WINDTECH

Ref: W400-38F01(rev2)- Memo

Date: November 8, 2011

To: Mirvac Design By email Pages: 13

Attn: **Mr Edward Kertawidjaja**

Cc: Ms Snezana Mitrovski

From: Adam Brownett

Re: **7 Railway Street, Chatswood**
Alternative Ground Level Wind Mitigation Strategy

TECHNICAL MEMO

1.0 Introduction

This memo presents the results of a detailed investigation into an alternative mitigation strategy for the ground level pedestrian winds along Railway Street for the abovementioned development. Note that this technical memo is to be read in conjunction with the original Pedestrian Wind Environment Study report (report reference W400-33F05(rev1), dated October 6, 2010).

Since the time of writing of the original report, additional wind tunnels tests have been undertaken to determine an alternate wind mitigation strategy for the ground level areas along Railway Street. The aim of the additional tests was to avoid the necessity for tree planning on the adjacent footpath due to extensive underground services for that area. The impact of the proposed change in planting strategy on the Ground Level Western Plaza Area was also monitored to ensure that the final alternate treatments suggested in this memo do not adversely impact onto the surrounding areas.

For the additional wind tunnel tests, several study point locations from the original study were selected for reanalysis. The layout of the study points that were monitored in this study are presented in Figure 1.

2.0 Results of the Study

2.1 Pedestrian Footpath Area along Railway Street

The Study Points

Test Points 18 and 53 are used to monitor the ground level wind conditions of the pedestrian footpath area along Railway Street. The location of each Study Point is also shown in Figure 1 of this memo.

Applicable Criteria

The various pedestrian footpaths around the site are used primarily as pedestrian thoroughfares. The appropriate wind comfort criterion for this type of use is the comfortable walking criterion of 7.5m/s for the weekly maximum GEM wind speeds. Note that the safety limit criterion of 23m/s for the annual maximum peak wind speeds should also be satisfied for all ground level areas.

Results and Recommendations

The main impact from the development is at Point 18 due to side stream effects from both the north-easterly and westerly winds. The results of the study indicates that with the inclusion of the revised tree layout depicted in Figure 2, wind conditions at Point 53 are within the comfortable walking criterion. Hence wind conditions at this point are acceptable for its intended use.

The results of the study indicates that the recommended hedge or line of densely foliating closely spaced 2m high shrubs along the western edge of the northern colonnade as depicted in Figure 1 is important in mitigating the effect of the westerly winds at Point 18 to meet the comfortable walking criterion. Note that, as an alternative to the hedge or line of shrubs, a screen or a series of baffle screens could be used in the same location and will provide a similar wind mitigation effect for the area. This is also shown in Figure 2.

2.2 Ground Level Western Plaza Area

The Study Points

Test Points 50, 51 and 52 are used to monitor the wind conditions within the Ground Level Western Plaza. The location of each Study Point is also shown in Figure 1 of this memo.

Applicable Criteria

The western plaza area is trafficable by pedestrians, and the comfortable walking criterion of 7.5m/s for the weekly maximum GEM wind speeds is considered an acceptable upper-limit for this type of use. Note that the safety limit criterion of 23m/s for the annual maximum peak wind speeds should also be satisfied for all ground level areas.

Results and Recommendations

The deep northern colonnade tends to exacerbate the effect of the north-easterly winds that are being downwashed and side-streamed through that area (Point 52). The results of the study indicates that with the inclusion of the revised tree layout depicted in Figure 2, wind conditions at Points 50 and 51 are within the comfortable walking criterion. Hence wind conditions at these points are acceptable for their intended use.

It was found that the inclusion of the revised tree layout depicted in Figure 2, and without the shrubs, Point 52 experienced north-north-easterly winds with speeds above the comfortable walking criteria. By adding the recommended line of 2m high shrubs/ hedge, north-west of Point 52, wind speeds in that area met the comfortable walking criterion. As mentioned previously, an alternative to the hedge or line of shrubs would be a screen, or a series of baffle screens, used in the same location. This would provide a similar wind mitigation effect for the area. This is also shown in Figure 2.

2.3 Lawn Area to the North of the Proposed Tower

The Study Points

Test Points 46 and 47 are used to monitor the wind conditions within the landscaped lawn area to the north of the proposed development. The location of each Study Point is also shown in Figure 1 of this memo.

Applicable Criteria

The northern landscaped garden area is trafficable by pedestrians, and the comfortable walking criterion of 7.5m/s for the weekly maximum GEM wind speeds is considered an acceptable upper-limit for this type of use. Note that the safety limit criterion of 23m/s for the annual maximum peak wind speeds should also be satisfied for all ground level areas.

Results and Recommendations

The results of the study indicates that with the inclusion of the revised tree layout depicted in Figure 2, wind conditions at Points 46 and 47 are still within the comfortable walking criterion. Hence wind conditions at these points are acceptable for their intended use.

