

ENVIRONMENTAL WIND SPEED MEASUREMENTS ON A WIND TUNNEL MODEL OF THE 2-4 BURLEIGH STREET AND 20- 24 RAILWAY PARADE DEVELOPMENT, BURWOOD

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SUMMARY

A wind tunnel study has been conducted on a 1/400 scale model of the proposed 2-4 Burleigh Street and 20-24 Railway Parade development in Burwood. The model of the Development within surrounding buildings was tested in a simulated upstream boundary layer of the natural wind to determine likely environmental wind conditions. These wind conditions have been related to the freestream mean wind speed at a reference height of 300m, which is used to calculate the gust windspeed and the mean windspeed.

At the Ground Level, the wind conditions for the Proposed Configuration at all Test Locations in the streetscapes surrounding the proposed development, have been shown to satisfy the walking in retail areas comfort criterion at a minimum, with most locations satisfying the standing comfort criteria. The wind conditions for the Proposed Configuration at the entrances into the development have been shown to satisfy the recommended standing comfort criterion.

At level 1, the Proposed Configuration at the outdoor terraces have been shown to satisfy the sitting comfort criterion at a minimum.

At level 2, the Proposed Configuration at the outdoor terraces have been shown to satisfy the standing comfort criterion at a minimum.

At level 36, the Proposed Configuration at the outdoor seating area have been shown to satisfy the standing comfort criterion.

At level 37, the Proposed Configuration at the outdoor terraces have been shown to satisfy the standing comfort criterion at a minimum, and the outdoor seating area was shown to satisfy the sitting comfort criterion.

At level 38, the Proposed Configuration at the outdoor terraces have been shown to satisfy the standing comfort criterion at a minimum.

The wind conditions for the Proposed Configuration satisfy the safety criterion at all Test Locations on the Ground Level; at terraces on the podium; at terraces and vented sections of the tower; and on the rooftop terrace.



Report 24010-WT-ENV01

**2-4 BURLEIGH STREET AND 20-24 RAILWAY PARADE - BURWOOD
ENVIRONMENTAL WIND TUNNEL MODELLING**

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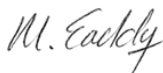
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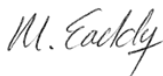
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1. INTRODUCTION

The proposed 2-4 Burleigh Street and 20-24 Railway Parade development will consist of a 39 level high-rise building (~146.9m high). The site is bounded by Railway Parade and Burleigh Street on the north and west respectively. Adjacent to the south and east there are single-storey suburban buildings. However, the surrounding terrain is a mix of suburban housing (especially between the northeast and southwest), and high-rise buildings, as shown in Figure 1.



Figure 1 – The proposed development site of the 2-4 Burleigh Street and 20-24 Railway Parade Development, Burwood

A wind tunnel model study was commissioned by Builtcom to investigate the environmental wind effects of the proposed building and, if necessary, to develop wind amelioration features to achieve conditions satisfying the recommended environmental wind criteria. This study was undertaken in the MEL Consultants 400kW Boundary Layer Wind Tunnel during June 2024.

2. ENVIRONMENTAL WIND CRITERIA

To assess whether the predicted wind conditions are likely to be acceptable or not, wind safety and comfort criteria is required. The Burwood Development Control Plan (BDCP) does not provide criteria for pedestrian comfort and safety wind conditions. Therefore, the Parramatta Development Control Plan (DCP) 2023, Section 5.4.7 (Wind Mitigation) will be used. The criteria are defined in Section C.09 are as follows:

Unsafe wind conditions mean a 3 second moving average gust wind speed of 23m/s is exceeded for less than 0.1% of time.

Comfortable wind conditions in and around new buildings, the wind speeds listed below are to be exceeded for less than 5% of the time for both hourly mean and gust equivalent mean wind speeds:

- < 2 ms⁻¹ – Outdoor Restaurant Dining
- < 4 ms⁻¹ – Sitting (such as cafe style dining), or scheduled outdoor events
- < 6 ms⁻¹ – Standing, generally supports outdoor planting
- < 8 ms⁻¹ – Walking in retail areas / active street frontages
- <10 ms⁻¹ – Walking / non-active street frontages (objective walking from A to B or for cycling)

The wind climate data utilised for the analysis has been obtained from Bankstown Airport AWS for all hours from 1 January, 1989, to 1 July, 2019. This data has been corrected for the anemometer approach terrains. Furthermore, data after 1 July, 2019, is not used due to the anemometer position change and the construction of a large hangar close to the new anemometer position. It is not possible to correct for the effect of a large building wake on the anemometer data.

3. MODEL AND EXPERIMENTAL TECHNIQUES

A 1/400 scale model of 2-4 Burleigh Street and 20-24 Railway Parade Development was constructed from digital information provided by NSW Housing Corporation Pty Ltd received on the 22nd May 2024. A model of the 2-4 Burleigh Street and 20-24 Railway Parade Development was inserted into a proximity model of surrounding buildings out to a minimum radius of 350m. No existing or proposed street trees were included within the model (i.e. not used for wind mitigation).

A combination of hot-wire anemometers and Irwin probes were used to measure the local wind speeds at various locations within a radius of the development and on elevated terraces of the development. The minimum radius examined was half the building height from the site boundaries.

The signals from the hot-wires and Irwin probes were recorded by a data acquisition system for 30 seconds for each of the 16 wind directions. This sampling time is equal to a 1 hour in full scale. The data was filtered using a 3 second running average and the mean and gust wind speeds obtained from the filtered data. Therefore, the gust wind speeds presented in this report are 3 second peak gust wind speeds.

For a pedestrian comfort environmental wind study, the Terrain Category approach relative to the top of the proposed building was evaluated using the analysis methodology for a developing boundary layer by Deaves (1981) and was determined to be a mixture of Terrain Category 3 and Terrain Category 2, the characteristics of which are given in Figure 2. The following velocity coefficients were measured in the wind tunnel with a hot-wire anemometer and Irwin probe.

$$mean \bar{V}_R = \frac{\bar{V}_{local}}{\bar{V}_{300m}}$$

$$gust \hat{V}_R = \frac{\hat{V}_{local}}{\hat{V}_{300m}}$$

where:

V_{local} is the velocity measured from the hot-wire anemometer at the test location

V_{300m} is the velocity measured at the free-stream reference height of 300m

These measured velocity coefficients were combined with a statistical model of the local wind climate that relates wind speed to a probability of exceedance. The model of the wind climate also includes the directional variation of wind speed (frequency).

The measured wind speeds are assessed against the pedestrian safety and the pedestrian comfort criteria. The pedestrian safety criterion is applied to the annual hourly maximum wind gusts for each wind direction. The pedestrian comfort criteria are based on all wind directions combined (i.e. summation of exceedances across 360 degrees of wind direction) and the pedestrian comfort criterion utilises the maximum of either the hourly mean wind speed, or the gust equivalent mean wind speed (GEM) as follows

$$\text{Mean wind speed for comfort criterion} = \max \left(\bar{V}, \frac{\hat{V}}{1.85} \right)$$

where:

$\bar{V}$ is the mean wind speed

$\hat{V}$ is the 3-second gust wind speed

Photographs of the model as tested in the wind tunnel are shown in Figures 3 and 4. The Test Locations in the surrounding streetscapes of the proposed Development are shown in Figure 5a.

4 DISCUSSION OF RESULTS

Velocity measurements were made at various locations around the proposed 2-4 Burleigh Street and 20-24 Railway Parade Development for different wind directions at 22.5° intervals.

The following sections detail the results for the various areas tested.

4.1 Summaries of Discussion

To assist with the assessment of the wind conditions, summaries of the pedestrian wind comfort and safety conditions achieved at various locations for the Proposed and Existing Configurations, based on the pedestrian wind criteria defined in the Parramatta Development Control Plan (DCP) 2023, have been presented using a colour code system in the following figures:

Ground Level	- Existing Configuration	Figure 6
Ground Level	- Proposed Configuration	Figure 7a
Level 1 Terraces	- Proposed Configuration	Figure 7b
Level 2 Terraces	- Proposed Configuration	Figure 7c
Level 36 Terraces	- Proposed Configuration	Figure 7d
Level 37 Terraces	- Proposed Configuration	Figure 7e
Level 38 Terraces	- Proposed Configuration	Figure 7f

The mean/GEM and gust criteria data as a function of wind direction is presented in Appendix A for each test location.

4.2 Burleigh Street

The wind conditions along Burleigh Street, to the west of the development (Test Locations 1 to 13) for the Proposed Configuration have been shown to satisfy the walking in retail areas comfort criterion at a minimum and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 1a and 1b.

The wind conditions for the Existing Configuration have been presented for comparison in Tables 1a and 1b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 1a: Pedestrian Wind Comfort– Burleigh Street

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations				
	Target Criteria (ms ⁻¹)	Proposed	Result	Existing	Result
1	<8 (Walking in retail)	5.1	Pass	4.6	Pass
2	<8 (Walking in retail)	5.8	Pass	4.7	Pass
3	<8 (Walking in retail)	5.4	Pass	3.8	Pass
4	<8 (Walking in retail)	5.0	Pass	4.1	Pass
5	<8 (Walking in retail)	4.9	Pass	4.9	Pass
6	<8 (Walking in retail)	5.3	Pass	5.0	Pass
7	<8 (Walking in retail)	5.3	Pass	4.4	Pass
8	<8 (Walking in retail)	6.2	Pass	5.3	Pass
9	<8 (Walking in retail)	5.9	Pass	5.6	Pass
10	<8 (Walking in retail)	5.5	Pass	5.3	Pass
11	<8 (Walking in retail)	4.8	Pass	5.0	Pass
12	<8 (Walking in retail)	4.9	Pass	4.4	Pass
13	<8 (Walking in retail)	4.9	Pass	4.4	Pass

Table 1b: Pedestrian Wind Safety – Burleigh Street

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations				
	Target gust wind speed (ms ⁻¹)	Proposed	Result	Existing	Result
1	<23	12.4	Pass	12.4	Pass
2	<23	13.9	Pass	12.8	Pass
3	<23	13.4	Pass	9.9	Pass
4	<23	13.0	Pass	12.1	Pass
5	<23	14.6	Pass	12.4	Pass
6	<23	13.7	Pass	13.8	Pass
7	<23	14.7	Pass	11.3	Pass
8	<23	16.9	Pass	14.1	Pass
9	<23	16.6	Pass	13.8	Pass
10	<23	14.1	Pass	13.9	Pass
11	<23	13.4	Pass	13.8	Pass
12	<23	13.2	Pass	12.0	Pass
13	<23	13.5	Pass	11.8	Pass

4.3 Railway Parade

The wind conditions along Railway Parade, to the north of the development (Test Locations 14 to 24) for the Proposed Configuration have been shown to satisfy the walking in retail areas comfort criterion at a minimum and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 2a and 2b.

The wind conditions for the Existing Configuration have been presented for comparison in Tables 2a and 2b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 2a: Pedestrian Wind Comfort – Railway Parade

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations				
	Target Criteria (ms ⁻¹)	Proposed	Result	Existing	Result
14	<6 (Standing)	3.8	Pass	4.0	Pass
15	<8 (Walking in retail)	4.7	Pass	4.5	Pass
16	<8 (Walking in retail)	5.0	Pass	4.5	Pass
17	<8 (Walking in retail)	5.2	Pass	4.2	Pass
18	<8 (Walking in retail)	6.2	Pass	5.0	Pass
19	<8 (Walking in retail)	5.9	Pass	5.4	Pass
20	<8 (Walking in retail)	5.2	Pass	5.3	Pass
21	<8 (Walking in retail)	5.0	Pass	5.0	Pass
22	<8 (Walking in retail)	5.6	Pass	5.8	Pass
23	<8 (Walking in retail)	5.1	Pass	5.5	Pass
24	<8 (Walking in retail)	4.5	Pass	4.9	Pass

Table 2b: Pedestrian Wind Safety – Railway Parade

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations				
	Target gust wind speed (ms ⁻¹)	Proposed	Result	Existing	Result
14	<23	10.2	Pass	10.7	Pass
15	<23	13.8	Pass	11.9	Pass
16	<23	14.5	Pass	12.1	Pass
17	<23	13.8	Pass	10.9	Pass
18	<23	16.1	Pass	13.9	Pass
19	<23	14.8	Pass	14.8	Pass
20	<23	16.0	Pass	12.6	Pass
21	<23	14.5	Pass	14.0	Pass
22	<23	15.4	Pass	15.8	Pass
23	<23	13.6	Pass	18.6	Pass
24	<23	12.6	Pass	13.5	Pass

4.4 Deane Street and Burwood Railway Station

The wind conditions along Deane Street and in the Burwood Railway Station, to the north of the development, (Test Locations 15 to 36) for the Proposed Configuration have been shown to satisfy the standing comfort criterion at a minimum and satisfy the safety criterion. Except for Test locations 25 and 32 which pass walking in retail areas comfort criterion. The criteria satisfied at these Test Locations have been presented in Tables 3a and 3b.

The wind conditions for the Existing Configuration have been presented for comparison in Tables 3a and 3b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 3a: Pedestrian Wind Comfort – Deane Street and Burwood Railway Station

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations				
	Target Criteria (ms ⁻¹)	Proposed	Result	Existing	Result
25	<8 (Walking in retail)	6.7	Pass	6.6	Pass
26	<6 (Standing)	5.6	Pass	5.5	Pass
27	<6 (Standing)	5.2	Pass	5.1	Pass
28	<6 (Standing)	5.1	Pass	5.1	Pass
29	<6 (Standing)	5.3	Pass	5.1	Pass
30	<6 (Standing)	5.6	Pass	5.6	Pass
31	<6 (Standing)	4.2	Pass	3.9	Pass
32	<6 (Standing)	6.0	Fail	5.9	Pass
33	<6 (Standing)	5.7	Pass	5.9	Pass
34	<6 (Standing)	5.1	Pass	4.5	Pass
35	<6 (Standing)	5.9	Pass	6.1	Fail
36	<6 (Standing)	5.9	Pass	6.2	Fail

Table 3b: Pedestrian Wind Safety – Deane Street and Burwood Railway Station

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations				
	Target gust wind speed (ms ⁻¹)	Proposed	Result	Existing	Result
25	<23	19.5	Pass	15.9	Pass
26	<23	15.4	Pass	13.4	Pass
27	<23	14.5	Pass	12.7	Pass
28	<23	14.0	Pass	13.3	Pass
29	<23	15.4	Pass	12.9	Pass
30	<23	14.9	Pass	13.0	Pass
31	<23	10.9	Pass	10.5	Pass
32	<23	14.2	Pass	13.8	Pass
33	<23	15.3	Pass	14.5	Pass
34	<23	13.0	Pass	11.2	Pass
35	<23	16.4	Pass	14.4	Pass
36	<23	15.2	Pass	17.3	Pass

4.5 26 Railway Parade Premises

The wind conditions on the premises of 26 Railway Parade, to the west of the development, (Test Locations 37 to 39) for the Proposed Configuration have been shown to satisfy the standing comfort criterion and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 4a and 4b.

The wind conditions for the Existing Configuration have been presented for comparison in Tables 4a and 4b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 4a: Pedestrian Wind Comfort – 26 Railway Parade Premises

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations				
	Target Criteria (ms ⁻¹)	Proposed	Result	Existing	Result
37	<6 (Standing)	4.1	Pass	4.2	Pass
38	<6 (Standing)	4.6	Pass	4.4	Pass
39	<6 (Standing)	4.3	Pass	3.2	Pass

Table 4b: Pedestrian Wind Safety – 26 Railway Parade Premises

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations				
	Target gust wind speed (ms ⁻¹)	Proposed	Result	Existing	Result
37	<23	10.4	Pass	10.8	Pass
38	<23	13.5	Pass	11.9	Pass
39	<23	12.4	Pass	8.7	Pass

4.6 Ford Lane and Elizabeth Street

The wind conditions along Ford Lane and Elizabeth Street, to the west, and the south of the development, (Test Locations 40 to 44) for the Proposed Configuration have been shown to satisfy the standing comfort criterion and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 5a and 5b.

The wind conditions for the Existing Configuration have been presented for comparison in Tables 5a and 5b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 5a: Pedestrian Wind Comfort– Ford Lane and Elizabeth Street

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations				
	Target Criteria (ms ⁻¹)	Proposed	Result	Existing	Result
40	<8 (Walking in retail)	4.5	Pass	4.0	Pass
41	<8 (Walking in retail)	4.1	Pass	4.1	Pass
42	<8 (Walking in retail)	4.4	Pass	4.4	Pass
43	<8 (Walking in retail)	4.5	Pass	4.7	Pass
44	<8 (Walking in retail)	4.9	Pass	5.1	Pass

Table 5b: Pedestrian Wind Safety – Ford Lane and Elizabeth Street

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations				
	Target gust wind speed (ms ⁻¹)	Proposed	Result	Existing	Result
40	<23	12.8	Pass	10.6	Pass
41	<23	11.9	Pass	10.1	Pass
42	<23	12.5	Pass	12.7	Pass
43	<23	11.6	Pass	12.2	Pass
44	<23	12.2	Pass	14.9	Pass

4.7 Carpark to Southeast of Premises and Within Premises

The wind conditions in the carpark (southeast of development) and within the development, (Test Locations 45 to 51) for the Proposed Configuration have been shown to satisfy the standing comfort criterion and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 6a and 6b. The entrances to the building (Test Locations 48 to 51) have been shown to satisfy the required standing comfort criterion.

The wind conditions for the Existing Configuration have been presented for comparison in Tables 6a and 6b where applicable.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 6a: Pedestrian Wind Comfort – Carpark and within Premises

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations				
	Target Criteria (ms ⁻¹)	Proposed	Result	Existing	Result
45	<8 (Walking in retail)	4.6	Pass	4.7	Pass
46	<8 (Walking in retail)	4.9	Pass	4.9	Pass
47	<8 (Walking in retail)	4.1	Pass	4.8	Pass
48	<6 (Standing)	5.2	Pass		
49	<6 (Standing)	5.6	Pass		
50	<6 (Standing)	4.1	Pass		
51	<6 (Standing)	4.6	Pass		

Table 6b: Pedestrian Wind Safety – Carpark and within Premises

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations				
	Target gust wind speed (ms ⁻¹)	Proposed	Result	Existing	Result
45	<23	14.6	Pass	12.3	Pass
46	<23	13.7	Pass	14.2	Pass
47	<23	10.6	Pass	15.3	Pass
48	<23	18.9	Pass		Pass
49	<23	16.8	Pass		Pass
50	<23	11.3	Pass		Pass
51	<23	15.4	Pass		Pass

4.8 Level 1 Terraces

The wind conditions on the Level 1 terraces, (Test Locations T1 to T4) for the Proposed Configuration have been shown to satisfy the sitting comfort criterion and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 7a and 7b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 7a: Pedestrian Wind Comfort – Level 1 Terraces

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations		
	Target Criteria (ms ⁻¹)	Proposed	Result
T1	<6 (Standing)	3.2	Pass
T2	<6 (Standing)	1.6	Pass
T3	<6 (Standing)	2.7	Pass
T4	<6 (Standing)	3.0	Pass

Table 7b: Pedestrian Wind Safety – Level 1 Terraces

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations		
	Target gust wind speed (ms ⁻¹)	Proposed	Result
T1	<23	10.3	Pass
T2	<23	5.5	Pass
T3	<23	7.2	Pass
T4	<23	8.0	Pass

4.9 Level 2 Terraces

The wind conditions on the Level 2 terraces, (Test Locations T5 to T9) for the Proposed Configuration have been shown to satisfy the standing comfort criterion at a minimum and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 8a and 8b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 8a: Pedestrian Wind Comfort – Level 2 Terraces

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations		
	Target Criteria (ms ⁻¹)	Proposed	Result
T5	<6 (Standing)	5.1	Pass
T6	<6 (Standing)	4.1	Pass
T7	<6 (Standing)	2.7	Pass
T8	<6 (Standing)	4.7	Pass
T9	<6 (Standing)	5.7	Pass

Table 8b: Pedestrian Wind Safety – Level 2 Terraces

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations		
	Target gust wind speed (ms ⁻¹)	Proposed	Result
T5	<23	16.8	Pass
T6	<23	13.0	Pass
T7	<23	9.2	Pass
T8	<23	13.3	Pass
T9	<23	19.0	Pass

4.10 Level 36 Outdoor Seating

The wind conditions on the Level 36 Outdoor Seating area, (Test Locations T10 to T11) for the Proposed Configuration have been shown to satisfy the standing comfort criterion and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 9a and 9b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 9a: Pedestrian Wind Comfort – Level 36 Outdoor Seating

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations		
	Target Criteria (ms ⁻¹)	Proposed	Result
T10	<6 (Standing)	5.0	Pass
T11	<6 (Standing)	5.8	Pass

Table 9b: Pedestrian Wind Safety – Level 36 Outdoor Seating

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations		
	Target gust wind speed (ms ⁻¹)	Proposed	Result
T10	<23	17.9	Pass
T11	<23	16.5	Pass

4.11 Level 37 Terrace and Outdoor Seating Area

The wind conditions on the Level 37 Terrace and Outdoor Seating Area, (Test Locations T12 to T14) for the Proposed Configuration have been shown to satisfy the sitting comfort criterion and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 10a and 10b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 10a: Pedestrian Wind Comfort – Level 37 Terrace and Outdoor Seating

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations		
	Target Criteria (ms ⁻¹)	Proposed	Result
T12	<6 (Standing)	3.5	Pass
T13	<6 (Standing)	3.5	Pass
T14	<6 (Standing)	4.2	Pass

Table 10b: Pedestrian Wind Safety – Level 37 Terrace and Outdoor Seating

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations		
	Target gust wind speed (ms ⁻¹)	Proposed	Result
T12	<23	14.3	Pass
T13	<23	11.9	Pass
T14	<23	13.3	Pass

4.12 Level 38 Terrace

The wind conditions on the Level 38 terrace, (Test Locations T15 to T18) for the Proposed Configuration have been shown to satisfy the standing comfort criterion at a minimum and satisfy the safety criterion. The criteria satisfied at these Test Locations have been presented in Tables 11a and 11b.

The wind conditions as a function of wind direction for mean windspeed and 3 second gust have been calculated and are presented on Appendix A. It is noted that at each test location the directional specific wind conditions may be higher than those of the tabulated results for all wind directions combined.

Table 11a: Pedestrian Wind Comfort – Level 38 Terrace

Test Locations	Mean or GEM Wind speeds achieved for the various test configurations		
	Target Criteria (ms ⁻¹)	Proposed	Result
T15	<6 (Standing)	3.6	Pass
T16	<6 (Standing)	3.0	Pass
T17	<6 (Standing)	4.9	Pass
T18	<6 (Standing)	4.1	Pass

Table 11b: Pedestrian Wind Safety – Level 38 Terrace

Test Locations	Annual hourly maximum peak 3 second gust wind speeds for the various test configurations		
	Target gust wind speed (ms ⁻¹)	Proposed	Result
T15	<23	10.0	Pass
T16	<23	16.0	Pass
T17	<23	16.6	Pass
T18	<23	13.5	Pass

4. CONCLUSIONS

A wind tunnel study has been conducted on a 1/400 scale model of the proposed 2-4 Burleigh Street and 20-24 Railway Parade development in Burwood. The model of the Development within surrounding buildings was tested in a simulated upstream boundary layer of the natural wind to determine likely environmental wind conditions. These wind conditions have been related to the freestream mean wind speed at a reference height of 300m, which is used to calculate the gust windspeed and the mean windspeed.

At the Ground Level, the wind conditions for the Proposed Configuration at all Test Locations in the streetscapes surrounding the proposed development, have been shown to satisfy the walking in retail areas comfort criterion at a minimum, with most locations satisfying the standing comfort criteria. The wind conditions for the Proposed Configuration at the entrances into the development have been shown to satisfy the recommended standing comfort criterion.

At level 1, the Proposed Configuration at the outdoor terraces have been shown to satisfy the sitting comfort criterion at a minimum.

At level 2, the Proposed Configuration at the outdoor terraces have been shown to satisfy the standing comfort criterion at a minimum.

At level 36, the Proposed Configuration at the outdoor seating area have been shown to satisfy the standing comfort criterion.

At level 37, the Proposed Configuration at the outdoor terraces have been shown to satisfy the standing comfort criterion at a minimum, and the outdoor seating area was shown to satisfy the sitting comfort criterion.

At level 38, the Proposed Configuration at the outdoor terraces have been shown to satisfy the standing comfort criterion at a minimum.

The wind conditions for the Proposed Configuration satisfy the safety criterion at all Test Locations on the Ground Level; at terraces on the podium; at terraces and vented sections of the tower; and on the rooftop terrace.

Authorised by:

M. Eaddy

M. Eaddy
December 2024



REFERENCES

1. W. H. Melbourne, Criteria for environmental wind conditions, Journal of Industrial Aerodynamics, Volume 3, 1978, pp. 241-249
2. W. H. Melbourne, Wind environment studies in Australia, Journal of Industrial Aerodynamics, Volume 3, 1978, pp. 201-214

FIGURES

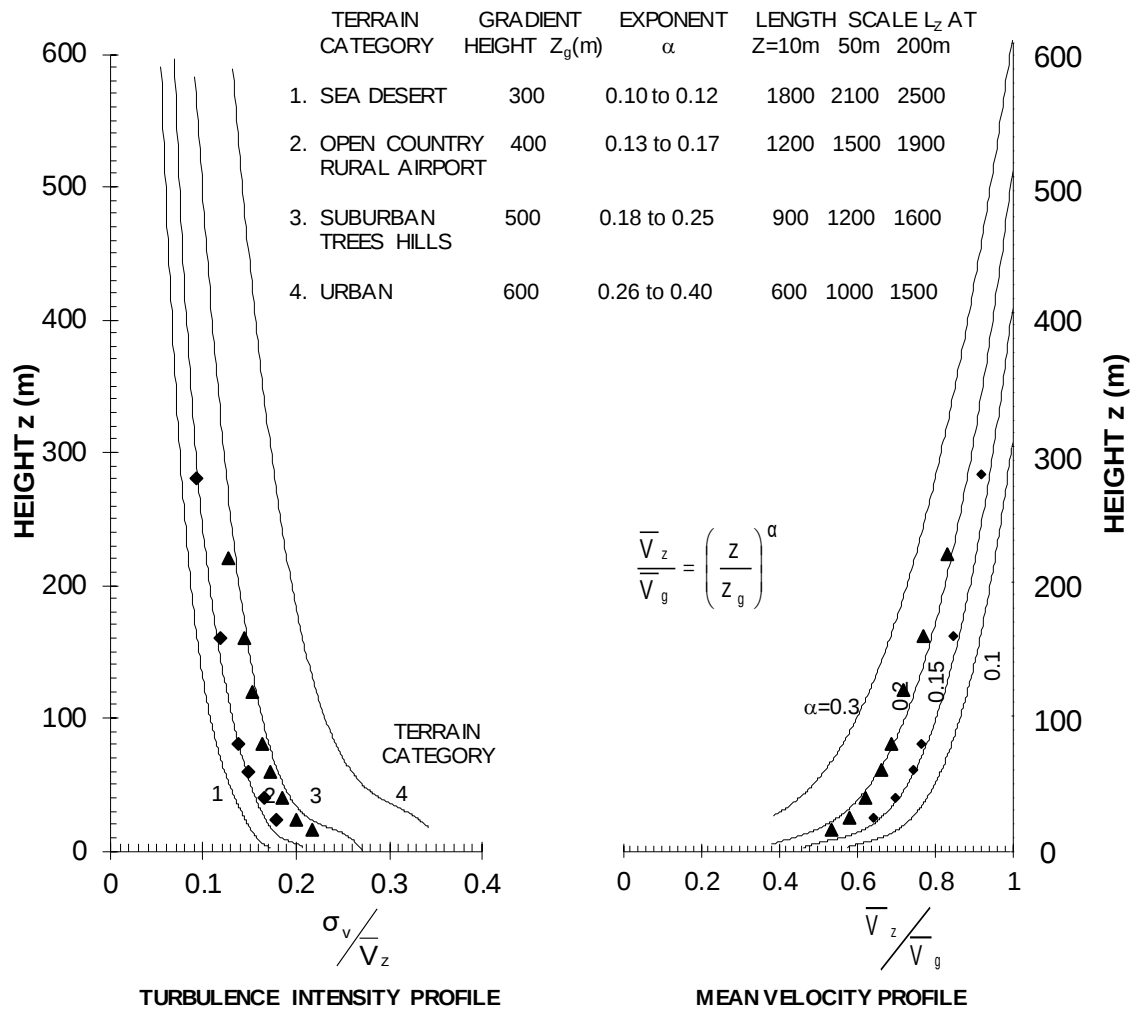


Figure 2 - 1/400 scale TC2 and TC3 boundary layer turbulence intensity and mean velocity profiles in the MEL Consultants Boundary Layer Wind Tunnel 4.8m x 2.2m working section, scaled to full scale dimensions.



