



PEDESTRIAN WIND ENVIRONMENT STATEMENT  
HCCD 1A, UNIVERSITY OF NEWCASTLE

WE613-01F02(REV0)- WS REPORT

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## EXECUTIVE SUMMARY

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This report is in relation to the HCCD Stage 1A proposed development located at 16B honeysuckle Drive, Newcastle and presents an opinion on the likely impact of the proposed design on the local wind environment on the critical outdoor areas within and around the subject development. The effect of wind activity is examined for the three predominant wind directions for the Newcastle region; namely the west-north-westerly, north-easterly and southerly winds. The analysis of the wind effects relating to the proposed development was carried out in the context of the local wind climate, building morphology and land topography.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the latest architectural drawings. No wind tunnel testing has been undertaken for the subject development, and hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

The results of this assessment indicate that the subject development benefits from shielding provided by the subject and neighbouring buildings. Downwash wind effects are not expected to be an issue due to the low overall height and orientation of the building to the prevailing wind direction. Due to the alignment of honeysuckle Drive and Worth Place, the pedestrian footpaths along these streets are potentially exposed to the prevailing west-north-westerly and southerly winds respectively travelling along these streets. It should be noted that this is an existing wind effect for the site, and the consideration of the following treatment strategies into the design of the development are expected to be effective in enhancing the local wind conditions along the pedestrian footpaths:

- The inclusion of the proposed impermeable awning above the ground level.
- The inclusion of the densely foliating street trees along Worth Place. The inclusion of densely foliating street trees along the remaining street frontages is expected to be effective in enhancing the wind conditions along these streets.
- The strategic inclusion of densely foliating vegetation such as trees, shrubs or hedge planting within the proposed non-trafficable areas around the subject development on the ground level.

Hence with the inclusion of the abovementioned treatment strategies into the design of the development, the wind conditions along the various pedestrian footpaths around the subject development are expected to be suitable for its intended uses.

Note the densely foliating vegetation is recommended to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.

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# 1 INTRODUCTION

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An opinion on the likely impact of the proposed design on the local wind environment affecting pedestrians within the critical outdoor areas within and around the subject development is presented in this report. The analysis of wind effects relating to the proposed development has been carried out in the context of the predominant wind directions for the region, building morphology of the development and nearby buildings, and local land topography. The conclusions of this report are drawn from our extensive experience in the field of wind engineering and studies of wind environment effects.

No wind tunnel testing has been undertaken for this assessment. Hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection, and any recommendations in this report are made only in-principle.

## **2 DESCRIPTION OF THE DEVELOPMENT AND SURROUNDINGS**

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The development is part of the first stage of the Honeysuckle Campus and is bounded by Honeysuckle Drive to the north, Worth Place to the west, Wright Lane to the south and a vacant construction site to the east; to be developed at a later stage as part of the Honeysuckle Campus. Surrounding the site is predominantly mid-rise buildings; concentrated primarily along Honeysuckle Drive, with intermittent construction sites, such as the Honeysuckle Campus along the eastern and southern boundary of the site. A survey of the land topography indicates there is a general descent towards the Hunter River to the north of the site. An aerial image of the subject site and the local surroundings is shown in Figure 1.

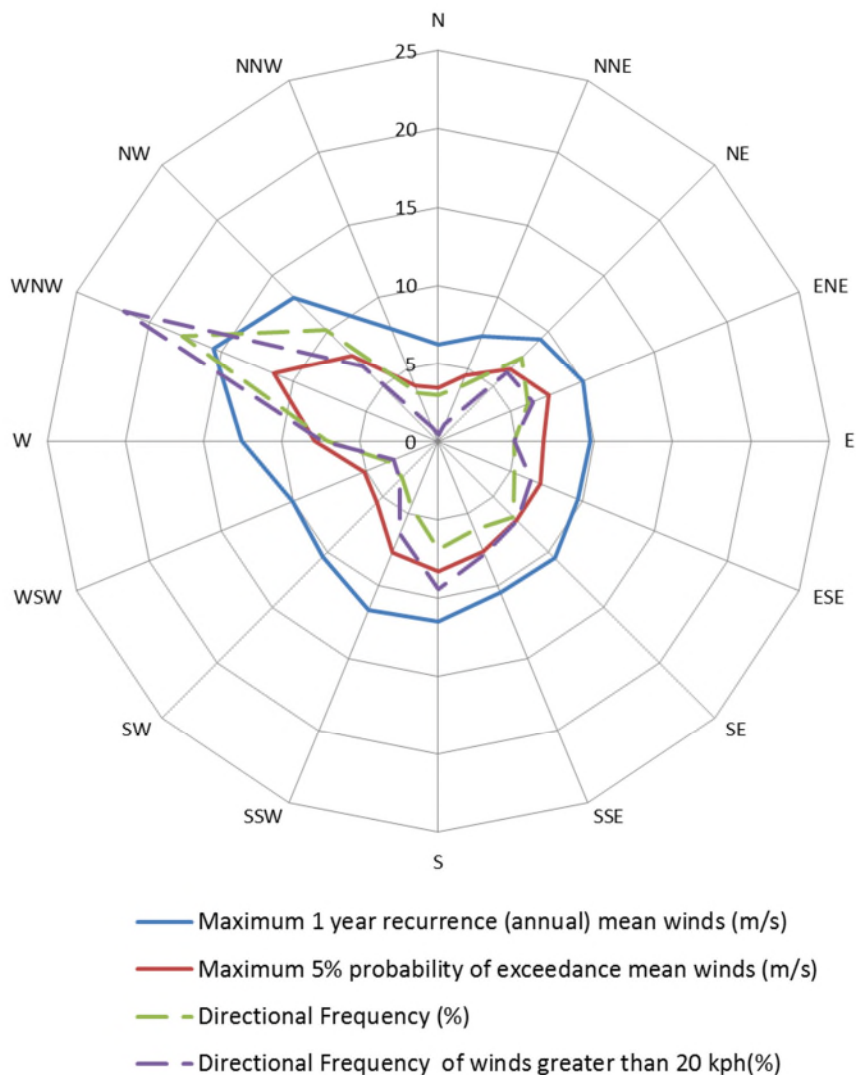
The proposed development is a singular four storey high university campus building comprised primarily of educational facilities and ancillary mechanical plantroom services. This assessment covers the critical outdoor trafficable areas associated with the proposed development, which are the ground level pedestrian thoroughfares along the Honeysuckle Drive, Worth Place and Wright Lane frontages of the site.