Figure 1: Study Point Layout (circled ○)

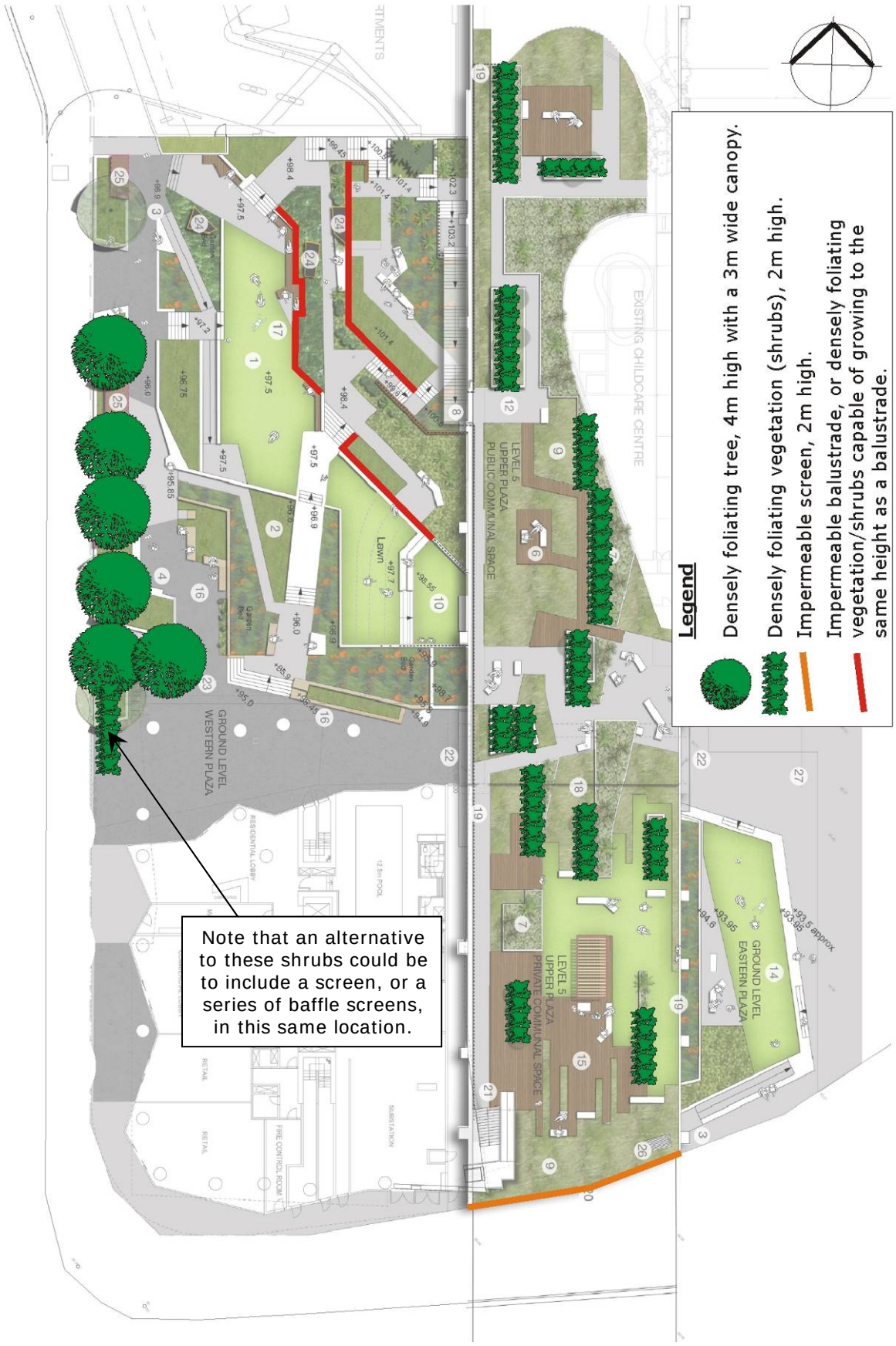


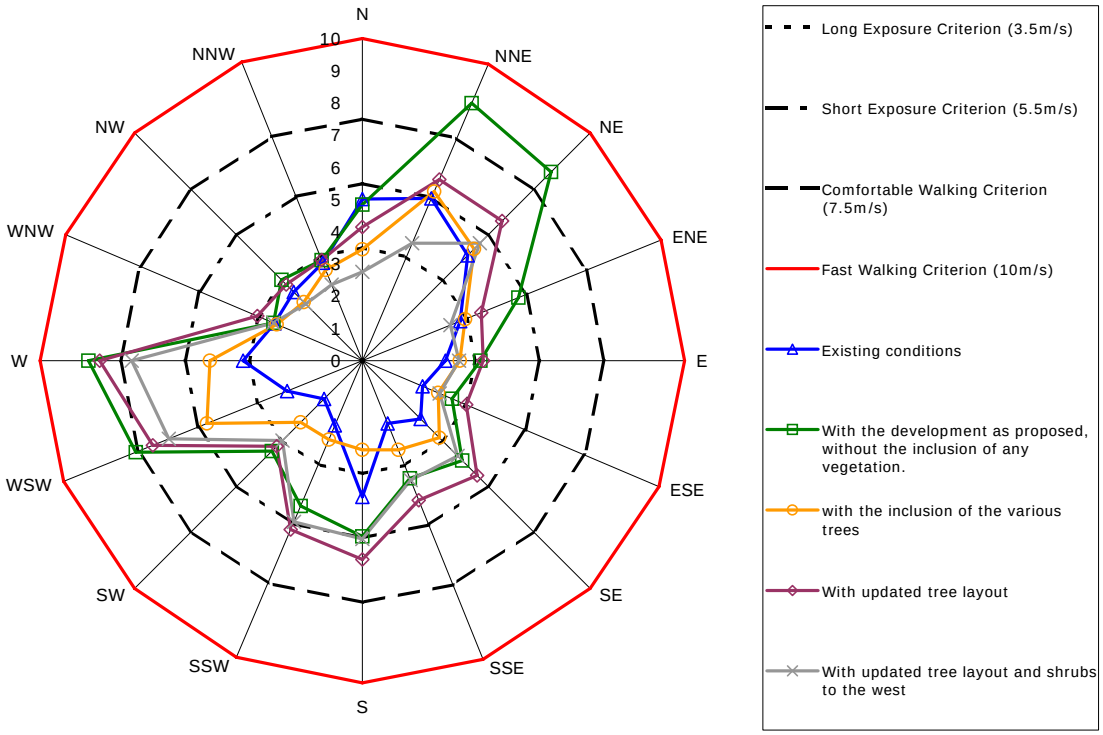
Figure 2: Recommended Treatments for the Accessible Outdoor Areas for Ground Level and Railway Enclosure

