PEDESTRIAN WIND ENVIRONMENT STATEMENT

253 COWARD STREET, MASCOT

WE848-01F02(REV1)- WS REPORT

AUGUST 1, 2019

Prepared for:

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DOCUMENT CONTROL

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July 16, 2019	Initial.	0	NR	SWR	HK
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EXECUTIVE SUMMARY

This report is in relation to the proposed development located at 253 Coward Street, Mascot 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 prevailing wind directions for the Sydney region; namely the north-easterly, southerly and westerly 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 is relatively exposed to the prevailing north-easterly winds with greater potential wind impact from the direct westerly and southerly winds due to the alignment of these winds with the proposed development. The tower form has the potential to capture the prevailing westerly and southerly winds resulting in downwash and side stream effects impacting the lobby and footpath areas. It is expected that the wind effects identified in the report can be ameliorated with the consideration of the following treatment strategies into the design of the development:

Ground Level

- Retention of the vertical fin elements on the current façade design
- Retention of some of the key existing large trees and planter boxes
- Retention of proposed trees and landscaping along the Coward Street, Kent Road and Chalmers Crescent frontages.

Note that the inclusion of additional landscaping or planting within and around the building is expected to be effective in improving local wind conditions. All landscaping or planting provided for wind mitigation purposes should be of a densely foliating and evergreen variety to ensure year-round wind mitigation performance.

CONTENTS

1 INTRODUCTION

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 prevailing 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

The development site is located at 253 Coward Street, Mascot and is included within the Bayside Local Government Area (LGA). The site has a main road frontage to the north along Coward Street as well as development frontage with vehicle access along the western aspect of the building via Kent Road leading into the proposed development carpark entrance.

The immediate area surrounding the site consists of predominantly low to medium rise commercial buildings and warehouses to the west and south with high rise residential and mixed-use developments to the north and east.

Further past the high rise buildings to the east are low-rise residential homes and to the south is Sydney Airport. Beyond the Alexandria Canal to the west remains a number of undeveloped properties. A survey of the local land topography indicates it is a general south-westerly descent towards the Canal and through the Airport and a general rise to the north-east. An aerial image of the subject site and the local surroundings is shown in Figure 1.

The proposed development includes a carpark dedicated basement level with additional allocations on Levels 2 and 3. The rest of the development contains commercial space other than the roof which has been designated for plant. The overall structure of the development comprises a total of 12 levels above the ground. This assessment covers the critical trafficable areas associated with the proposed development which are the focus of this assessment with regards to wind effects. This includes the trafficable areas at ground level around the lobby and commercial spaces as well as the footpath adjacent to the site.

