Attachment A11

Environmental Wind Assessment
and Appendices
187 Thomas Street, Haymarket

Greaton Developments Pty. Ltd.

187 Thomas Street, Haymarket

Environmental Wind Assessment

Wind

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Arup Australia Projects Pty Ltd
ABN 57 625 911 711

Arup
Level 5, 151 Clarence Square
Sydney, NSW 2000
Australia
www.arup.com

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Executive summary

This summary report provides discussion on the impact of proposed development at 187 Thomas Street on the measured wind conditions for comfort and safety in and around the site. The wind tunnel testing report conducted around the development in the existing, baseline, and a potential building configuration, are presented in Appendix 4.

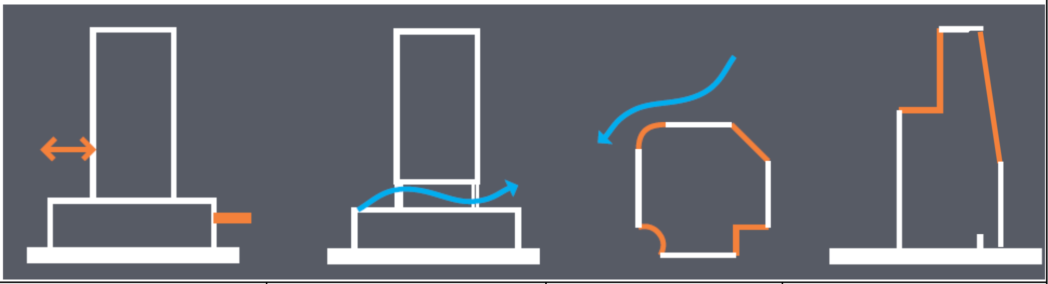
Generally, the inclusion of any large buildings on the fringe of a City markedly changes the local wind environment. The first isolated building typically creates the largest change in wind conditions with the windiest locations at the building corners. Subsequent large developments alter the overall wind flow pattern making some areas calmer and others windier, particularly at the outer corners of the compound shape and between closely spaced towers. As this area of the city continues to expand the area would tend to become calmer while the windier locations are moved to the perimeter of the developed area. Ideally the 'final' developed built-up profile would have the tallest buildings towards the middle tapering in height to the fringes.

Compared with the existing wind conditions, the inclusion of a large building generally increases the local comfort wind speeds by about one criterion level. For this site, the wind conditions change comfort classification category from pedestrian sitting to pedestrian standing. The majority of locations meet the target classification of pedestrian walking and standing depending on location.

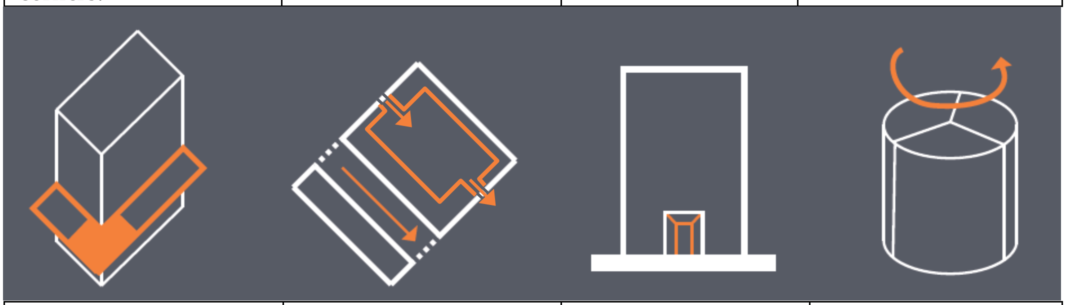
From a safety perspective there are fewer exceedances of the safety criterion in the Proposed than the Baseline configuration. These locations are close to the site along Thomas and Valentine Streets and only slightly exceed the criterion level. The critical wind directions are from the south-east (where there are numerous proposed large buildings that would be expected to reduce the incident wind speed and direction) and the west.

Measured wind conditions are highly dependent on the proposed building massing, geometry, distribution, and orientation. The current tests have shown that the wind conditions around the site are problematic in specific areas. From a fundamental fluid mechanics perspective, there are numerous potential solutions to mitigate the exceedances of the safety criteria as described in Figure 1 and a combination of features could be employed to mitigate the issues. The current testing indicates that amending the tower detail close to the podium has a beneficial impact on the wind conditions at ground level reducing the number of exceedances of the safety criterion.

As part of the Design Excellence process, the architect teams would be expected to address the highlighted wind issues around the site, through incorporation of such features described in Figure 1. It is considered that there is currently sufficient information to highlight the critical locations impacted by wind, and information to inform an appropriate architectural solution. Additional testing to 'solve' the problems prior to the architectural Design Excellence competition would be considered unnecessary, as proposed building forms could drastically change the local wind conditions on the ground plane. Keeping wind considerations as a key consideration through the Design Excellence process is considered the best methodology to mitigate the wind issues. This would be a similar process to other Design Competitions processes such as 338 Pitt Street, and Cockle Bay Precinct, which all showed exceedances of the comfort and/or safety criteria in the initial massing scheme.



Keep taller buildings to centre of block, and/or include a podium with min. 6 m offset to the tower from the podium edge, or at minimum include awnings around the corners.	Raise the tower at least above the podium to allow the flow to dissipate through this open level; best with a tower setback from the podium edge and minimum 3 storey gap.	Round or chamfer tower corners to encourage horizontal flow.	Provide setbacks or taper in the tower with height to reduce the windward area.



Include awnings at ground level, particularly around the corners, to offer wind and wind-driven rain protection to pedestrians.	Avoid constant width through site links, particularly directly under the tower. Better to have narrower entrances with central open area to concentrate fast flow.	Keep main entrances away from building corners, and preferably inset.	Consider revolving doors to main entry, particularly if lobby has multiple entrances. Double doors tend not be effective in high trafficked areas.

Figure 1: Methods to improve pedestrian level wind conditions

Contents

1 Introduction

Greaton Developments Pty. Ltd. are seeking to construct a large mixed-use development at 187 Thomas Street, Haymarket, Figure 2. This report summarises the wind climate in and around the site from the quantitative wind-tunnel testing conducted on the site in the existing and two proposed configurations.

Figure 2: City of Sydney Development Control Plan (DCP) 2012, Active frontages map Sheet 015

2 Wind assessment

Arup has been engaged to provide a quantitative environmental wind assessment for the proposed development at 187 Thomas Street, Haymarket. This report discusses the relevant results of the wind-tunnel testing study conducted on the development and interpretive discussion on the impact of the proposed buildings on the pedestrian level wind comfort and safety.

2.1 Modelling

Wind-tunnel testing was conducted by RWDI on the existing, and two potential schemes for the site: the base envelope case, and an initial proposed design. Details of the three configurations are shown in Figure 3.

The construction of the physical models was based on the 3d model received from the architect. No landscaping was included in the models as this cannot be relied on for pedestrian safety in strong winds. Any landscaping would locally slightly improve the wind comfort conditions. All approved buildings in the vicinity were included in the model.

The wind-tunnel testing programme conducted by RWDI was in accordance with the requirements of AWES (2019) and appropriate for the investigation. Appropriate wind speed and turbulence profiles, and test locations were used in the testing. Testing was conducted for 36 wind directions and integrated with the Sydney wind climate.

Existing	 
Baseline	 
Proposed	 

Figure 3: Photographs of tested models

2.2 Local wind climate

Weather data recorded at Sydney Airport by the Bureau of Meteorology has been analysed for this project. The analysis is summarised in Appendix 1. This wind assessment is based on these wind directions.

A general description on flow patterns around buildings is given in Appendix 2.

2.3 Specific wind controls

The wind comfort and safety criteria used in the assessment were taken from the Draft City of Sydney Planning Strategy 2016-2036. The criteria are:

For pedestrian **safety** the annual maximum 0.5 s gust wind speed occurring in an hour between 6 am and 10 pm should be less than 24 m/s. This represents a 0.017% probability of occurrence.

For pedestrian **comfort** the greater of the hourly mean or gust equivalent mean wind speed occurring for 5% of the time, i.e. no more than 292 hours per annum between 6 am and 10 pm should be less than:

- 8 m/s for transient spaces such walking
- 6 m/s for more leisurely standing type activities such as window shopping or waiting for public transport

- 4 m/s for more sedentary activities such as pedestrian sitting, but not outdoor dining

2.4 Discussion of results

The primary findings of the study for the three configurations are summarised in Figure 4, which list the locations selected for investigation, shown in Figure 5, along with the target and measured comfort and safety classifications. The values presented in Figure 4 are the wind speed associated with the criterion probability of time, and the colour represents the classification associated with the criterion. An additional classification has been included for the safety criterion when the mean wind speed is between 22 and 24 m/s, close to the failure level.

A visual summary of the spatial wind comfort classifications in and around the site for the various configurations is shown in Figure 5 to Figure 7 for the existing, baseline, and proposed configurations respectively. These plots show the physical location identifier, with the colour representing the wind classification for comfort in the top and safety in the lower images. The results have been condensed in Figure 4 for ease of comparison between configurations.

For pedestrian comfort, it is evident that in the existing configuration close to the site along Thomas, Valentine and Quay Streets the majority of locations are classified as suitable for pedestrian sitting activities with a number of locations just inside the standing criterion level. The wind speed at all locations with the development increase in magnitude and are classified as suitable for pedestrian standing and walking and therefore meeting the target criterion level. Generally the comfort conditions with proposed development are slightly better than the baseline case.

Further from the site the wind comfort conditions at the majority of locations in all configurations are classified as suitable for pedestrian standing type activities. In each configuration there are locations that move across the criterion threshold to be classified as walking or sitting.

Based on the results, the majority of locations would be classified as suitable for standing and walking type activities thereby meeting the target comfort classifications.

In terms of pedestrian safety, the existing configuration passes everywhere except close to the McKell building, due to the isolated massing of this building. In the Baseline configuration, there are additional exceedances of the safety criterion. The number and magnitude of exceedances of the safety criterion decreases in the Proposed configuration.

The primary areas of concern for both comfort and safety are close to the site along Thomas and Valentine Streets. The further afield issues around the McKell building are existing conditions. The flow mechanism causing the nearby issues are for winds from the south-east and west quadrants causing downwash flow accelerating around the windward corners of the exposed building, as described in Appendix 2. It is evident that amendments to the building geometry such as the inclusion of a notch above the podium level in the Proposed configuration, Figure 3, have a beneficial impact on the surrounding wind conditions. Such a notch is beneficial for the ground floor environment, but would be expected to classify the podium as suitable for pedestrian walking type activities, meeting the wind speed associated with the sitting criterion for about 60% of the time, which could be improved with local amelioration on the terrace.

Further improving the ground floor conditions through the Architectural Design Excellence competition using the fundamental guidelines described in Figure 1 should be achievable with the information available, and a key consideration for the technical panel and jury.