Appendix

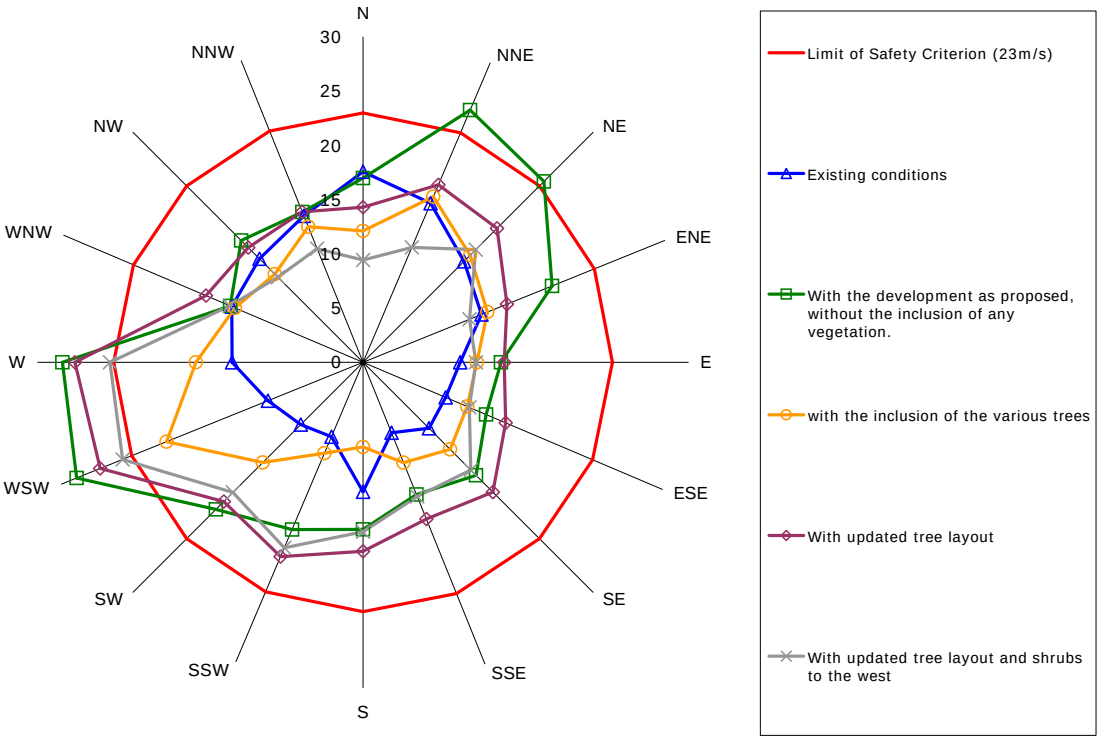
Plots of Wind Tunnel Results

Measured Wind Speeds at Point 18

Weekly Maximum Gust Equivalent Mean Wind Speeds (m/s)

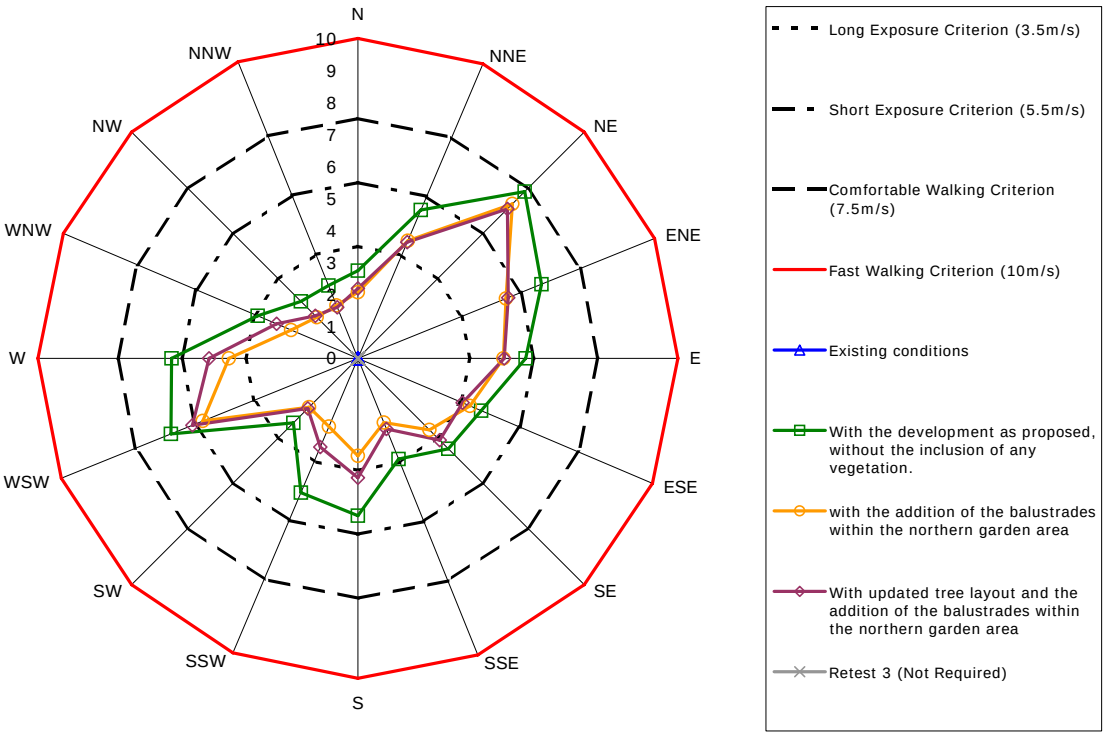


Annual Maximum Gust Wind Speeds (m/s)