**Figure 1: Aerial Image of the Site Location**

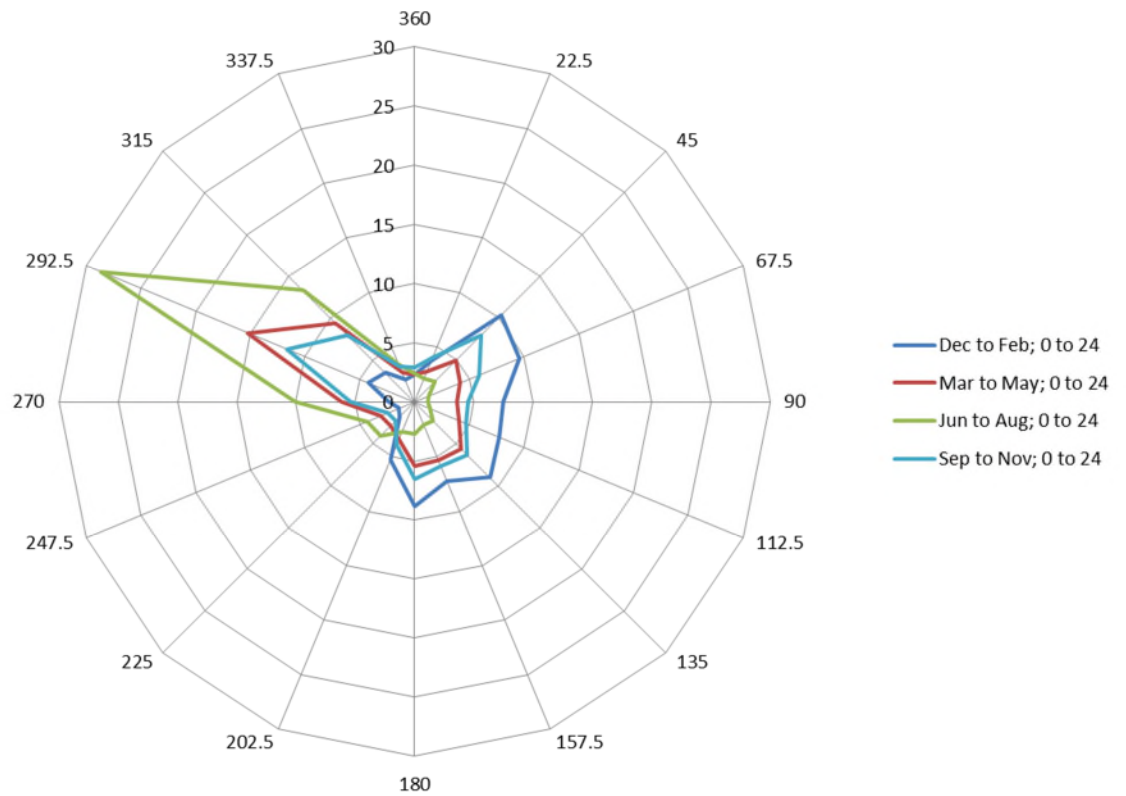
### 3 REGIONAL WIND

The Newcastle region is governed by three principle wind directions, and these can potentially affect the subject development. These winds prevail from the west-north-west, north-east and south directions. A directional plot of the annual and 5% probability of exceedance winds for the Newcastle region is shown in Figure 2. The frequency of occurrence of these winds is also shown in Figure 2. The seasonal frequency of the prevailing wind directions is shown in Figure 3. The west-north-westerly winds are the most frequent and occur predominantly throughout the winter months, while the north-easterly and southerly winds occur most frequently throughout the summer months. These plots have been produced based on an analysis of recorded wind speed data obtained from Williamtown Airport from 1958 to 2013.