Figure 3 – View from the Northwest of the 1/400 scale Proposed Configuration model of the 2-4 Burleigh Street and 20-24 Railway Parade Development in the wind tunnel.



Figure 4 – View from the South of the 1/400 scale Proposed Configuration model of the 2-4 Burleigh Street and 20-24 Railway Parade Development in the wind tunnel.

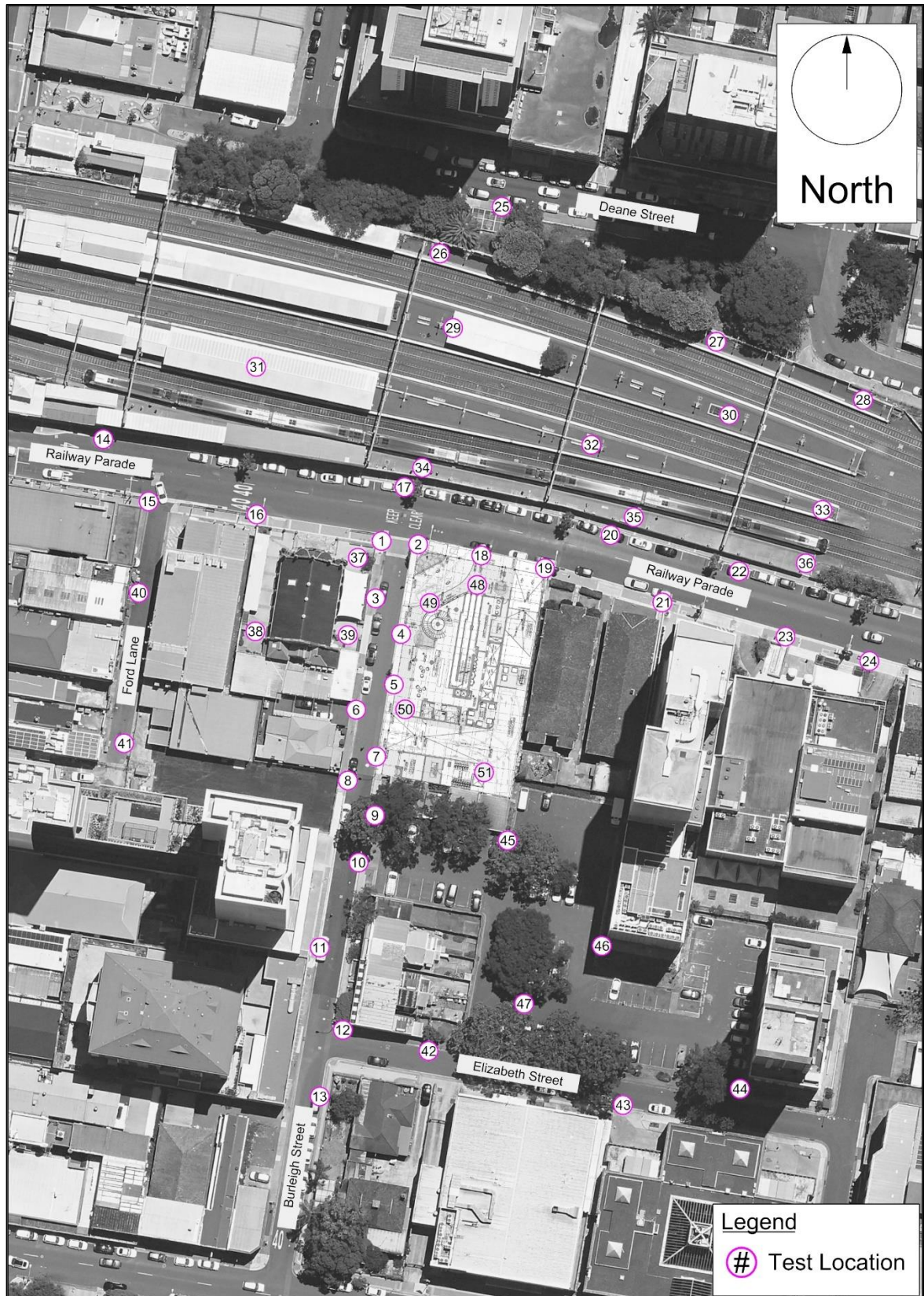
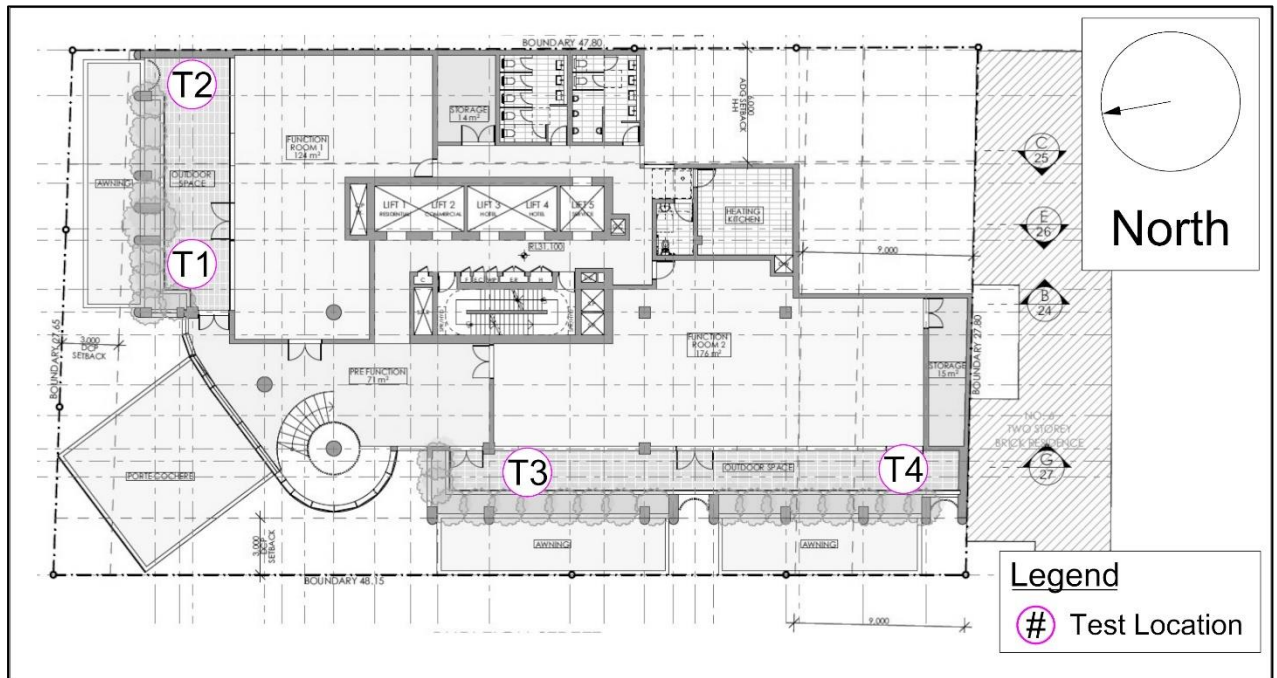


Figure 5a - Ground Level Test Locations in the surrounding streetscapes for the proposed 2-4 Burleigh Street and 20-24 Railway Parade Development.



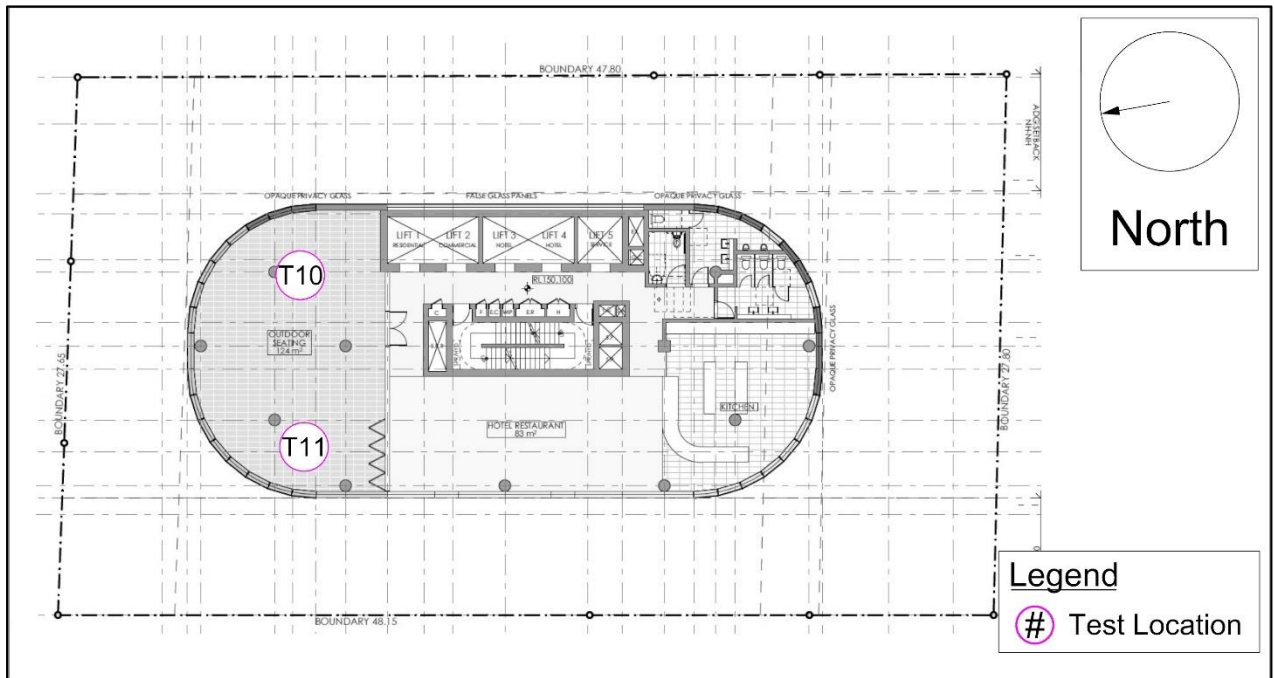


Figure 5d – Level 36 Test Locations for the proposed 2-4 Burleigh Street and 20-24 Railway Parade Development.

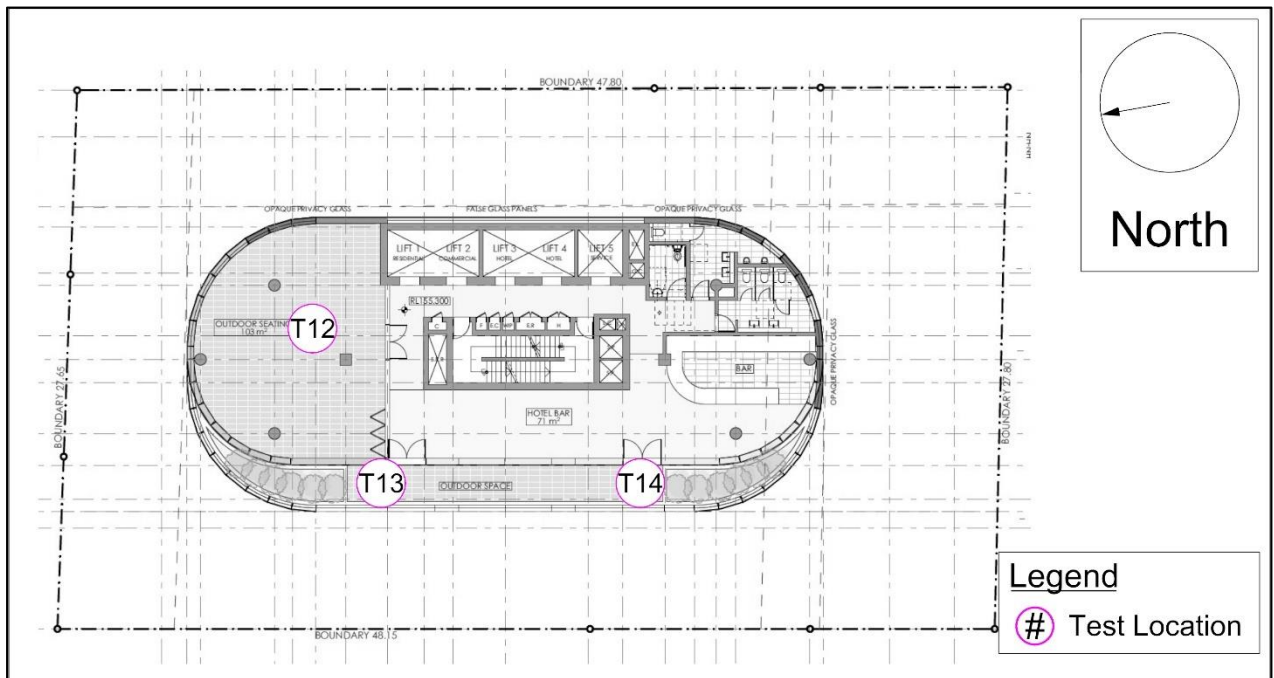


Figure 5e – Level 37 Test Locations for the proposed 2-4 Burleigh Street and 20-24 Railway Parade Development.

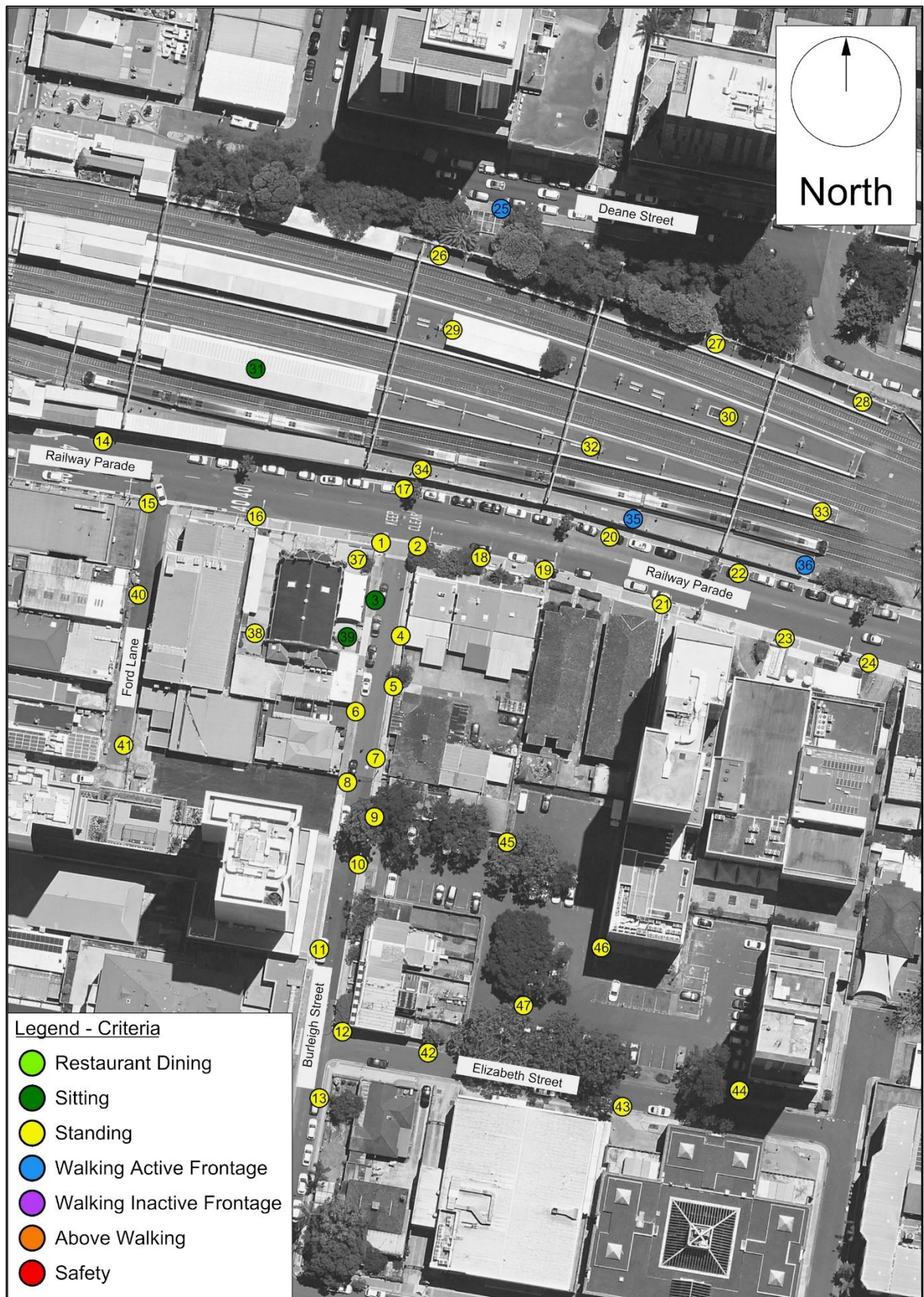


Figure 6 - Summary of Ground Level wind conditions for the Existing Configuration around the 2-4 Burleigh Street and 20-24 Railway Parade Development.

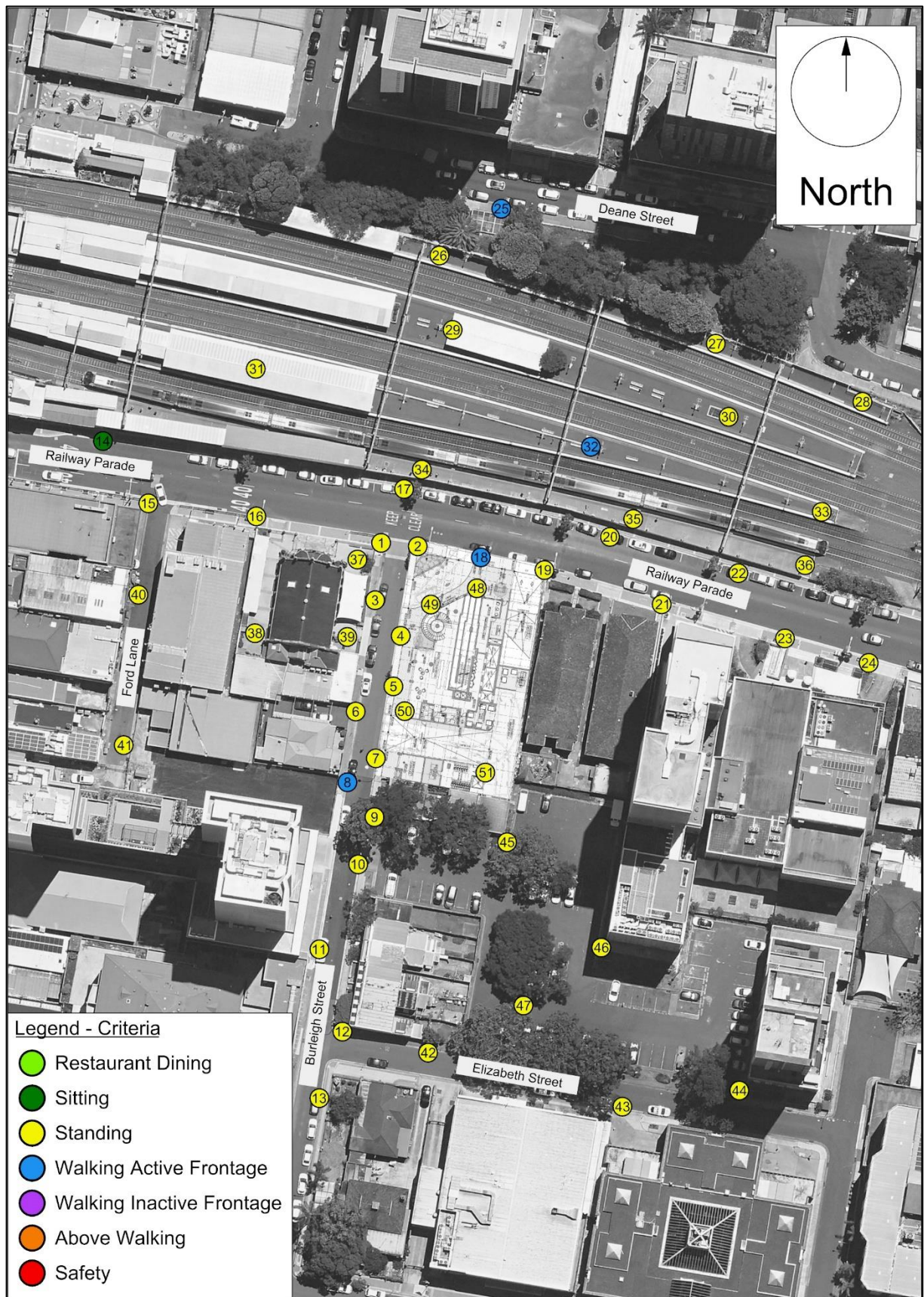


Figure 7a - Summary of Ground Level wind conditions for the Proposed Configuration around the 2-4 Burleigh Street and 20-24 Railway Parade Development.



Figure 7b - Summary of wind conditions at the Level 1 terraces for the Proposed Configuration.

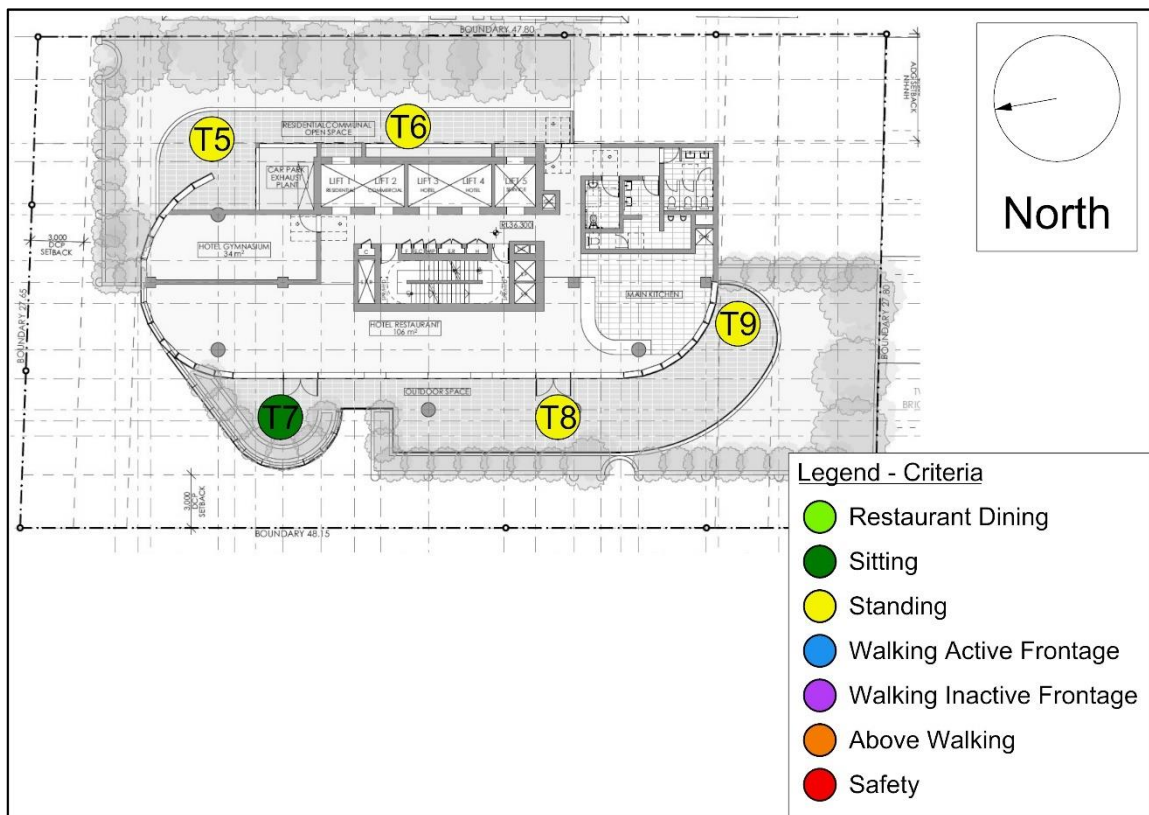


Figure 7c - Summary of wind conditions at the Level 2 terraces for the Proposed Configuration.

