REPORT

THE MARSHALL

ST LEONARDS, NSW

NATURAL VENTILATION DESIGN REVIEW

PROJECT #: 2509991
13 NOVEMBER 2025

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI Australia Pty Ltd (RWDI) was retained to provide advice with regards to the natural ventilation performance for the proposed The Marshall development located at 2-10 Berry Road, St Leonards, NSW. The assessment was performed with consideration of the Apartment Design Guide (ADG) of the State Environmental Planning Policy No 65 (SEPP 65).

On review of the proposed design in the drawings received in May 2025, it is expected that **62.8% (98/156)** of the assessed apartments for the development can be considered naturally cross ventilated. This includes:

- 81 residential apartments with dual-aspect designs;
- 17 residential apartments with facade articulation which has the potential to generate pressure differential between the positively pressurised windward façade and the negative pressurised recess, when impacted by the oblique prevailing winds. Less obstruction within the balcony recess is important to improve the natural ventilation for these units. Natural ventilation modelling can be undertaken to quantify the performance.

A further review of the updated architectural drawings received November 2025, indicate that the key changes to the design do not impact the overall results of this assessment.

1. INTRODUCTION

RWDI Australia Pty Ltd (RWDI) was retained to provide advice with regards to the natural ventilation performance for the proposed development located at 2-10 Berry Road, St Leonards, NSW. The assessment was performed with consideration of the Apartment Design Guide (ADG) of the State Environmental Planning Policy No 65 (SEPP 65). This report documents the findings of our desktop review.

The proposed development is known as The Marshall, and comprised of Areas 13, 14 and 15 within the St Leonards South Precinct, and is bound by Marshall Avenue to the north, Holdsworth Avenue to the east and Berry Road to the west. The site comprises 10 allotments with a total site area of 5,874sqm. The location of the site within its broader existing surrounding context is shown in Figure 1. The immediate vicinity of the project site is currently occupied by tall buildings in the N through NNE directions and a mixture of low-rise buildings and roadways in the E through NW directions (Figure 1). The latter is a positive from a natural ventilation perspective as it increases wind exposure to the proposed development. Hence, the majority of the dual-aspect apartments will be exposed to the prevailing northwest and south winds which will primarily drive natural ventilation throughout the year.

Figure 1: Project Site and Existing Surroundings and Exposure to Prevailing Winds (Map Credit: Nearmap)

2. METHODOLOGY

The assessment was performed with consideration of the Apartment Design Guide (ADG) of the State Environmental Planning Policy No 65 (SEPP 65). This assessment was based on a desktop review of the following:

- Architectural drawings prepared by project architects PTW, provided to RWDI on 29 May 2025;
- Natural Cross Ventilation Diagrams prepared by project architects PTW, provided to RWDI on 29 May 2025;
- Updated architectural drawings prepared by project architects PTW, provided to RWDI on 13 November 2025;
- Local meteorological data for the Sydney region; and
- RWDI's knowledge of air flows within and around buildings.

The objective of this study is to assess the apartments' access to natural ventilation for residents. The analysis was based on a desktop review of the architectural drawings of the proposed development and its surrounding context combined with the meteorological data for Sydney. No simulations or wind tunnel studies were undertaken as part of this desktop review. To quantify these conditions or refine any conceptual mitigation measures, further investigations can be undertaken at a later stage.

3. CRITERIA

Apartment Design Guide (ADG)

Section 4B of the ADG states that "natural cross ventilation is achieved by apartments having more than one aspect with direct exposure to the prevailing winds, or windows located in significantly different pressure regions, rather than relying on purely wind driven air".

Natural cross ventilation is also defined in the ADG as "natural ventilation which allows air to flow between positive pressure on the windward side of building to the negative pressure on the leeward side of the building"

The ADG guidance also focuses on two key aspects for natural ventilation in apartment developments. This is noted in the following sections:

Section 4B-1: All Habitable rooms are naturally ventilated.

This section provides guidance to support natural ventilation. The main guidance provided is that an area of unobstructed window opening be provided for each habitable room of 5% of the floor area served. Furthermore, the buildings orientation should be such that it maximises the capture and use of the prevailing breezes.

Section 4B-3: Number of apartments with natural cross ventilation is maximised to create a comfortable indoor environment for residences.

This section details design criteria for natural cross ventilation in the first 9 storeys of the building being assessed, specifically that at least 60% of the apartments on these levels be naturally cross ventilated. Apartments located on level 10 and above are deemed to be considered naturally cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed. Furthermore, depth of cross-over or cross-through apartments should not be more than 18 m from glass line to glass line.

