

appendix 19

acoustic

insulation

requirements

AP19.1 Airport Effects Control Overlay

Ap19.1.i The provisions in Tables 1 and 2 are the minimum measures which are an approved method of complying with the acoustic insulation rules applying within the Airport Effects Control Overlay. The rules apply in the Residential Zone, the Industrial Zone, the Suburban Commercial Zone, and are a matter to be taken into account in any development in the Open Space and Recreation Zone and the Conservation Zone.

The tables apply within areas exposed to noise levels of Ldn 60 to 62 (34.6 to 54.8 Pasques), and Ldn 62 (54.8 Pasques) and above in the Airport Effects Control Overlay. The precise location of these areas is shown on the map in this Appendix. The application of these provisions shall be determined in accordance with the location of these lines.

table 1 - acoustic insulation of living areas and bedrooms within inner part of airport effects control overlay (Ldn 62 (54.8 Pasques) and above)

Building Element	Required Construction
Walls	Exterior: 20mm timber plus 12mm ply or particle board or 2 x 6mm fibre cement or 1 x 9mm compressed fibre cement Frame: 100mm with acoustic blanket Interior: 2 x 12.5mm gypsum plasterboard on resilient channel
Windows	Up to 20% of wall area 10mm glazing or 7mm laminated (2 x 3mm with interlayer) Up to 50% of wall area 6/50/6mm double glazing or 7mm hushglass Aluminium framing with compression seals
Pitched Roof	Cladding: 0.5mm profiled steel or tiles or 6mm corrugated fibre cement Frame: Timber truss with acoustic blanket Ceiling: 2 x 12.5mm gypsum plasterboard
Skillion Roof	Cladding: 0.5mm profiled steel or Butynol Sarking: 2 x 12mm particle board or plywood Frame: 100mm gap with acoustic blanket Ceiling: 2 x 12.5mm gypsum plasterboard
External Door	Solid core door of at least 24kg/m ² with airtight seals (or if glazed, otherwise as per window requirements).
Ventilation	The indoor design sound level shall be achieved with windows and doors shut.

Notes:

Acoustic Blanket: 75mm of acoustically absorbent material with minimum density of 580g/m², such as fibreglass, rockwool, polyester or wool. Thermal insulation such R1.2 is also suitable.

Plasterboard: Gypsum plasterboard of minimum density 680kg/m³.

Fibre Cement: Sheets or planks of fibre cement board of minimum density 1,500kg/m³ (compressed sheet minimum 2,000kg/m³).

table 2 - acoustic insulation of living areas and bedrooms within the outer part of the airport effects control overlay (Ldn 60 to 62 (34.6 to 54.8 Pasques))

