



**22 CLEELAND ROAD
SOUTH OAKLEIGH VIC 3167
AUSTRALIA**

(ACN 004 230 013)

Ref: 208-20-DE-REV-00

1 December 2020

City of Parramatta
126 Church Street
Parramatta NSW 2150

Attn: Brad Roeleven

Dear Brad,

**12-14 Birnie Avenue, Lidcombe
Review of Windtech Pedestrian Wind Environment Study
Windtech Document Number: WE430-01F03(REV0)-WE Report**

The review of the Vipac Wind Impact Statement is based on MEL Consultants' experience of wind flow around buildings and structures. This experience has been developed from a company experience of more than 40 years of desktop, wind tunnel, and full scale studies of environmental wind conditions in urban and sub-urban areas. No wind tunnel studies have been undertaken to support the review. Our comments are as follows:

- The Windtech study details a wind tunnel model investigation of the wind impact of the proposed development on the surrounding streetscapes. We agree with this approach for a development of this size.
- Windtech have used the Bankstown Airport wind climate data as representative of the wind climate of Lidcombe. Windtech have corrected these data for topography and buildings that surround the anemometer site. We have no issue with the use of data from this site that has been appropriately corrected, as this has been discussed during reviews of previous Windtech reports.

- We have no issue with the proposed development and proximity model built by Windtech for the wind tunnel study. We note the high level of detail on the subject building model. The study has been undertaken without landscaping inside and outside the title boundaries.
- We have no issue with the boundary layer chosen to be modelled in the wind tunnel.
- Windtech provide a good discussion of the various pedestrian comfort criteria in the appendices and clearly state the criteria (comfort and safety) to be used for the assessment of the wind effects of the proposed development. MEL Consultants and Windtech have discussed the appropriate pedestrian criteria during previous reviews and for the purposes of this review the assessment will be against the information presented by Windtech. Windtech have used hot-wire anemometers to measure the local wind speeds at the test locations and have discussed the data acquisition in Appendix B.
- Windtech have selected a detailed number of test locations adjacent to the development and a limited number of locations on the opposite sides of the streets. Windtech reference the AWES Pedestrian Wind Guidelines (2014) in the Introduction and these guidelines suggest a minimum distance away from the site to be studied. While the 6 study points extend the study area out to approximately the minimum distance the 6 points present a sparse spatial distribution investigation. It is noted that Windtech have not quantified the environmental wind conditions on the communal areas on the podium, private balconies, and roof terraces. This is a significant oversight as these podium communal areas and open corner balconies are locations of potentially high wind conditions and should be included in the study.
- The Windtech study has identified many locations around the proposed development that fail the pedestrian comfort and safety criteria. To assist with the discussion the Windtech results have been summarised in Table 1 and the outcomes colour coded. The colour codes for passing and failing the target wind comfort and safety criteria are:

Pedestrian Comfort

Pass	Green
Fail	Orange

Pedestrian Safety

Pass	Green
Fail	Red

MEL Consultants disagree that being on the safety criterion of 23 ms^{-1} would satisfy the criterion. We have spoken to the author of this criterion and the observations were of young physically able pedestrians that lead to the development of this criterion of 23 ms^{-1} when these young pedestrians were blown over. It is noted that persons less physically able or have unsteady mobility would be blown over at wind speeds below this criterion wind speed. In our opinion the Locations 01, 19, and 29 fail the safety criterion and the design should not have wind conditions that approach the 23 ms^{-1} safety criterion. Many locations have been shown to be within 1 ms^{-1} of the safety criterion, which is concerning.

- Windtech have shown for the Existing Configuration a number of locations exceed the safety criterion and this is unexpected for the Industrial Warehouse, particularly at the lower height south end. Figure 1 presents Figure 6b from the Windtech report with the Study Locations at the south end of the building from Figure 6a of the Windtech report. The positions of the Study Locations have been determined by comparing Figures 6a and 6b, since Windtech overlayed the ground plan in Figure 6b. Windtech determined for the Existing Configuration that Study Locations 19, 20, and 21 have wind conditions that exceed the safety criterion. Based on the locations in Figure 1, Study Location 21 is on the roof and Study Locations 19 and 20 are on the east side of the existing building. Windtech need to provide an explanation for the high wind speeds measured at Study Locations 19 and 20 on the east side of the low-rise section of the existing building away from the influence of tall buildings.

Furthermore, these locations are not near the building corner where wind acceleration would be expected.