Noting that the ADG is a guideline, it does not provide specific metrics detailing what constitutes adequate natural ventilation. It therefore falls to the wind consultant to recommend an appropriate metric.

4. METEOROLOGICAL DATA

The 10-year meteorological data for the period of 2013 through 2022 recorded at the Sydney Airport in Sydney, Australia was chosen as reference for wind conditions due to its proximity to the proposed development.

The wind rose in Figure 2a graphically depicts the combined directional distributions of wind frequencies and speeds annually measured at the airport at an anemometer height of 10m.

Natural ventilation at the proposed development project will be primarily driven by exposure to the prevailing winds from the northeast, south, and west through northwest directions throughout the year.

To facilitate analysis, annual winds were further broken down into two seasons as illustrated in Figure 2b on the following page. The seasonal wind roses show winds with high frequencies from the northeast and south during summers, while westerly through north-westerly winds dominate during the winter months. Winds with mean speeds greater than 30 km/h occur 11.4% of the time in summer and 9.0% of the time in winter.

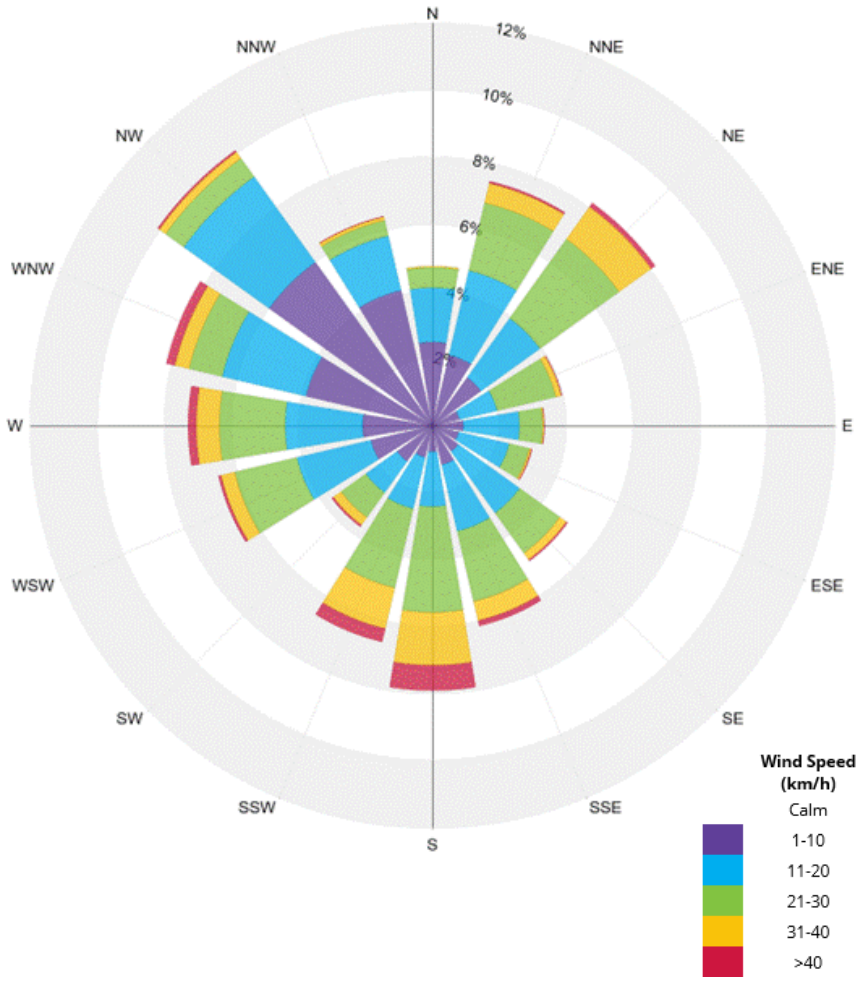

Figure 2a: Directional Distribution of Winds (Winds Blowing From) Sydney Airport (2013 – 2022)