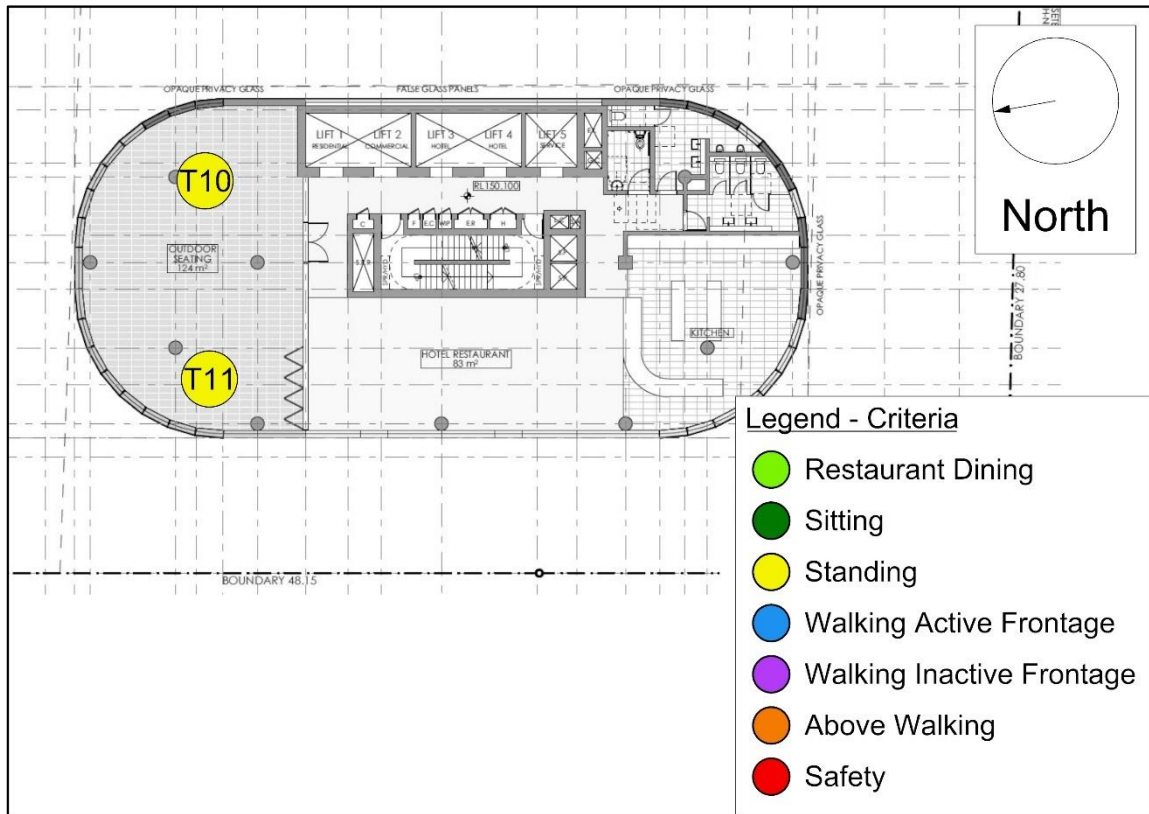


Figure 7d - Summary of wind conditions at the Level 36 terrace for the Proposed Configuration.

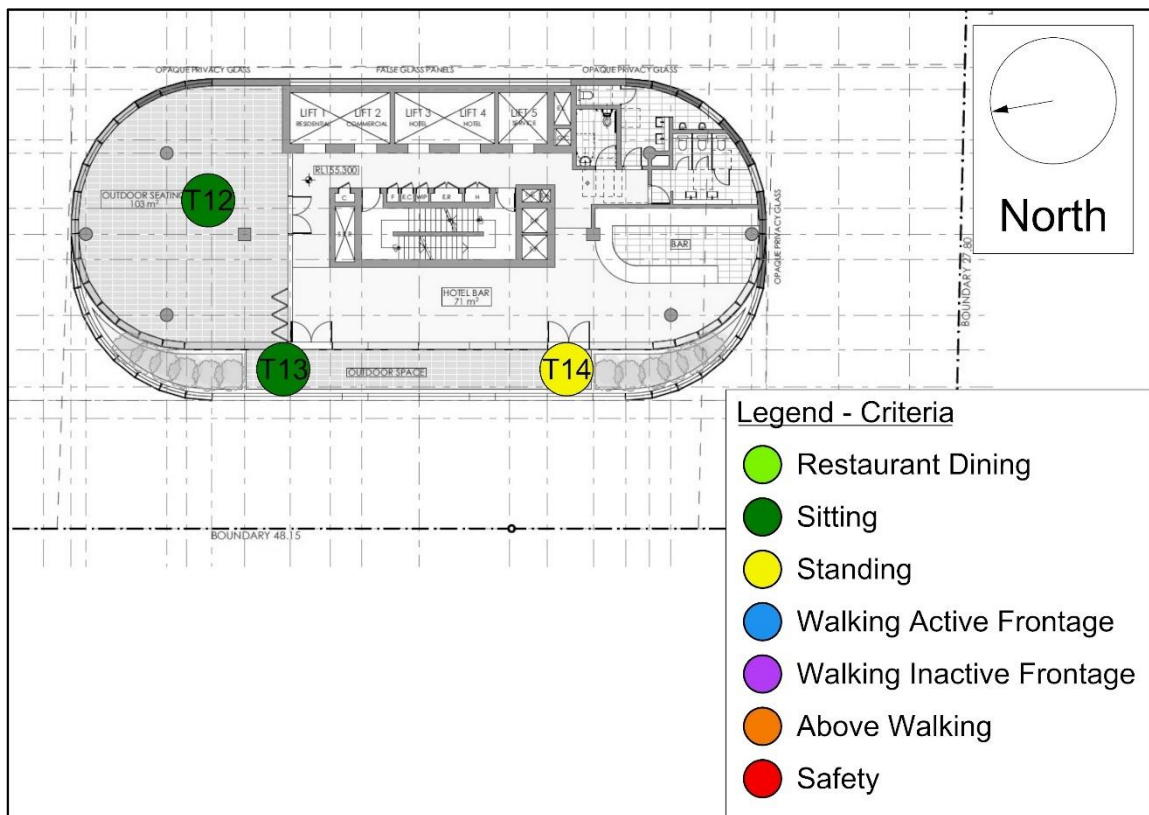


Figure 7e - Summary of wind conditions at the Level 37 terrace for the Proposed Configuration.

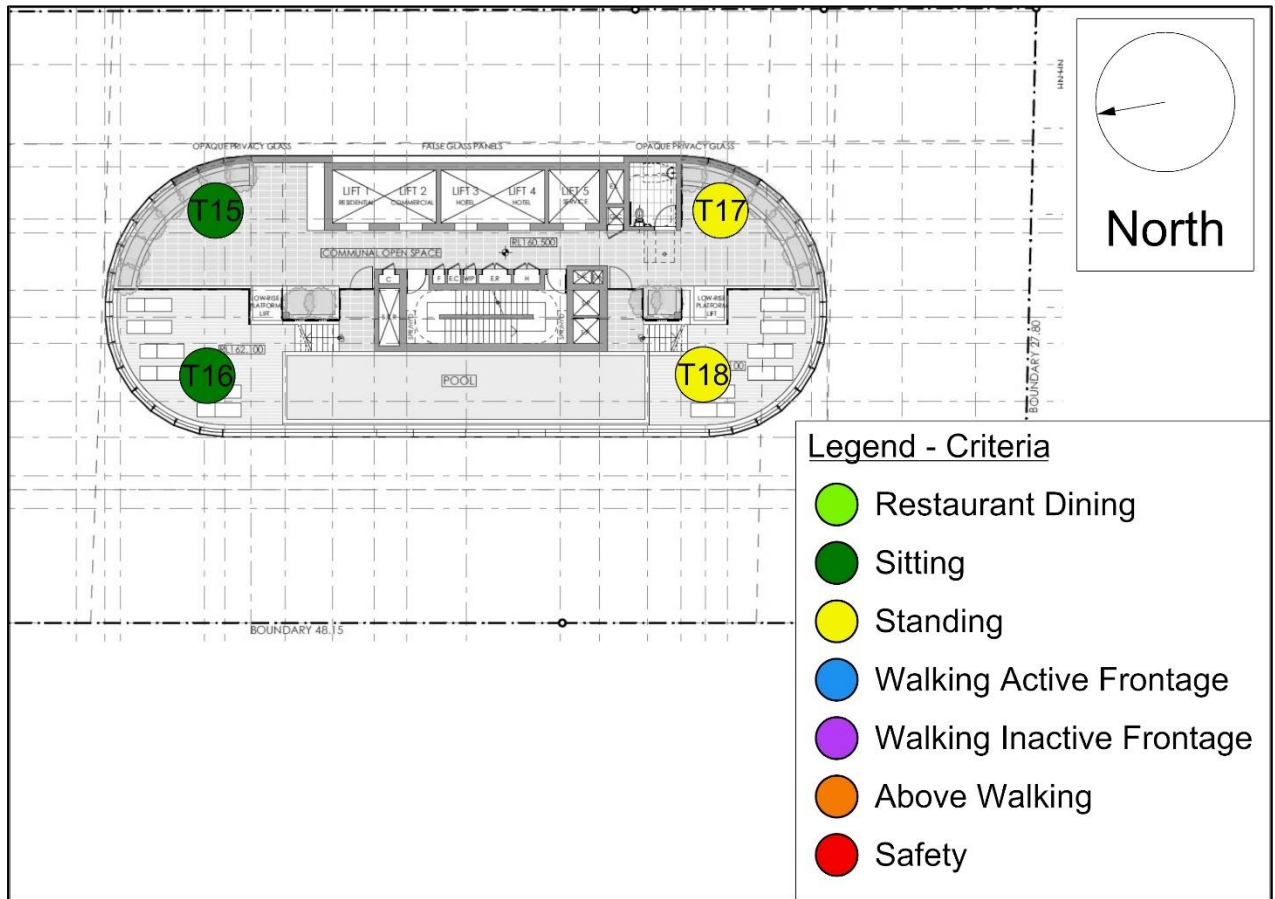
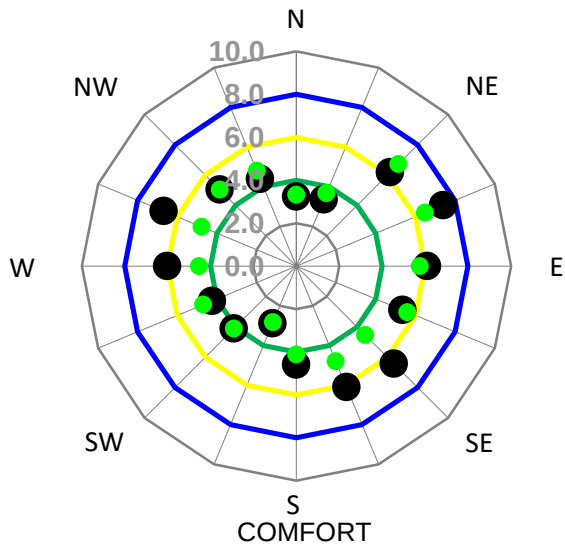


Figure 7f - Summary of wind conditions at the Level 38 terrace for the Proposed Configuration.

APPENDIX A – DIRECTIONAL MEAN/GEM AND GUST WIND SPEED PLOTS

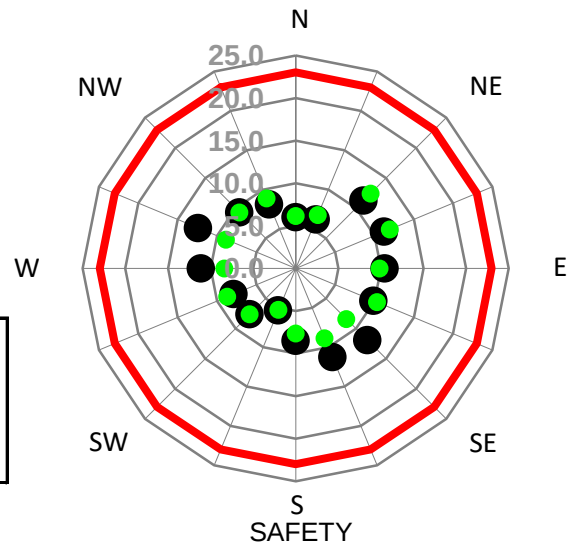
Test Location

1



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



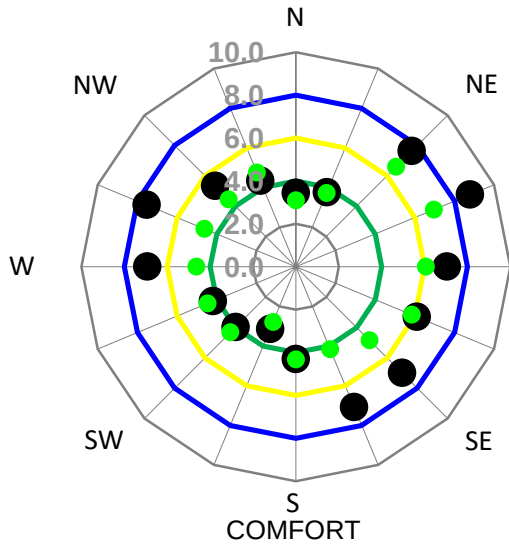
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	12.7%	1.9%	0.1%	5.1	Pass	12.4	Pass
● Existing Configuration	8.9%	1.0%	0.0%	4.6	Pass	12.4	Pass
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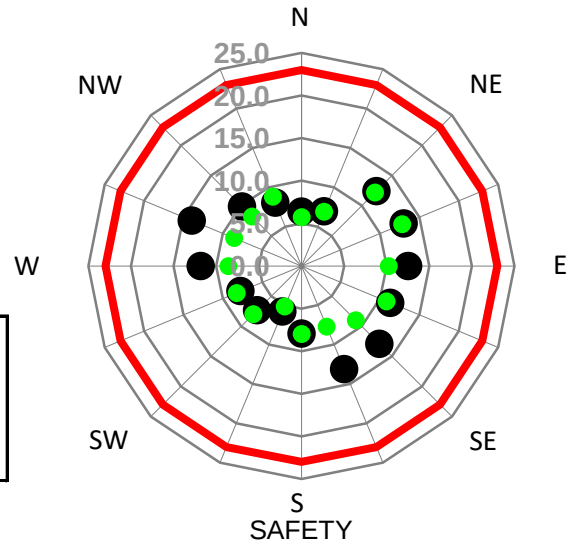
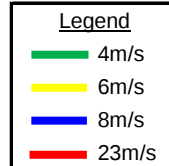
Test Location

2



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



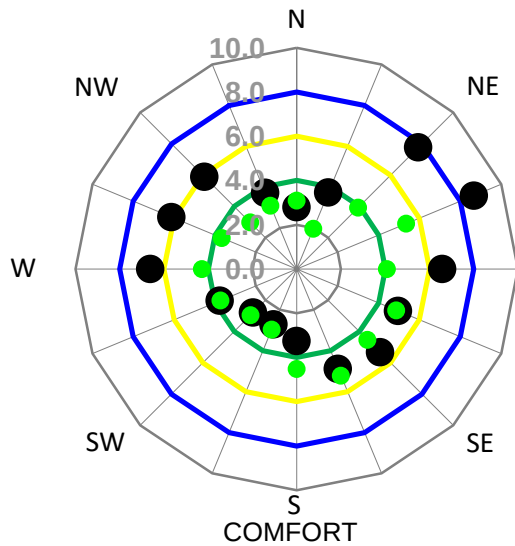
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	16.9%	4.2%	0.7%	5.8	Pass	13.9	Pass
● Existing Configuration	9.3%	1.3%	0.0%	4.7	Pass	12.8	Pass
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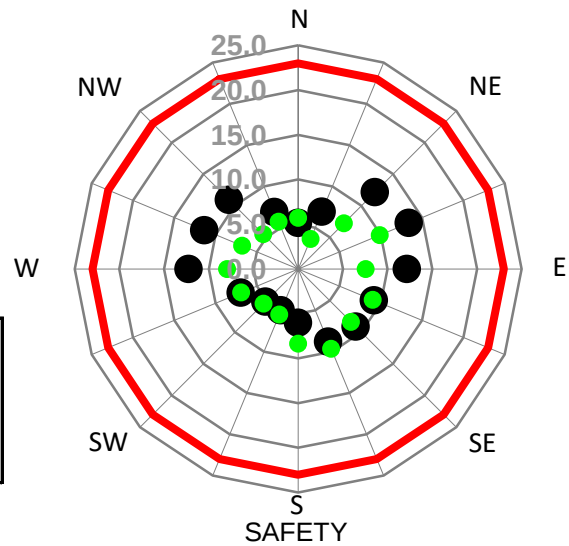
Test Location

3



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



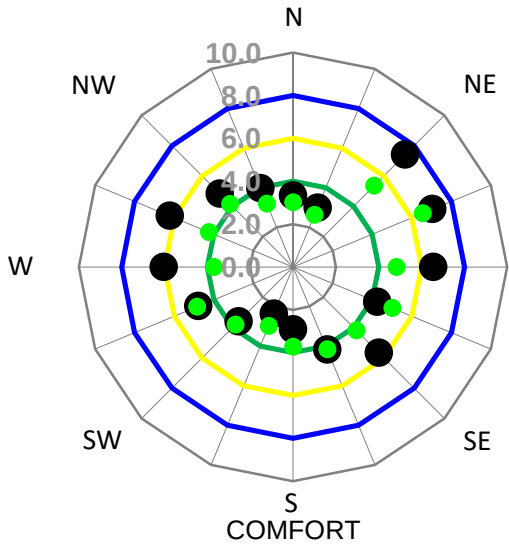
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	11.6%	2.8%	0.5%	5.4	Pass	13.4	Pass
● Existing Configuration	3.5%	0.1%	0.0%	3.8	Pass	9.9	Pass
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Test Location

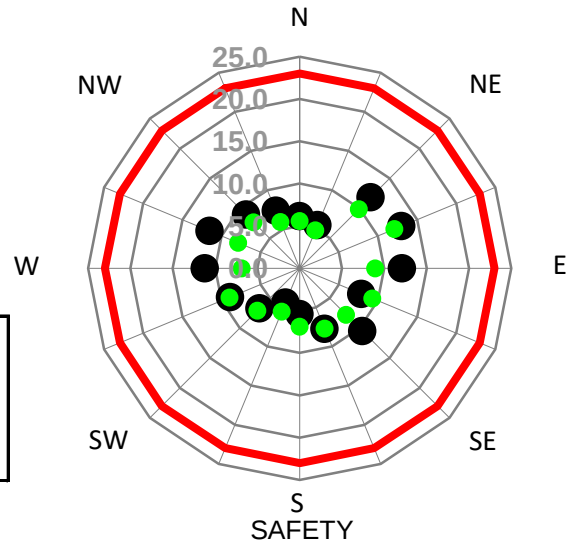
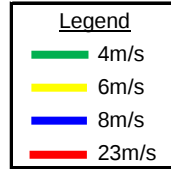
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Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s

E



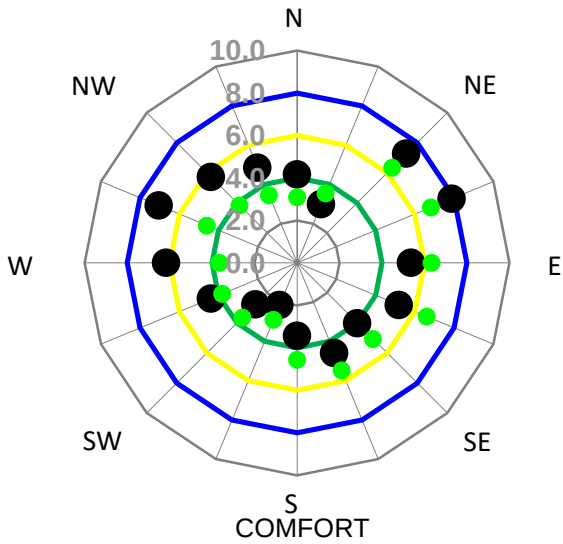
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	10.3%	1.9%	0.1%	5.0	Pass	13.0	Pass
● Existing Configuration	5.8%	0.5%	0.0%	4.1	Pass	12.1	Pass
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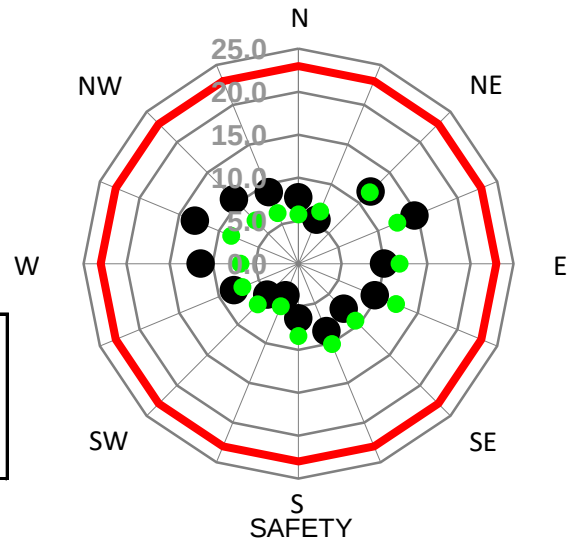
Test Location

5



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



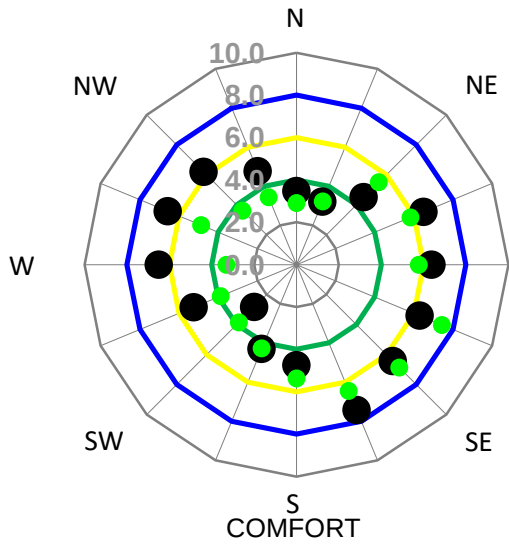
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	10.0%	2.1%	0.2%	4.9	Pass	14.6	Pass
● Existing Configuration	10.2%	1.5%	0.0%	4.9	Pass	12.4	Pass
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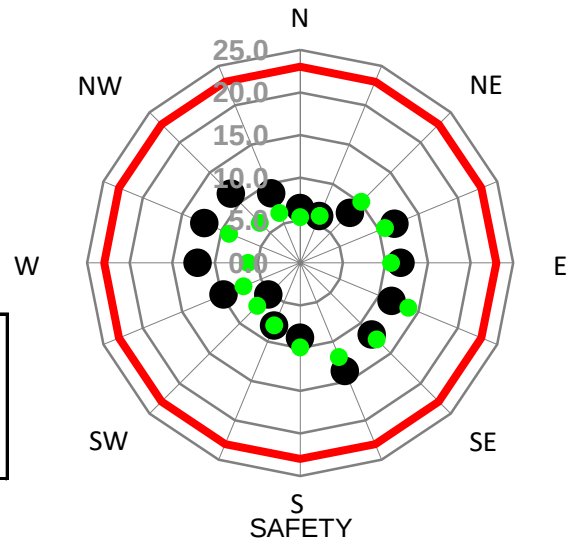
Test Location

6



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s

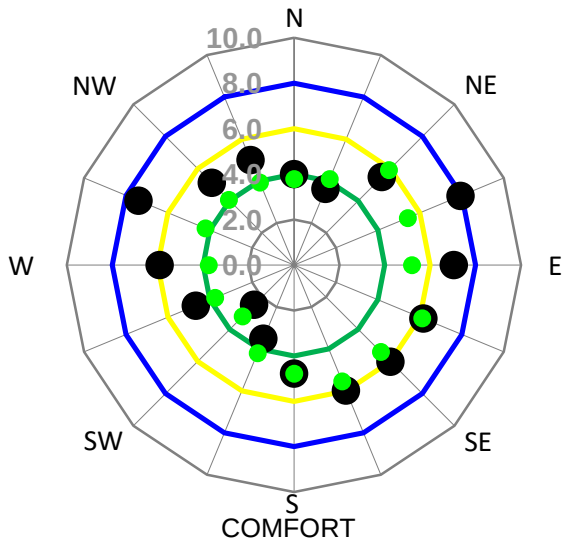


Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

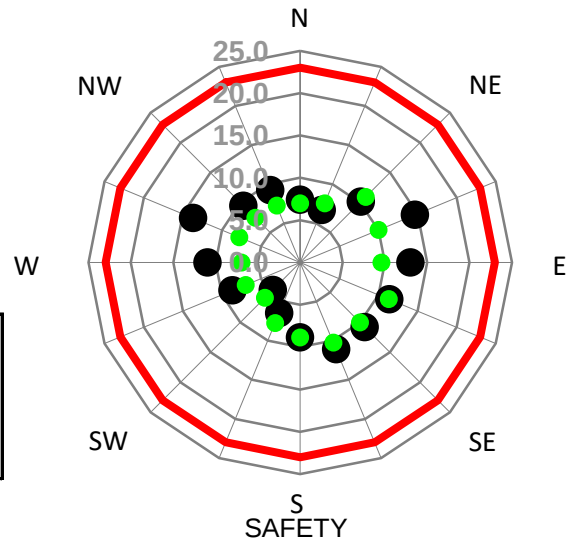
Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	14.5%	2.0%	0.1%	5.3	Pass	13.7	Pass
● Existing Configuration	11.8%	1.6%	0.1%	5.0	Pass	13.8	Pass
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Test Location



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



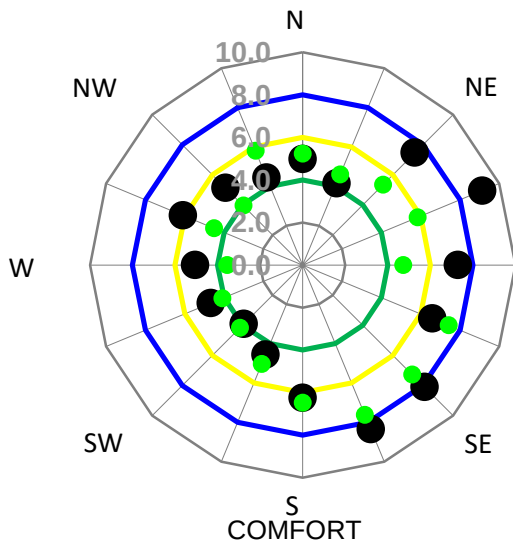
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	13.6%	2.7%	0.2%	5.3	Pass	14.7	Pass
● Existing Configuration	8.2%	0.4%	0.0%	4.4	Pass	11.3	Pass
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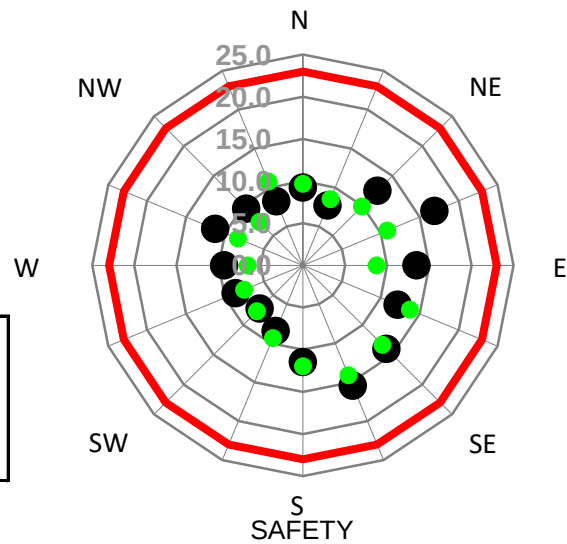
Test Location