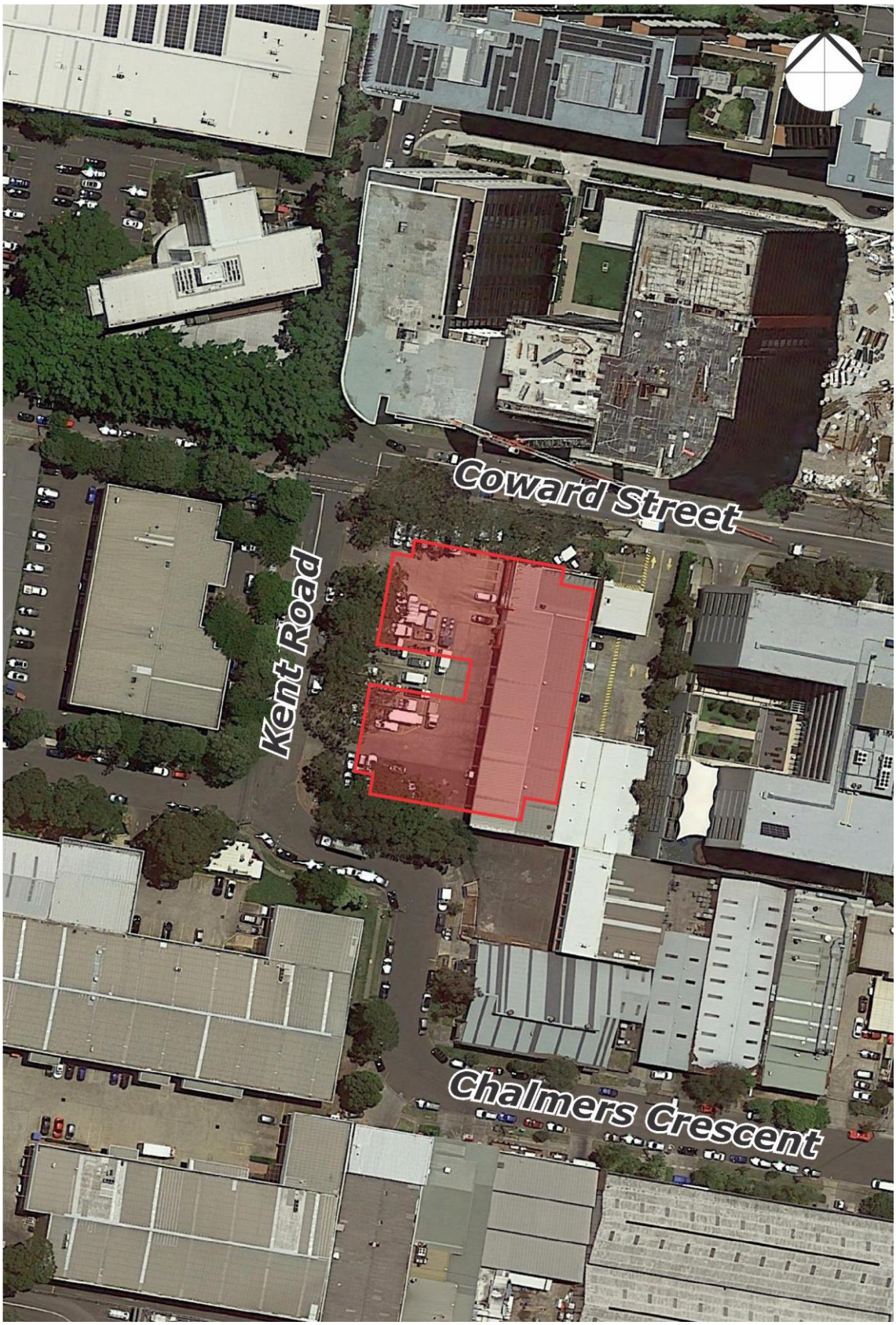

Figure 1: Aerial Image of the Site Location

3 REGIONAL WIND

The Sydney region is governed by three principal wind directions, and these can potentially affect the subject development. These winds prevail from the north-east, south and west. These wind directions were determined from an analysis undertaken by Windtech Consultants of recorded directional wind speeds obtained at the meteorological station located at Sydney Airport by the Bureau of Meteorology. The data has been collected from this station from 1995 to 2016 and corrected so that it represents winds over standard open terrain at a height of 10m above ground level. Figure 2 shows a summary of this analysis in the form of a plot presenting the directional wind speeds and corresponding directional frequencies of occurrence.