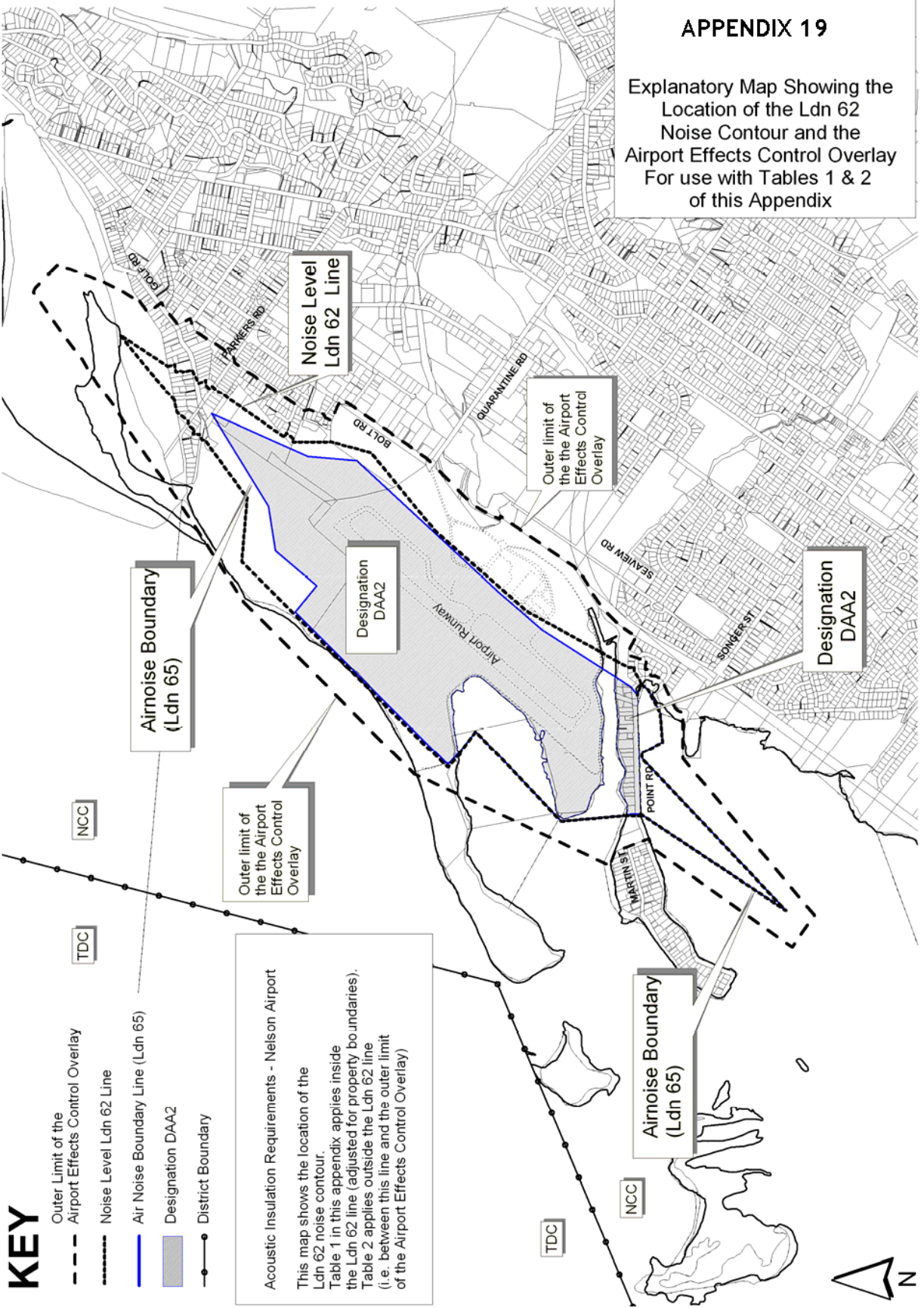
Building Element	Required Construction
Walls	Exterior: 20mm timber or 6mm fibre cement Frame: 100mm with acoustic blanket Interior: 12.5mm gypsum plasterboard
Windows	Up to 40% of wall area: 4mm glazing Up to 60% of wall area: 6mm glazing Aluminium framing with compression seals
Pitched Roof	Cladding: 0.5mm profiled steel or tiles or 6mm corrugated fibre cement Frame: Timber truss with acoustic blanket Ceiling: 12.5mm gypsum plasterboard
Skillion Roof	Cladding: 0.5mm profiled steel or Butynol Sarking: 12mm particle board or plywood Frame: 100mm gap with acoustic blanket Ceiling: 12.5mm gypsum plasterboard
External Door	Solid core door of at least 24kg/m ² although no special seals are necessary (if glazed, otherwise as per window requirements).
Ventilation	The indoor design sound level shall be achieved with windows and doors shut.

Notes:

Houses with brick veneer wall require 9.5mm gypsum plasterboard on the internal walls and ceilings. For windows up to 60% of the wall area, only 4mm glazing is required.