8



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



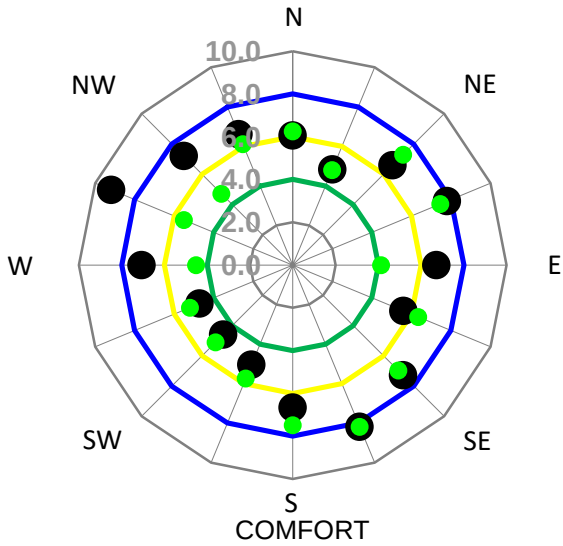
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	18.8%	5.8%	1.0%	6.2	Pass	16.9	Pass
● Existing Configuration	14.1%	2.3%	0.2%	5.3	Pass	14.1	Pass
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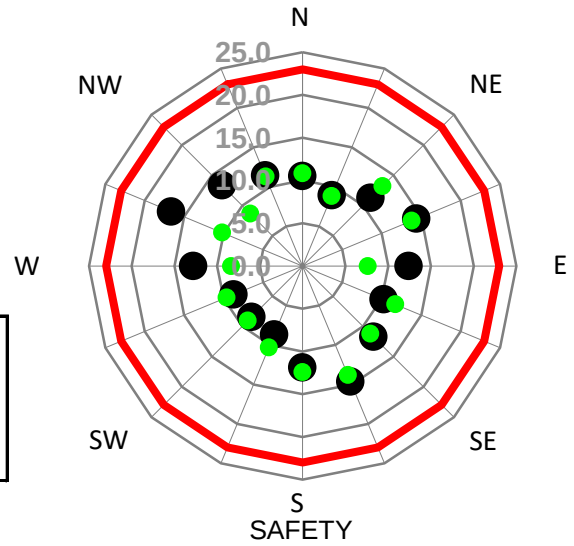
Test Location

9



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



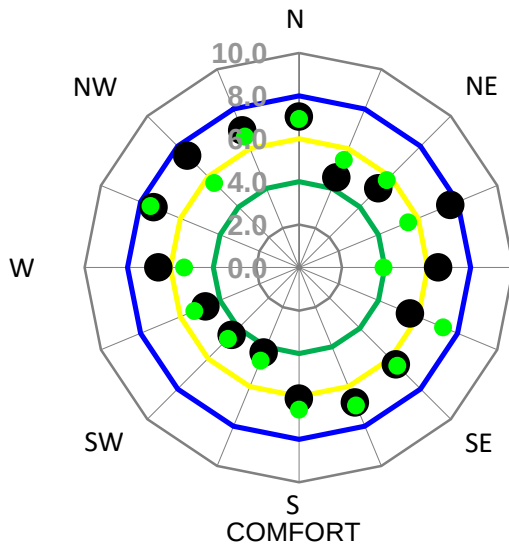
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	20.5%	4.8%	0.7%	5.9	Pass	16.6	Pass
● Existing Configuration	17.5%	3.6%	0.3%	5.6	Pass	13.8	Pass
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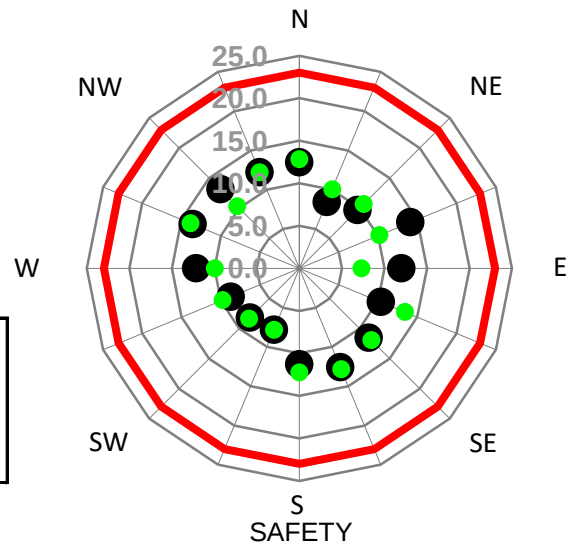
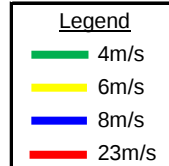
Test Location

10



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



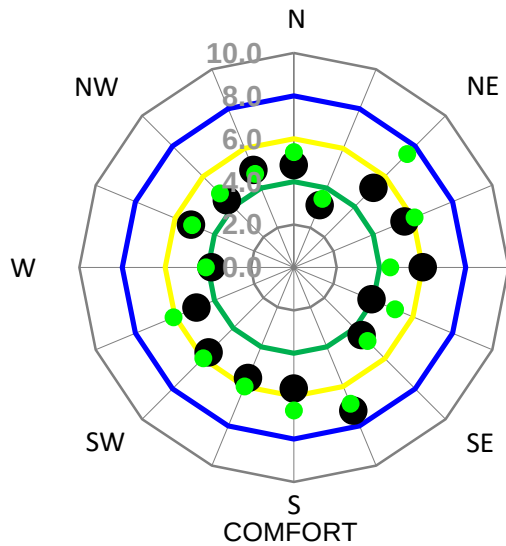
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	17.1%	3.1%	0.3%	5.5	Pass	14.1	Pass
● Existing Configuration	15.4%	2.4%	0.2%	5.3	Pass	13.9	Pass
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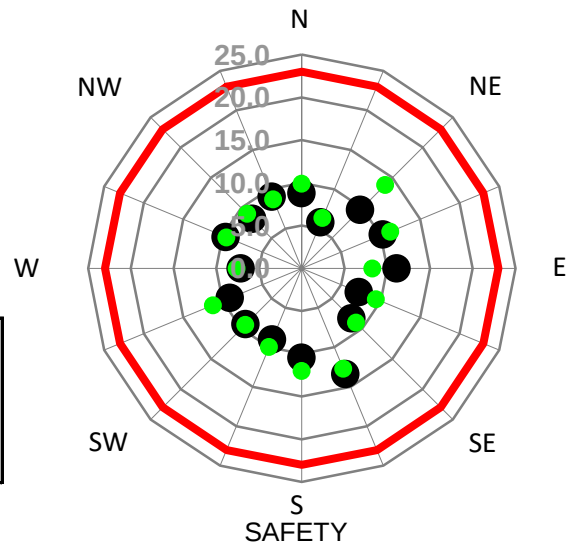
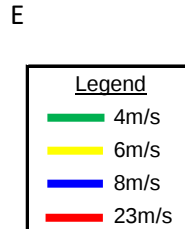
Test Location

11



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



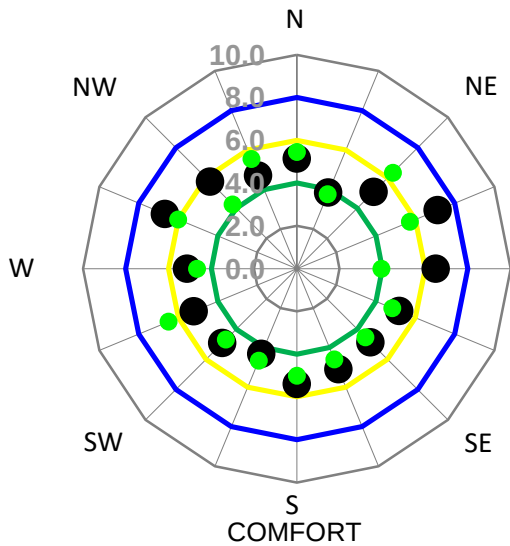
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	9.7%	0.8%	0.1%	4.8	Pass	13.4	Pass
● Existing Configuration	12.4%	1.5%	0.1%	5.0	Pass	13.8	Pass
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Test Location

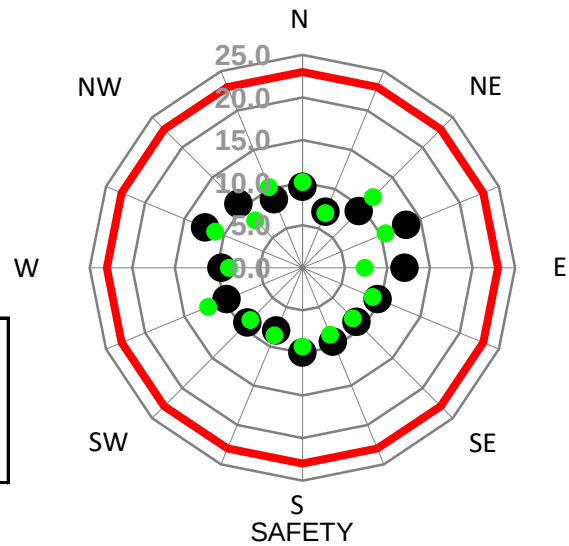
12



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s

E



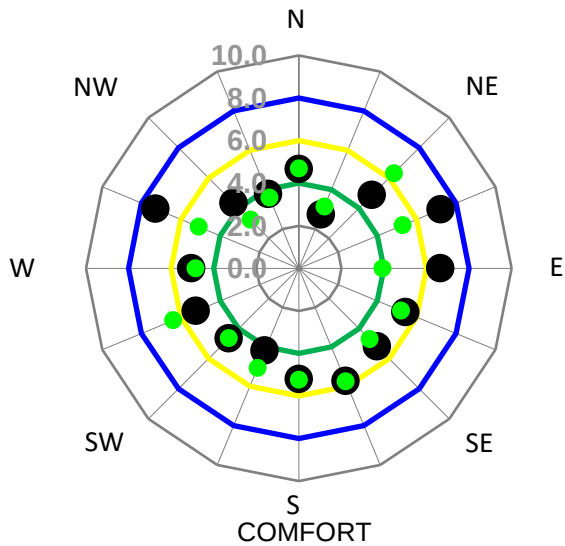
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	11.2%	1.6%	0.1%	4.9	Pass	13.2	Pass
● Existing Configuration	7.9%	0.8%	0.0%	4.4	Pass	12.0	Pass
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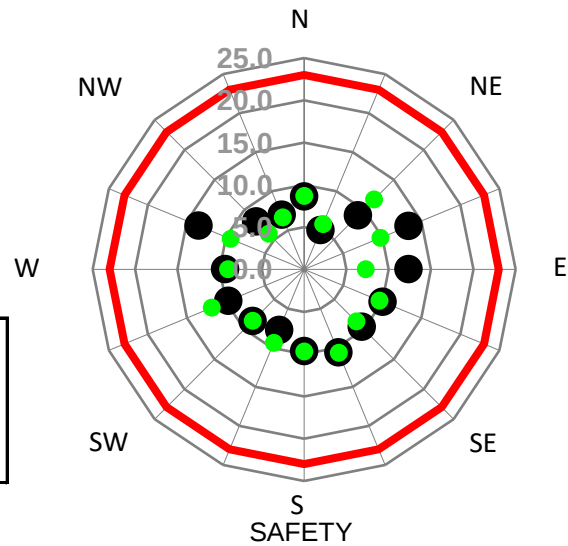
Test Location

13



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



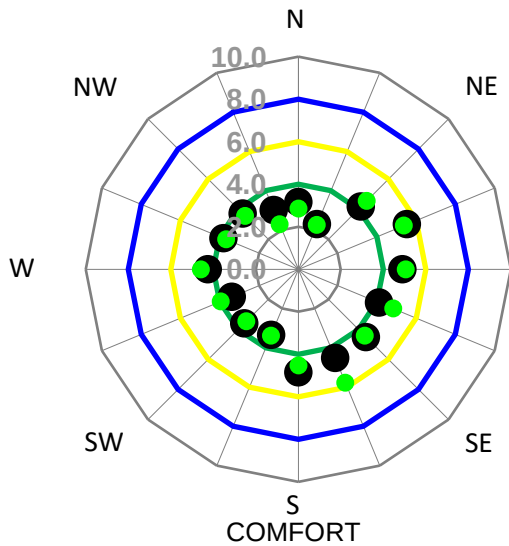
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	11.5%	1.8%	0.1%	4.9	Pass	13.5	Pass
● Existing Configuration	8.0%	0.6%	0.0%	4.4	Pass	11.8	Pass
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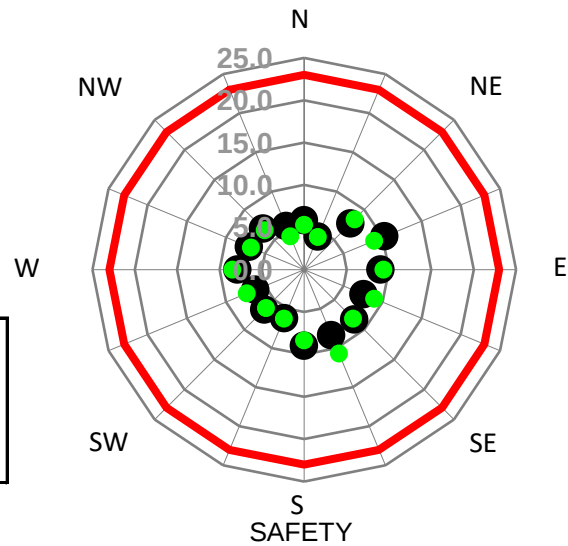
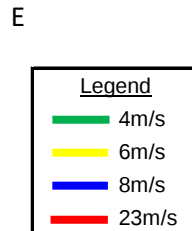
Test Location

14



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



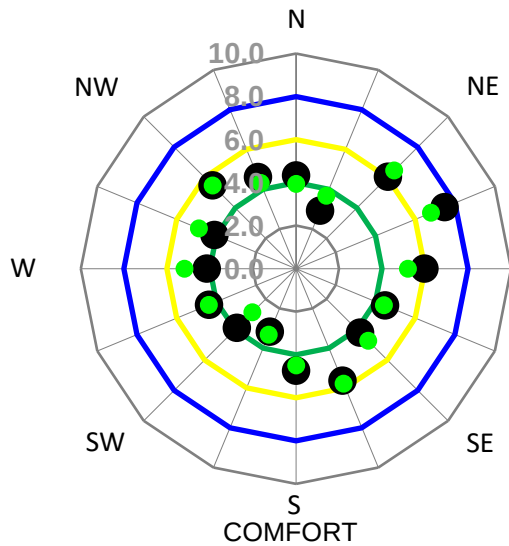
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	3.8%	0.1%	0.0%	3.8	Pass	10.2	Pass
● Existing Configuration	5.3%	0.1%	0.0%	4.0	Pass	10.7	Pass
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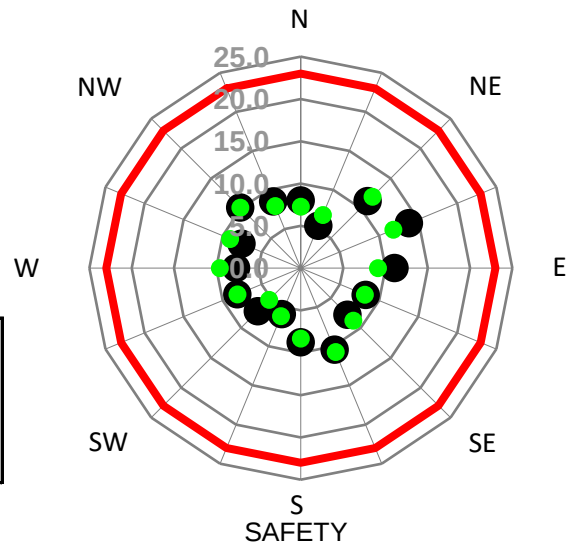
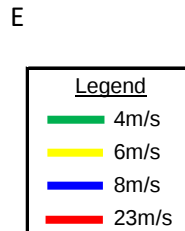
Test Location

15



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



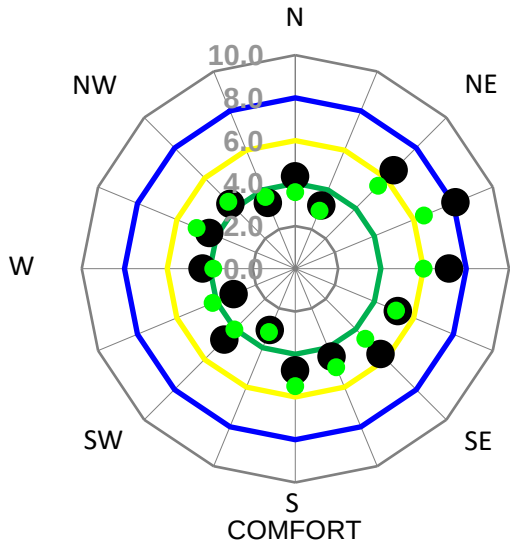
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	8.5%	1.3%	0.1%	4.7	Pass	13.8	Pass
● Existing Configuration	8.7%	1.1%	0.0%	4.5	Pass	11.9	Pass
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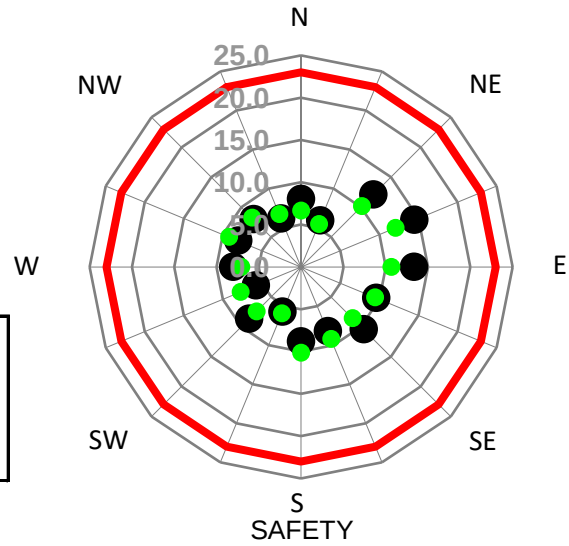
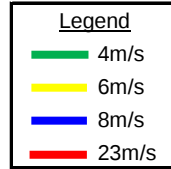
Test Location

16



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



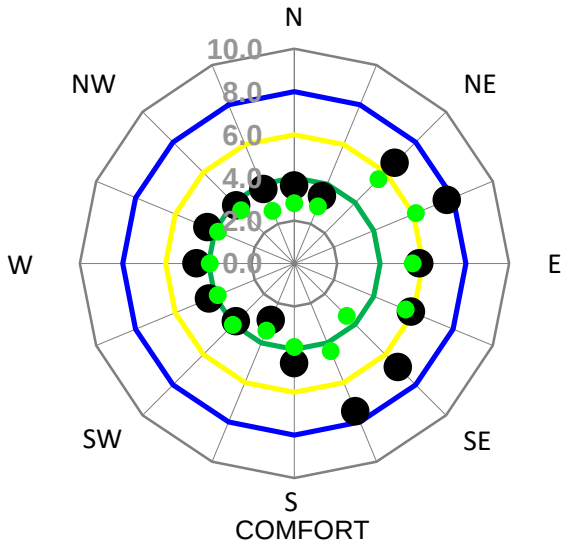
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	10.7%	2.5%	0.2%	5.0	Pass	14.5	Pass
● Existing Configuration	8.0%	0.7%	0.0%	4.5	Pass	12.1	Pass
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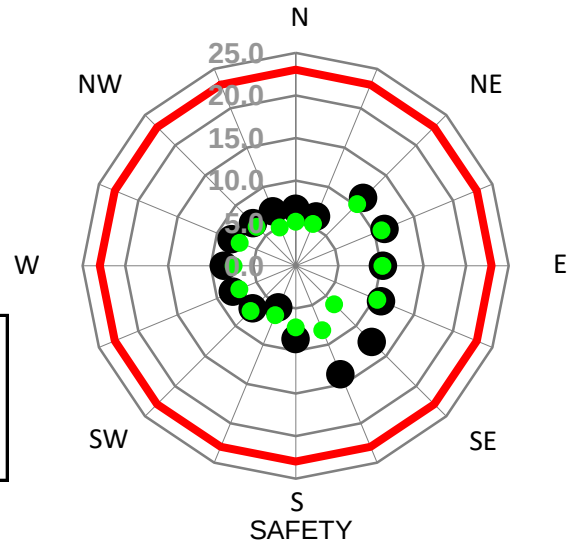
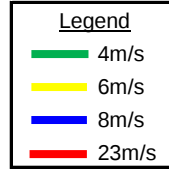
Test Location

17



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



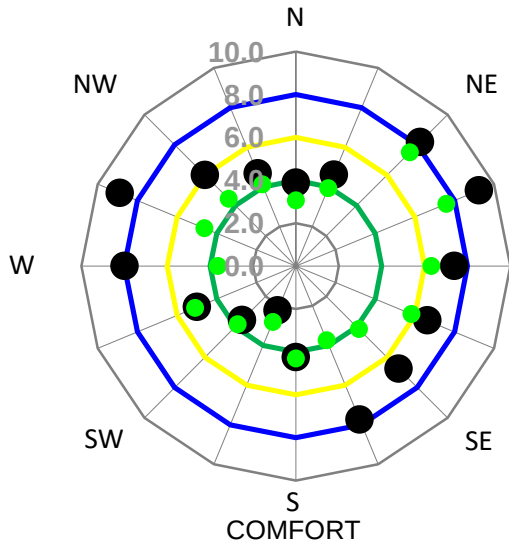
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	13.1%	2.3%	0.2%	5.2	Pass	13.8	Pass
● Existing Configuration	6.1%	0.3%	0.0%	4.2	Pass	10.9	Pass
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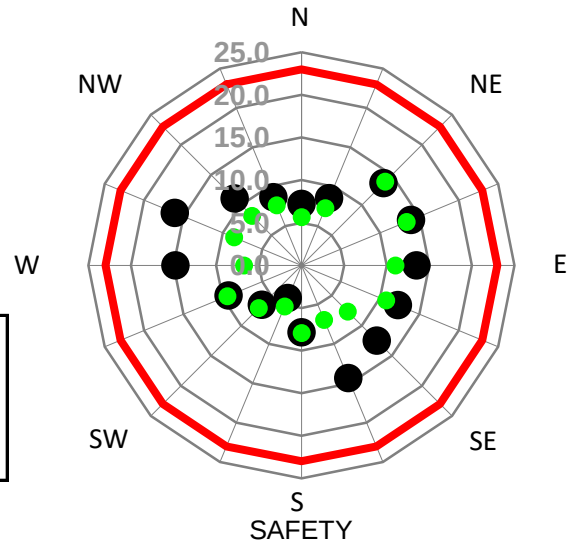
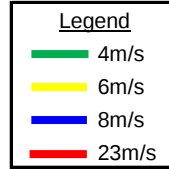
Test Location

18



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



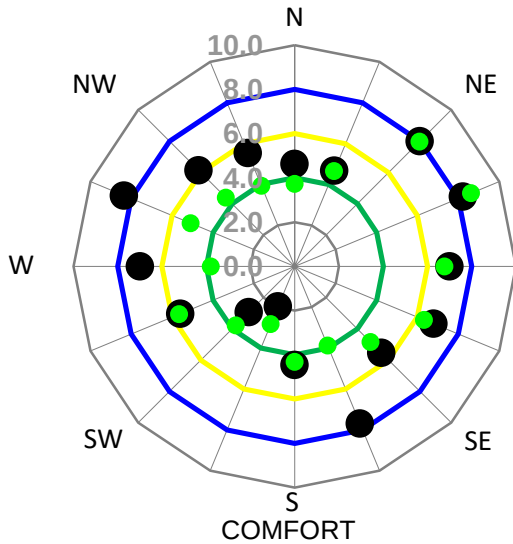
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	19.6%	5.9%	1.3%	6.2	Pass	16.1	Pass
● Existing Configuration	9.4%	1.9%	0.1%	5.0	Pass	13.9	Pass
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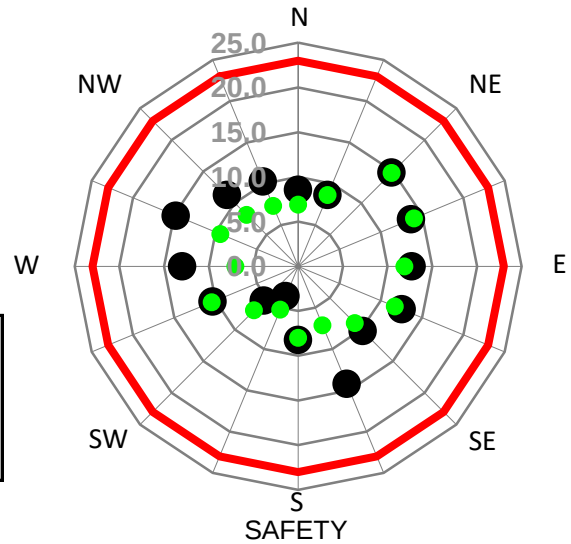
Test Location

19



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



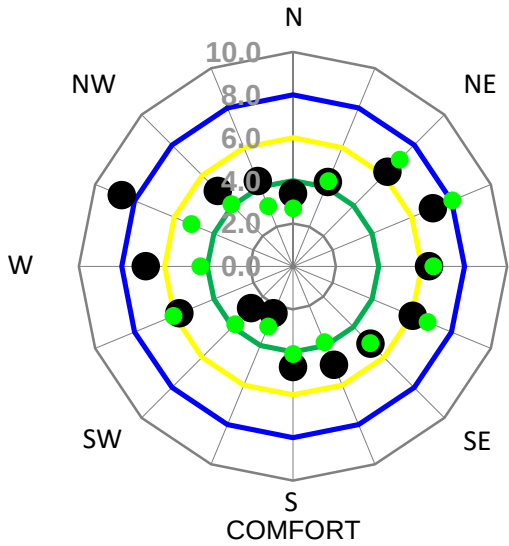
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	18.2%	4.5%	0.7%	5.9	Pass	14.8	Pass
● Existing Configuration	11.8%	2.8%	0.6%	5.4	Pass	14.8	Pass
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Test Location