Description / identifier		Comfort target	Wind-tunnel results: Existing Comfort	Existing Safety	Baseline Comfort	Baseline Safety	Proposed Comfort	Proposed Safety
Thomas St	1	>6 to 8	3.3	13.5	5.8	21.9	5.8	21.9
	2	>6 to 8	3.3	15.2	5.6	24.9	4.7	17.0
	3	>6 to 8	3.6	14.3	5.8	23.4	5.0	19.3
	4	>6 to 8	n/a	n/a	n/a	n/a	5.6	21.9
	5	>6 to 8	3.6	13.5	6.4	23.4	5.0	19.0
	6	>6 to 8	3.6	13.5	6.7	25.4	5.6	20.5
	7	>6 to 8	3.6	13.5	8.1	29.0	6.1	22.5
	8	>6 to 8	3.9	15.5	6.4	22.5	6.4	23.1
	9	>6 to 8	4.2	16.4	7.8	26.6	6.9	22.8
	48	>6 to 8	3.6	13.5	5.0	18.1	5.3	20.5
	49	>6 to 8	3.6	13.2	5.8	20.2	3.9	16.4
	50	>6 to 8	4.2	19.3	5.3	21.1	4.2	17.8
	51	>6 to 8	3.6	14.0	4.7	19.3	4.2	15.8
	52	>6 to 8	3.6	14.6	4.2	17.3	5.0	17.8
	53	>6 to 8	4.2	18.1	4.4	16.4	5.6	19.9
	54	>6 to 8	3.9	17.0	5.3	21.6	5.3	20.5
	70	>6 to 8	3.9	16.7	4.7	17.6	5.0	21.4
	71	>6 to 8	3.6	15.2	3.6	14.3	4.4	18.4
	72	>6 to 8	3.3	12.9	5.3	23.4	6.1	23.4
	73	>6 to 8	3.6	15.5	5.0	20.8	6.1	23.4
	74	>6 to 8	3.9	14.0	6.7	26.0	6.4	25.7
	75	>6 to 8	3.3	11.4	6.1	24.3	6.7	22.8
Valentine Street	10	>6 to 8	3.9	13.7	6.7	23.7	6.1	24.6
	11	>6 to 8	4.2	14.0	8.6	27.8	8.3	25.2
	12	>6 to 8	3.9	13.7	6.9	23.7	6.4	20.5
	13	>6 to 8	n/a	n/a	n/a	n/a	5.8	19.0
	14	>6 to 8	3.9	13.7	5.3	19.3	6.1	22.2
	15	>6 to 8	3.6	13.5	5.0	20.5	5.6	23.4
	16	>6 to 8	3.3	11.4	n/a	n/a	5.6	24.0
	17	>6 to 8	3.1	10.8	4.4	17.8	5.6	22.8
	40	>6 to 8	3.1	10.8	3.9	15.2	5.0	25.4
	41	>6 to 8	4.2	15.2	4.2	15.5	5.6	24.0
Quay Street	42	>6 to 8	3.9	13.5	4.4	21.1	5.6	21.4
	43	>6 to 8	3.9	16.1	6.4	23.1	4.4	18.7
	44	>6 to 8	4.7	19.0	5.8	19.9	5.0	18.4
	45	>6 to 8	3.6	13.7	4.7	16.7	5.0	19.6
	46	>6 to 8	3.3	11.7	5.0	18.4	5.0	18.7
	47	>6 to 8	3.6	12.6	5.6	19.9	5.8	20.5
	55	>6 to 8	3.9	17.8	5.8	24.3	6.1	23.1
	56	>6 to 8	4.4	22.2	5.8	23.7	5.3	21.1
	57	>6 to 8	3.9	16.4	5.8	21.4	5.8	22.2
George Street	18	>4 to 6	3.9	14.0	4.4	19.3	5.0	19.0
	19	>4 to 6	4.2	15.5	4.2	17.3	4.7	19.9
	21	>4 to 6	5.0	19.0	5.0	18.1	5.0	18.4
	22	>4 to 6	4.7	17.8	5.3	21.9	4.7	17.8
	23	>4 to 6	5.3	19.3	5.6	20.5	5.3	19.6
	24	>4 to 6	5.8	22.2	6.4	24.0	6.1	22.8
	28	>4 to 6	5.3	21.1	5.6	21.1	5.6	20.8
	32	>4 to 6	3.6	14.3	n/a	n/a	5.0	19.0
	33	>4 to 6	3.6	12.6	n/a	n/a	4.2	15.5
	35	>4 to 6	4.7	17.8	3.9	15.8	4.7	19.0
	36	>4 to 6	4.7	17.0	5.8	19.6	4.4	16.1
	37	>4 to 6	4.2	15.2	4.7	16.7	4.2	15.2
	38	>4 to 6	4.2	16.1	4.4	16.4	4.2	15.8
	39	>4 to 6	4.4	16.7	4.4	15.2	4.7	18.4
Ultimo Road	58	>6 to 8	5.0	19.9	5.0	21.4	5.0	19.0
	59	>6 to 8	4.2	17.0	5.3	20.8	3.9	15.8
	60	>6 to 8	4.7	17.3	5.0	19.3	5.0	18.1
	61	>6 to 8	3.9	15.2	3.9	16.4	4.2	15.8
	62	>6 to 8	4.7	17.3	5.0	17.8	4.7	16.4
	63	>6 to 8	5.0	19.6	3.9	15.5	4.7	18.4
	64	>6 to 8	5.0	20.8	4.7	17.0	5.0	19.3
	65	>6 to 8	5.0	22.5	5.3	19.0	5.3	20.8
	66	>6 to 8	5.0	21.4	5.0	19.6	5.3	19.9
	67	>6 to 8	5.3	21.1	5.0	21.9	4.7	18.4
	68	>6 to 8	4.7	18.7	5.0	20.5	5.0	18.7
	69	>6 to 8	4.2	14.6	4.2	16.1	3.9	15.2
McKell Building	25	>6 to 8	6.1	24.6	6.1	25.4	6.1	25.4
	26	>6 to 8	6.1	23.1	6.4	25.4	6.1	24.3
	27	>6 to 8	7.2	27.5	7.8	29.0	7.5	28.4
Pitt St	34	>6 to 8	5.8	19.9	4.2	18.7	5.8	19.3
Rawson Place	29	>6 to 8	5.3	18.1	5.8	18.7	5.6	18.4
	30	>6 to 8	6.4	21.6	6.7	24.3	6.1	22.5
	31	>6 to 8	5.6	21.1	5.8	22.2	5.6	21.1

LEGEND

Comfort criterion
- Outdoor dining
- Pedestrian Sitting
- Pedestrian standing
- Pedestrian Walking
- Business Walking
- Uncomfortable