APPENDIX 19

Explanatory Map Showing the Location of the Ldn 62 Noise Contour and the Airport Effects Control Overlay For use with Tables 1 & 2 of this Appendix



AP19.2 Port Effects Control Overlay

AP19.2.i Acoustic insulation requirements for the Port Effects Control Overlay area included in the rules for the respective zones. However, no minimum construction requirements for habitable spaces are specified for the Port Effects Control Overlay. Instead, the rules require certification from an acoustic engineer that the building design will achieve the required design sound level for that zone and certification on completion of the works.

AP19.2.ii In addition, where the indoor design level cannot be achieved with ventilating windows open, the minimum ventilation requirements for habitable spaces require either:

- a) A mechanical system or mechanical ventilation system capable of:
- providing at least 15 air changes of outdoor air per hour in the principal living room of each building and give 5 air changes of outdoor air per hour in the other habitable spaces of each building, in each case with all external doors and windows of the building closed with the exception of such windows in non-habitable spaces that need to be ajar to provide air relief paths;
 - enabling the rate of airflow to be controlled across the range, from the maximum airflow capacity down to 0.5 air changes (plus or minus 0.1) of outdoor air per hour in all habitable spaces;
 - limiting internal air pressure to not more than 30 Pascals above ambient air pressure;
 - being individually switched on and off by the building occupants, in the case of each system; and
 - creating no more than 40 dB $L_{Aeq(15\ min)}$ in the principal living room, no more than 30 dB $L_{Aeq(15\ min)}$ in the other habitable spaces, and no more than 50 dB $L_{Aeq(15\ min)}$ any hallway, in each building. Sound levels from the mechanical system(s) shall be measured at least one meter away from any diffuser.

Note: This is the ventilation option provided for by the Port Noise Mitigation Plan. In the event that qualifying residents opt for the following (more expensive) air conditioning option (option b), those residents shall be required to pay the difference.

or:

- b) Air conditioning plus mechanical outdoor air ventilation capable of:
- providing internal temperatures in habitable spaces not greater than 25 degrees Celsius at 5% ambient design conditions as published by the National Institute of Water & Atmosphere Research (NIWA) (NIWA, Design Temperatures for Air Conditioning (degrees Celsius), Data Period 1991-2000), with all external doors and windows of the habitable spaces closed;
 - providing 0.5 air changes (plus or minus 0.1) of outdoor air per hour in all habitable spaces;
 - each of the air conditioning and mechanical ventilation systems shall be capable of being individually switched on and off by the building occupants; and
 - creating no more than 40 dB $L_{Aeq(15\ min)}$ in the principal living room, no more than 30 dB $L_{Aeq(15\ min)}$ in the other habitable spaces, and no more than 40 dB $L_{Aeq(15\ min)}$ in any hallway, in each building. Sound levels from the mechanical systems(s) shall be measured at least one metre away from any diffuser.

and:

- c) a mechanical kitchen extractor fan ducted directly to the outside to serve any cooking hob, if such an extractor fan is not already installed and in sound working order.

AP19.2.iii A single Residential Unit may contain a combination of the ventilation options a) and b) set out above to achieve the most practicable and cost effective approach. As an example it may be best for the principal living room to comply with option b) whilst the other habitable spaces may comply with option a).

AP19.3 Inner City Zone

AP19.3.i Acoustic insulation requirements for the Inner City Zone are included in the rule ICr.43A 'Acoustic Insulation of Buildings'. Under this rule a choice can be made between minimum construction requirements or having the acoustic insulation specifically designed for the proposed development. When designing acoustic insulation the rule requires certification from an acoustic engineer that the building design will achieve the required design sound level.