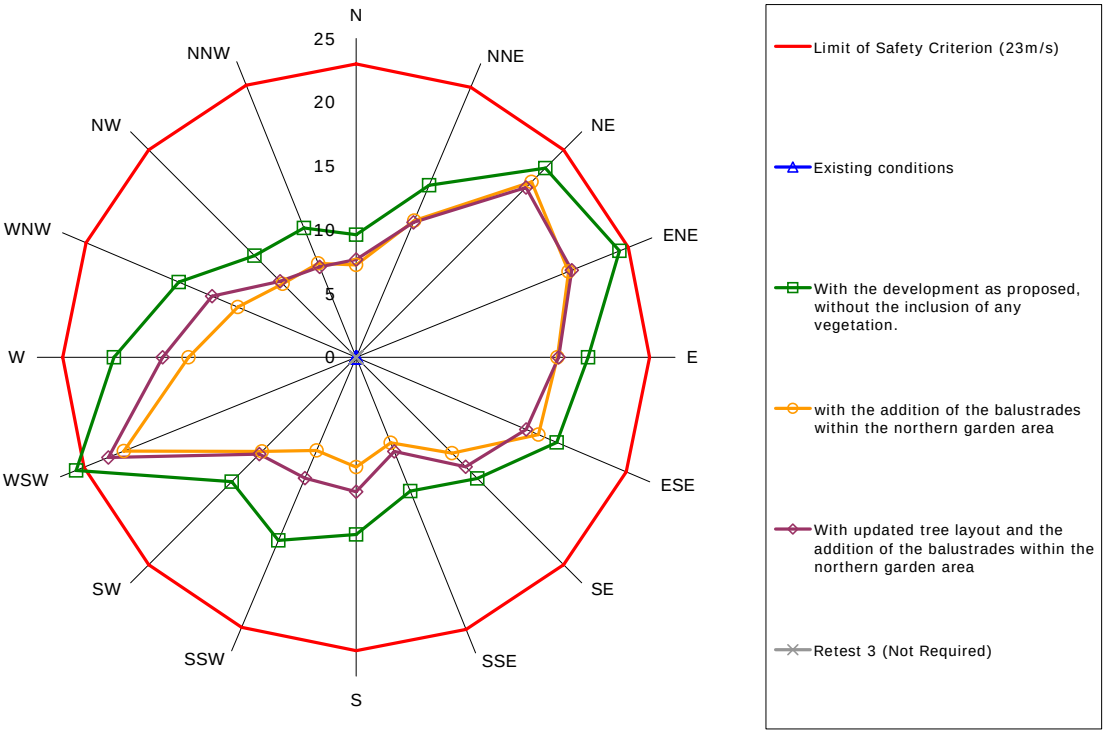


Measured Wind Speeds at Point 46

Weekly Maximum Gust Equivalent Mean Wind Speeds (m/s)

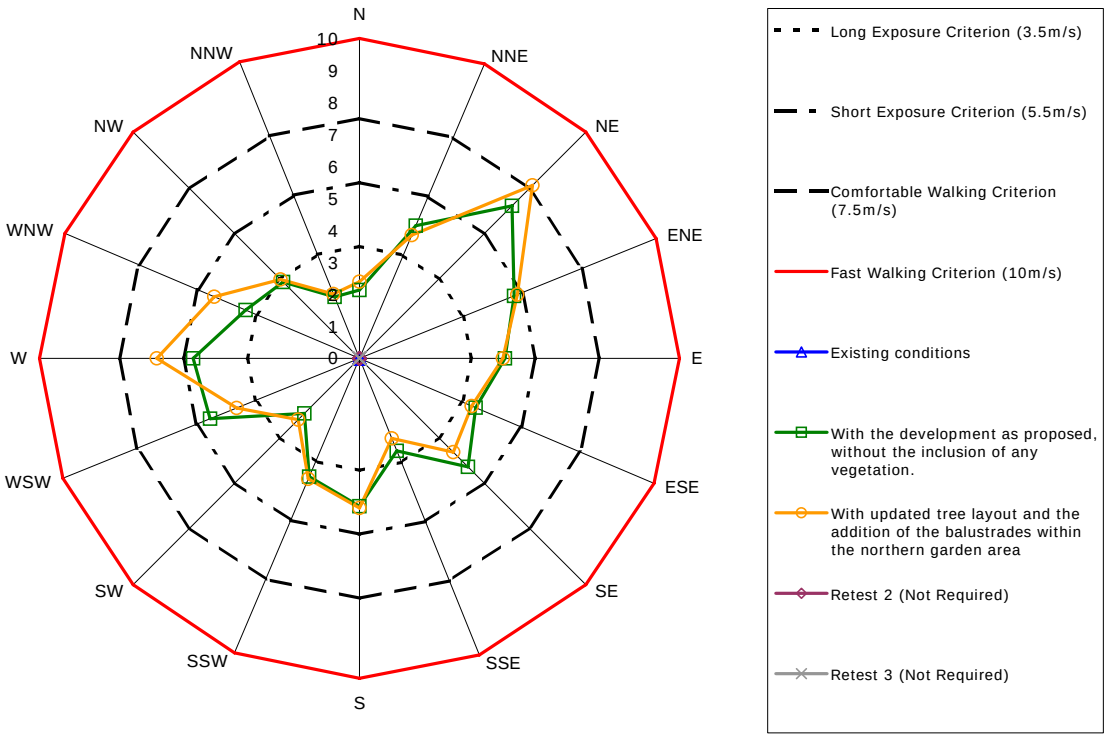


Annual Maximum Gust Wind Speeds (m/s)