Safety criterion
- ≤22 Pass
- >22 Pass
- >24 Fail

Figure 4: Summary of wind tunnel results

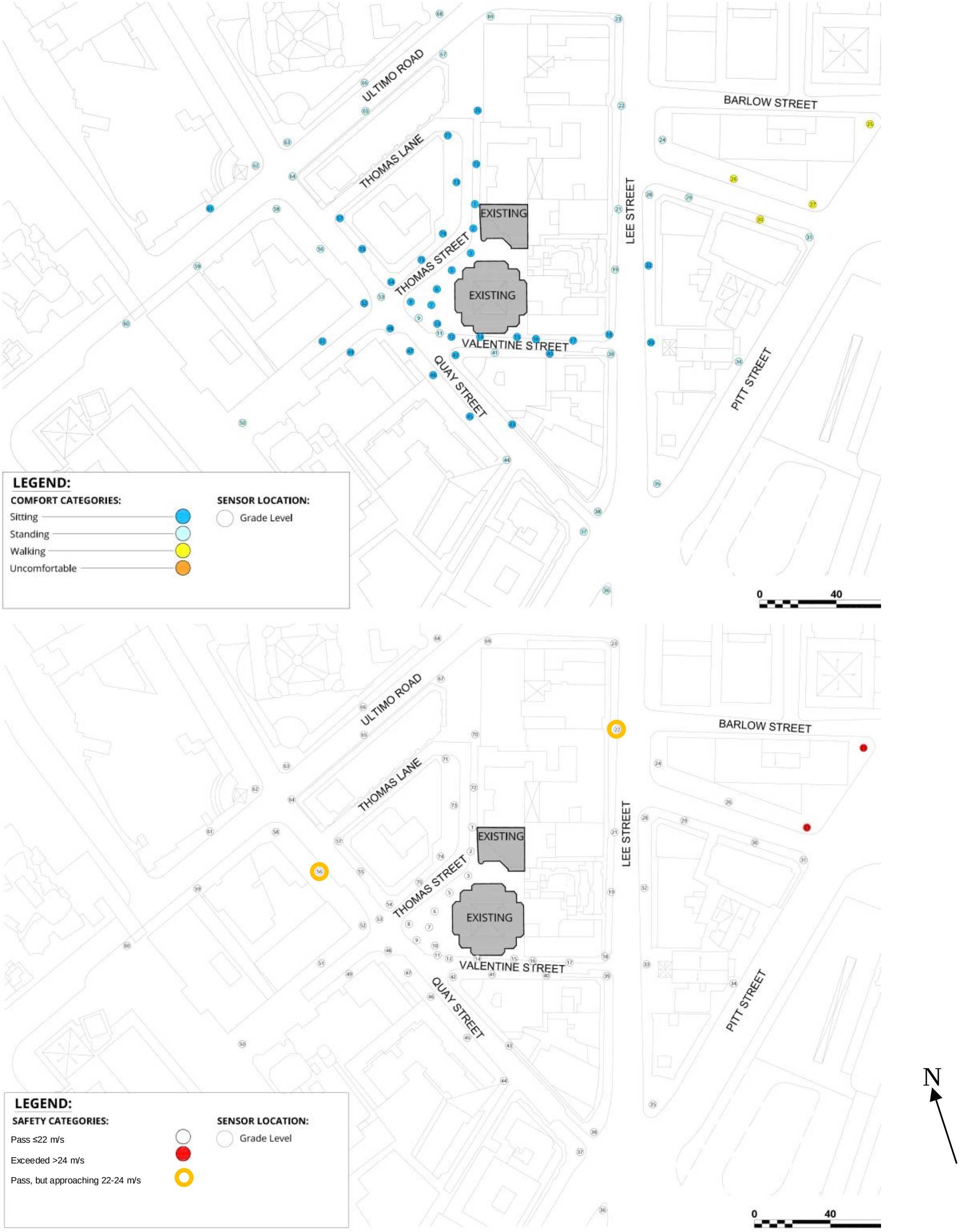


Figure 5: Existing configuration comfort (T) and safety(B) wind rating

Figure 6: Baseline configuration comfort (T) and safety(B) wind rating

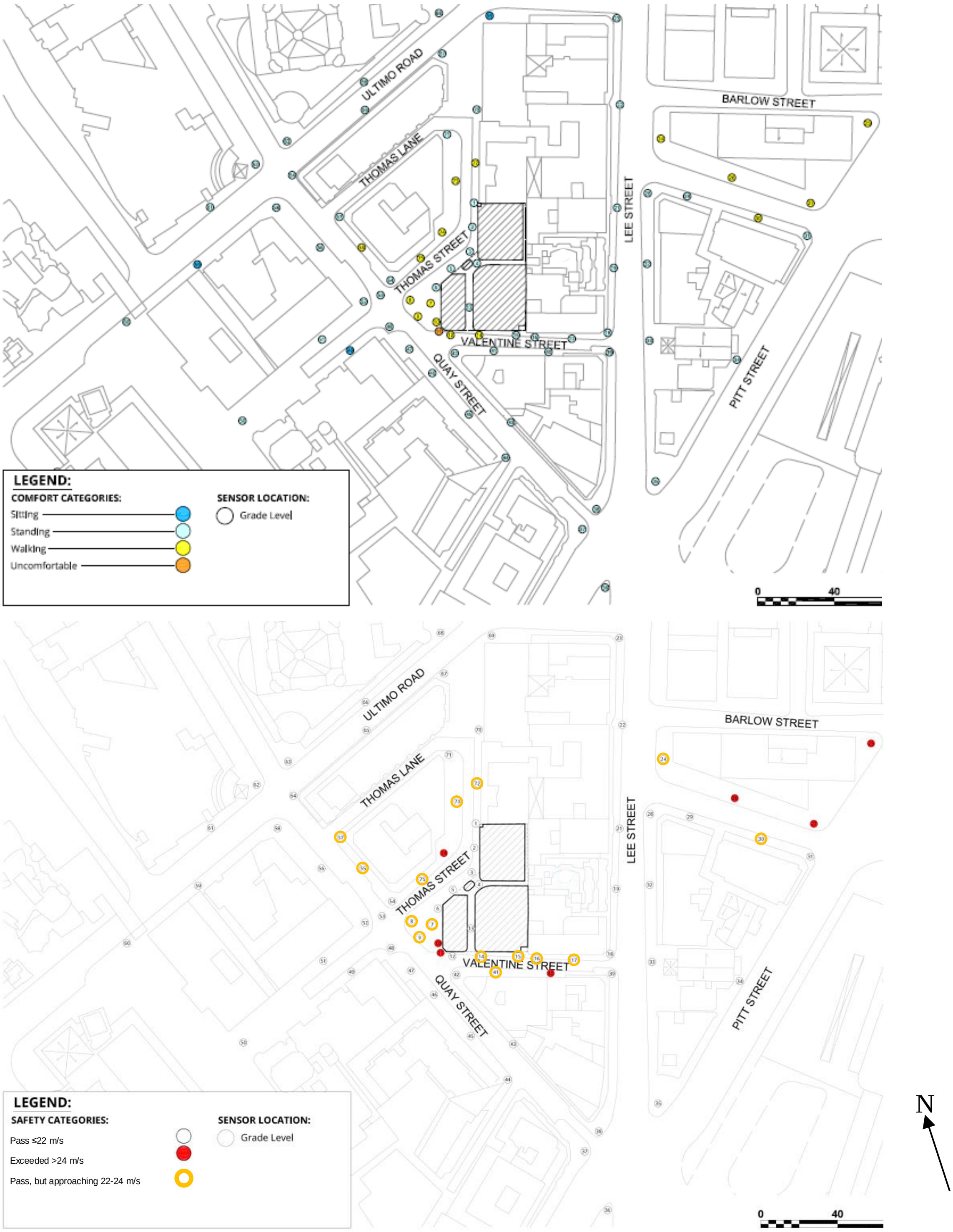


Figure 7: Proposed configuration comfort (T) and safety(B) wind rating

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Appendix 1: Wind climate

The wind frequency and direction information measured by the Bureau of Meteorology anemometer at a standard height of 10 m at Sydney Airport from 1995 to 2017 have been used in this analysis, Figure 8. The arms of the wind rose point in the direction from where the wind is coming from. The anemometer is located about 8 km to the south of the site. The directional wind speeds measured here are considered representative of the wind conditions at the site.

It is evident from Figure 8 that strong prevailing winds are organised into three main groups which centre at about the north-east, south, and west quadrants.

Strong summer winds occur mainly from the south and north-east quadrants. Winds from the south are associated with large synoptic frontal systems and generally provide the strongest gusts during summer. Moderate intensity winds from the north-east tend to bring cooling relief on hot summer afternoons typically lasting from noon to dusk. These are small-scales temperature driven effects; the larger the temperature differential between land and sea, the stronger the wind.

Winter and early spring strong winds typically occur from the south-west, and west quadrants. West quadrant winds provide the strongest winds affecting the area throughout the year and tend to be associated with large scale synoptic events that can be hot or cold depending on inland conditions.

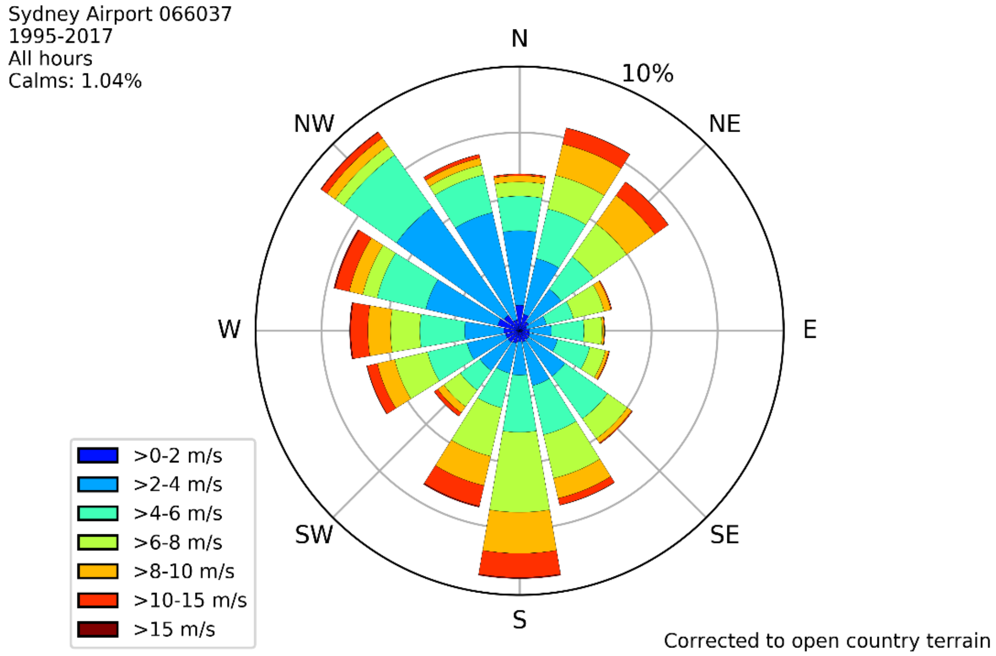

Figure 8: Wind rose showing probability of time of wind direction and speed

Appendix 2: Wind flow mechanisms

An urban environment generates a complex wind flow pattern around closely spaced structures, hence it is exceptionally difficult to generalise the flow mechanisms and impact of specific buildings as the flow is generated by the entire surrounds. However, it is best to start with an understanding of the basic flow mechanisms around an isolated structure.

Isolated building

When the wind hits an isolated building, the wind is decelerated on the windward face generating an area of high pressure, Figure 9, with the highest pressure at the stagnation point at about two thirds of the height of the building. The higher pressure bubble extends a distance from the building face of about half the building height or width, whichever is lower. The flow is then accelerated down and around the windward corners to areas of lower pressure, Figure 9. This flow mechanism is called **downwash** and causes the windiest conditions at ground level on the windward corners and along the sides of the building.

Rounding the building corners or chamfering the edges reduces downwash by encouraging the flow to go around the building at higher levels. However, concave curving of the windward face can increase the amount of downwash. Depending on the orientation and isolation of the building, uncomfortable downwash can be experienced on buildings of greater than about 6 storeys.

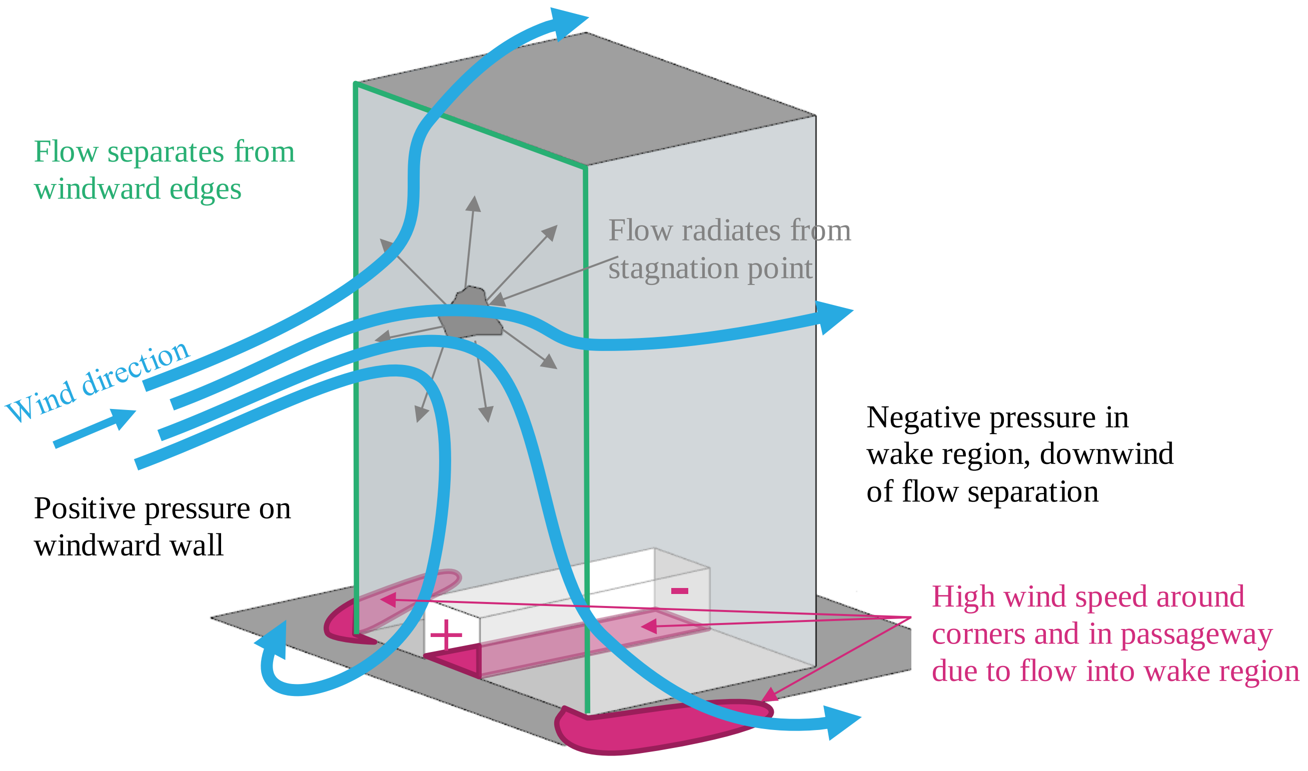

Figure 9: Schematic wind flow around tall isolated building

Techniques to mitigate the effects of downwash winds at ground level include the provision of horizontal elements, the most effective being a podium to divert the downward flow away from pavements and building entrances, but this will generate windy conditions on the podium roof, Figure 11. Generally, the lower the podium roof and deeper the setback from the podium edge to the tower improves the ground level wind conditions. The provision of an 8 m setback on an isolated building is generally sufficient to improve ground level conditions, but is highly dependent on the building isolation, orientation to prevailing wind directions, shape and width of the building, and any plan form changes at higher level.

