



Doc Ref: WD770-01F02(rev0)- NV Memo

Date: June 14, 2017

To: Rothelowman Architects Pty Ltd (NSW)

Address: Level 2/171 William Street,  
Darlinghurst, NSW 2010

**RE: 41 TERRY STREET, ROUSE HILL**  
**Natural Cross-Ventilation Memo**

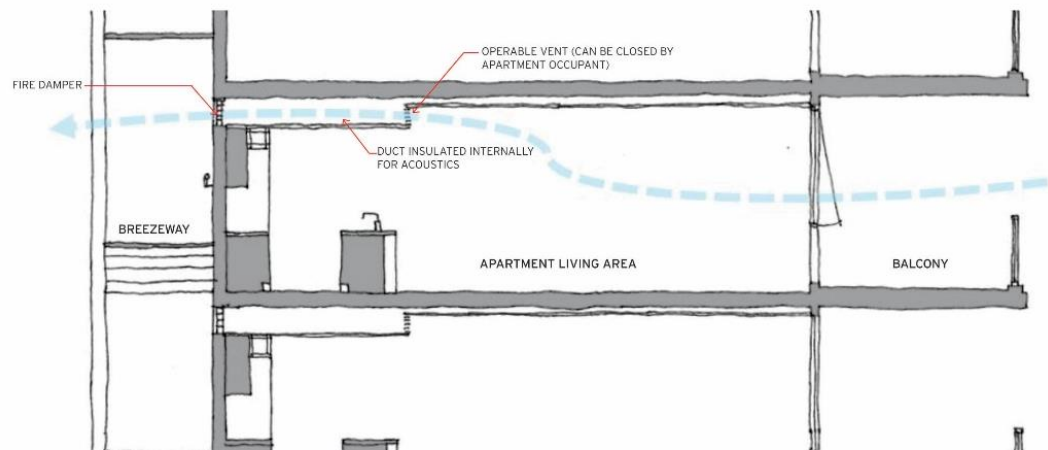
This technical memo is in relation to the use of plenum ducts to provide natural cross-ventilation for 13 of the apartments located on Ground Level, Level 1 and Level 2 of the proposed development located at 41 Terry Street, in Rouse Hill.

Windtech are leading specialist in the field of natural ventilation, having undertaken extensive full-scale and wind tunnel verification studies which have been presented at numerous international conferences. Effective natural cross-ventilation is provided through an apartment by pressure driven flow between two openings located on opposite or orthogonal aspects. This typically occurs with one opening located in a more positively pressurised region due to the prevailing winds and drawn to other opening, generally located in a neutrally/negatively pressurised region.

The proposed development proposes to include plenum ducts to enable natural cross-ventilation to be provided to 13 of the apartments as indicated in the drawings received June 8, 2017. The plenum duct design enables the apartment to have an opening connected to two orthogonal aspects of the built form, enabling this to behave in a similar way to a corner apartment due to the pressure driven flow. A positive pressure on one of the openings would also cause a negative/neutral pressurisation on the alternate opening of these apartments, and hence will be effective in providing natural cross-ventilation.

It is important to note that the design of the plenum duct is important to ensure that suitable airflow for thermal comfort and air quality is achieved. The following design guidelines are based on criteria for ventilation outlined in international standards as well as modelling undertaken by Windtech (full-scale, wind tunnel and computational modelling). The plenum duct should include a minimum effective free area of 0.4m<sup>2</sup> to provide suitable within the occupiable zone of the apartment (accounting for insect screening, louvres etc.). Obstructions to flow within the shaft such as pipes should be kept to a minimum, with the inclusion of turning veins to minimise flow losses along the flow path. An example of a plenum duct is shown in Figure 1.

Consideration should be given with regards to the design of the plenum ducting with regards to acoustic lining and fire dampers. This should be reviewed and detailed by relevant consultants.



**Figure 1 – Example Section View of Plenum Duct Design**

Yours sincerely,

Henry Kuo

*BE Aero (Hons)*

*Project Engineer*

Windtech Consultants Pty Ltd