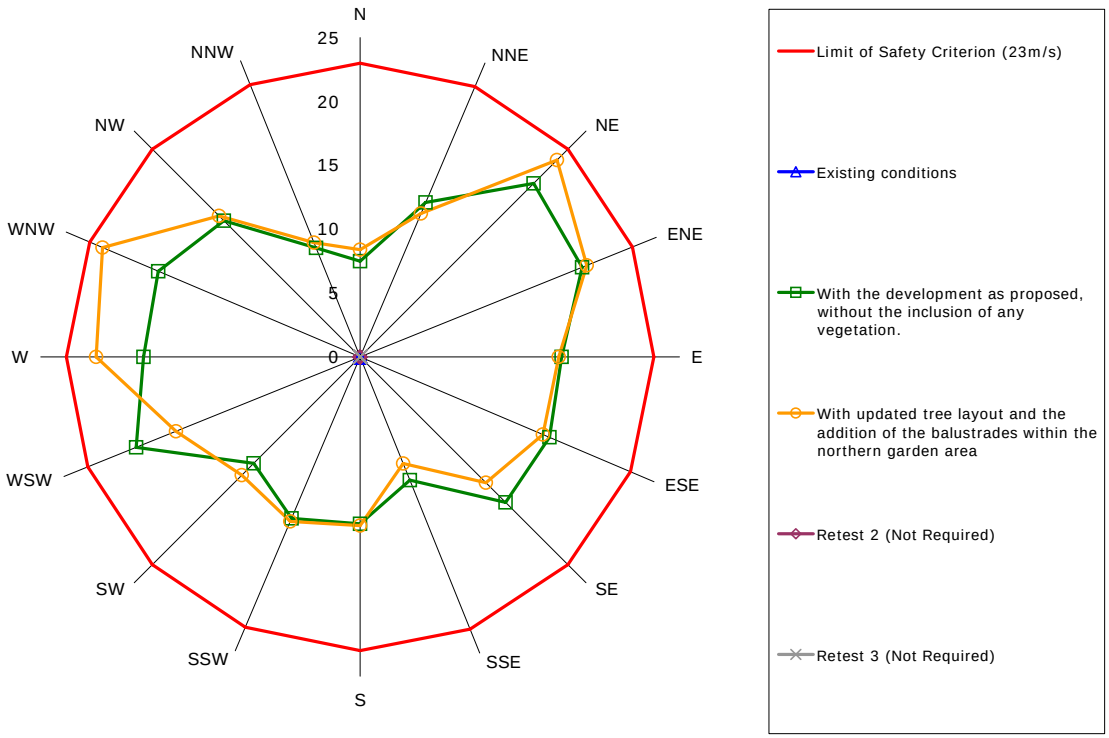


Measured Wind Speeds at Point 47

Weekly Maximum Gust Equivalent Mean Wind Speeds (m/s)

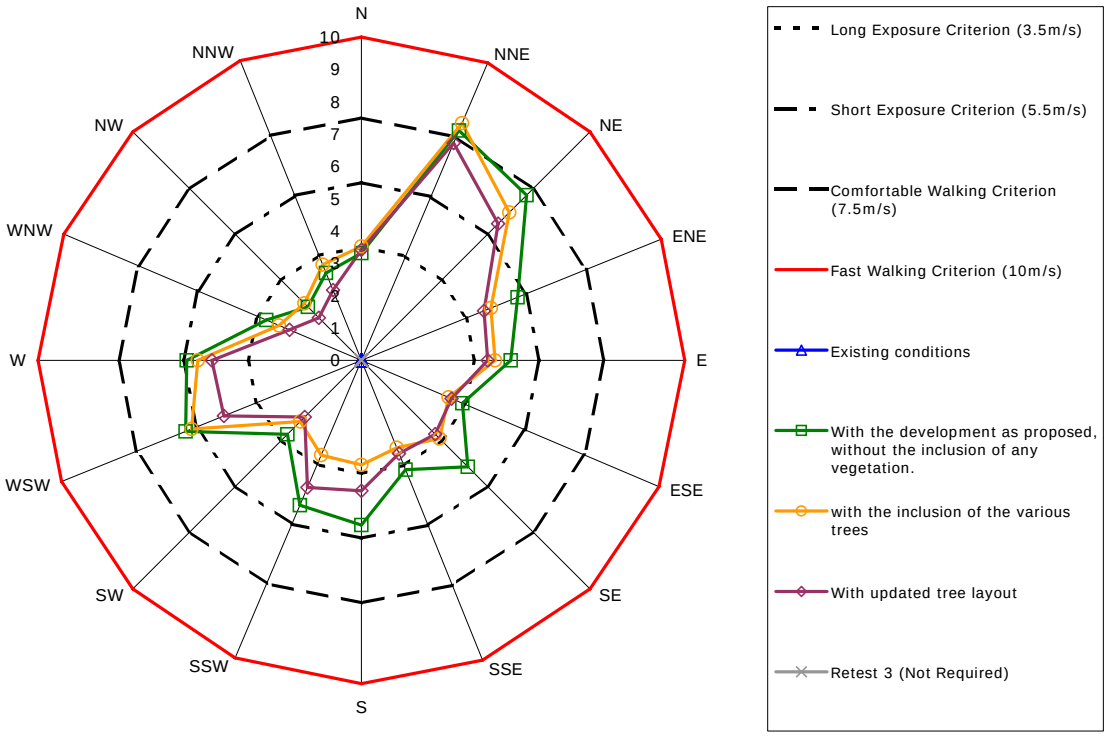


Annual Maximum Gust Wind Speeds (m/s)