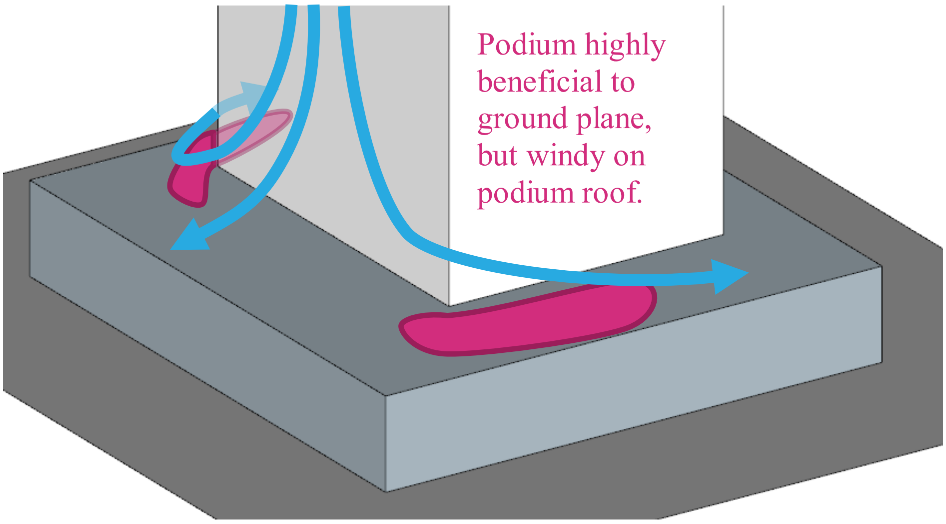

Figure 10: Schematic flow pattern around building with podium

Awnings along street frontages perform a similar function as a podium, and generally the larger the horizontal projection from the façade, the more effective it will be in diverting downwash flow, Figure 11. Awnings become less effective if they are not continuous along the entire façade, or on wide buildings as the positive pressure bubble extends beyond the awning resulting in horizontal flow under the awning.

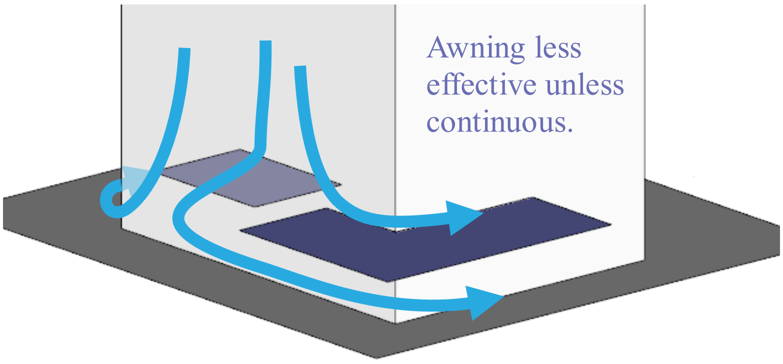

Figure 11: Schematic flow pattern around building with awning

It should be noted that colonnades at the base of a building with no podium generally create augmented windy conditions at the corners due to an increase in the pressure differential, Figure 12. Similarly, open through-site links through a building cause wind issues as the environment tries to equilibrate the pressure generated at the entrances to the link, Figure 9. If the link is blocked, wind conditions will be calm unless there is a flow path through the building, Figure 13. This area is in a region of high pressure and therefore the is the potential for internal flow issues. A ground level recessed corner has a similar effect as an undercroft, resulting in windier conditions, Figure 13.

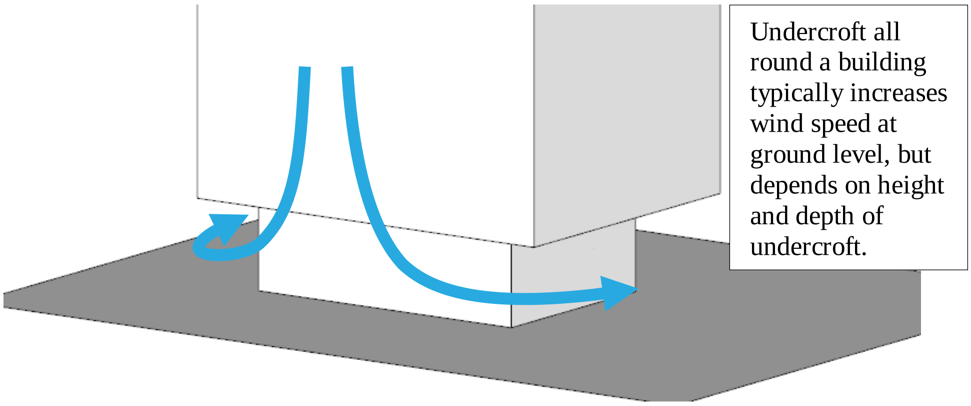

Figure 12: Schematic of flow patterns around isolated building with undercroft

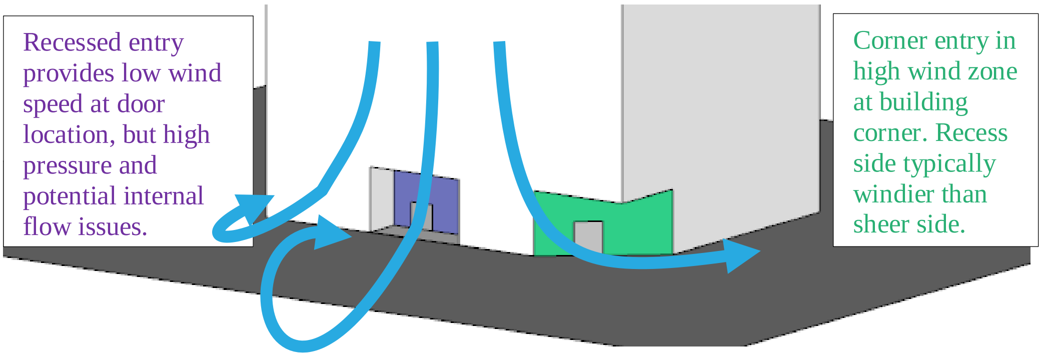

Figure 13: Schematic of flow patterns around isolated building with ground articulation

Multiple buildings

When a building is located in a city environment, depending on upwind buildings, the interference effects may be positive or negative, Figure 14. If the building is taller, more of the wind impacting on the exposed section of the building is likely to be drawn to ground level by the increase in height of the stagnation point, and the additional negative pressure induced at the base. If the upwind buildings are of similar height then the pressure around the building will be more uniform hence downwash is typically reduced with the flow passing over the buildings.

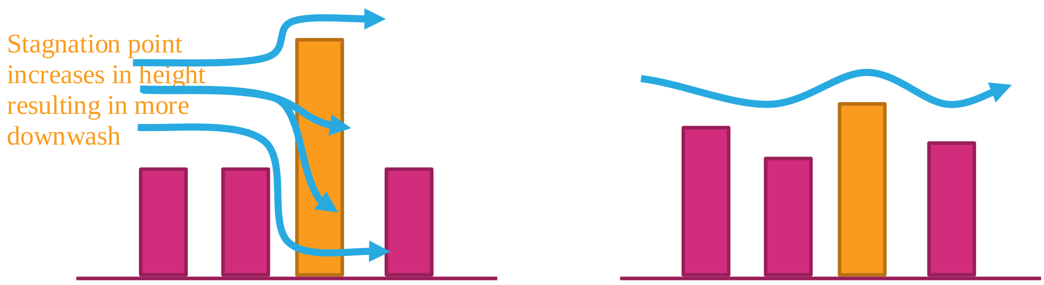

Figure 14: Schematic of flow pattern interference from surrounding buildings

The above discussion becomes more complex when three-dimensional effects are considered, both with orientation and staggering of buildings, and incident wind direction, Figure 15.

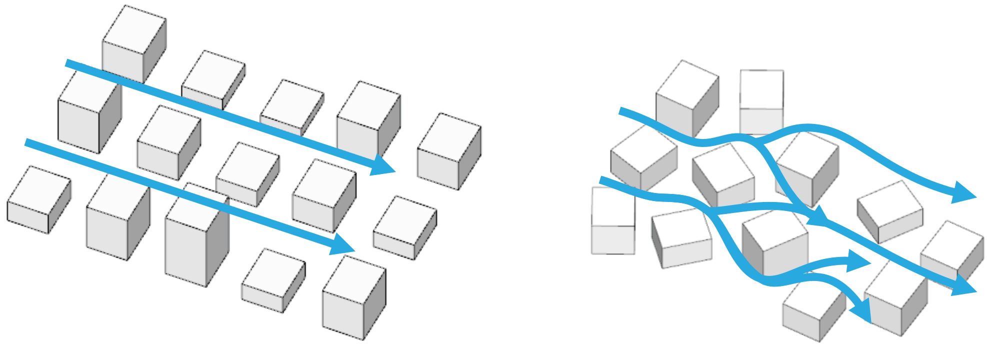

Figure 15: Schematic of flow patterns through a grid and random street layout

Channelling occurs when the wind is accelerated between two buildings, or along straight streets with buildings on either side, Figure 15(L), particularly on the edge of built-up areas where the approaching flow is diverted around the city massing and channelled along the fringe by a relatively continuous wall of building facades. This is generally the primary mechanism driving the wind conditions for this perimeter of a built-up area, particularly on corners, which are exposed to multiple wind directions. The perimeter edge zone in a built-up area is typically about two blocks deep. Downwash is more important flow mechanism for the edge zone of a built-up area with buildings of similar height.

As the city expands, the central section of the city typically becomes calmer, particularly if the grid pattern of the streets is discontinued, Figure 15(R). When buildings are located on the corner of a central city block, the geometry becomes slightly more important with respect to the local wind environment.

Appendix 3: Wind speed criteria

Primary controls that are used in the assessment of how wind affects pedestrians are the wind speed, and rate of change of wind speed. A description of the effect of a specific wind speed on pedestrians is provided in Table 1. It should be noted that the turbulence, or rate of change of wind speed, will affect human response to wind and the descriptions are more associated with response to mean wind speed.

Table 1. Summary of wind effects on pedestrians

Description	Speed (m/s)	Effects
Calm, light air	0–2	Human perception to wind speed at about 0.2 m/s. Napkins blown away and newspapers flutter at about 1 m/s.
Light breeze	2–3	Wind felt on face. Light clothing disturbed. Cappuccino froth blown off at about 2.5 m/s.
Gentle breeze	3–5	Wind extends light flag. Hair is disturbed. Clothing flaps.
Moderate breeze	5–8	Raises dust, dry soil. Hair disarranged. Sand on beach saltates at about 5 m/s. Full paper coffee cup blown over at about 5.5 m/s.
Fresh breeze	8–11	Force felt on body. Limit of agreeable wind on land. Umbrellas used with difficulty. Wind sock fully extended at about 8 m/s.
Strong breeze	11–14	Hair blown straight. Difficult to walk steadily. Wind noise on ears unpleasant. Windborne snow above head height (blizzard).
Near gale	14–17	Inconvenience felt when walking.
Gale	17–21	Generally impedes progress. Difficulty with balance in gusts.
Strong gale	21–24	People blown over by gusts.