4. METEOROLOGICAL DATA

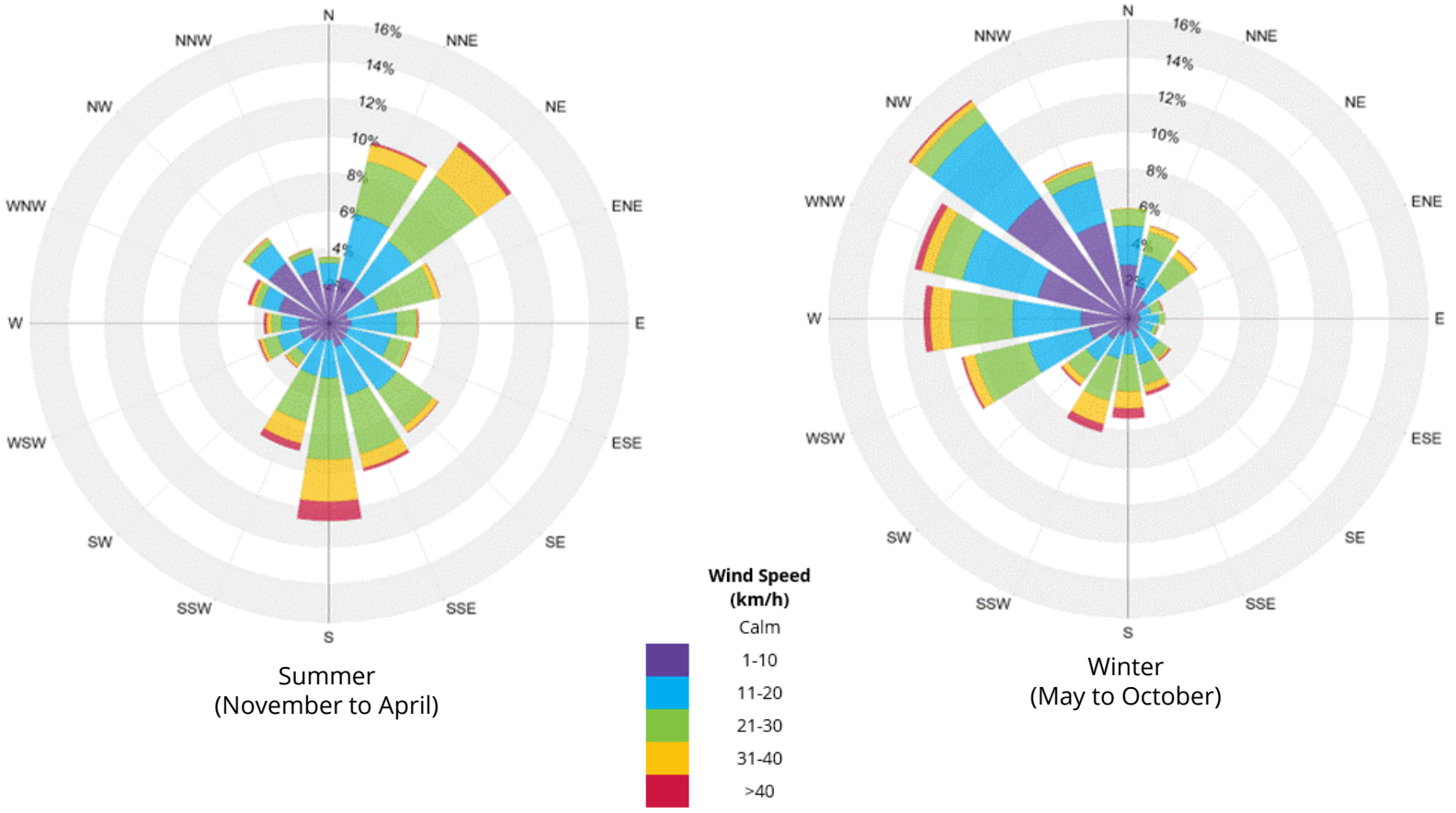

Figure 2b: Directional Distribution of Winds for Summer and Winter Seasons at Sydney Airport (2013 – 2022)

5. NATURAL VENTILATION STRATEGIES

The ability of the proposed development to harness natural ventilation will be dependent on the exposure of the external openings on the building's façade to the prevailing winds, as well as the type of natural ventilation strategy employed.

Wind driven natural ventilation takes advantage of the local wind conditions to drive air through the internal spaces of residences. The internal air flow is driven by a pressure differential across the openings, with air moving from high to low pressure openings, as noted in Figure 3. Therefore, it is important to understand the pressure distribution around a built form as well as the prevailing wind direction(s) to assist in the positioning of opening locations. This will allow for wind pressure driven natural ventilation to be achieved in accordance with the Apartment Design Guide.

Figure 4 provides a simplified plan and section view of a wind pressure field around a built form for a given wind direction. Note that thermal driven buoyancy ventilation would act in addition to this wind driven flow path.