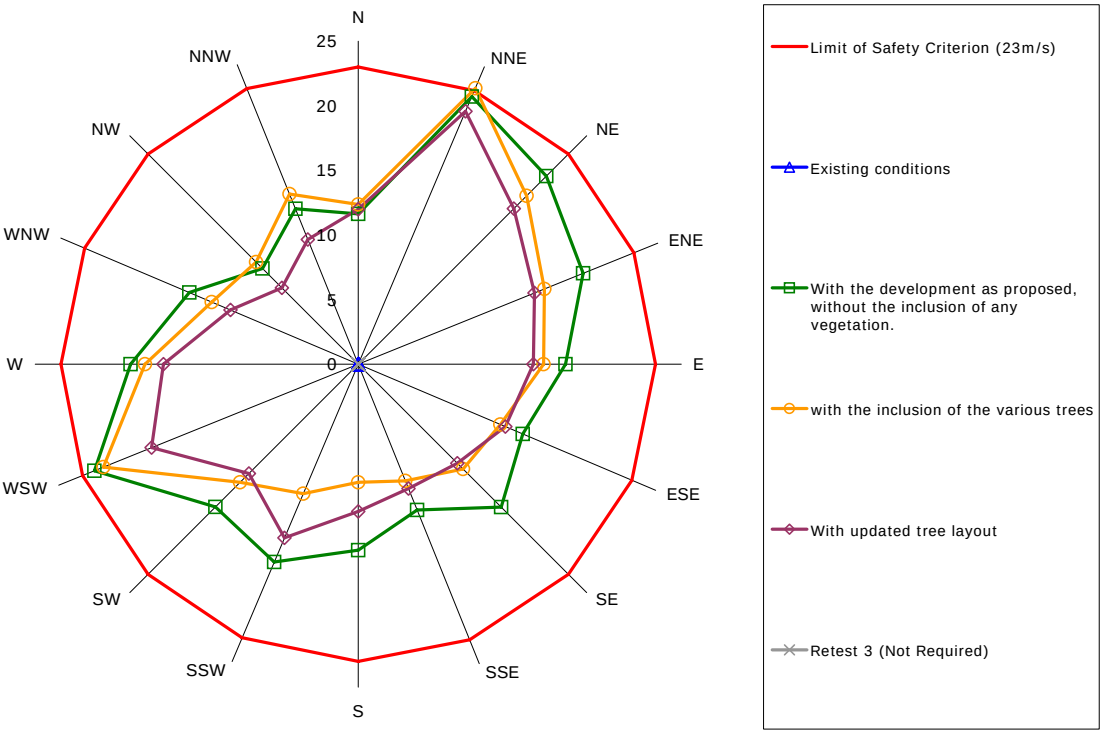


Measured Wind Speeds at Point 50

Weekly Maximum Gust Equivalent Mean Wind Speeds (m/s)

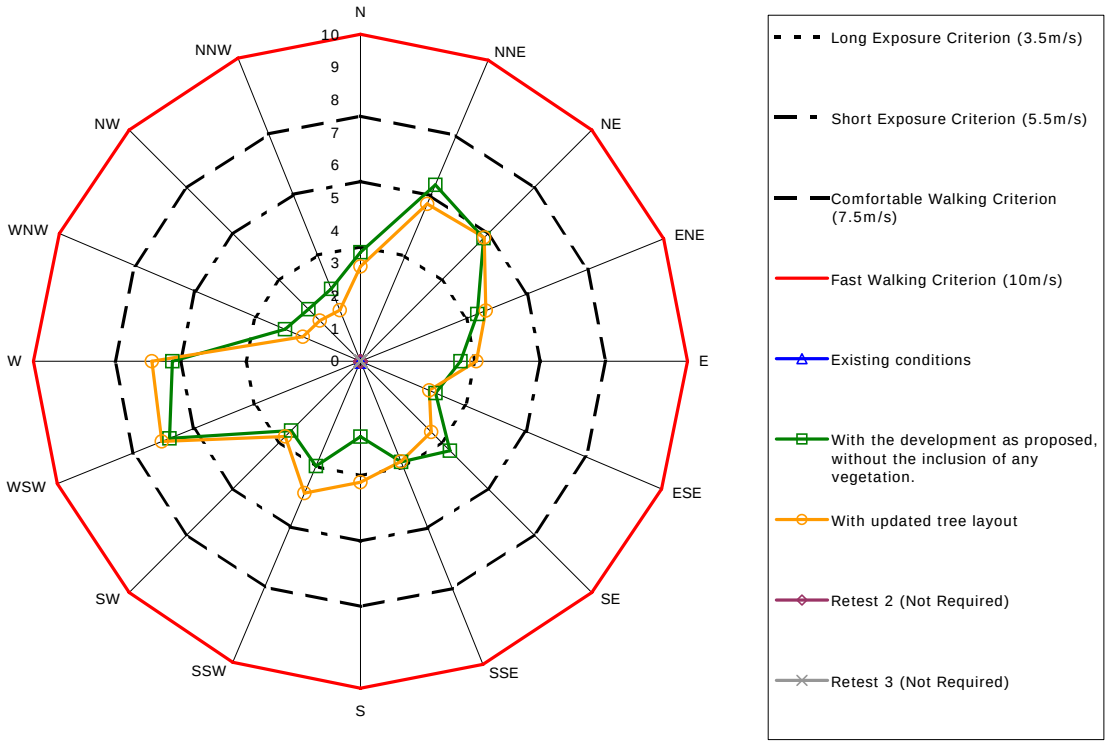


Annual Maximum Gust Wind Speeds (m/s)