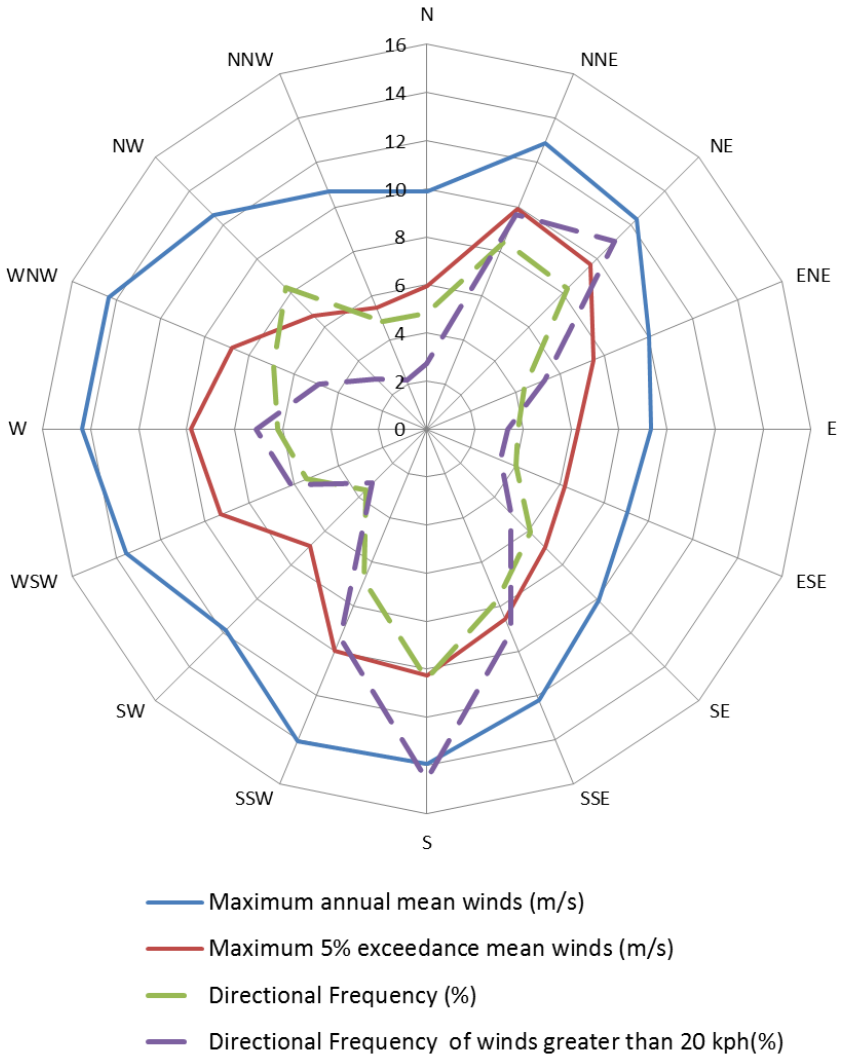

Figure 2: Annual and 5% Exceedance Hourly Mean Wind Speeds, and Frequencies of Occurrence, for the Sydney Region (referenced to 10m above ground in standard open terrain)

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

The expected wind conditions are discussed in 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 presence of the East Square building to the immediate north provides shielding for the pedestrian footpath area along Coward Street from the direct impact effects of the prevailing north-easterly winds. However due to the alignment of the façade, winds will side stream along the facade and downwash onto pedestrians as well as accelerate around the north-western corner of the development making conditions uncomfortable at this location.

It is expected that the protruding fin and structural elements will disrupt the oncoming flow to some extent reducing the overall impact near the base of the building. However, adverse conditions along the footpath may remain and it is suggested that some of the existing trees along Coward Street be retained in addition to the proposed vegetation of densely foliating, evergreen shrubs and trees to be included in the allocated landscape areas.

From the west, prevailing winds will be captured by the façade due to its perpendicular alignment and the limited shielding from nearby buildings, resulting in direct impact effects at ground level around the proposed lobby and seating areas. The setback of the lower levels minimises the effect of downwash on the pedestrian footpath along Kent Road, however, the lobby area may still be adversely impacted by this wind effect.

The use of protruding fin elements along the façade as well as the awning above the main lobby entrance is expected to mitigate the downwash effects and should be retained. Similarly, retaining some of the existing trees coupled with the proposed new planting along Kent Road will buffet winds that attempt to funnel underneath, reducing the adverse wind effects on people in the proposed seating and lobby areas as well as footpaths.

The alignment of the southern building aspect indicates that pedestrians will experience similar wind effects as previously mentioned. There is limited shielding by neighbouring buildings promoting direct impact as well as downstream and side stream effects onto pedestrians walking along the footpath adjacent to Chalmers Crescent. These effects are strongest near the base of the building and hence it is suggested that some trees and vegetation be retained. Vehicle access is required to the substation therefore it is suggested that the proposed trees and vegetation should be retained on either side of the access road to minimise the wind effects on pedestrians.

6 REFERENCES

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