the AUP (OP) noise limit, nevertheless will still comply with the AUP (OP) if the measurement taken at 1.5m above ground level complies.

## 2 Measuring predicted/modelled noise

Actual noise measurements relate to the physical presence (or not) of any buildings and structures whereas predicted/modelled noise may need to consider existing **and** future buildings which do not yet exist. In Resource Management Act 1991 (RMA) terms, this is known as the receiving environment – an environment which includes activities which currently exist as well as those in the reasonably foreseeable future as modified by activities that are permitted under the AUP (OP) and/or any unimplemented resource consents that are likely to be implemented. This will be considered if the matters for discretion/control enable the planner to consider amenity and/or noise effects.

If an adjacent site contains a single dwelling or is vacant, the vertical height measurement should include levels taken 1.5 metres above ground level as well as each floor level that may potentially exist as a permitted activity.

These hypothetical vertical locations are to be determined by the permitted activity rules and standards (e.g. height, Height in relation to boundary, yards) in the AUP (OP) and any unimplemented resource consents (i.e. the receiving environment). As an example, if a new 3 level dwelling could be built as a permitted activity to replace the existing dwelling, then these higher vertical noise level locations should be modelled/predicted. In Figure 3 below, which shows an existing dwelling as well as a potential permitted dwelling, the predicted noise levels should be measured at each vertical location shown by the asterisk\*. This captures the existing dwelling as well as the future dwelling and both should be used in determining what the effect is on the neighbouring site/s.



**Figure 3: Modelling/predicting noise – hypothetical permitted dwelling**

Note that the hypothetical new dwelling/building will need to meet the RMA tests for the receiving environment. That is, the building needs to be permitted or an unimplemented resource consent that is likely to be implemented and not be fanciful. The planner cannot

consider built development that is not permitted/consented as part of the receiving environment. Further if the adjacent site has a new dwelling on it and that site is unlikely to be redeveloped in the short to medium future, then modelling a new dwelling with the maximum permitted height and minimum yard may be fanciful. What is reasonable and valid in terms of a receiving environment assessment is case specific and requires an individual assessment. For this reason, planners should clearly set out the receiving environment when briefing the noise expert.

Where the adjacent site is located in a zone that requires resource consent for all new dwellings or buildings (for example the Terrace Housing and Apartment Buildings (THAB) Zone and the Business – Mixed Use Zone) it should not be assumed that a future building would be established and what that building may look like. The planner is unable to take into account ‘anticipated development’ which will still require consent in terms of the receiving environment. The approach described above and shown in Figure 3 would apply in the THAB Zone where there is a valid but unimplemented resource consent for a building. If there is no consented building then the predicted/modelled noise level assessment locations may need to be based on the existing situation shown in Figures 1 and 2 above, in terms of an assessment under the receiving environment and compliance with the AUP (OP) rule.

While it is well established that the effects assessment required for Council’s notification and substantive decisions on resource consent applications under the RMA must be made in the “context of the legislation and the district plan” and s104 requires that the objectives and policies must be had regard to, caution needs to be applied to ensure that this does not go as far as setting up an ‘anticipated development’ receiving environment for assessing adverse effects at notification or at the substantive stage. You must, however, in terms of your s104 substantive decision, have regard to any relevant provisions of a plan under s104(1)(b)(vi). For example, policy E25.3(5) seeks to prevent significant noise-generating activities from establishing in or adjoining residential zones and policy H6.3(9) requires non-residential activities to avoid, remedy or mitigate adverse effects on residential amenity. Hence while the effects of the noise-generating activity may be acceptable in terms of a receiving environment test, in terms of its compatibility with the zone (and hence potential future development) it may not be suitable.