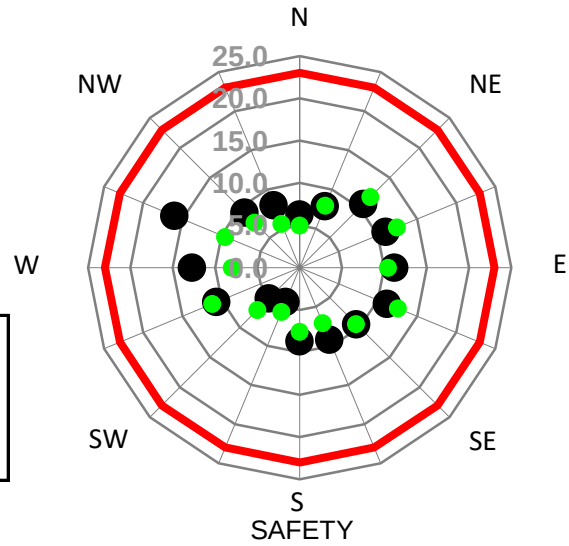
20



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s

E



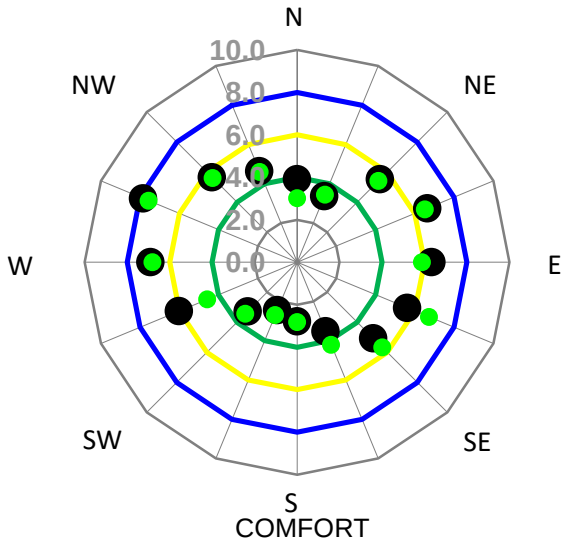
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	12.6%	2.2%	0.2%	5.2	Pass	16.0	Pass
● Existing Configuration	11.5%	2.5%	0.2%	5.3	Pass	12.6	Pass
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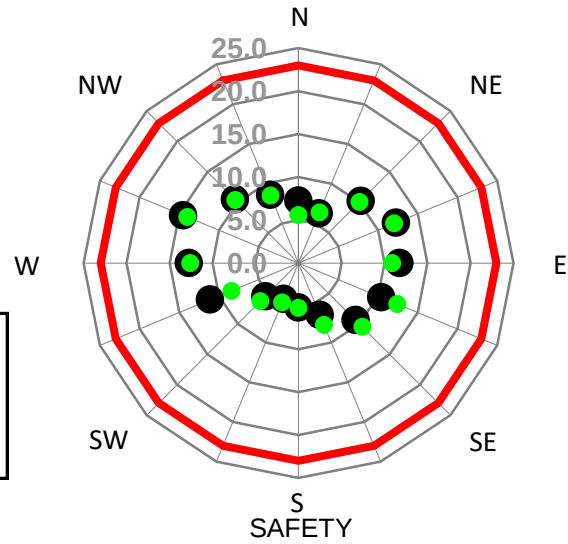
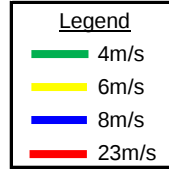
Test Location

21



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



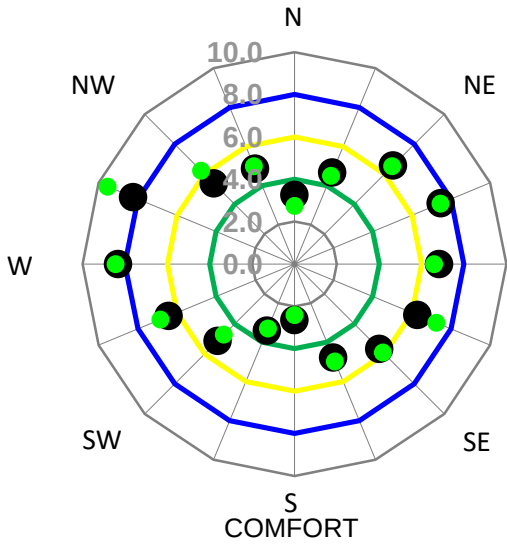
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	11.0%	1.7%	0.1%	5.0	Pass	14.5	Pass
● Existing Configuration	11.4%	1.6%	0.1%	5.0	Pass	14.0	Pass
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Test Location

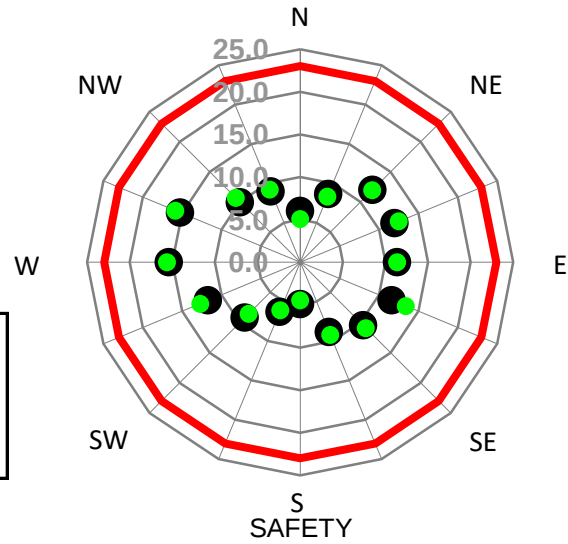
22



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s

E



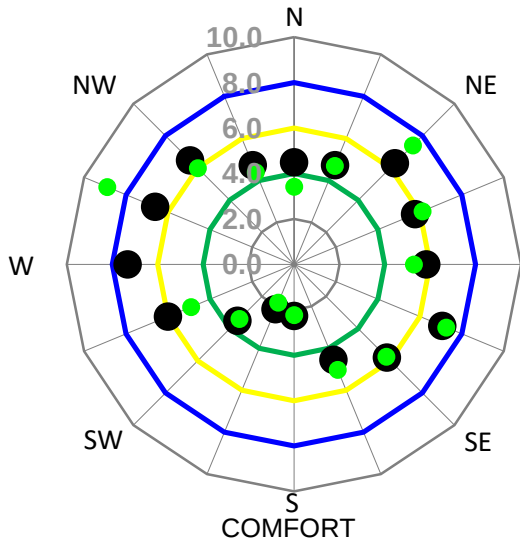
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	15.0%	3.4%	0.4%	5.6	Pass	15.4	Pass
● Existing Configuration	16.3%	4.2%	0.6%	5.8	Pass	15.8	Pass
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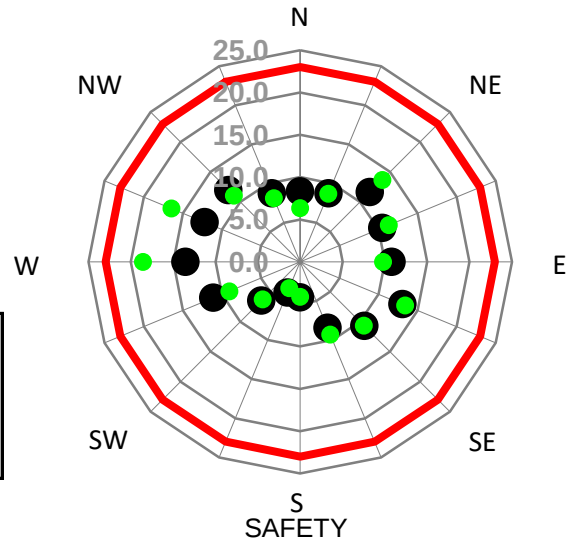
Test Location

23



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



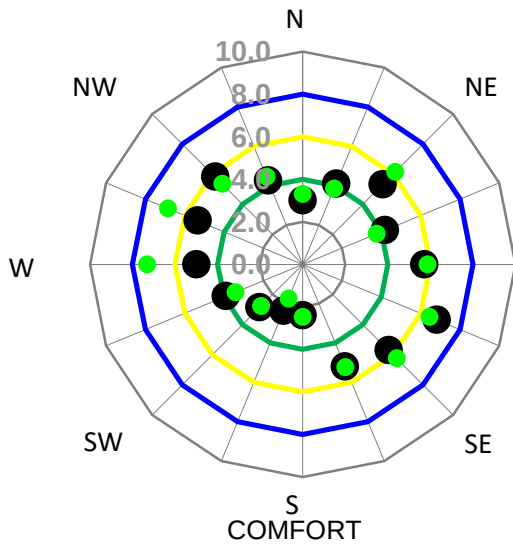
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	13.0%	1.9%	0.1%	5.1	Pass	13.6	Pass
● Existing Configuration	14.1%	3.3%	0.7%	5.5	Pass	18.6	Pass
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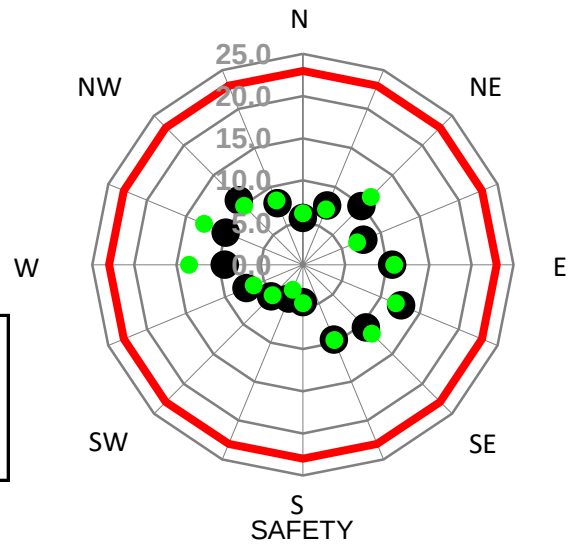
Test Location

24



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



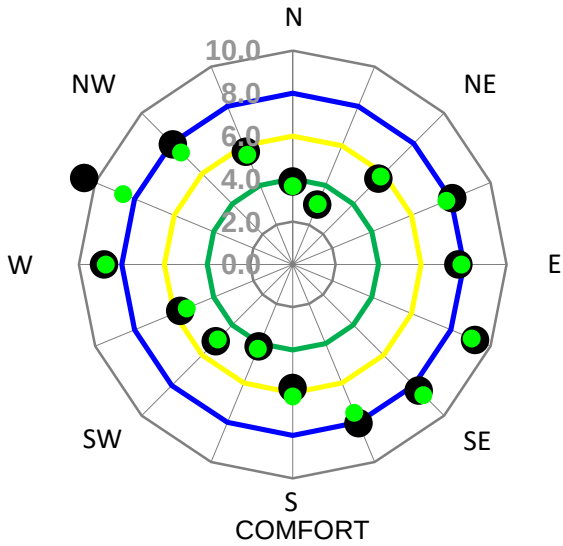
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	8.4%	0.7%	0.0%	4.5	Pass	12.6	Pass
● Existing Configuration	10.3%	1.2%	0.1%	4.9	Pass	13.5	Pass
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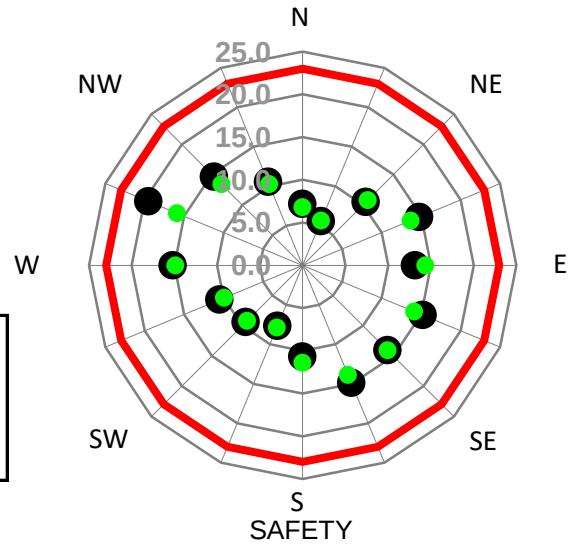
Test Location

25



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



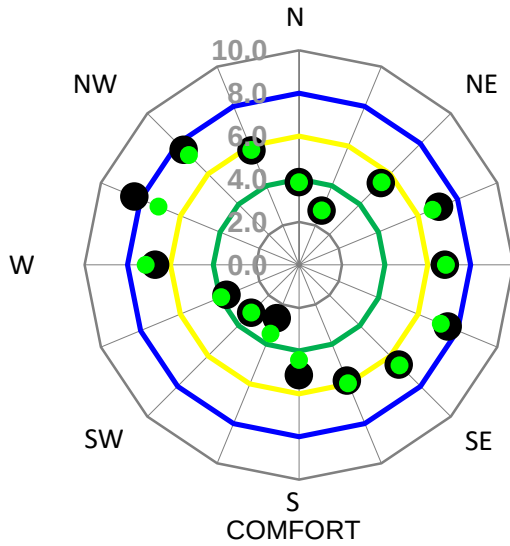
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	22.1%	8.3%	1.6%	6.7	Pass	19.5	Pass
● Existing Configuration	21.6%	7.6%	1.2%	6.6	Pass	15.9	Pass
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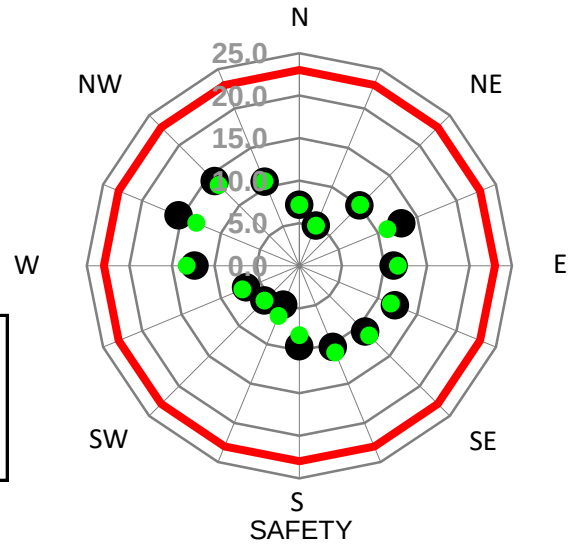
Test Location

26



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



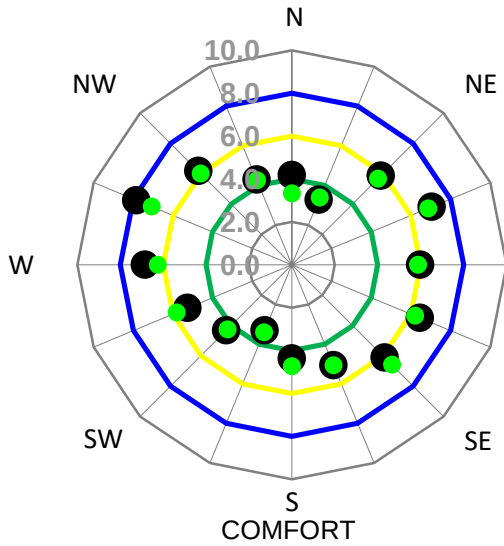
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	15.6%	3.5%	0.4%	5.6	Pass	15.4	Pass
● Existing Configuration	15.3%	2.9%	0.2%	5.5	Pass	13.4	Pass
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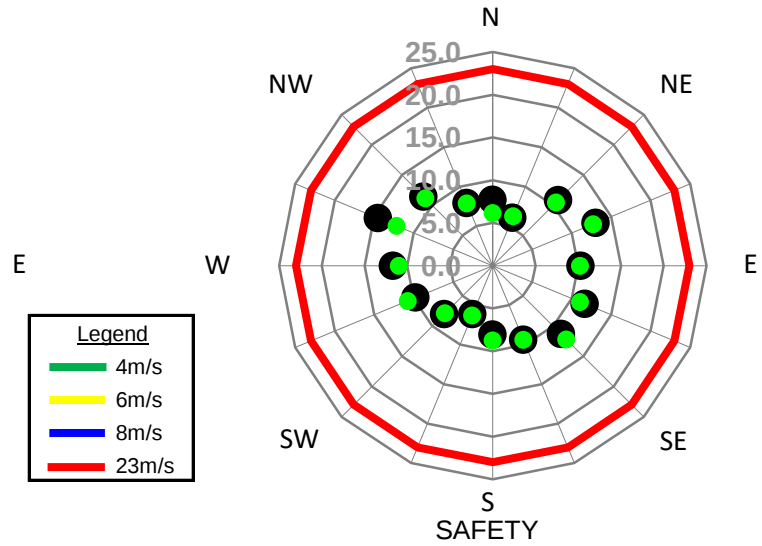
Test Location

27



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



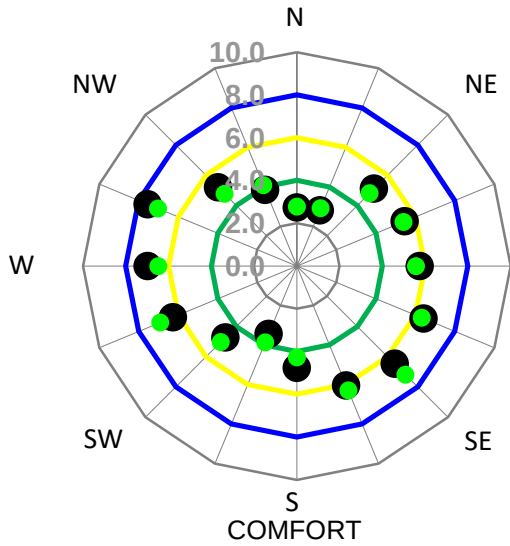
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	13.6%	2.1%	0.2%	5.2	Pass	14.5	Pass
● Existing Configuration	13.1%	1.7%	0.1%	5.1	Pass	12.7	Pass
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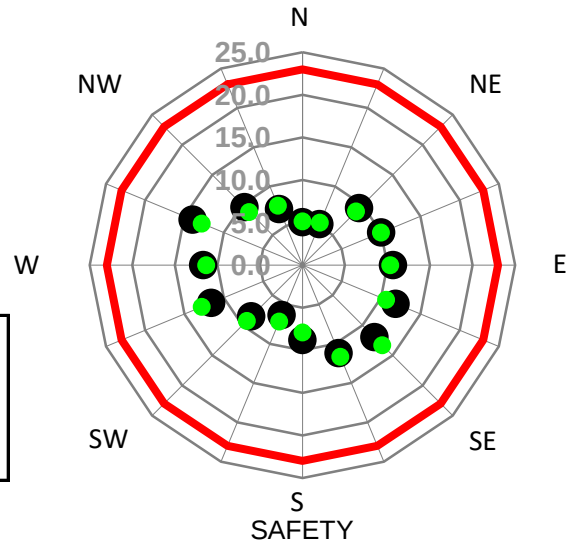
Test Location

28



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



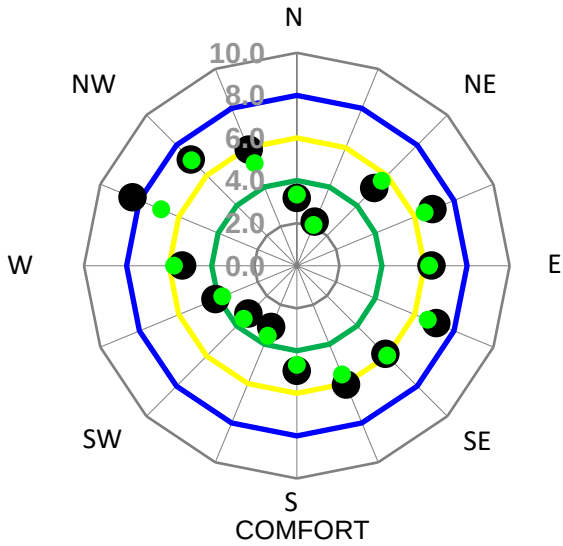
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	12.9%	1.5%	0.1%	5.1	Pass	14.0	Pass
● Existing Configuration	13.1%	1.6%	0.1%	5.1	Pass	13.3	Pass
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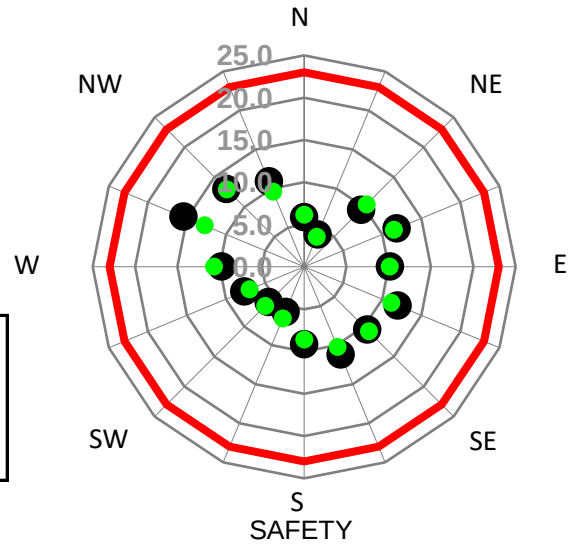
Test Location

29



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



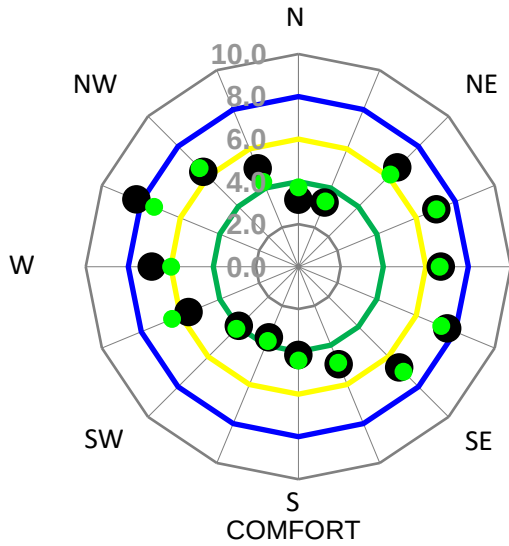
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	13.8%	2.6%	0.3%	5.3	Pass	15.4	Pass
● Existing Configuration	12.6%	1.7%	0.1%	5.1	Pass	12.9	Pass
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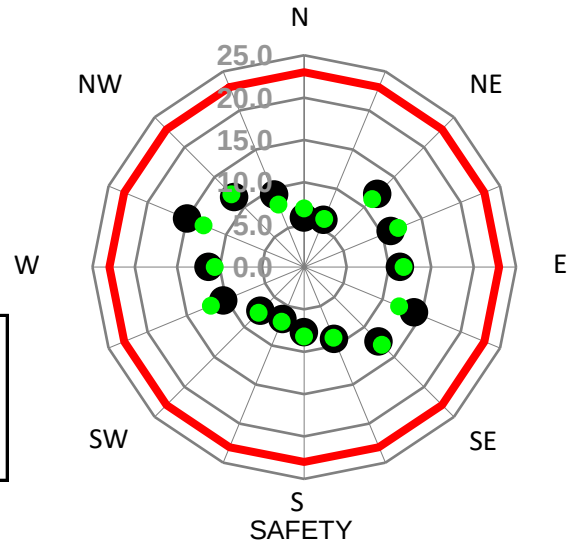
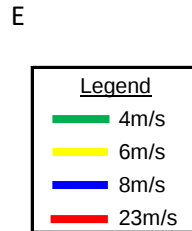
Test Location

30



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



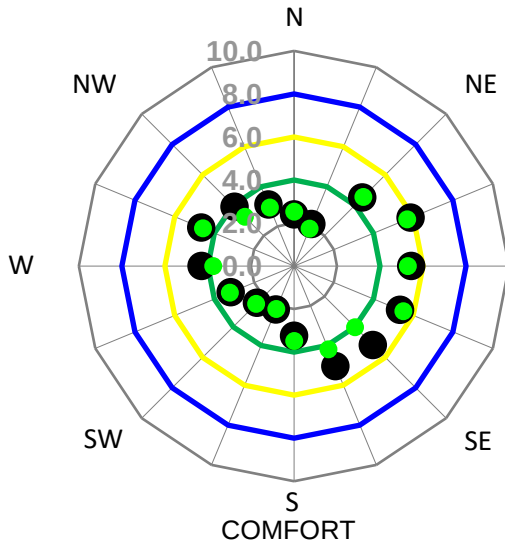
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	15.9%	3.6%	0.3%	5.6	Pass	14.9	Pass
● Existing Configuration	15.3%	3.2%	0.2%	5.6	Pass	13.0	Pass
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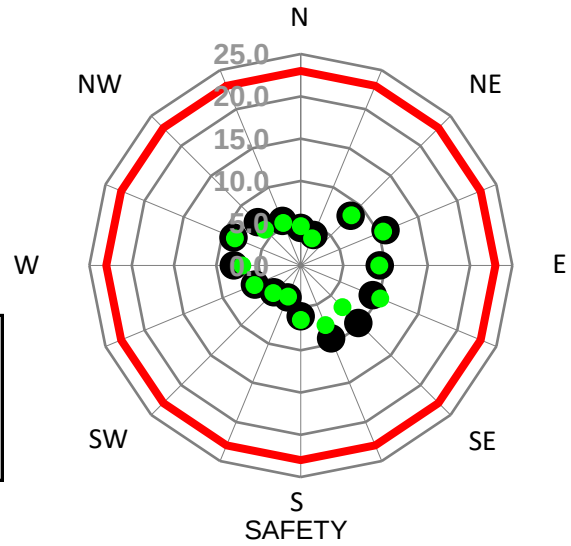
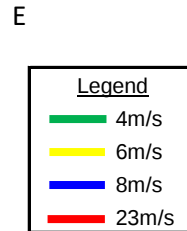
Test Location

31



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



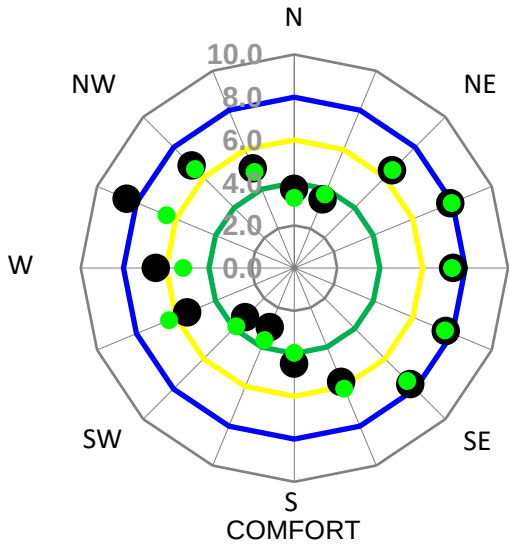
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	6.3%	0.2%	0.0%	4.2	Pass	10.9	Pass
● Existing Configuration	4.9%	0.2%	0.0%	4.0	Pass	10.5	Pass
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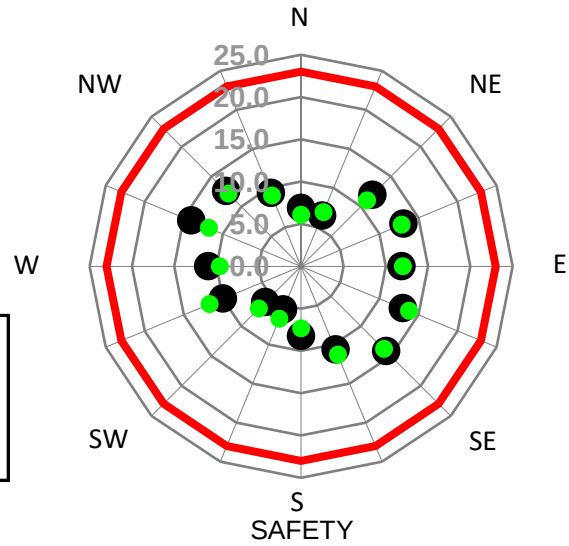
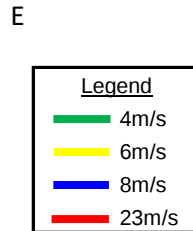
Test Location