Local wind effects can be assessed with respect to a number of environmental wind speed criteria established by various researchers. These have all generally been developed around a 3 s gust, or 1 hour mean wind speed. During strong events, a pedestrian would react to a significantly shorter duration gust than a 3 s, and historic weather data is normally presented as a 10 minute mean.

Despite the apparent differences in numerical values and assumptions made in their development, it has been found that when these are compared on a probabilistic basis, there is some agreement between the various criteria. However, a number of studies have shown that over a wider range of flow conditions, such as smooth flow across water bodies, to turbulent flow in city centres, there is less general agreement among. The downside of these criteria is that they have seldom been benchmarked, or confirmed through long-term measurements in the field, particularly for comfort conditions. The wind criteria were all developed in temperate climates and are unfortunately not the only environmental factor that affects pedestrian comfort.

For assessing the effects of wind on pedestrians, neither the random peak gust wind speed (3 s or otherwise), nor the mean wind speed in isolation are adequate. The gust wind speed gives a measure of the extreme nature of the wind, but the mean wind speed indicates the longer duration impact on pedestrians. The extreme gust wind speed is considered to be suitable for safety considerations, but not necessarily for serviceability comfort issues such as outdoor dining. This is because the instantaneous gust velocity does not always correlate well with mean wind speed, and is not necessarily representative of the parent distribution. Hence, the perceived 'windiness' of a location can either be dictated by strong steady flows, or gusty turbulent flow with a smaller mean wind speed.

To measure the effect of turbulent wind conditions on pedestrians, a statistical procedure is required to combine the effects of both mean and gust. This has been conducted by various researchers to develop an equivalent mean wind speed to represent the perceived effect of a gust event. This is called the 'gust equivalent mean' or 'effective wind speed' and the relationship between the mean and 3 s gust wind speed is defined within the criteria, but two typical conversions are:

$$U_{GEM} = \frac{(U_{mean} + 3 \cdot \sigma_u)}{1.85} \text{ and } U_{GEM} = \frac{1.3 \cdot (U_{mean} + 2 \cdot \sigma_u)}{1.85}$$

It is evident that a standard description of the relationship between the mean and impact of the gust would vary considerably depending on the approach turbulence, and use of the space.

A comparison between the mean and 3 s gust wind speed criteria from a probabilistic basis are presented in Figure 16 and Figure 18. The grey lines are typical results from modelling and show how the various criteria would classify a single location. City of Auckland has control mechanisms for accessing usability of spaces from a wind perspective as illustrated in Figure 16 with definitions of the intended use of the space categories defined in Figure 17.

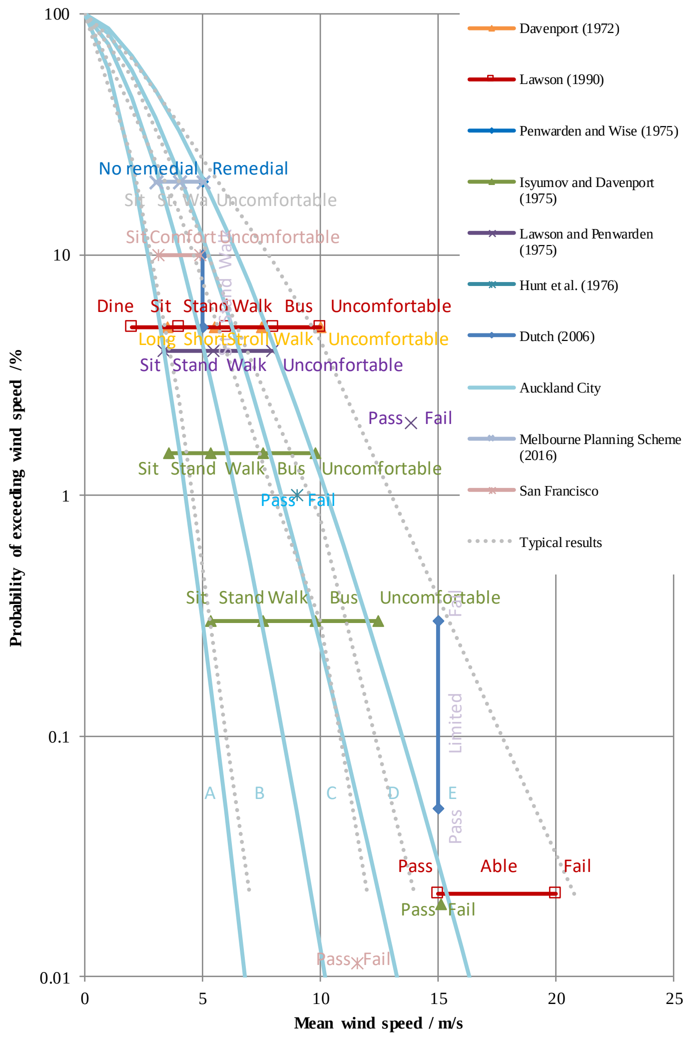

Figure 16: Probabilistic comparison between wind criteria based on mean wind speed

Category A	Areas of pedestrian use or adjacent dwellings containing significant formal elements and features intended to encourage longer term recreational or relaxation use i.e. public open space and adjacent outdoor living space
Category B	Areas of pedestrian use or adjacent dwellings containing minor elements and features intended to encourage short term recreation or relaxation, including adjacent private residential properties
Category C	Areas of formed footpath or open space pedestrian linkages, used primarily for pedestrian transit and devoid of significant or repeated recreational or relaxational features, such as footpaths not covered in categories A or B above
Category D	Areas of road, carriage way, or vehicular routes, used primarily for vehicular transit and open storage, such as roads generally where devoid of any features or form which would include the spaces in categories A - C above.
Category E	Category E represents conditions which are dangerous to the elderly and infants and of considerable cumulative discomfort to others, including residents in adjacent sites. Category E

Figure 17: Auckland Utility Plan (2016) wind categories

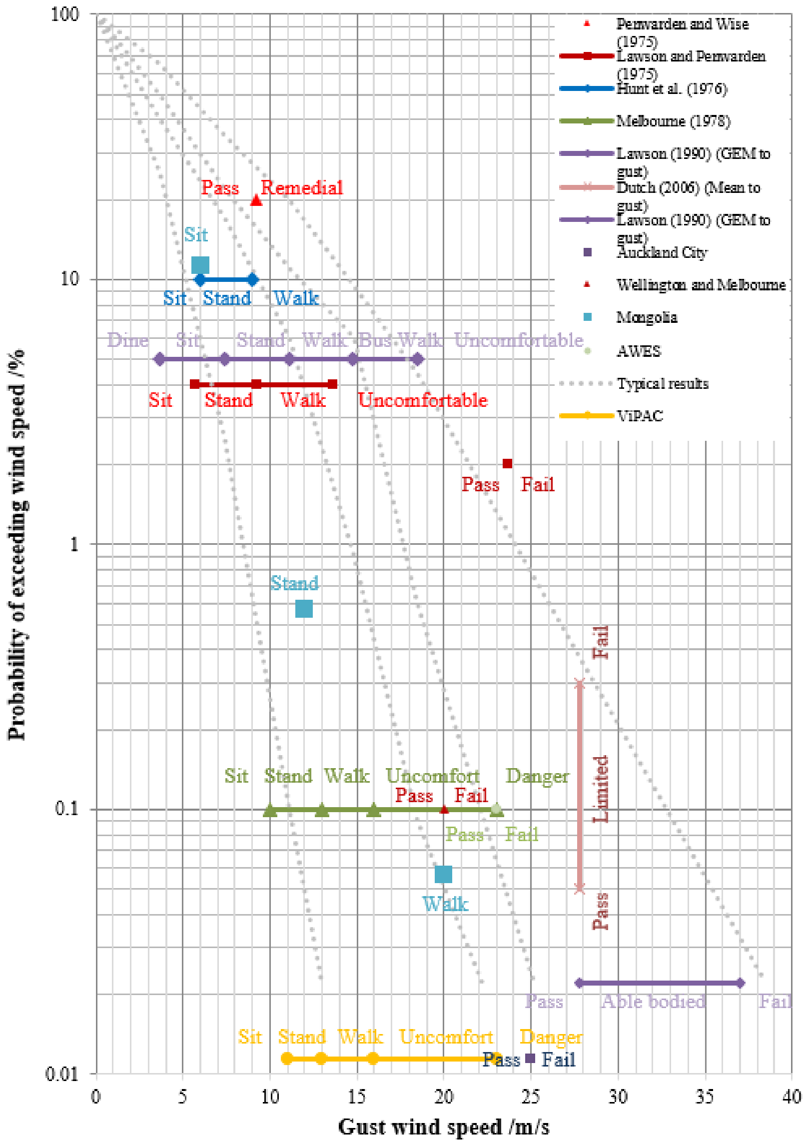

Figure 18: Probabilistic comparison between wind criteria based on 3 s gust wind speed

Appendix 4: Wind tunnel test report

REPORT

187 THOMAS STREET

SYDNEY, AUSTRALIA

PEDESTRIAN WIND STUDY
RWDI # 2000023
February 21, 2020

SUBMITTED TO

Graeme Wood PhD., B.Eng.
Associate Principal | Wind Engineer
Graeme-S.Wood@arup.com
D: +61 2 9320 9921
M: +61 416 161 856

SUBMITTED BY

R. V. Vinoth, AMIE., CEng., IGBC AP
Project Engineer
vinoth@rwdi.com

Daniel Hackett, MEng
Senior Engineer | Associate
daniel.hackett@rwdi.com

Michael Pieterse, M.A.Sc., CPEng., P.Eng.
Project Manager | Associate
michael.pieterse@rwdi.com
T: +61 2 8103 4020 x2324

Kevin Peddie, B.E.(Aero), MsEM, CPEng., NER
Regional Manager| Associate
Kevin.peddie@rwdi.com
T: +61 2 8103 4020 x2325

ARUP
Level 5, 151 Clarence Street
Sydney NSW 2000

RWDI Anemos Ltd.
Unit 1, Tilers Road
Milton Keynes
MK11 3LH, UK

EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed development located at 187 Thomas Street in Sydney, Australia (Image 1). Based on our wind-tunnel testing for the proposed development under the Existing, Proposed and Baseline configurations (Images 2A, 2B and 2C), and the local wind records (Image 3), the potential wind comfort and safety conditions predicted as shown on site plans in Figures 1A through 2C, while the associated wind speeds are listed in Table 1. These results can be summarised as follows:

- Strong winds exceeding the safety criterion are expected on the west, south and east sides of the development site in both the proposed and baseline configurations. In the baseline configuration, the safety exceedances are expected to be higher when compared to the proposed configuration. These areas require mitigation measures which are discussed within this report.

- Wind speeds are expected to be slightly higher than predicted in the existing configuration for both the proposed and baseline configurations throughout the year. In most areas, these higher wind speeds remain acceptable for active pedestrian use. However, there are some localised areas (southwest corner of the proposed development and adjacent existing building terrace) where undesired wind conditions are expected to occur. Wind control measures recommended in this report would help to achieve the desired wind conditions.