- The target pedestrian comfort criterion have been shown to be exceeded in the outdoor area between the towers, with Study Locations 29 and 31 failing the safety criterion. Furthermore, Study Locations 27, 28, and 29 significantly exceed the target criterion by 16%, 33%, and 16% respectively. Windtech have provided comment, via PPD Planning Consultants, indicating the exceedances of the criteria are due to the funnelling of wind flow between the towers and acceleration around corners for the prevailing wind directions. MEL Consultants concerned that the wind issues are caused by the prevailing wind directions as this indicates that these wind conditions would be expected to have a high frequency of occurrence. This would not be expected to be identified by the comfort criteria used by Windtech since the percentage exceedance is determined for all wind directions combined.
- Windtech have provided recommended wind treatments for the Study Locations that have been shown to exceed the target comfort and safety criteria. However, even though Windtech have demonstrated the significant adverse wind impacts of the proposed development, they have not undertaken testing to quantify the effectiveness of the wind treatments. Given the significant pedestrian safety and comfort issues, this further study should have been completed as the existing report only demonstrates the proposed development has unacceptable wind impacts on the pedestrian realm. The treatments recommended by Windtech include 2 to 3m high screens between the buildings with a maximum porosity of 50%. These types of screens typically provide wind mitigation for approximately 5 screens heights downstream when the wind flow is approaching horizontally along the ground. However, as noted by Windtech, the area between the buildings would be subject to downwash wind flow, i.e. the wind flow has a vertical component. The downwash would reduce the effectiveness of the screens to provide wind mitigation. Furthermore, the screens have been shown to have narrow gaps for pedestrian access and wind flow would be expected to be funnelled and accelerated through these gaps. This further emphasises that

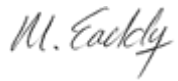
the wind treatments need to be tested to confirm, or otherwise, their effectiveness.

- Windtech and Inhabit, via PPD Planning Consultants, have comments on the use landscaping to mitigate the wind impacts. MEL Consultants, in agreement with the AWES Guidelines, do not support the use of landscaping for mitigating safety exceedances and also note the advice of the Guidelines on the use of landscaping for high wind conditions. Many of the Study Locations have gust wind speeds within a few metres per second of the safety criterion. The AWES Guidelines comment '*Trees planted in windy locations rarely mature to their normal full height as modelled in the wind tunnel for a range of reasons including loss of limbs, the drying effect of the wind and the natural tendency of trees to remain stunted in such locations to provide the best chance of survival.*' Therefore, landscaping for wind mitigation in the communal area between the buildings may not thrive and reach the mature state to provide the necessary wind mitigation. Unfortunately, the failure of the landscaping may not be realised for years after the completion of the buildings. MEL Consultants agree with the Windtech study not relying on landscaping/trees outside the control of the developer, such as trees along Edwin Flack Avenue.
- Windtech have also identified exceedances of the pedestrian comfort criterion in the far field at Study Locations 40 and 44. Windtech need to comment on the causes of these exceedances and determine appropriate wind mitigation treatments. MEL Consultants experience has been these exceedances are caused by wind flow deflected by the upper levels of the proposed development, so the mitigation treatments may require changes to the tower forms.

In conclusion, we have reviewed the Windtech Pedestrian Wind Environment Study for the development at 12-14 Birnie Avenue, Lidcombe. The report provides pedestrian level wind conditions compared to the pedestrian comfort and safety criteria used by Windtech. The study has investigated the ground level wind impacts but has not examined the communal areas on the podium and roof and private balconies. Windtech have demonstrated the proposed development would have significant pedestrian safety and comfort exceedances, particularly in the communal area

between the towers. Windtech have recommended wind treatments but have not quantified their effectiveness. Given the significant wind impacts identified, it would be expected that Windtech would have provide a complete report detailing the quantified effectiveness of the treatments instead of the current report. MEL Consultants has concerns with the use of landscaping to mitigate the significant wind impacts identified by Windtech and these have been discussed based on the AWES Guidelines. Finally, further wind tunnel testing of the development needs to be undertaken to address the issues raised in this review.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'M. Eaddy', written in a cursive style.

M. Eaddy
MEL Consultants Pty Ltd

Table 1 – Summary of Windtech Data

	GEM (5%)		Safety Criterion	
Study Point	Criterion (m/s)	Result (%)	Criterion (m/s)	Results (m/s)
Point 01	7.5	9	23	23
Existing		4		20
Point 02	7.5	9	23	21
Existing		13		21
Point 03	7.5	6	23	19
Existing		11		19
Point 04	7.5	12	23	21
Existing		2		20
Point 05	7.5	0	23	12
Point 06	7.5	4	23	20
Point 07	7.5	1	23	17
Point 08	7.5	2	23	17
Point 09	7.5	1	23	18
Existing		2		17
Point 10	7.5	1	23	17
Point 11	5.5	19	23	20
		12		17
Point 12	5.5	6	23	15
Existing		3		14
Point 13	7.5	3	23	18
Point 14	7.5	1	23	16
Point 15	7.5	11	23	22
		3		17
Point 16	7.5	4	23	19
Point 17	7.5	19	23	22
Existing		9		22
Point 18	7.5	9	23	21
Existing		1		15
Point 19	7.5	18	23	23
Existing		16		27