32



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



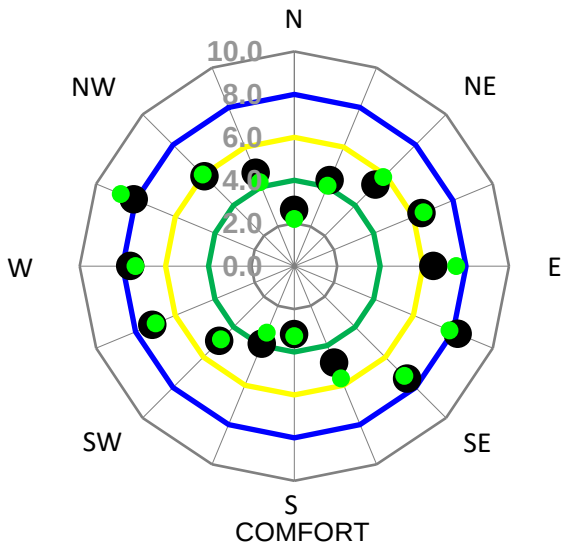
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	17.4%	5.1%	0.6%	6.0	Fail	14.2	Pass
● Existing Configuration	16.8%	4.7%	0.4%	5.9	Pass	13.8	Pass
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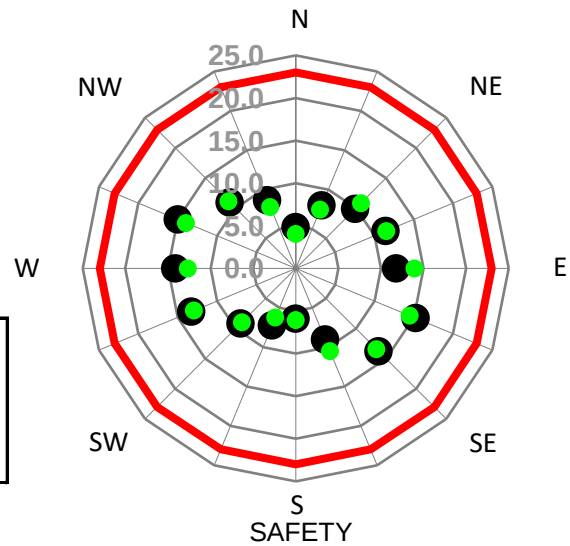
Test Location

33



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



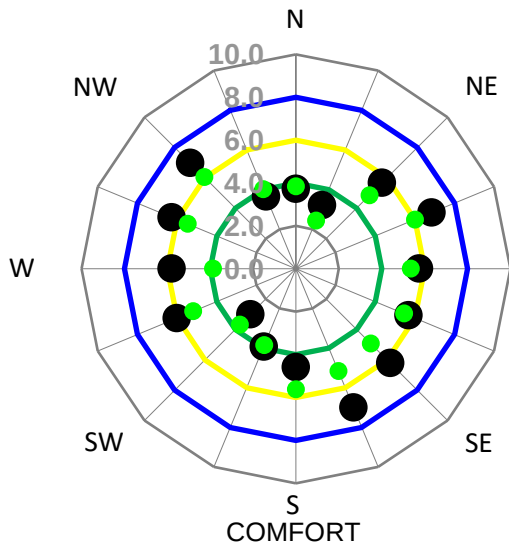
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	16.0%	3.9%	0.4%	5.7	Pass	15.3	Pass
● Existing Configuration	17.2%	4.6%	0.5%	5.9	Pass	14.5	Pass
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Test Location

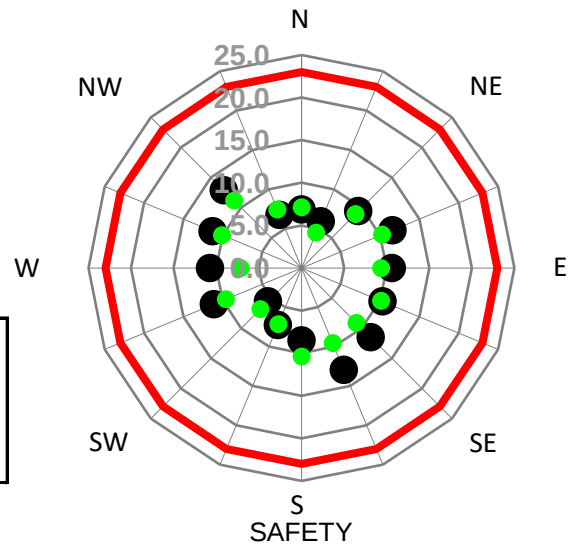
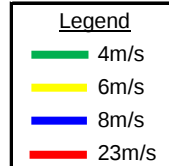
34



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s

E



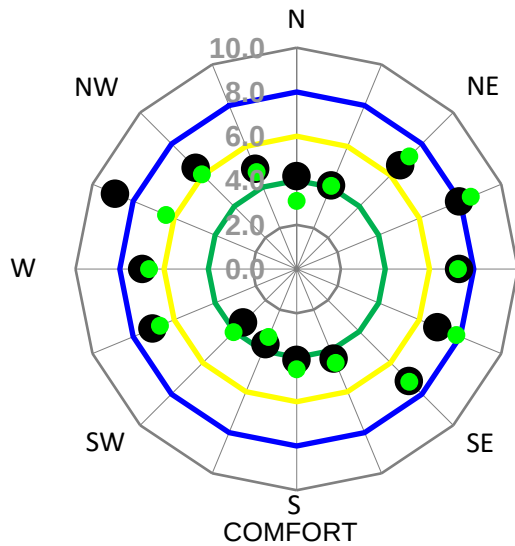
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	13.4%	1.8%	0.1%	5.1	Pass	13.0	Pass
● Existing Configuration	8.5%	0.5%	0.0%	4.5	Pass	11.2	Pass
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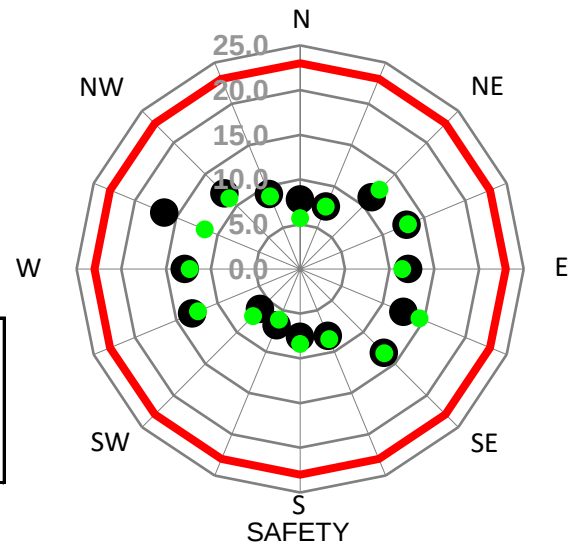
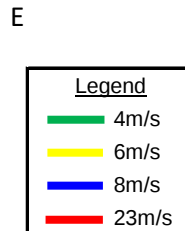
Test Location

35



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



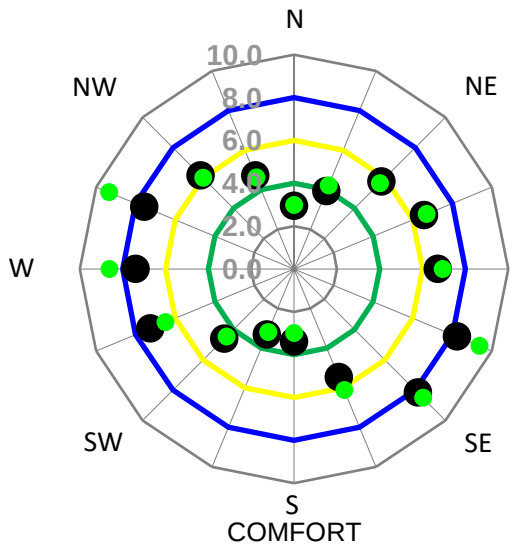
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	17.1%	4.6%	0.5%	5.9	Pass	16.4	Pass
● Existing Configuration	16.9%	5.0%	0.6%	6.0	Fail	14.4	Pass
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Test Location

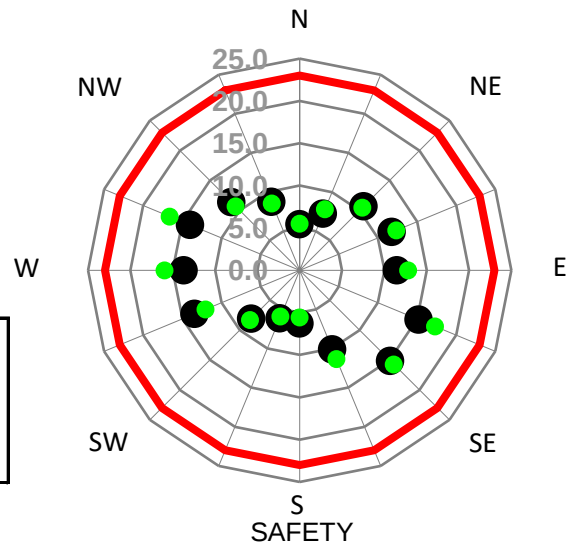
36



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s

E



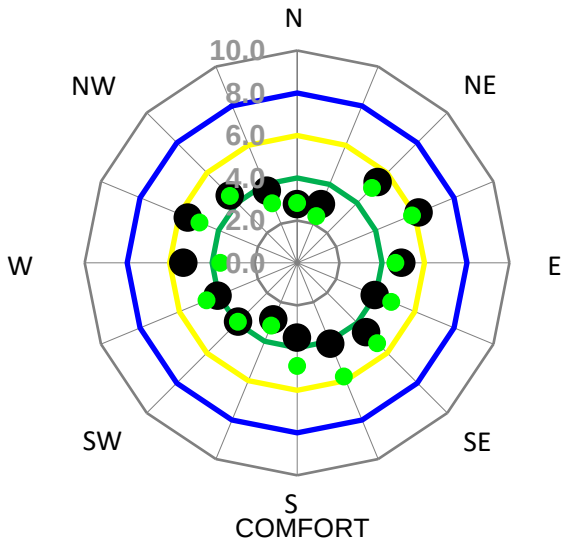
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	16.9%	4.5%	0.4%	5.9	Pass	15.2	Pass
● Existing Configuration	18.3%	6.1%	1.1%	6.2	Fail	17.3	Pass
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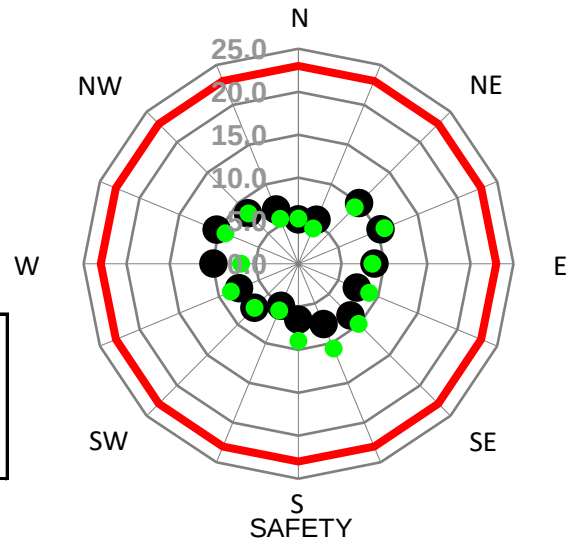
Test Location

37



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



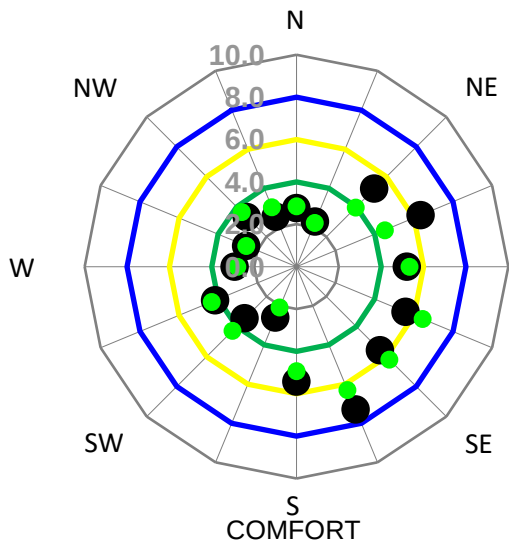
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	5.6%	0.4%	0.0%	4.1	Pass	10.4	Pass
● Existing Configuration	6.6%	0.3%	0.0%	4.2	Pass	10.8	Pass
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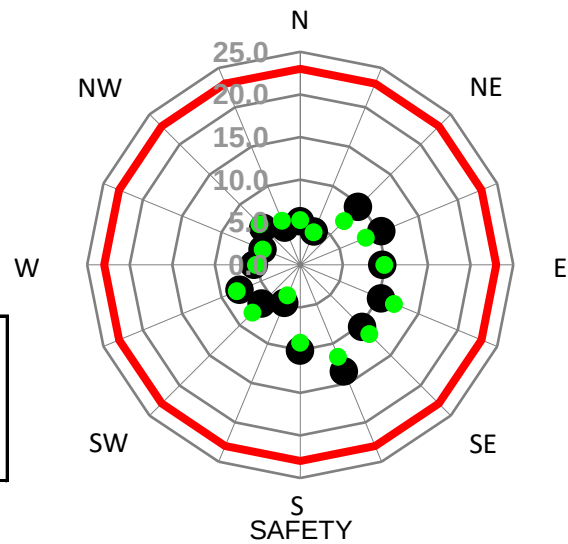
Test Location

38



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



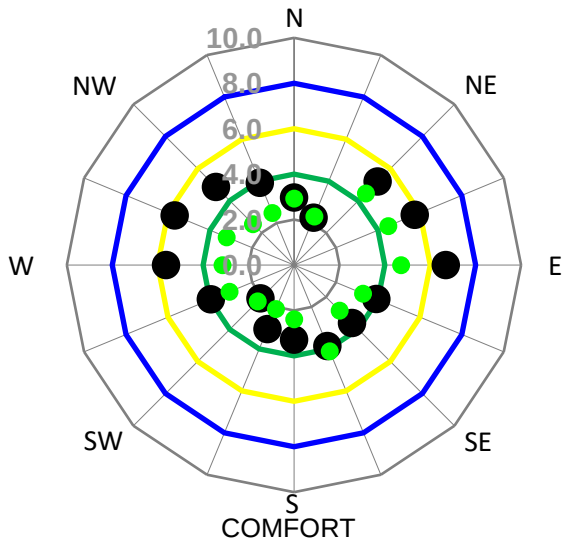
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	9.5%	0.9%	0.0%	4.6	Pass	13.5	Pass
● Existing Configuration	8.2%	0.6%	0.0%	4.4	Pass	11.9	Pass
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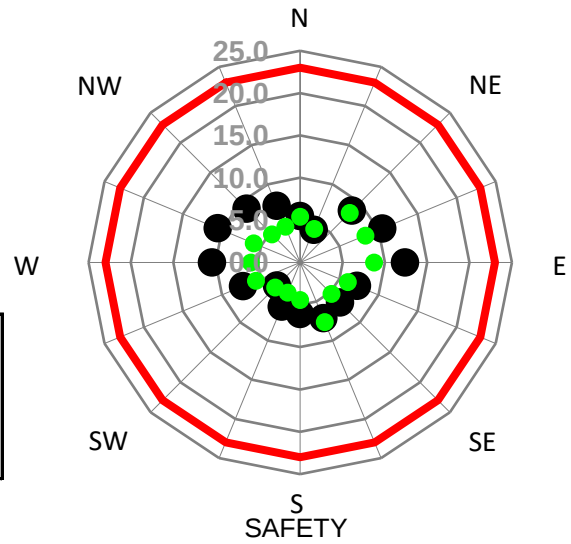
Test Location

39



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



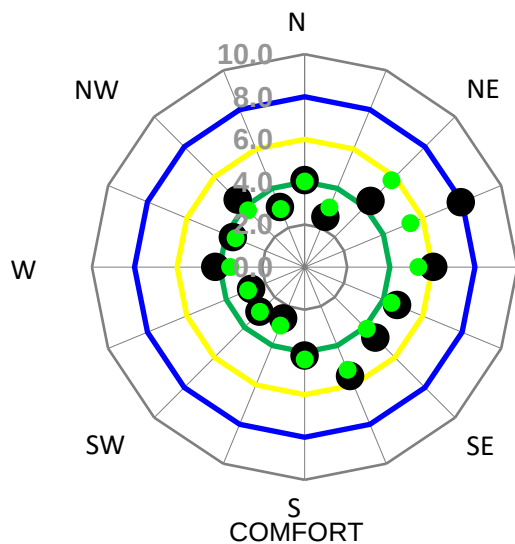
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	6.1%	0.7%	0.0%	4.3	Pass	12.4	Pass
● Existing Configuration	1.8%	0.0%	0.0%	3.2	Pass	8.7	Pass
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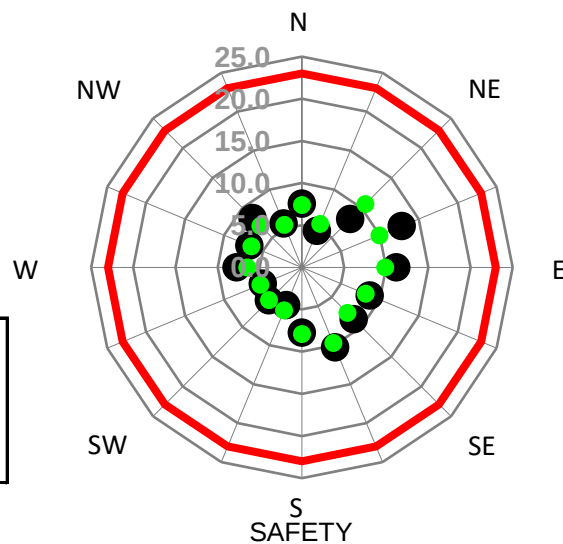
Test Location

40



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



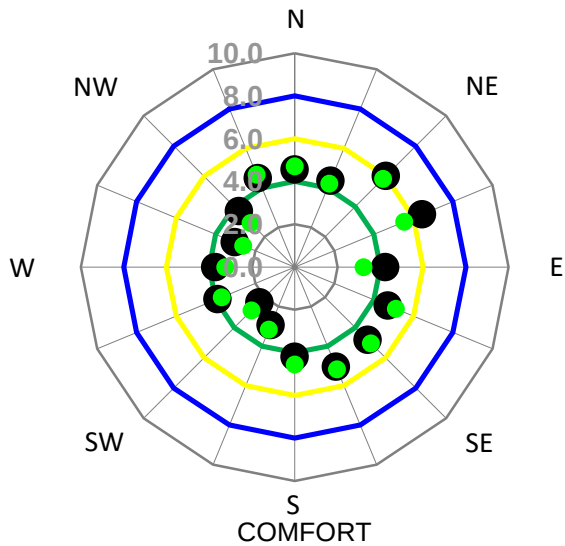
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	7.2%	1.3%	0.1%	4.5	Pass	12.8	Pass
● Existing Configuration	5.0%	0.1%	0.0%	4.0	Pass	10.6	Pass
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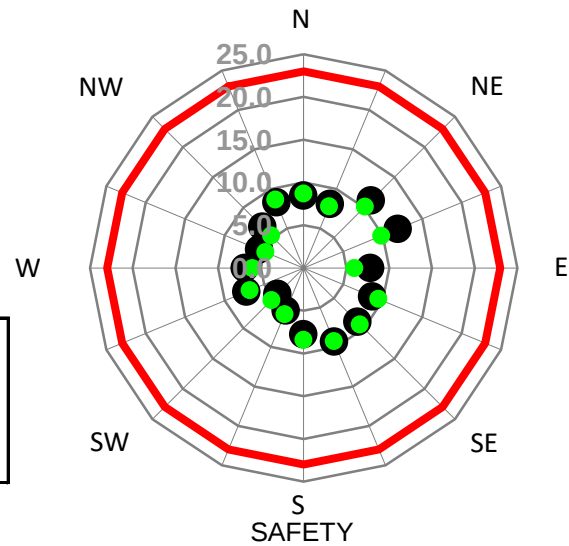
Test Location

41



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



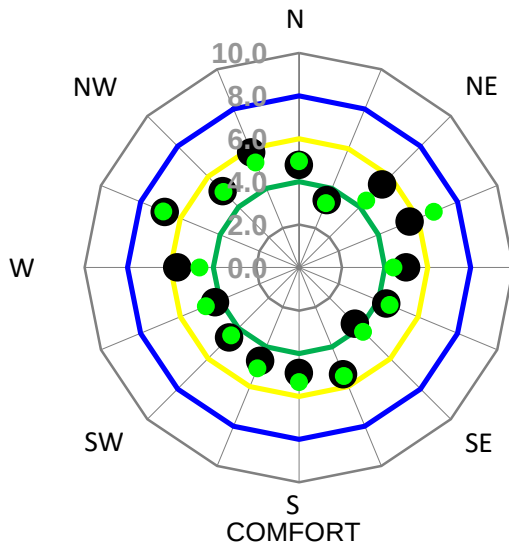
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	6.0%	0.6%	0.0%	4.1	Pass	11.9	Pass
● Existing Configuration	5.4%	0.2%	0.0%	4.1	Pass	10.1	Pass
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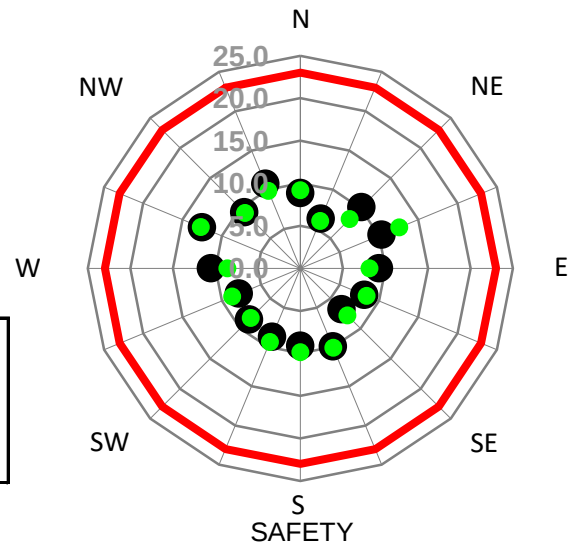
Test Location

42



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



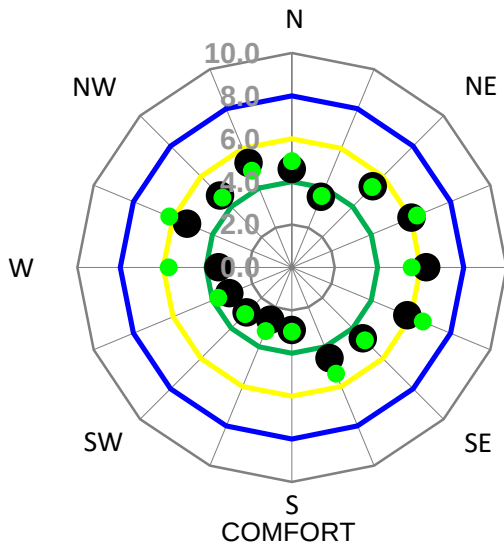
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	7.8%	0.6%	0.0%	4.4	Pass	12.5	Pass
● Existing Configuration	7.8%	1.1%	0.0%	4.4	Pass	12.7	Pass
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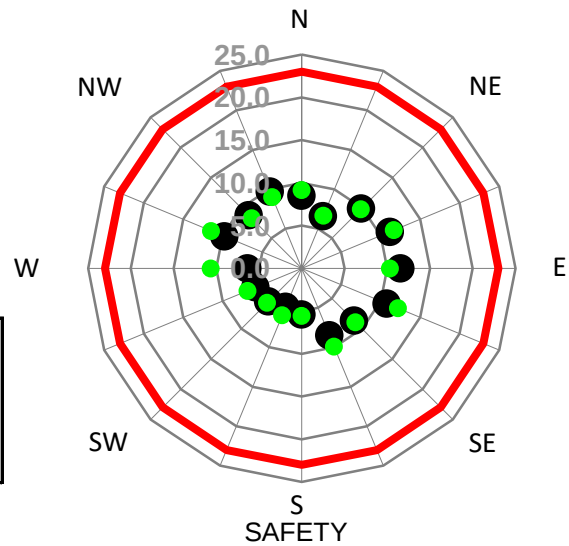
Test Location

43



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



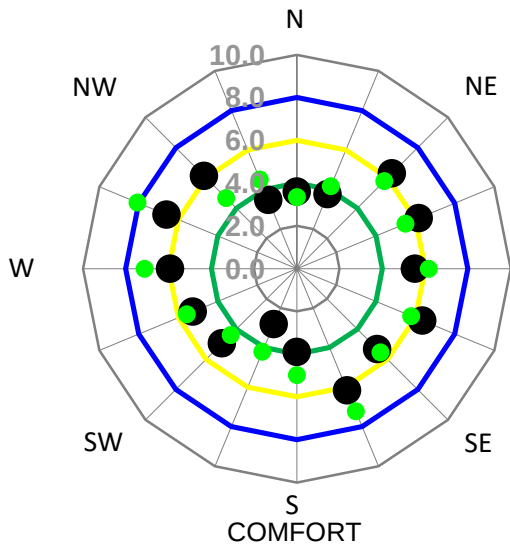
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	7.7%	0.6%	0.0%	4.5	Pass	11.6	Pass
● Existing Configuration	9.7%	1.0%	0.0%	4.7	Pass	12.2	Pass
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Test Location