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1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed development located at 187 Thomas Street development in Sydney, Australia. This report presents the project objectives, background and approach, and discusses of the results from RWDI's wind tunnel assessment and provides conceptual wind control measures, where necessary.

1.1 Project Description

The project (site shown in Image 1) is located at the intersection of Thomas, Quay and Valentine Streets. The proposed development will consist of a 53-storey commercial and hotel tower, approximately 205m in height above street level.

1.2 Objectives

The objective of the study was to assess the effect of the proposed development on local conditions in pedestrian areas on and around the study site and provide recommendations for minimising adverse effects, if needed. This quantitative assessment was based on wind speed measurements of a scale model of the project and its surroundings in one of RWDI's boundary-layer wind tunnels. These measurements were combined with the local wind records and compared to appropriate criteria for gauging wind comfort and safety in pedestrian areas. The assessment focused on critical pedestrian areas, including public footpaths.

Image 1: Aerial View of Site and Surroundings (Photo Courtesy of Google™ Earth)

2 BACKGROUND AND APPROACH

2.1 Wind Tunnel Study Model

To assess the wind environment around the proposed project, a 1:400 scale model of the project site and surroundings was constructed for the wind tunnel testing of the following configurations:

A - Existing: Existing site with existing surroundings, including approved developments (at the time of testing) - (Image 2A), and,

B - Proposed: Proposed development with existing surroundings, including approved developments (at the time of testing, as requested by the client) - (Image 2B).

C - Baseline: Proposed development (Baseline) with existing surroundings, including approved developments (at the time of testing, as requested by the client) - (Image 2C).

Approved developments were included as requested by ARUP, and were based on photos of the approved development model at Town Hall taken on 17 January 2020.

The wind tunnel model included all relevant surrounding buildings and topography within an approximately 480 m radius of the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 75 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately 1.5 m above local grade in the pedestrian accessible areas throughout the study area. Wind speeds were measured for 36 directions at 10-degree increments. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site and reviewed by ARUP.