**Figure 2: Annual and 5% probability of exceedance Mean Wind Speeds, and Frequencies of Occurrence, for the Newcastle Region (based on 10-minute mean observations from Williamtown Airport from 1958 to 2013, corrected to open terrain at 10m)**





**Figure 3: Seasonal Frequency of Mean Wind Speeds for the Newcastle Region (based on 10 minute mean observations from Williamtown Airport from 1958 to 2013, corrected to open terrain at 10m)**

## 4 WIND EFFECTS ON PEOPLE

The acceptability of wind in any area is dependent upon its use. For example, people walking or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant. Various other researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, and A.D. Penwarden, have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities. Some Councils and Local Government Authorities have adopted elements of some of these into their planning control requirements.

For example, A.D. Penwarden (1973) developed a modified version of the Beaufort scale which describes the effects of various wind intensities on people. Table 1 presents the modified Beaufort scale. Note that the effects listed in this table refers to wind conditions occurring frequently over the averaging time (a probability of occurrence exceeding 5%). Higher ranges of wind speeds can be tolerated for rarer events.

**Table 1: Summary of Wind Effects on People (A.D. Penwarden, 1973)**

Type of Winds	Beaufort Number	Mean Wind Speed (m/s)	Effects
Calm	0	Less than 0.3	Negligible.
Calm, light air	1	0.3 – 1.6	No noticeable wind.
Light breeze	2	1.6 – 3.4	Wind felt on face.
Gentle breeze	3	3.4 – 5.5	Hair is disturbed, clothing flaps, newspapers difficult to read.
Moderate breeze	4	5.5 – 8.0	Raises dust, dry soil and loose paper, hair disarranged.
Fresh breeze	5	8.0 – 10.8	Force of wind felt on body, danger of stumbling
Strong breeze	6	10.8 – 13.9	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, wind noise on ears unpleasant.
Near gale	7	13.9 – 17.2	Inconvenience felt when walking.
Gale	8	17.2 – 20.8	Generally impedes progress, difficulty balancing in gusts.
Strong gale	9	Greater than 20.8	People blown over.

It should be noted that wind speeds can only be accurately quantified with a wind tunnel study. This assessment addresses only the general wind effects and any localised effects that are identifiable by visual inspection and the acceptability of the conditions for outdoor areas are determined based on their intended use (rather than referencing specific wind speeds). Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

## 5 RESULTS AND DISCUSSION

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The expected wind conditions are discussed in the following sub-section of this report for the various outdoor areas within and around the subject development. The interaction between the wind and the building morphology in the area is considered and important features taken into account including the distances between the surrounding buildings and the proposed building form, as well as the surrounding landform. Note that only the potentially critical wind effects are discussed in this report.

### 5.1 Ground Level Areas

The pedestrian footpaths along the various street frontages of the site benefits from the shielding provided by the subject and the existing surrounding mid-rise buildings to direct wind effects where the buildings are located upstream of the prevailing wind direction. Note the remaining staged buildings of the Honeysuckle Campus to the east and south of the site, when completed are expected to provide additional shielding to the prevailing north-easterly and southerly winds onto the pedestrian footpath along Wright Lane. Down-wash wind effects off the building façade are not expected to be an issue for the pedestrian footpaths due to the low overall height and orientation of the building to the prevailing wind direction. The proposed impermeable awning as indicated in the architectural drawings is expected to be effective in deflecting any potential down-wash wind effects away from the pedestrian footpath, hence it is recommended to be retained in the final design of the development.

Due to the east to west and north-west to south-east alignments of Honeysuckle Drive and Worth Place respectively, the pedestrian footpaths along these street frontages however are susceptible to the prevailing west-north-westerly and southerly winds which will tend to flow along these streets. It should be noted that this is an existing wind effect for the site, and the inclusion of the street trees and densely foliating vegetation such as trees, shrubs or hedge planting along the pedestrian footpath as indicated in Figure 4 are expected to be effective in further enhancing the local wind conditions.

Hence with the inclusion of the abovementioned treatment strategies into the design of the development, the wind conditions along the various pedestrian footpaths around the subject development are expected to be suitable for its intended uses.

Note the densely foliating vegetation is recommended to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.

**Legend**



Densely foliating street trees are recommended to be retained.



Non-trafficable areas are recommended to be populated with densely foliating vegetation such as trees, shrubs or hedge planting.

Note the densely foliating vegetation is recommended to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year. Furthermore additional street trees along the remaining street frontages is expected to be effective in enhancing the local wind conditions.



**Figure 4: Suggested Treatment Strategy – Ground Level**

## 6 REFERENCES

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