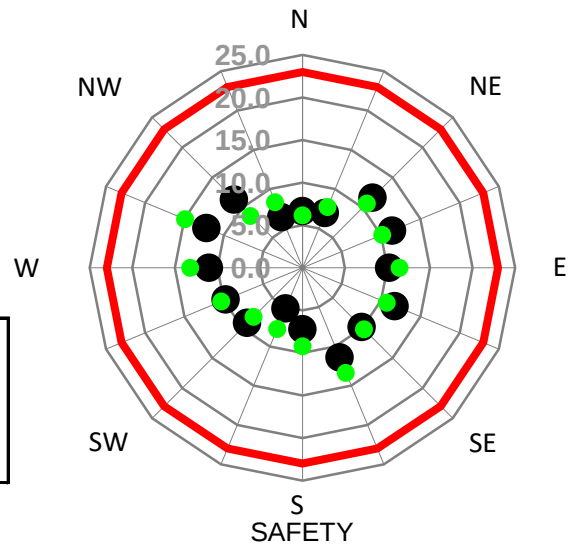
44



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s

E



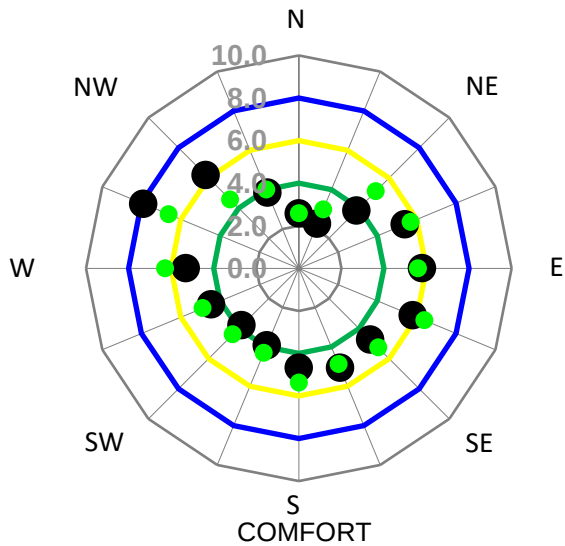
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	12.2%	1.3%	0.1%	4.9	Pass	12.2	Pass
● Existing Configuration	13.3%	1.6%	0.2%	5.1	Pass	14.9	Pass
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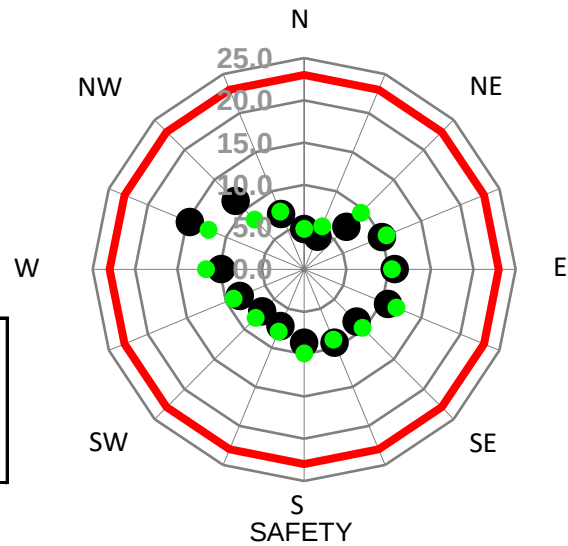
Test Location

45



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



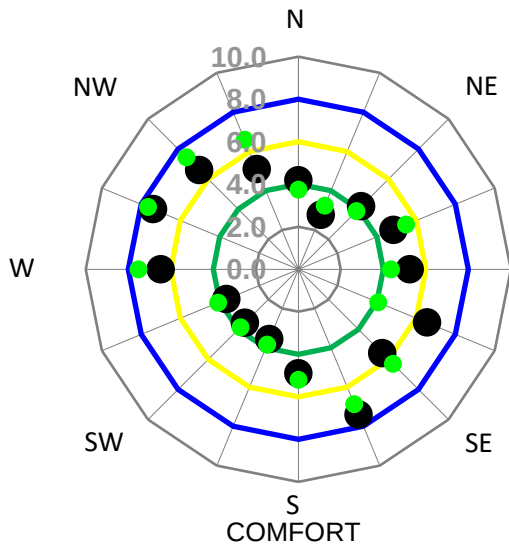
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	8.1%	0.8%	0.1%	4.6	Pass	14.6	Pass
● Existing Configuration	10.0%	0.8%	0.0%	4.7	Pass	12.3	Pass
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▲							

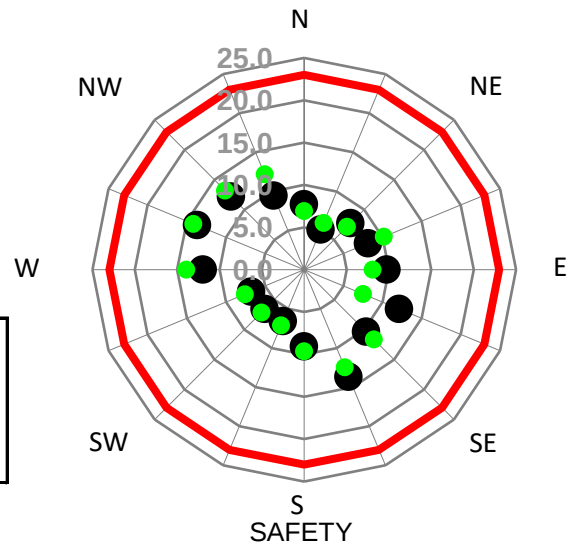
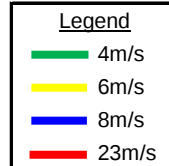
Test Location

46



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



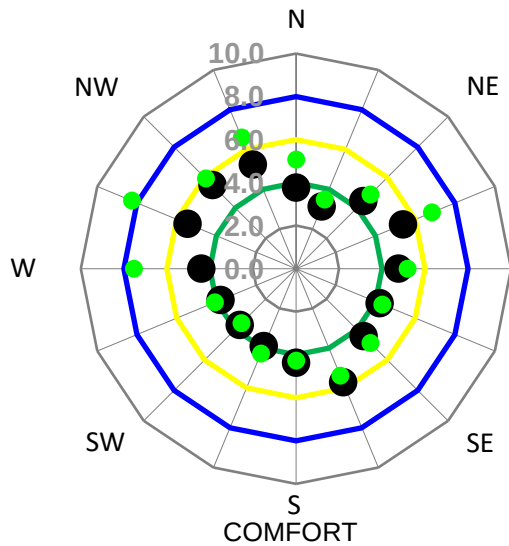
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	11.7%	1.5%	0.2%	4.9	Pass	13.7	Pass
● Existing Configuration	10.6%	1.5%	0.3%	4.9	Pass	14.2	Pass
■							
◆							
▲							
■							
◆							
▲							

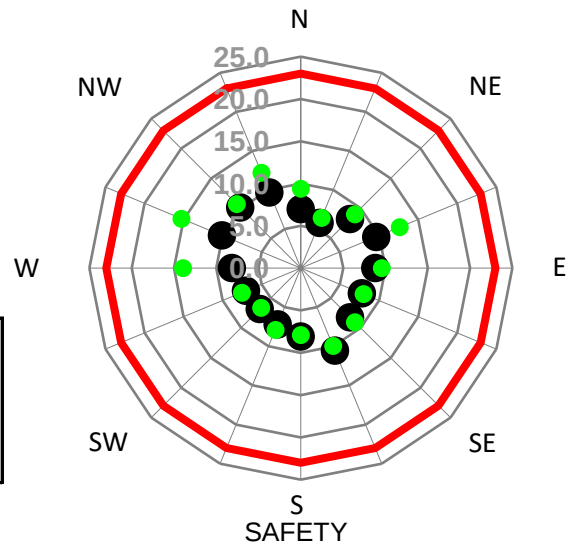
Test Location

47



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



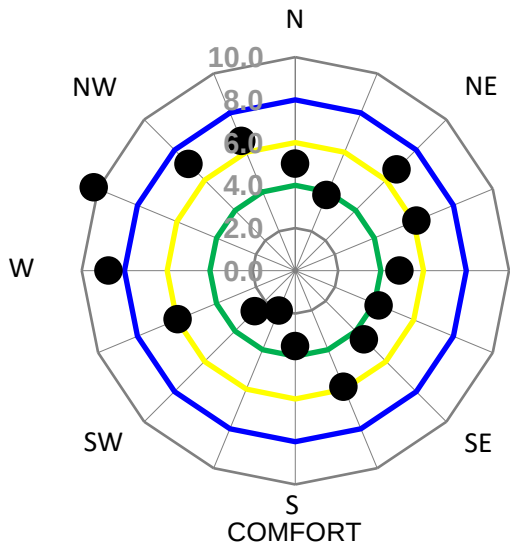
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

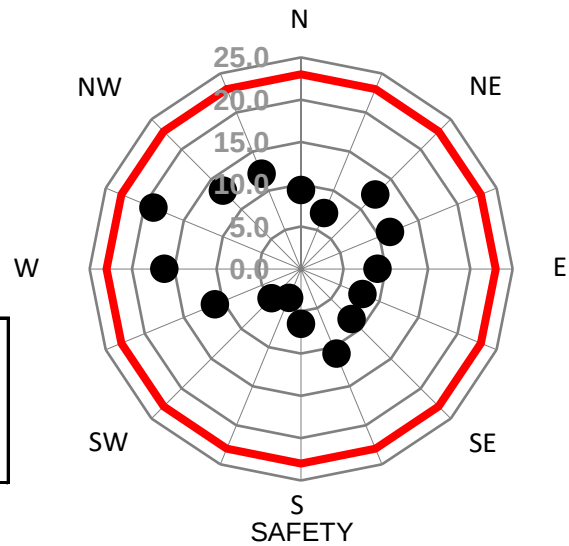
Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	5.5%	0.2%	0.0%	4.1	Pass	10.6	Pass
● Existing Configuration	10.4%	1.8%	0.3%	4.8	Pass	15.3	Pass
■							
◆							
▲							
■							
◆							
▲							

Test Location

48



Target Wind Speed for Test Location = 6m/s

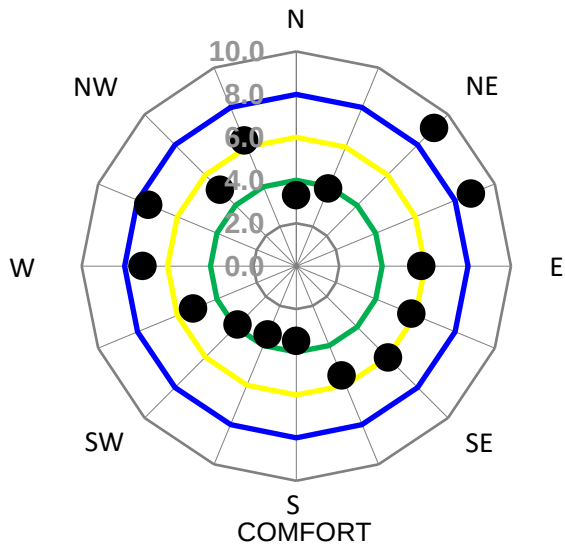


Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	11.9%	2.6%	0.6%	5.2	Pass	18.9	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

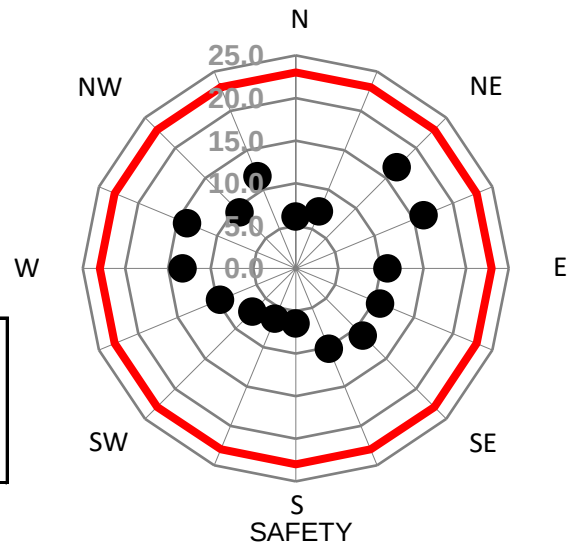
Test Location

49



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



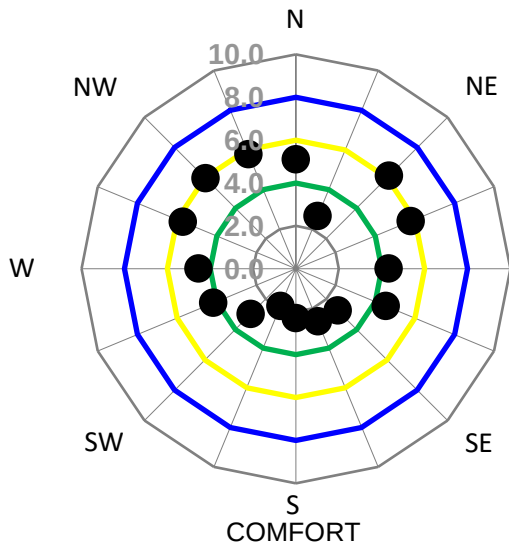
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	15.2%	3.8%	1.0%	5.6	Pass	16.8	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

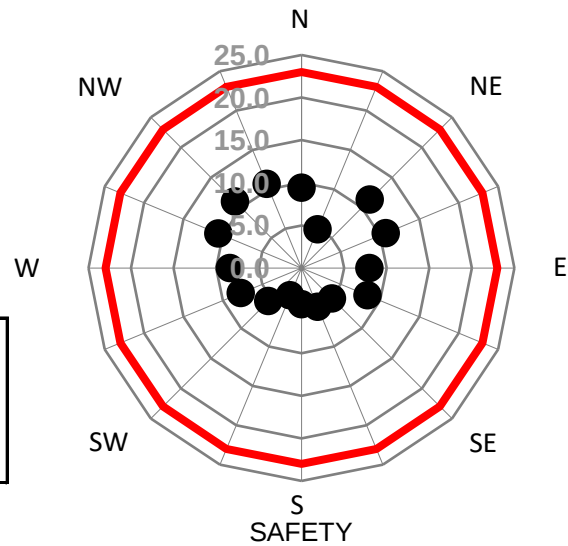
Test Location

50



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



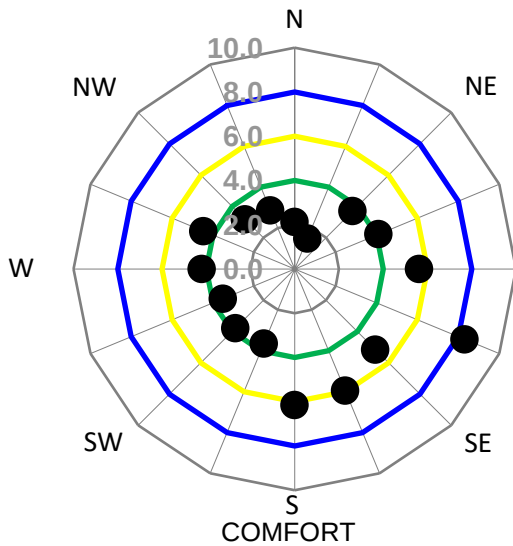
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	5.6%	0.5%	0.0%	4.1	Pass	11.3	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

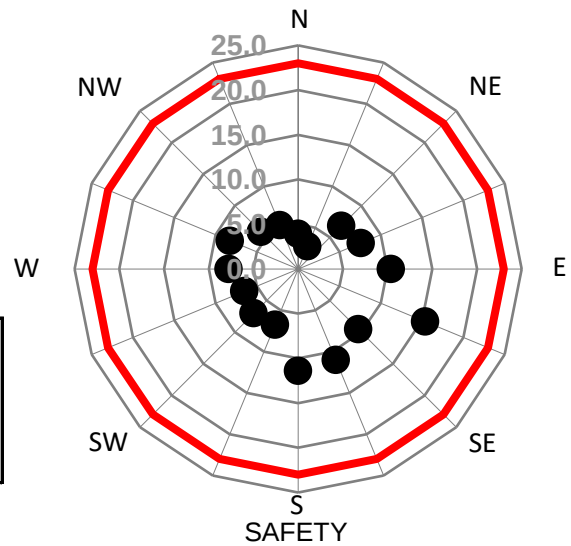
Test Location

51



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



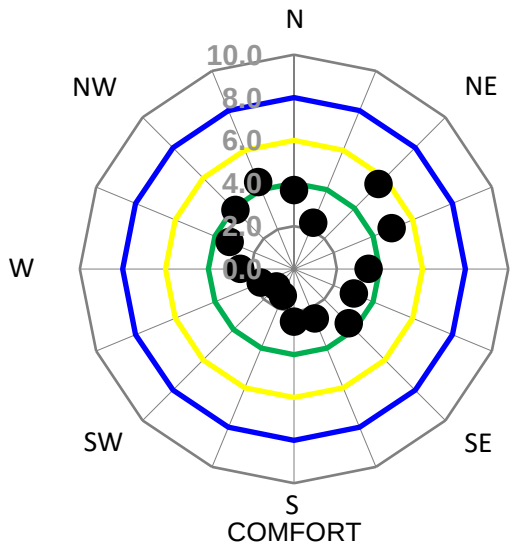
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	8.2%	1.6%	0.1%	4.6	Pass	15.4	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

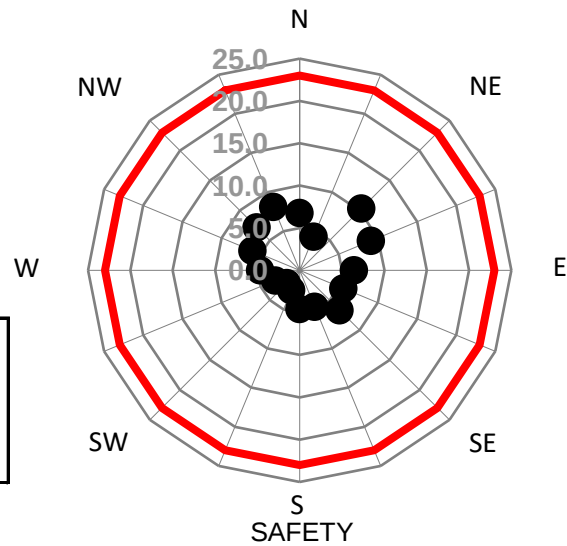
Test Location

T1



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



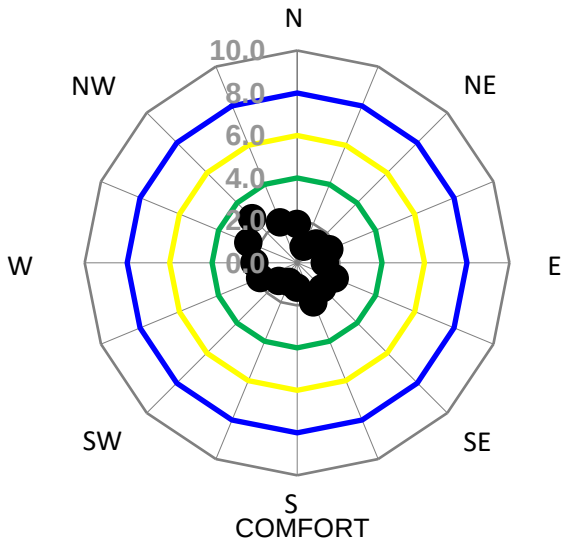
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	2.0%	0.1%	0.0%	3.2	Pass	10.3	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

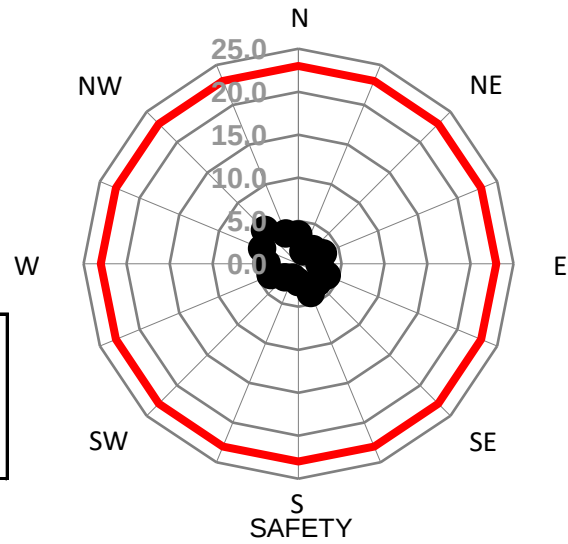
Test Location

T2



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



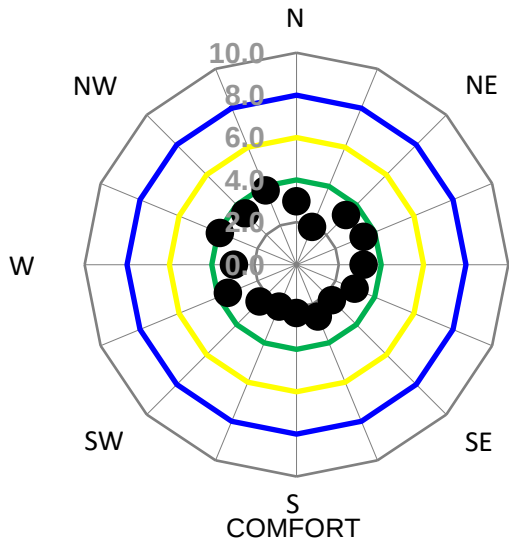
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	0.0%	0.0%		1.6	Pass	5.5	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

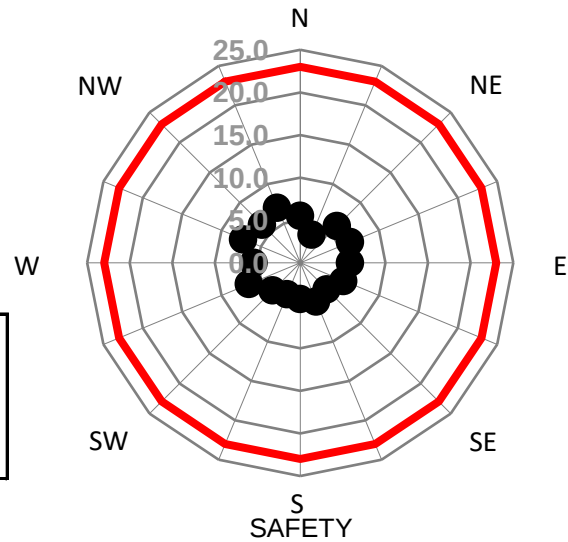
Test Location

T3



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



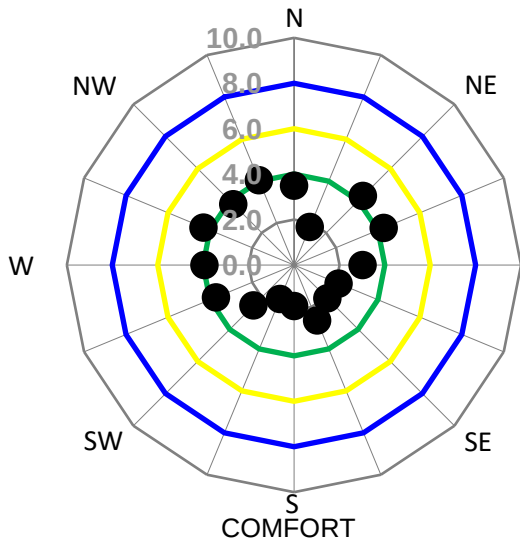
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	0.3%	0.0%	0.0%	2.7	Pass	7.2	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

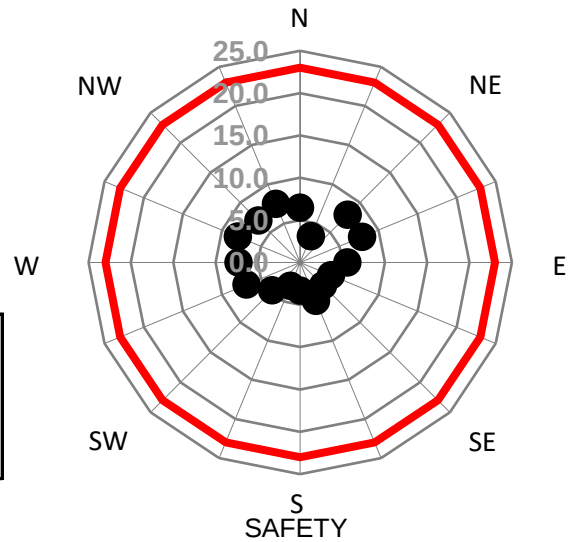
Test Location

T4



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



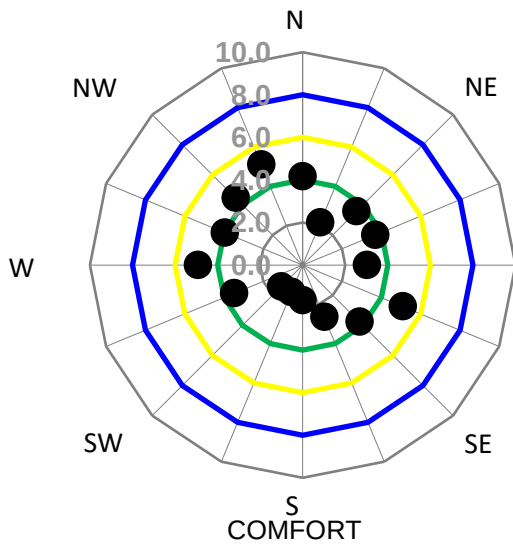
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	1.2%	0.0%	0.0%	3.0	Pass	8.0	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

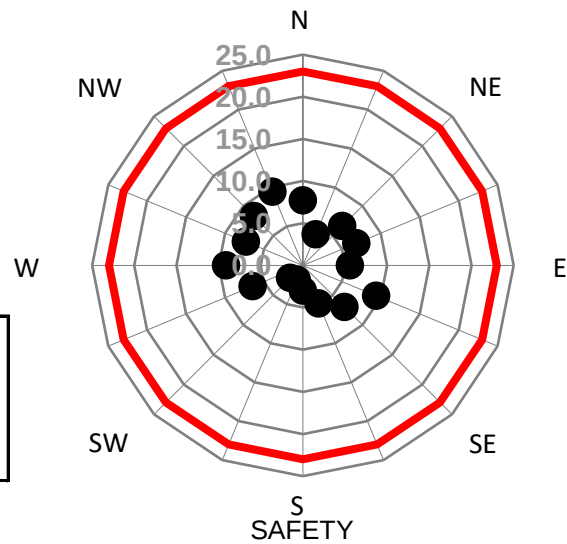
Test Location

T5



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



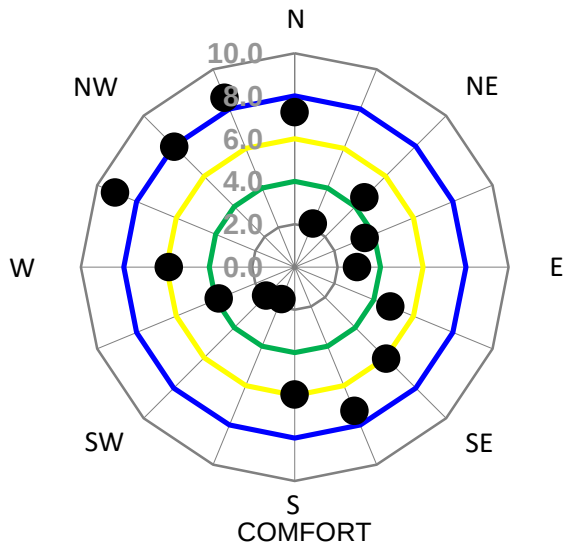
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	2.2%	0.1%	0.0%	3.4	Pass	9.4	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