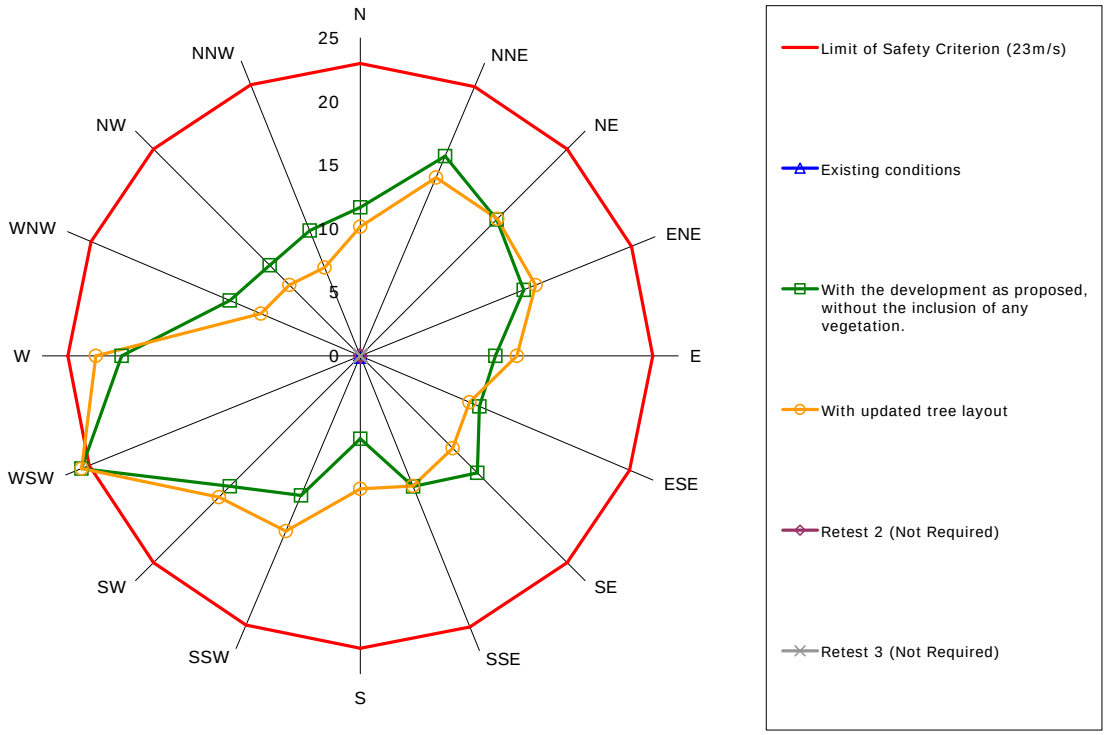


Measured Wind Speeds at Point 51

Weekly Maximum Gust Equivalent Mean Wind Speeds (m/s)

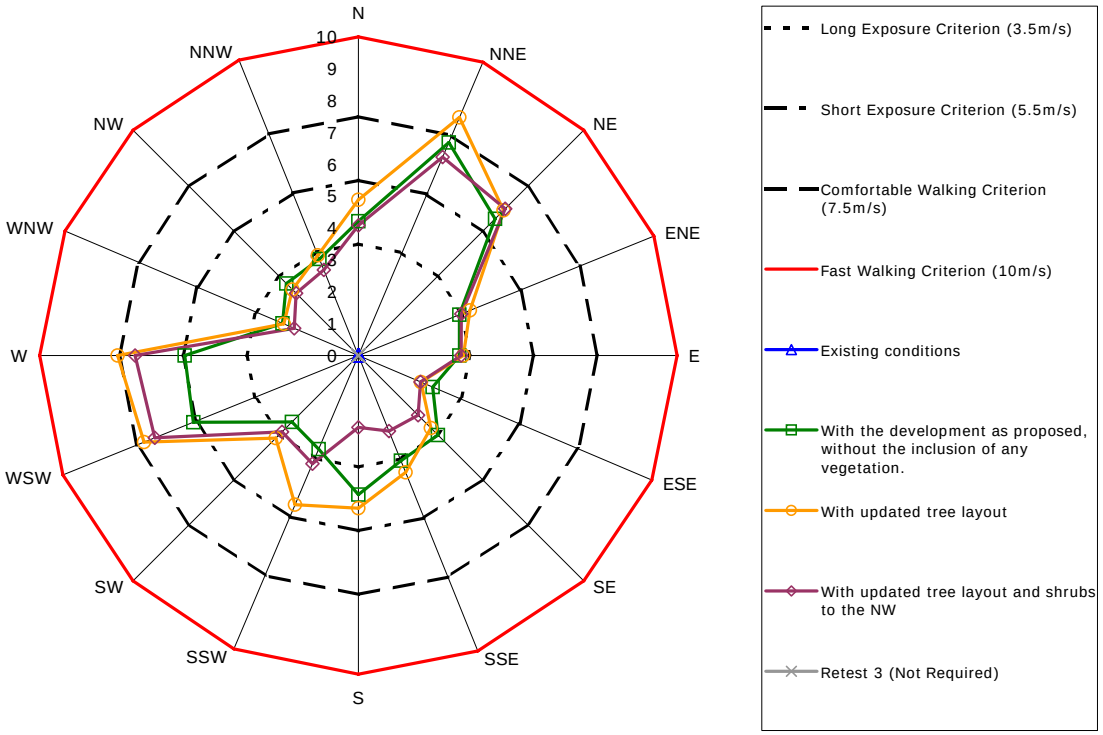


Annual Maximum Gust Wind Speeds (m/s)