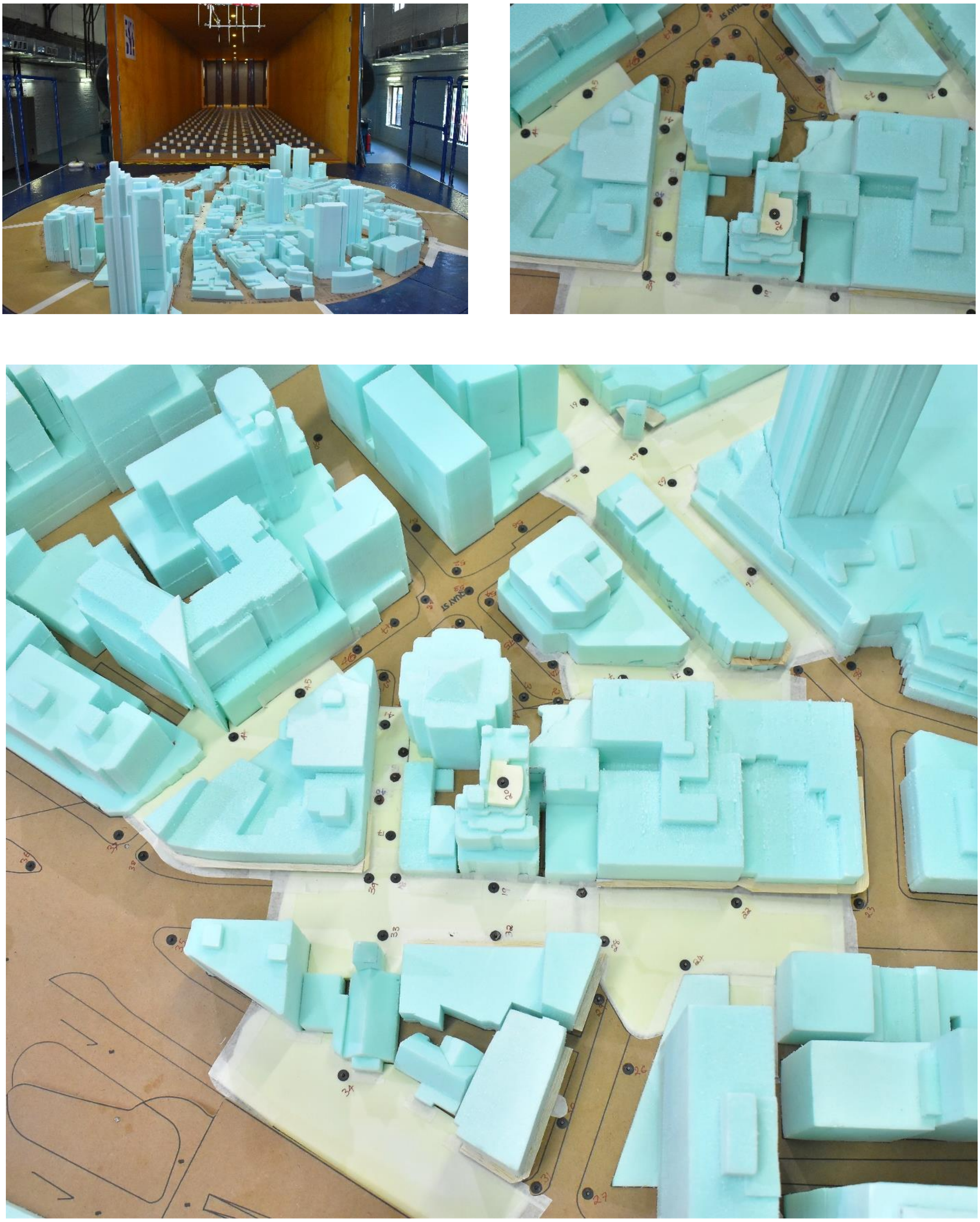


Image 2A: Wind Tunnel Study Model – Existing Configuration

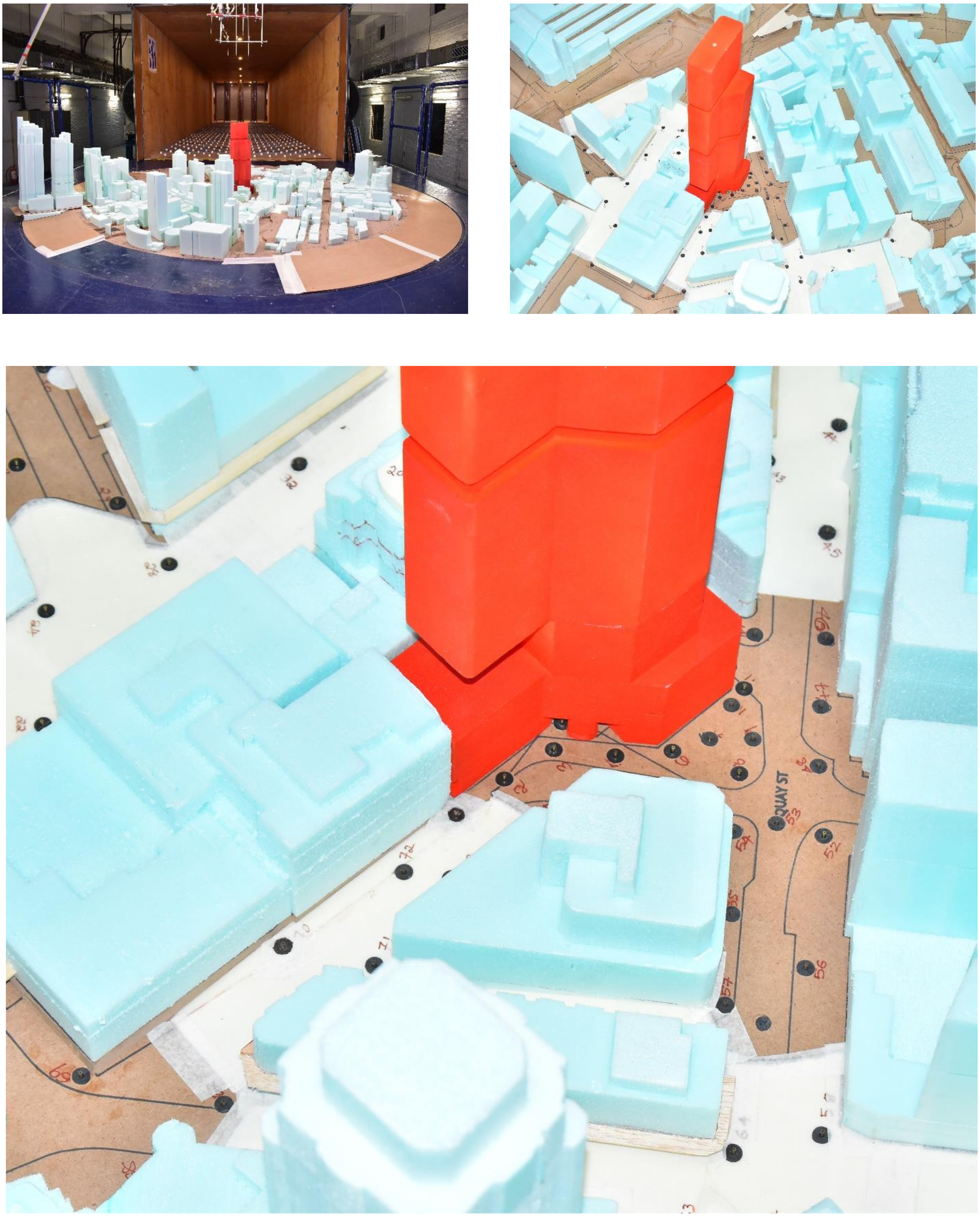


Image 2B: Wind Tunnel Study Model – Proposed Configuration

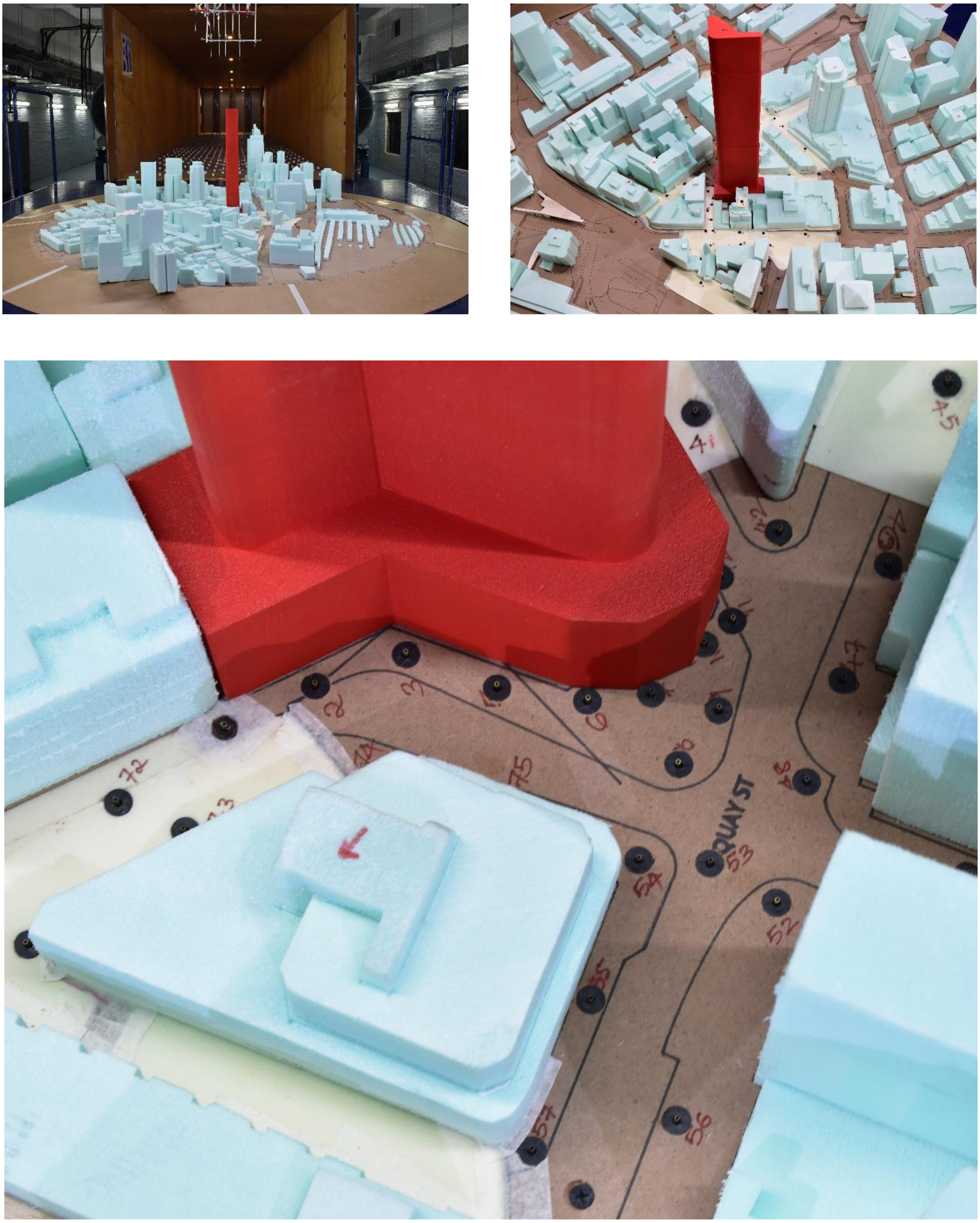
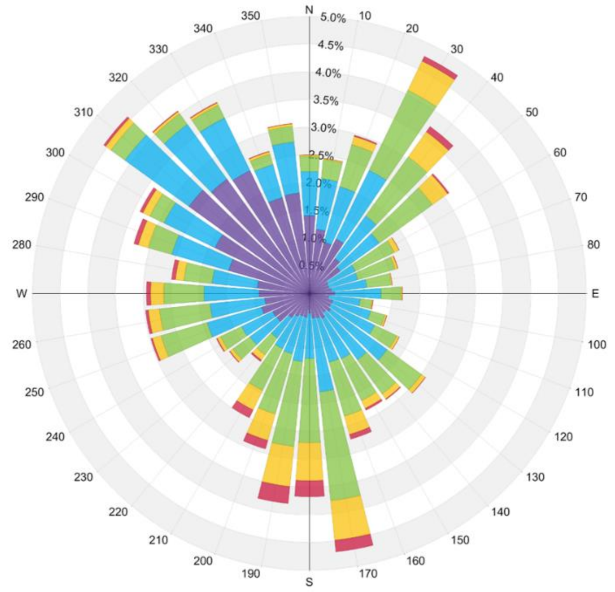


Image 2C: Wind Tunnel Study Model – Baseline Configuration

2.2 Meteorological Data

Wind statistics recorded at Sydney International Airport between 1999 and 2018, inclusive, were analyzed annually. Image 3 graphically depicts the annual directional distributions of wind frequencies and speeds. Winds from the northwest, west and northeast, south directions are predominant throughout the year as indicated by the wind rose (Image 3). Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10 m) occur for 9.4% of the time throughout the year.

Wind statistics were combined with the wind tunnel data to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions were then compared with the wind criteria for pedestrian comfort and safety.



Annual Winds

Wind Speed (km/h)	Probability (%)
Calm	0.3
1-10	33.2
11-20	31.8
21-30	25.3
31-40	7.3
>40	2.1

Image 3: Directional Distribution of Winds Approaching Sydney International Airport From 1999 to 2018

2.3 The Draft Sydney Planning Strategy 2016-2036 wind criteria

The assessment of wind comfort and safety is based on the criteria described in the Draft Sydney Planning Strategy 2016 – 2036, as requested by ARUP. The criteria states the following:

> *Define the mandatory **Wind Safety Standard** as an annual maximum peak 0.5 second gust wind speed in one hour measured between 6am and 10pm Eastern Standard Time (EST) of **24 metres per second.***
>
> *Define the mandatory **Wind Comfort Standard for Walking** as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST (i.e 5 percent of those hours) of **8 metres per second**.*
>
> *Define the mandatory **Wind Comfort Standard for Sitting** in Parks as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST of **4 metres per second** and applies to parks protected by Sun Access Planes and/or No Additional Overshadowing Controls.*
>
> *Define the desirable **Wind Comfort Standard for Sitting and Standing** as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST of:*
>
> ***4 metres per second for Sitting***
> ***6 metres per second for Standing***

3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on site plans in Figures 1A, 1B, 2A and 2B located in the "Figures" section of this report. Existing conditions are shown in Figures 1A, and 2A, while proposed conditions are shown in Figures 1B, and 2B. Figures 1A and 1B show safety conditions, 2A and 2B show annual comfort conditions.

These conditions and the associated wind speeds are also represented in Table 1, located in the "Tables" section of this report. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use of each area of interest.

3.1 Configuration A - Existing (Locations 1 through 75)

Wind conditions on and around the project site are largely suitable for sitting or standing use throughout the year at most of the locations. However, there are some locations (eastern side of the project site) where walking wind conditions are expected, which nevertheless remain acceptable for the intended active pedestrian use.

3.2 Configuration B - Proposed (Locations 1 through 75)

Wind speeds are expected to be slightly higher than predicted for the current existing configuration throughout the year. For the most part, the conditions would remain acceptable for active pedestrian use. However, localised uncomfortable conditions are expected at the southwest corner of the proposed development (Location 11). Wind control measures such as canopy or shrubs in planters around the southwest corner of the proposed development will help to reduce this effect and achieve the desired wind comfort conditions.

Wind conditions on the terrace of the adjacent existing building (eastern side of the proposed development, Location 20) are expected to be relatively windy (suitable for Walking). Wind approaching the opening/void located between RL 54.80 and RL 34.40 (Image 4) of the proposed development further accelerate the prevailing wind, causing undesired wind conditions on the existing surrounding building terraces. Wind control measures such as a porous façade section or vertical fins covering the opening/void of the proposed development mentioned above will help to reduce the funnelled winds to the adjacent existing building terraces.

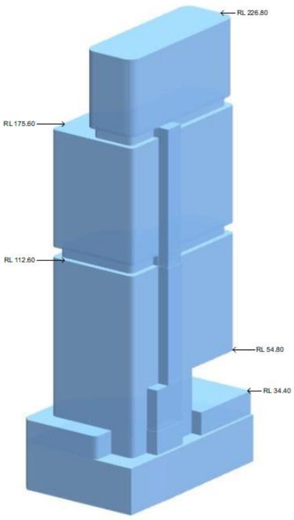


Image 4: Opening/void in the Proposed Development

There were occurrences of strong winds which will exceed the safety threshold of 24 m/s at the western, southern and eastern sides of the proposed development (Locations 10, 11, 20, 25, 26, 27, 40 and 74). For the southwestern corner (Locations 10 and 11) and the existing building terrace (Location 20) on the eastern side of the proposed development, wind control measures suggested in the previous paragraph would help to reduce the strong winds which cause exceedance of the safety threshold.

For the remaining windy locations, mitigation may consist of a combination of street-level landscaping and additions/modifications to the form of the building itself (e.g. additional fins on the façade, modifying the profile of the building corners). These measures will need to be further explored and developed as the design progresses with verification through additional wind tunnel testing as part of the design development process.

It is also noted that this development is the first of a larger redevelopment of the southern precinct of the Sydney CBD, which also includes the Central Station Western Gateway precinct. The inclusion of these developments is expected to further shield the site from the prevailing southerly and westerly winds impacting the site.


Image 5: Samples of Wind Control Measures

3.3 Configuration C - Baseline (Locations 1 through 75)

There were found to be more locations where strong winds exceeded the safety threshold of 24 m/s (13 Locations) than expected in the proposed Configuration B (8 Locations). However, there are a few locations (Locations 10 and 40) where wind speeds are reduced, and safer wind conditions are expected (compared to Configuration B). Wind control measures discussed in the proposed configuration remain acceptable and recommended for this Baseline configuration.

Wind conditions at most locations are consistent with the proposed Configuration B. However, there is one more uncomfortable condition (Location 7) expected in addition to the southwest corner (Location 11). Wind control measures such as shrubs in planters or screens (2m high and 2m wide) are recommended to achieve the desired wind conditions for the active pedestrian use.

4 APPLICABILITY OF RESULTS

The drawings and information listed below were received from ARUP and were used to construct the scale model of the proposed development located at 187 Thomas Street in Sydney. The wind conditions presented in this report pertain to the proposed development as detailed in the architectural design drawings listed in the table below. The form of the tower (Configuration B) was based on 200109_G187 187 Thomas_Opt5B.dwg with the overall height (RL 226.7 m) based on fjmt-1050 Option 5B Sections.dwg. The constructed scale model was reviewed and approved by ARUP.