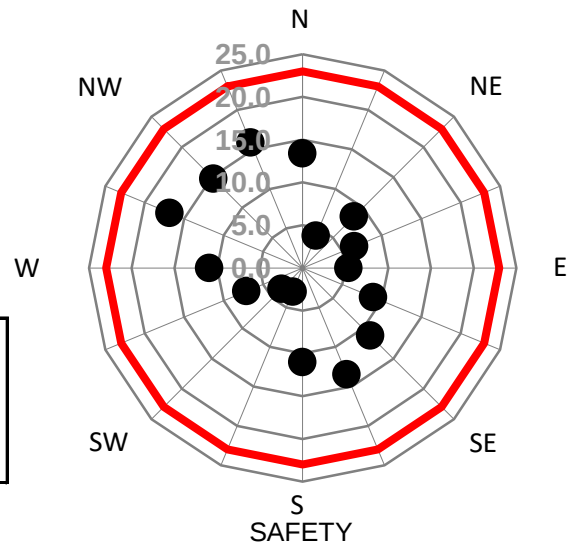
Test Location

T6



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



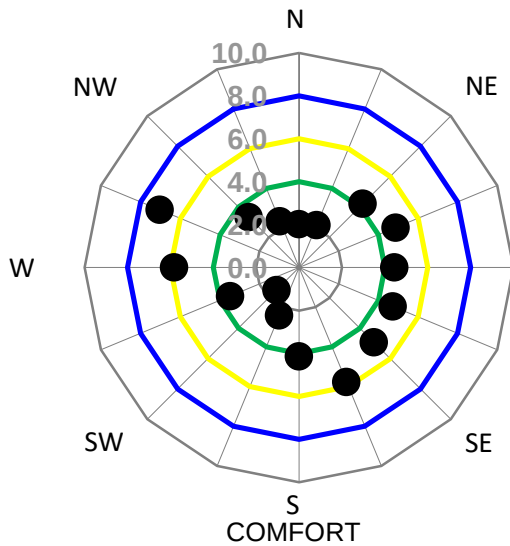
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	11.5%	2.4%	0.6%	5.1	Pass	16.8	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

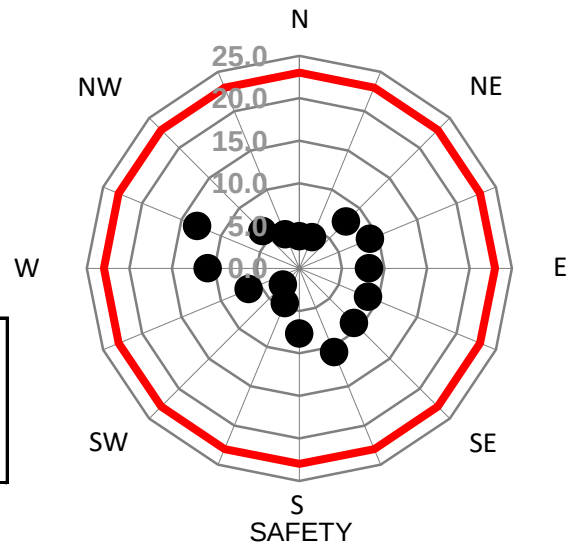
Test Location

T7



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



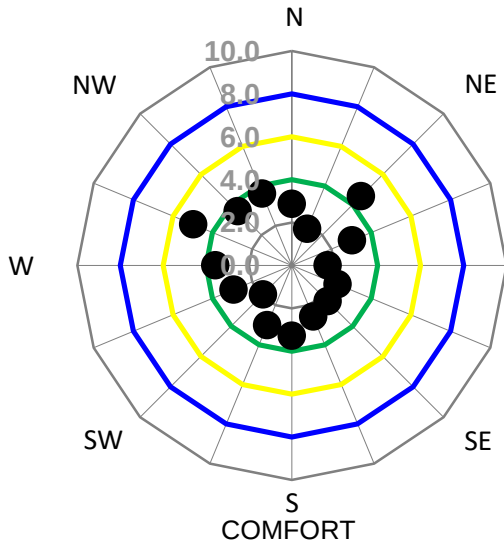
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	5.5%	0.4%	0.0%	4.1	Pass	13.0	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

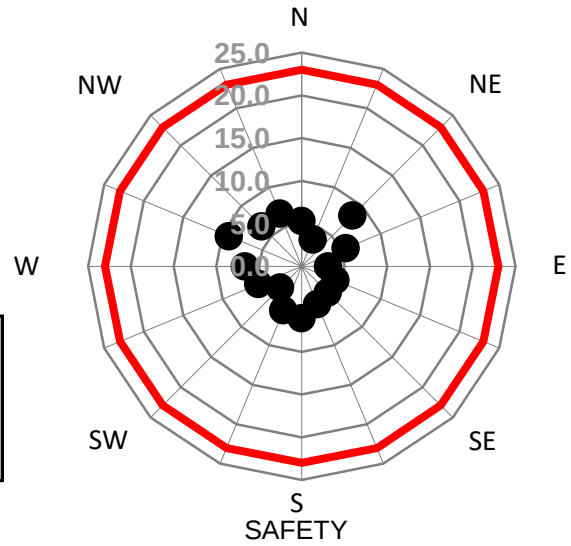
Test Location

T8



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



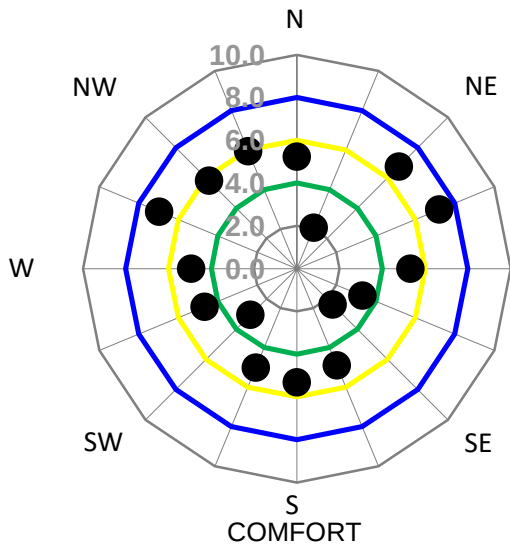
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	0.9%	0.0%	0.0%	2.7	Pass	9.2	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

Test Location

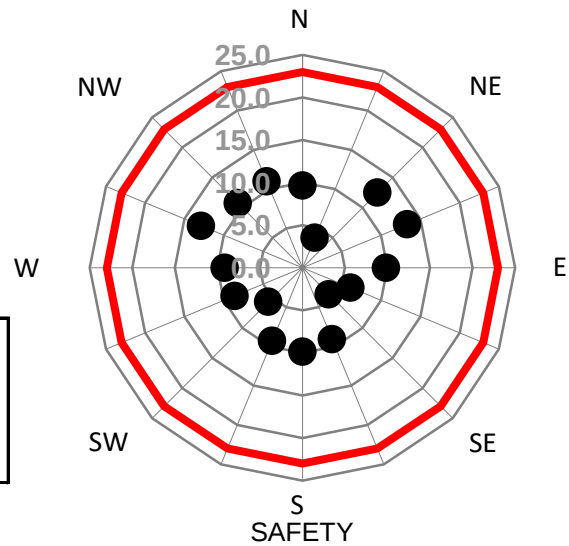
T9



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s

E



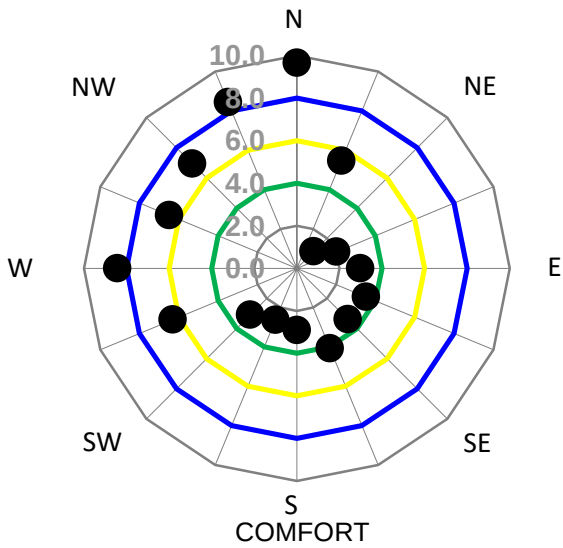
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	9.6%	1.7%	0.1%	4.7	Pass	13.3	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

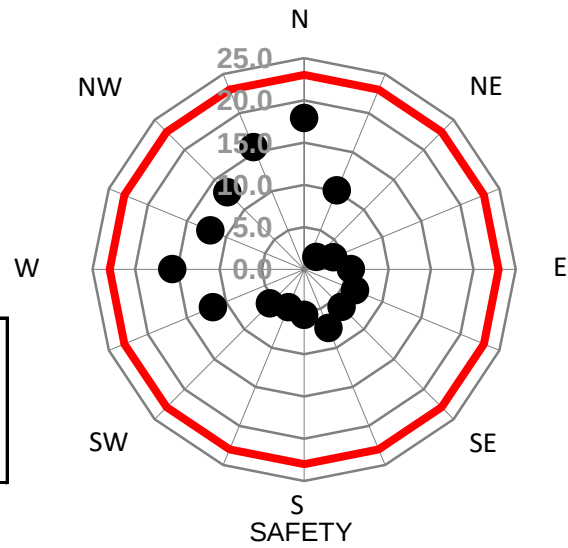
Test Location

T10



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



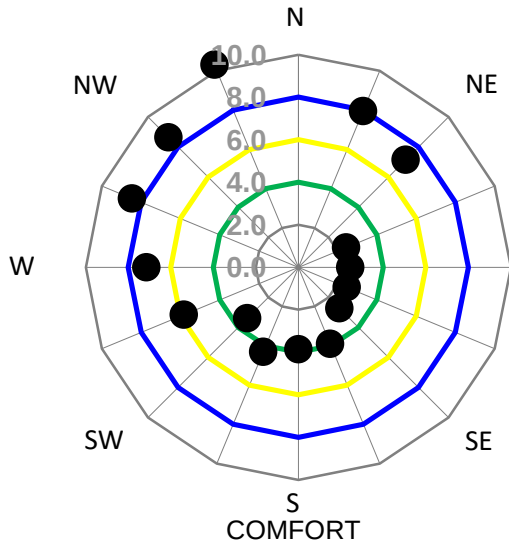
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	8.6%	2.5%	0.6%	5.0	Pass	17.9	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

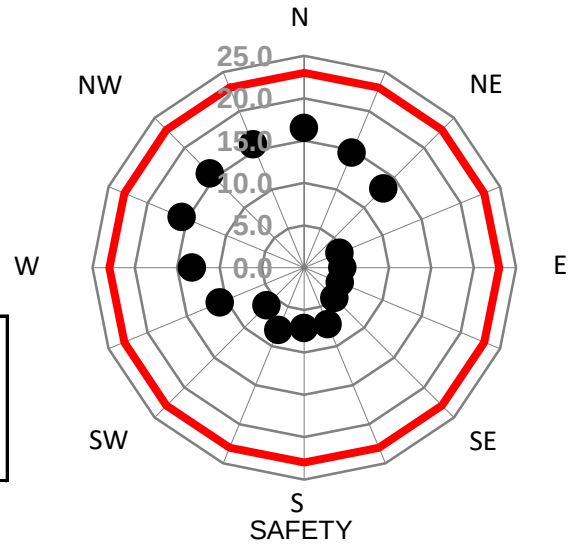
Test Location

T11



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



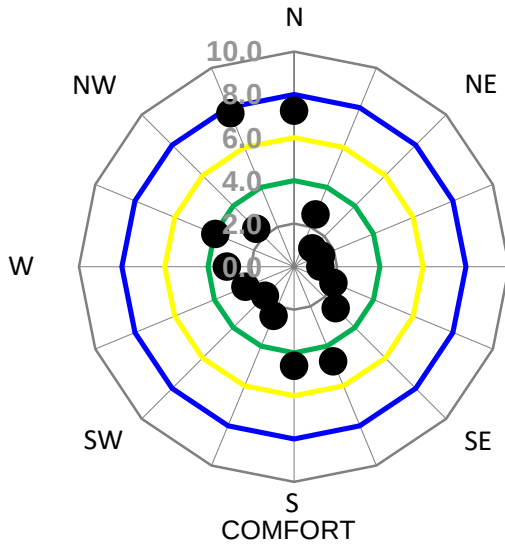
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	13.6%	4.4%	1.5%	5.8	Pass	16.5	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

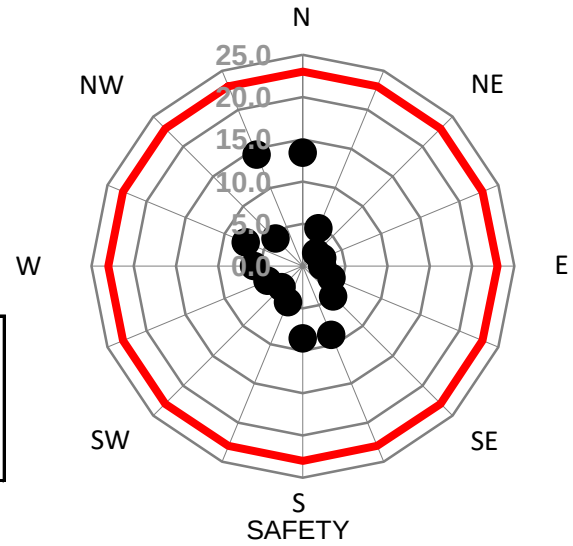
Test Location

T12



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 6m/s



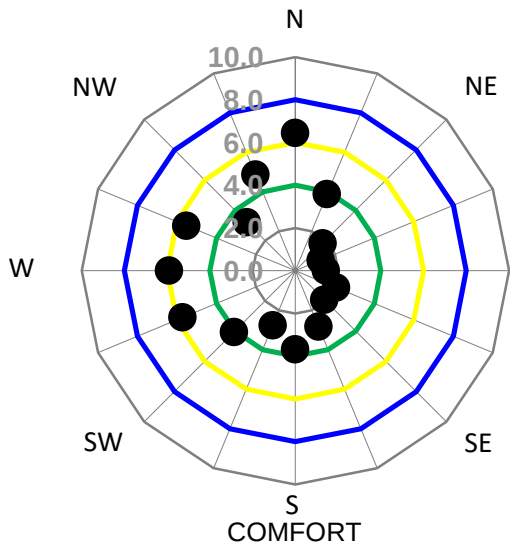
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 6m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	2.9%	0.6%	0.1%	3.5	Pass	14.3	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

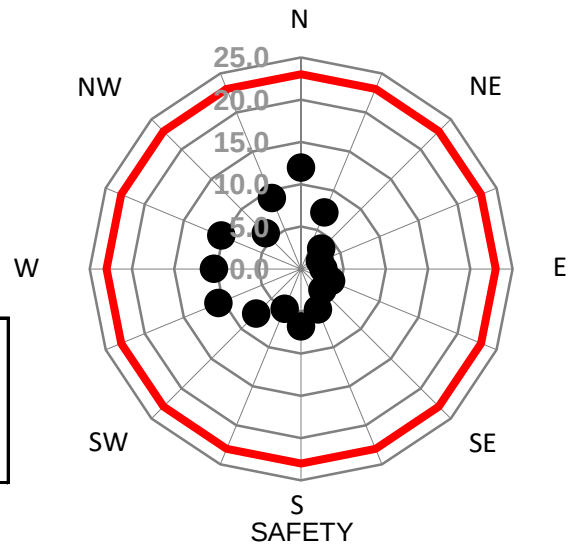
Test Location

T13



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



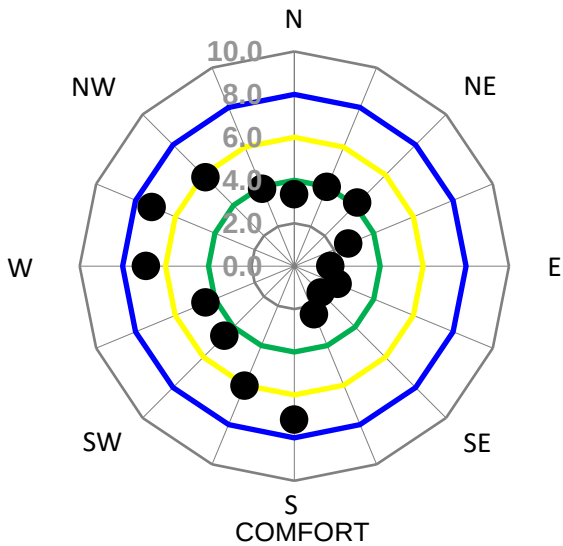
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	3.3%	0.4%	0.0%	3.5	Pass	11.9	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

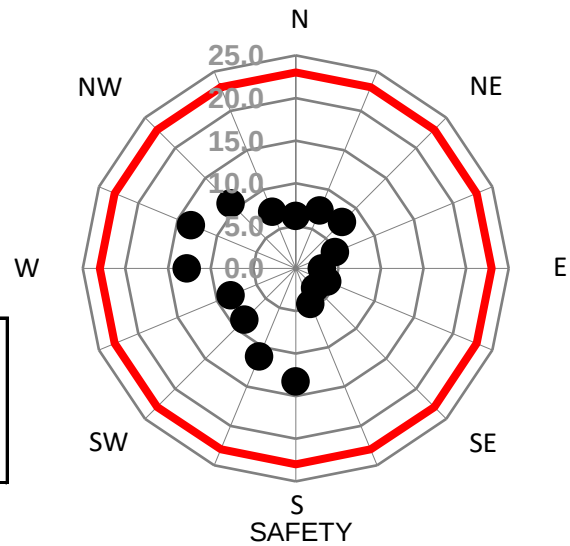
Test Location

T14



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



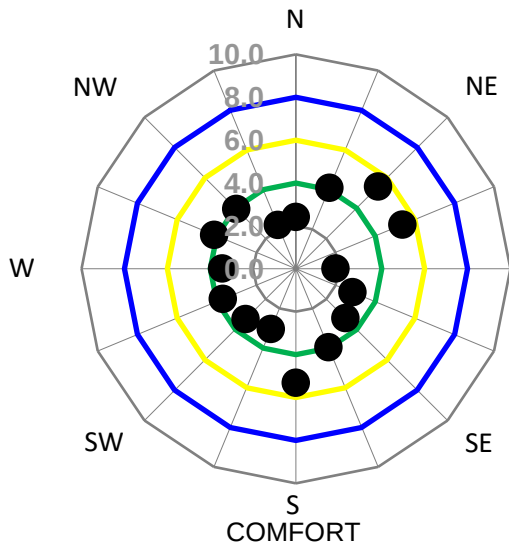
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	5.9%	1.0%	0.1%	4.2	Pass	13.3	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

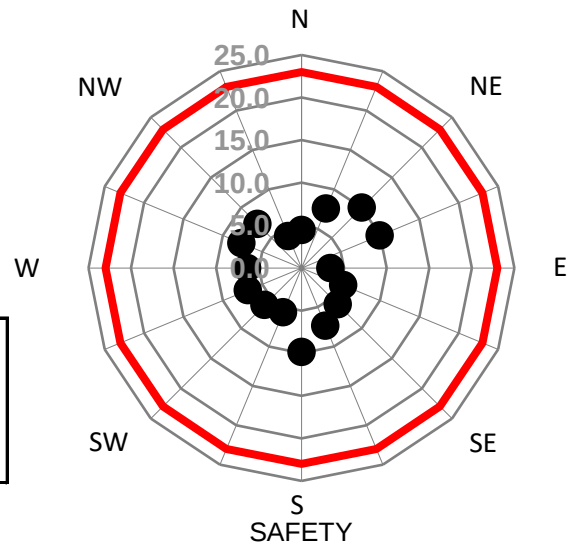
Test Location

T15



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



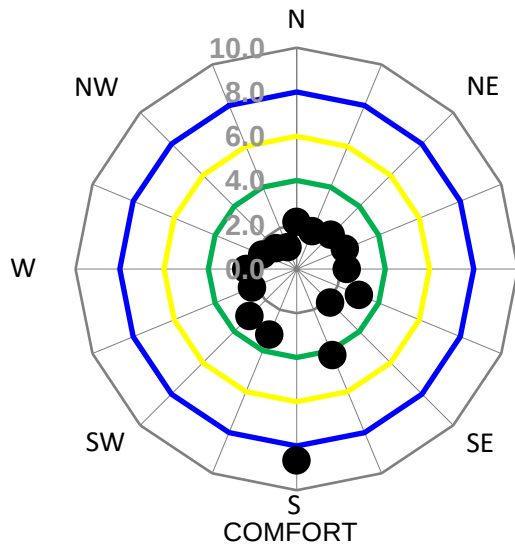
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	3.0%	0.1%	0.0%	3.6	Pass	10.0	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

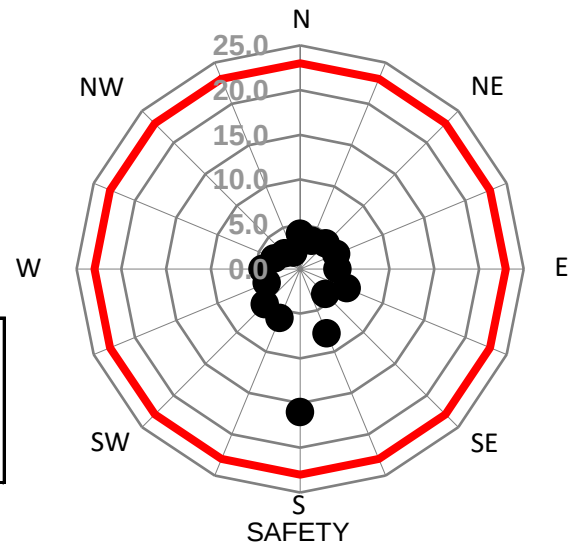
Test Location

T16



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



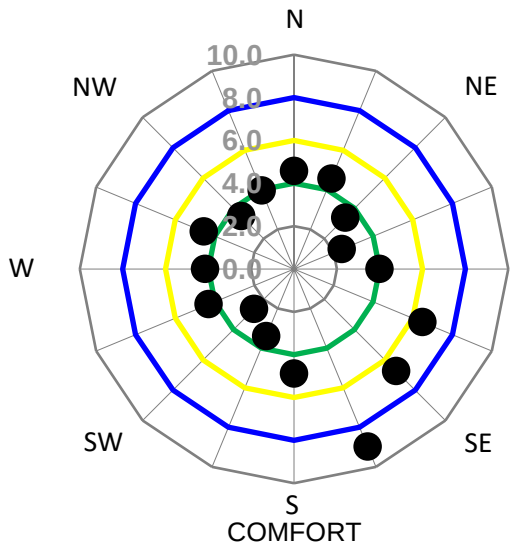
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	2.8%	0.8%	0.2%	3.0	Pass	16.0	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

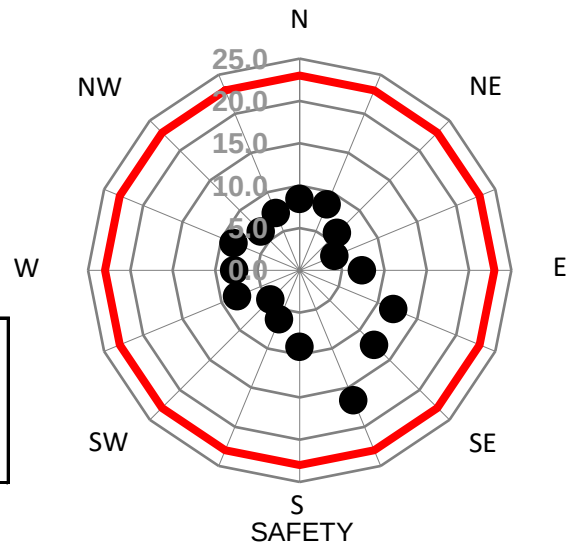
Test Location

T17



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



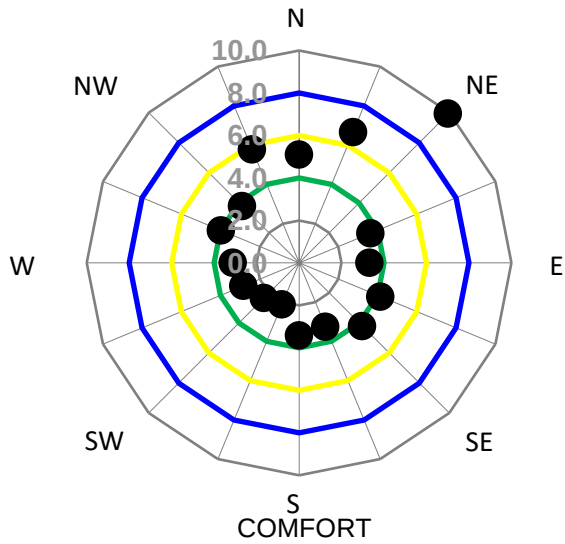
Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	8.9%	1.8%	0.2%	4.9	Pass	16.6	Pass
●							
■							
◆							
▲							
■							
◆							
▲							

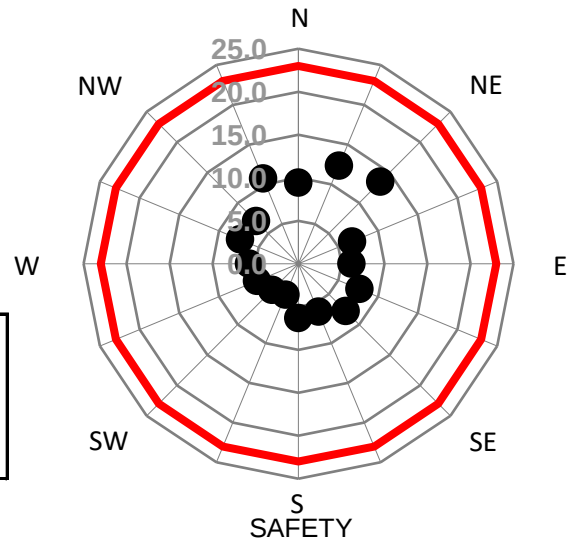
Test Location

T18



Local mean wind speed (m/s)

Target Wind Speed for Test Location = 8m/s



Local peak 3 second gust wind speed (m/s)

Safety Wind Speed = 23m/s

Configuration	Wind Comfort Criteria					Safety Criterion	
	Exceedence of given wind speed per year			Mean wind speed (exceeded 5% of year)	Result (compared against Target wind speed of 8m/s)	Peak wind speed (of all wind directions)	Result (compared against Safety wind speed of 23m/s)
	Sitting (4m/s)	Standing (6m/s)	Walking (8m/s)				
	%	%	%	m/s	Pass/Fail	m/s	Pass/Fail
● Proposed Configuration	5.3%	1.9%	0.5%	4.1	Pass	13.5	Pass
●							
■							
◆							
▲							
■							
◆							
▲							