Objective 4B-2 of the ADG notes that natural ventilation for single-aspect apartments can have primary windows augmented with plenums and light wells, even so, they are generally not suitable for natural cross ventilation as they are typically located on the same building aspect. However, natural cross ventilation can still be achieved through various means to induce a pressure driven flow, including (but not limited to) façade articulation, openings via ventilated skylights, ducts/plenums to another aspect, ventilation to an open corridor, and other such strategies. In some instances where the apartment depth is slightly deeper, the opening size of the apartment can be increased and/or internal layout improved to reduce bends and other obstructions to improve natural ventilation performance.

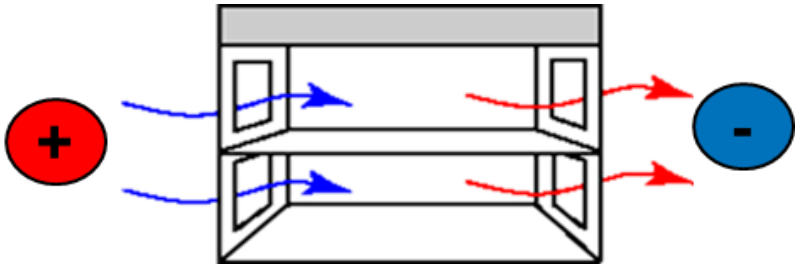

Figure 3: Pressure-driven Natural Ventilation

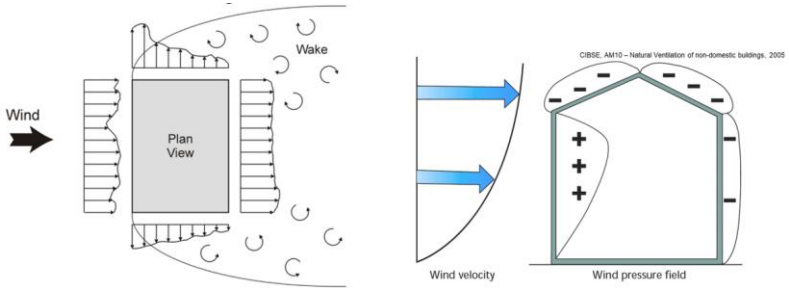

Figure 4: Pressure Distribution around a building for a given wind direction: Plan (left) and Section (right)

6. NATURAL VENTILATION RESULTS

An assessment has been undertaken for the compliance diagrams (shown in Appendix A) of apartments located on the first 9 storeys of the proposed development (Areas 13, 14 and 15) for natural cross ventilation in accordance with the Apartment Design Guide, based on the drawings received in May 2025.

Based on our review, it is expected that **62.8% (98 out of 156)** of the residential apartments can be considered naturally cross ventilated.

81 units achieved cross ventilation by leveraging openings on orthogonal/opposite aspects. Note that the natural ventilation of the 2 corner units on Level 5 (Units 130504 and 150506) take advantage of the significant pressure difference across the openings to the void on lower level.

In addition, of the 98 units, 17 residential apartments achieved natural cross ventilation via façade articulation to induce a significant pressure differential between the windward façade, and the balcony openings. In order to create a pocket of negatively pressurised region at the balcony door, it is important reduce flow obstructions as the prevailing winds impacts the façade at an oblique angle. A wind tunnel study or computational fluid dynamics analysis could be carried out during detailed design stage to verify that significant pressure difference and hence adequate flow rate is achieved.

The breakdown of the assessment is presented in Table 1.

A further review of the updated architectural drawings received November 2025, indicate that the key changes to the design do not impact the overall results of this assessment.

Table 1: Detailed Breakdown of Natural Ventilation Assessment

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
140001	No	No	No
140002	No	No	No
140003	No	No	No
140004	Yes	No	Yes
140101	No	No	No
140201	Yes	No	Yes
140202	Yes	No	Yes
140203	No	No	No
140204	Yes	No	Yes
140205	Yes	No	Yes
140301	Yes	No	Yes
140302	Yes	No	Yes
140303	No	No	No
140304	Yes	No	Yes
140305	Yes	No	Yes
140306	No	No	No

6. NATURAL VENTILATION RESULTS

Table 1: Detailed Breakdown of Natural Ventilation Assessment (cont.)