AP19.3.ii This appendix sets out the minimum ventilation requirements for new Bedrooms in the Inner City Zone where the indoor design level cannot be achieved with ventilating windows open. These require either:

- a) A mechanical system or mechanical ventilation system capable of:
- 5 air changes of outdoor air per hour in new bedrooms. In each case with all external doors and windows of the building closed with the exception of such windows in non-habitable spaces that need to be ajar to provide air relief paths;
 - enabling the rate of airflow to be controlled across the range, from the maximum airflow capacity down to 0.5 air changes (plus or minus 0.1) of outdoor air per hour in all new bedrooms;
 - limiting internal air pressure to not more than 30 Pascals above ambient air pressure;
 - being individually switched on and off by the building occupants, in the case of each system; and
 - creating no more than 30 dB $L_{Aeq(15 \text{ min})}$ in new bedrooms. Sound levels from the mechanical system(s) shall be measured at least one metre away from any diffuser.

or:

- a) Air conditioning plus mechanical outdoor air ventilation capable of:
- providing internal temperatures in new bedrooms not greater than 25 degrees Celsius at 5% ambient design conditions as published by the National Institute of Water & Atmosphere Research (NIWA) (NIWA, Design Temperatures for Air Conditioning (degrees Celsius), Data Period 1991-2000), with all external doors and windows of the new bedrooms closed;
 - providing 0.5 air changes (plus or minus 0.1) of outdoor air per hour in all new bedrooms;
 - each of the air conditioning and mechanical ventilation systems shall be capable of being individually switched on and off by the building occupants; and
 - creating no more than 30 dB $L_{Aeq(15 \text{ min})}$ in new bedrooms. Sound levels from the mechanical system(s) shall be measured at least one metre away from any diffuser.

AP19.3.iii Individual rooms in a single Residential Unit may contain a combination of the ventilation options a) and b) set out above to achieve the most practicable and cost effective approach.

AP19.3.iv The minimum measures identified in Table 3 below are one of two ways of demonstrating permitted activity status for acoustic insulation of new Bedrooms in the Inner City Zone. See rule ICr.43A 'Acoustic Insulation of Buildings'.

table 3 - acoustic insulation of new Bedrooms in the Inner City Zone

Building Element	Required Construction
Walls	<p>Exterior: 20mm timber weatherboards or 2 x 6mm fibre cement or 1 x 9mm compressed fibre cement</p> <p>Frame: nominal 100mm with acoustic blanket</p> <p>Interior: 3 x 13mm high density gypsum plasterboard for top floor Bedrooms 2 x 13mm high density gypsum plasterboard for mid-level Bedrooms</p> <p>Or: 190 series concrete blocks (minimum every 4th core filled)</p> <p>Or: 100mm thick pre cast concrete slabs</p> <p>Or: Solid clay brick veneer (minimum 70mm thick) with standard internal framing and plasterboard lining.</p>
Windows	<p>Minimum 17mm thick laminated glass for top floor Bedrooms</p> <p>Minimum 13mm thick laminated glass for mid-level Bedrooms</p> <p>Or: Double glazed unit with 10mm and 6mm panes, separated by a minimum 50mm air gap.</p>
Roof	<p>Top floor only, not needed for mid-level Bedrooms</p> <p>Cladding: 0.5mm profiled steel or tiles or 6mm corrugated fibre cement</p> <p>Frame: Timber truss with acoustic blanket</p> <p>Ceiling: 3 x 13mm high density gypsum plasterboard</p>
External Door	Hinged solid core door of at least 40kg/m ² with airtight seals (or if glazed, as per window requirements). Sliding doors are not suitable.
Internal Door	Internal doors to new bedrooms shall be hinged solid core of at least 16kg/m ²
Ventilation	The indoor design sound level shall be achieved with windows and doors shut. This requires the use of minimum ventilation requirements as set out in Appendix 19.3 Inner City Zone.

Notes:

Acoustic Blanket: 75mm of acoustically absorbent material with minimum area density of 580g/m², such as fibreglass, rockwool, polyester or wool. Thermal insulation such as R1.8 is also suitable.

High Density Plasterboard: Gypsum Plasterboard of minimum density of 960kg/m³.