	GEM (5%)		Safety Criterion	
Study Point	Criterion	Result (%)	Criterion (m/s)	Results (m/s)
Point 20	7.5	10	23	20
Existing		16		27
Point 21	7.5	11	23	21
Existing		16		24
Point 22	7.5	11	23	22
Existing		5		19
Point 23	7.5	9	23	22
Point 24	5.5	9	23	21
Point 25	7.5	4	23	18
Point 26	5.5	12	23	17
Existing		10		21
Point 27	5.5	21	23	20
Point 28	5.5	38	23	21
Point 29	5.5	21	23	23
Existing		15		17
Point 30	5.5	0	23	14
Point 31	5.5	8	23	24
Existing		9		22
Point 32	7.5	10	23	22
		1		17
Point 33	7.5	8	23	21
Existing		3		18
Point 34	5.5	6	23	15
Existing		0		12
Point 35	7.5	3	23	19
Point 36	7.5	3	23	19
Point 37	7.5	8	23	21
Existing		1		15
Point 38	7.5	10	23	20
Existing		3		17

	GEM (5%)		Safety Criterion	
Study Point	Criterion	Result (%)	Criterion (m/s)	Results (m/s)
Point 39	7.5	4	23	19
Existing		3		18
Point 40	7.5	13	23	21
Existing		12		22
Point 41	7.5	5	23	22
Existing		2		18
Point 42	7.5	2	23	17
Existing		2		15
Point 43	7.5	4	23	20
Existing		5		18
Point 44	7.5	1	23	22
Existing		11		22
Point 45	5.5	11	23	20
Existing		17		17

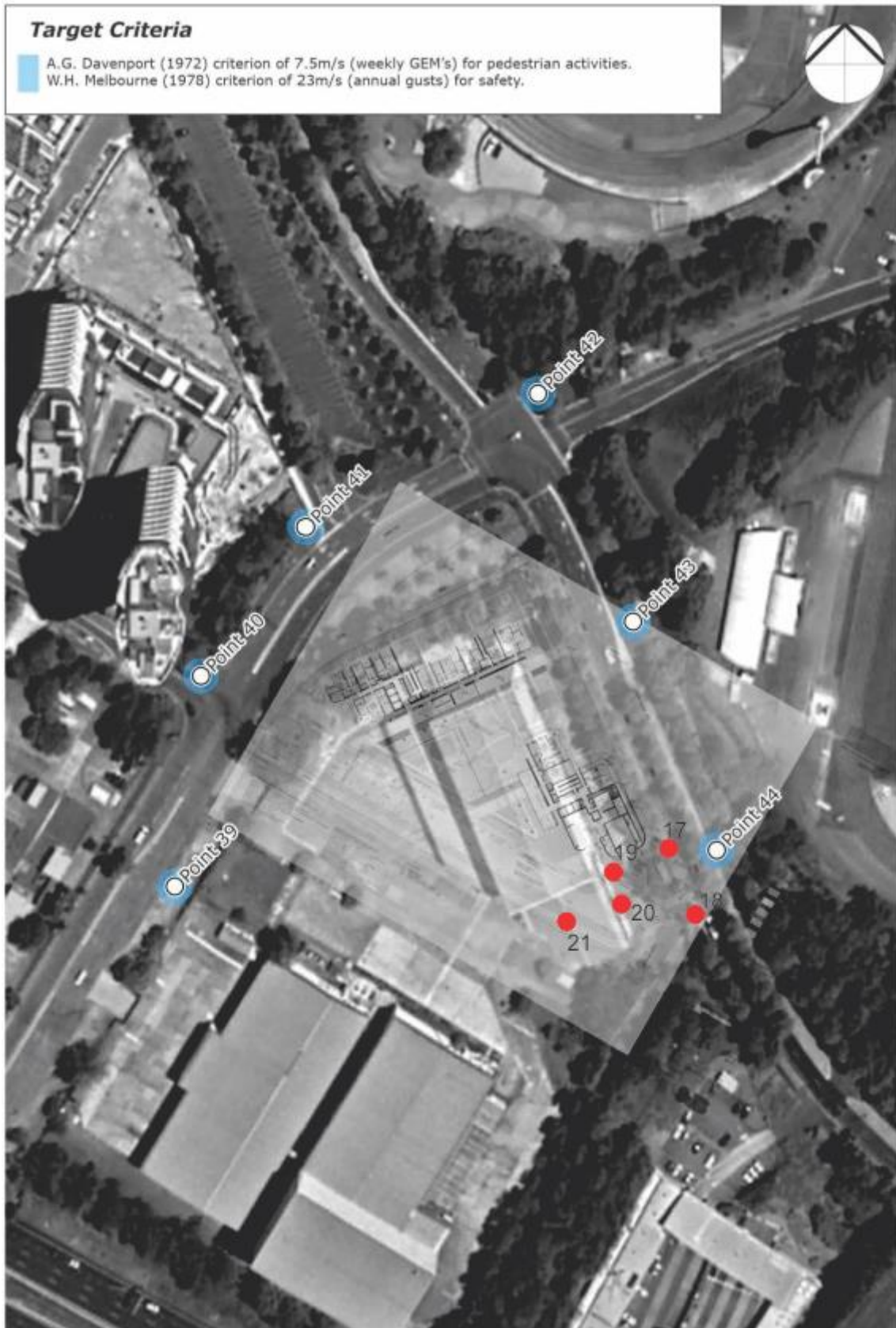


Figure 1: Test locations from Windtech Report Figure 6a located on Windtech Report Figure 6b