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
140401	Yes	No	Yes
140402	Yes	No	Yes
140403	No	No	Yes
140404	Yes	No	Yes
140405	Yes	No	Yes
140406	No	No	No
140501	Yes	No	Yes
140502	Yes	No	Yes
140503	Yes	No	Yes
140504	Yes	No	Yes
140505	No	No	No
140601	Yes	No	Yes
140602	Yes	No	Yes
140603	Yes	No	Yes
140604	Yes	No	Yes
140605	No	No	No
140701	Yes	No	Yes
140702	Yes	No	Yes

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
140703	Yes	No	Yes
140704	Yes	No	Yes
140705	No	No	No
140801	Yes	No	Yes
140802	Yes	No	Yes
140803	Yes	No	Yes
140804	Yes	No	Yes
140805	No	No	No
150201	Yes	No	Yes
150202	Yes	No	Yes
150203	No	No	No
150301	Yes	No	Yes
150302	Yes	No	Yes
150303	No	No	No
150304	No	No	No
150305	Yes	No	Yes
150306	Yes	No	Yes
150307	No	Yes	Yes

6. NATURAL VENTILATION RESULTS

Table 1: Detailed Breakdown of Natural Ventilation Assessment (cont.)

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
150401	Yes	No	Yes
150402	Yes	No	Yes
150403	No	No	No
150404	No	No	No
150405	Yes	No	Yes
150406	Yes	No	Yes
150407	No	Yes	Yes
150501	Yes	No	Yes
150502	Yes	No	Yes
150503	No	No	No
150504	No	No	No
150505	No	No	No
150506	Yes	No	No
150507	No	No	No
150508	No	Yes	Yes
150601	Yes	No	Yes
150602	Yes	No	Yes
150603	No	No	No

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
150604	No	No	No
150605	No	No	No
150606	No	No	No
150607	No	No	No
150608	No	Yes	Yes
150701	Yes	No	Yes
150702	Yes	No	Yes
150703	No	No	No
150704	No	No	No
150705	No	No	No
150706	No	No	No
150707	No	No	No
150708	No	Yes	Yes
150801	Yes	No	Yes
150802	Yes	No	Yes
150803	No	No	No
150804	No	No	No
150805	No	Yes	Yes

6. NATURAL VENTILATION RESULTS

Table 1: Detailed Breakdown of Natural Ventilation Assessment (cont.)

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
150901	Yes	No	Yes
150902	Yes	No	Yes
150903	No	No	No
150904	No	No	No
150905	No	No	No
150906	No	Yes	Yes
151001	Yes	No	Yes
151002	Yes	No	Yes
151003	No	No	No
151004	No	No	No
151005	No	No	No
151006	No	Yes	Yes
130301	No	Yes	Yes
130302	Yes	No	Yes
130303	Yes	No	Yes
130304	No	No	No
130305	Yes	No	Yes
130306	Yes	No	Yes

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
130307	Yes	No	Yes
130401	No	Yes	Yes
130402	Yes	No	Yes
130403	Yes	No	Yes
130404	No	No	No
130501	No	Yes	Yes
130502	No	No	No
130503	Yes	No	Yes
130504	Yes	No	Yes
130505	No	No	No
130506	Yes	No	Yes
130507	Yes	No	Yes
130601	No	Yes	Yes
130602	No	No	No
130603	Yes	No	Yes
130604	No	No	No
130605	No	No	No
130606	Yes	No	Yes

6. NATURAL VENTILATION RESULTS

Table 1: Detailed Breakdown of Natural Ventilation Assessment (cont.)

Unit No.*	Dual Aspect	Façade Articulation	Cross Ventilated
130607	Yes	No	Yes
130701	No	Yes	Yes
130702	No	No	No
130703	Yes	No	Yes
130704	No	No	No
130705	No	No	No
130706	Yes	No	Yes
130707	Yes	No	Yes
130801	No	Yes	Yes
130802	No	No	No
130803	Yes	No	Yes
130804	No	No	No
130805	Yes	No	Yes
130806	Yes	No	Yes
130901	No	Yes	Yes
130902	No	No	No
130903	Yes	No	Yes
130904	No	No	No
130905	Yes	No	Yes
130906	Yes	No	Yes
131001	No	Yes	Yes
131002	No	No	No
131003	Yes	No	Yes
131004	No	No	No
131005	Yes	No	Yes
131006	Yes	No	Yes
131101	No	Yes	Yes
131102	No	No	No
131103	Yes	No	Yes
131104	No	No	No
131105	Yes	No	Yes
131106	Yes	No	Yes

*Note: The unit numbers presented in this table correspond to the drawing set received in May 2025.

10. GENERAL STATEMENT OF LIMITATIONS

This report entitled "*The Marshall: Natural Ventilation – Design Review*", dated 13 November 2025, was prepared by RWDI Australia Pty Ltd ("RWDI") for DASCO ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

APPENDIX A

COMPLIANCE DIAGRAM REVIEW MARKUPS