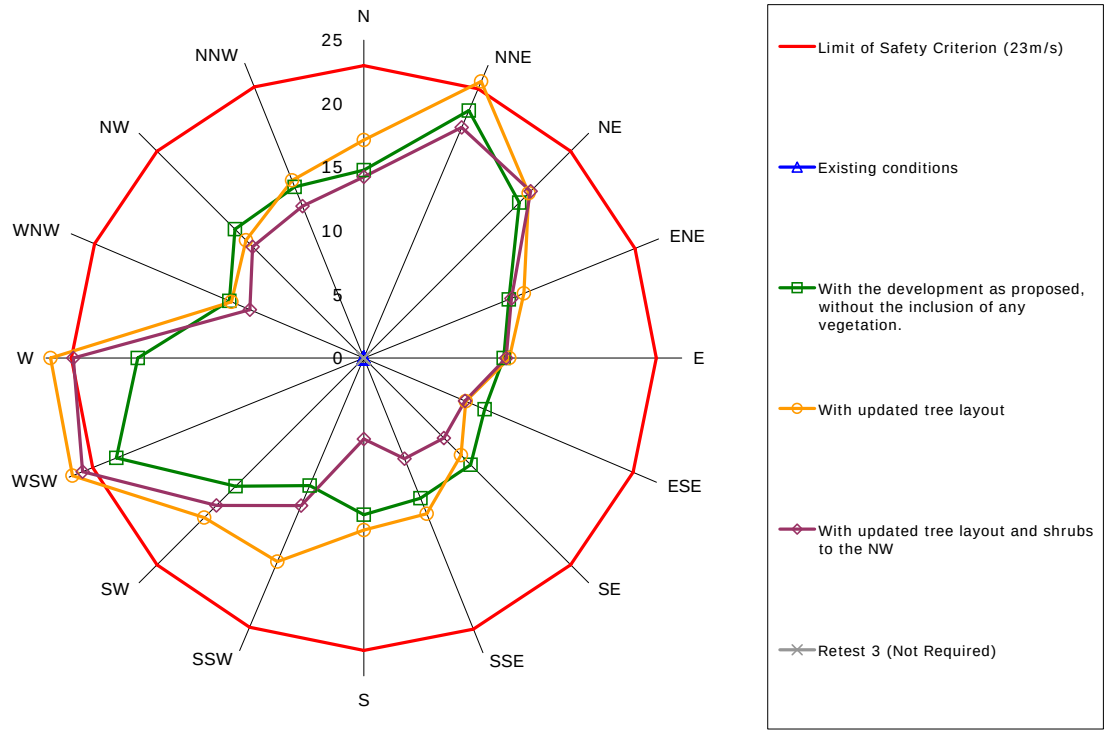


Measured Wind Speeds at Point 52

Weekly Maximum Gust Equivalent Mean Wind Speeds (m/s)

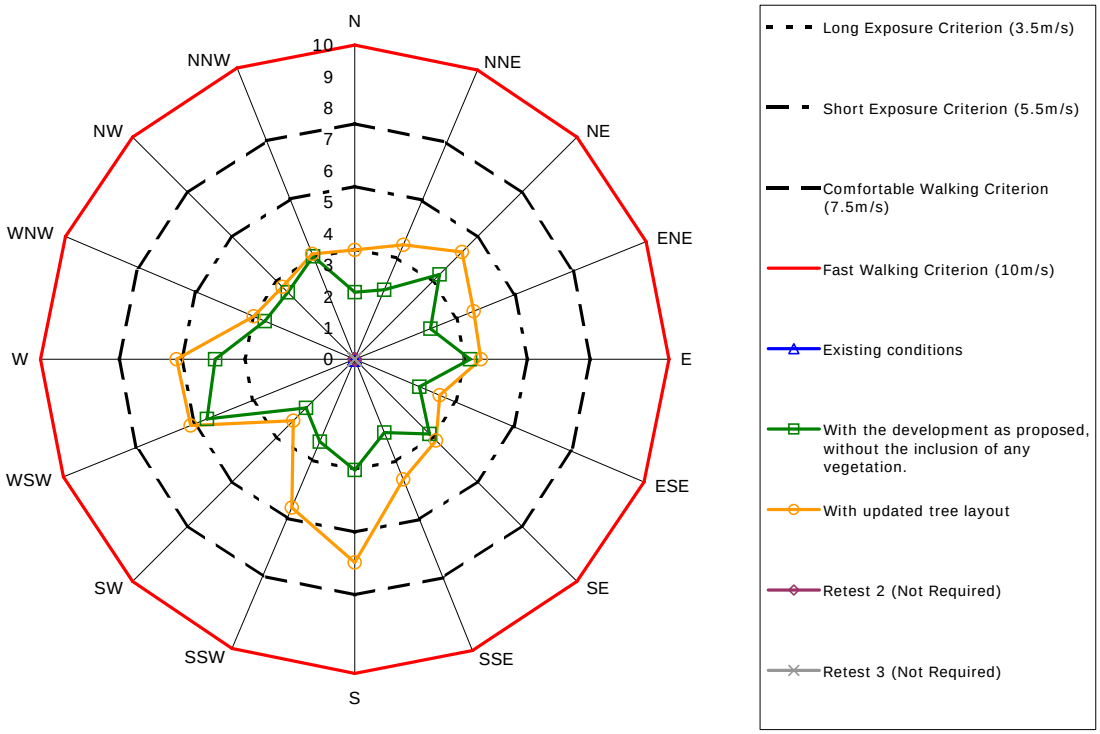


Annual Maximum Gust Wind Speeds (m/s)



Measured Wind Speeds at Point 53

Weekly Maximum Gust Equivalent Mean Wind Speeds (m/s)



Annual Maximum Gust Wind Speeds (m/s)