Should there be any design changes that deviate from this list of drawings, the wind condition predictions presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

File Name	File Type	Date Received (dd/mm/yyyy)
200109_G187 187 Thomas_Opt5B	.dwg	09/01/2020
fjmt-1050 Option 5B Sections	.dwg	09/01/2020
fjmt-1002 Option 5B - Locality Plan	.pdf	09/01/2020
fjmt-1006 Ground Floor	.pdf	09/01/2020
20190809_187 Thomas St only_Option 3A - Base case massing	.pdf	04/02/2020
Option 3A BASE CASE MASSING-3d	.dwg	04/02/2020

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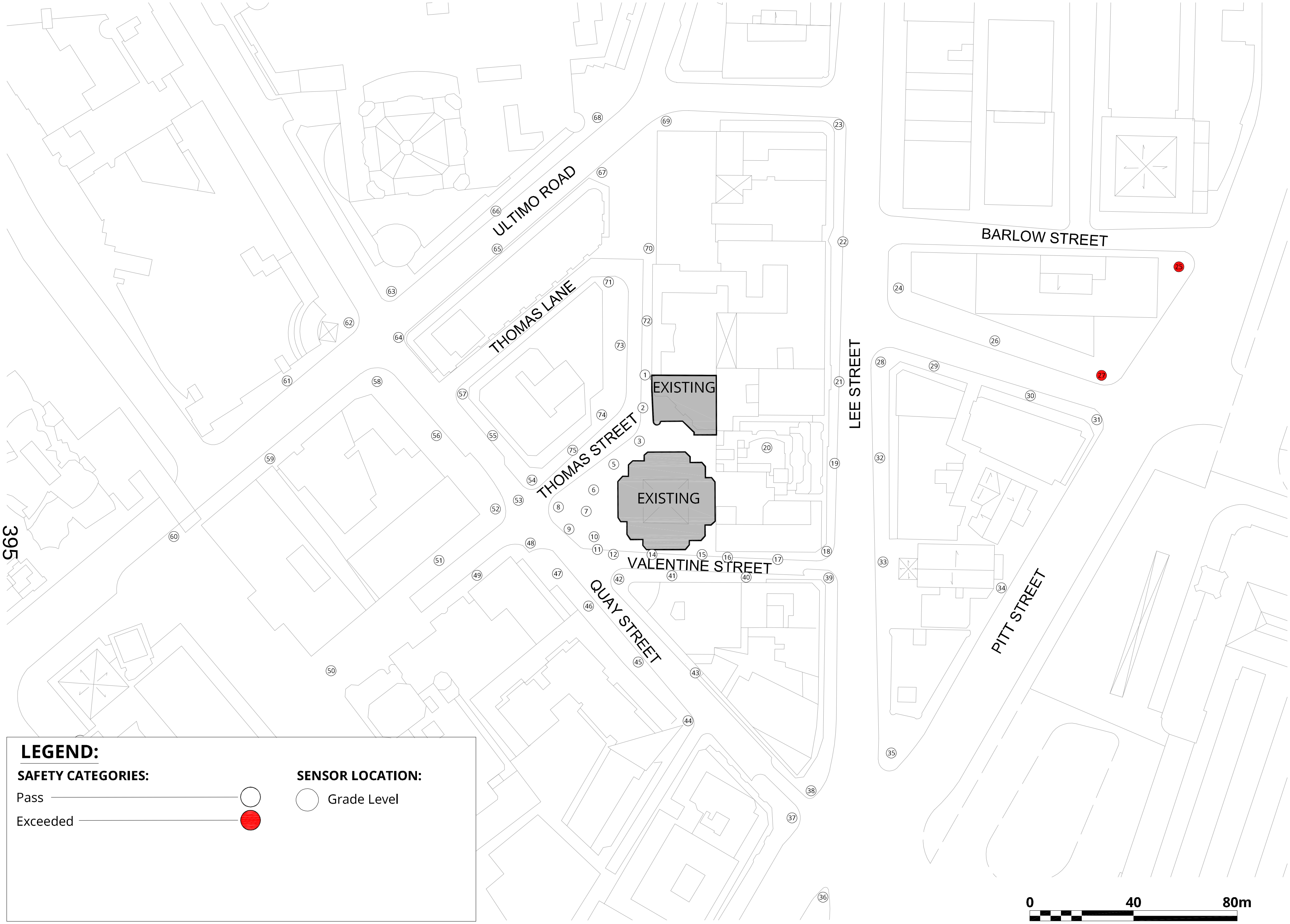
FIGURES



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Pedestrian Wind Safety Conditions

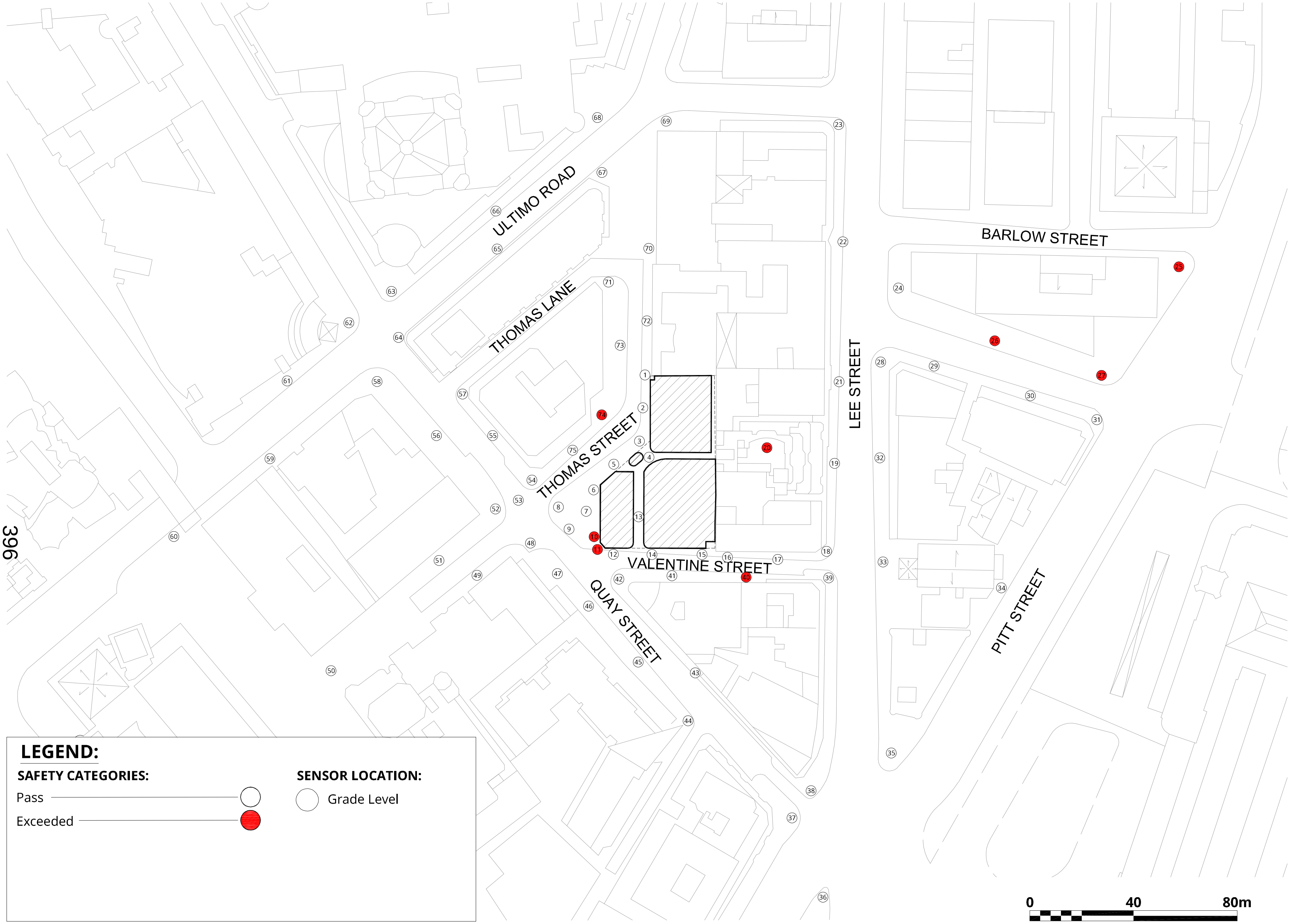
Existing
Annual (January to December, 6:00 to 22:00)

187 Thomas Street - Sydney,Australia

True North

Project #2000023

Drawn by: MBR	Figure: 1A
Approx. Scale:	1:2000
Date Revised:	Feb. 13, 2020



Pedestrian Wind Safety Conditions

Proposed

Annual (January to December, 6:00 to 22:00)

187 Thomas Street - Sydney,Australia

True North

Project #2000023

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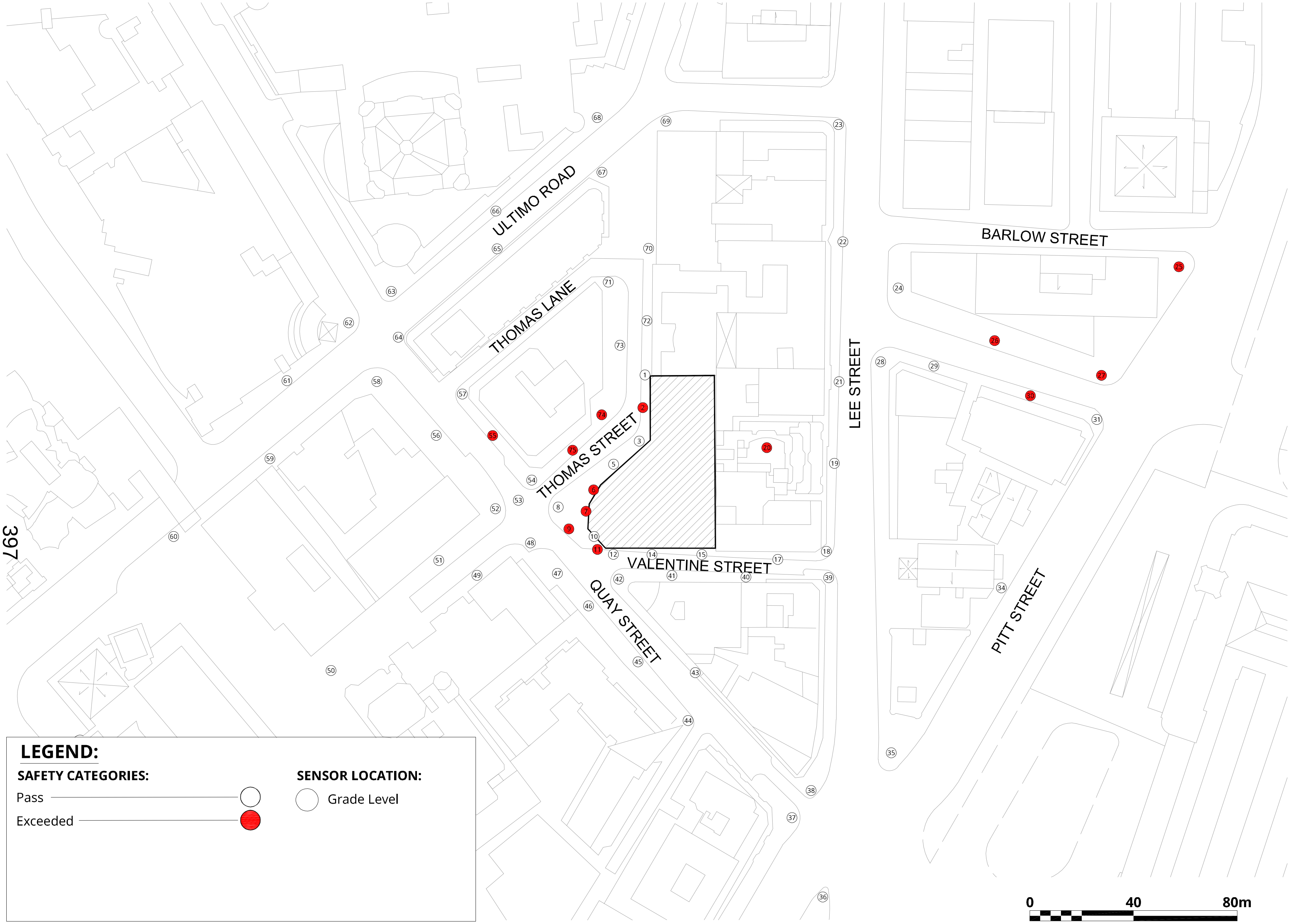

Pedestrian Wind Safety Conditions
Baseline
Annual (January to December, 6:00 to 22:00)

187 Thomas Street - Sydney,Australia

True North

Project #2000023

Drawn by: MBR	Figure: 1C
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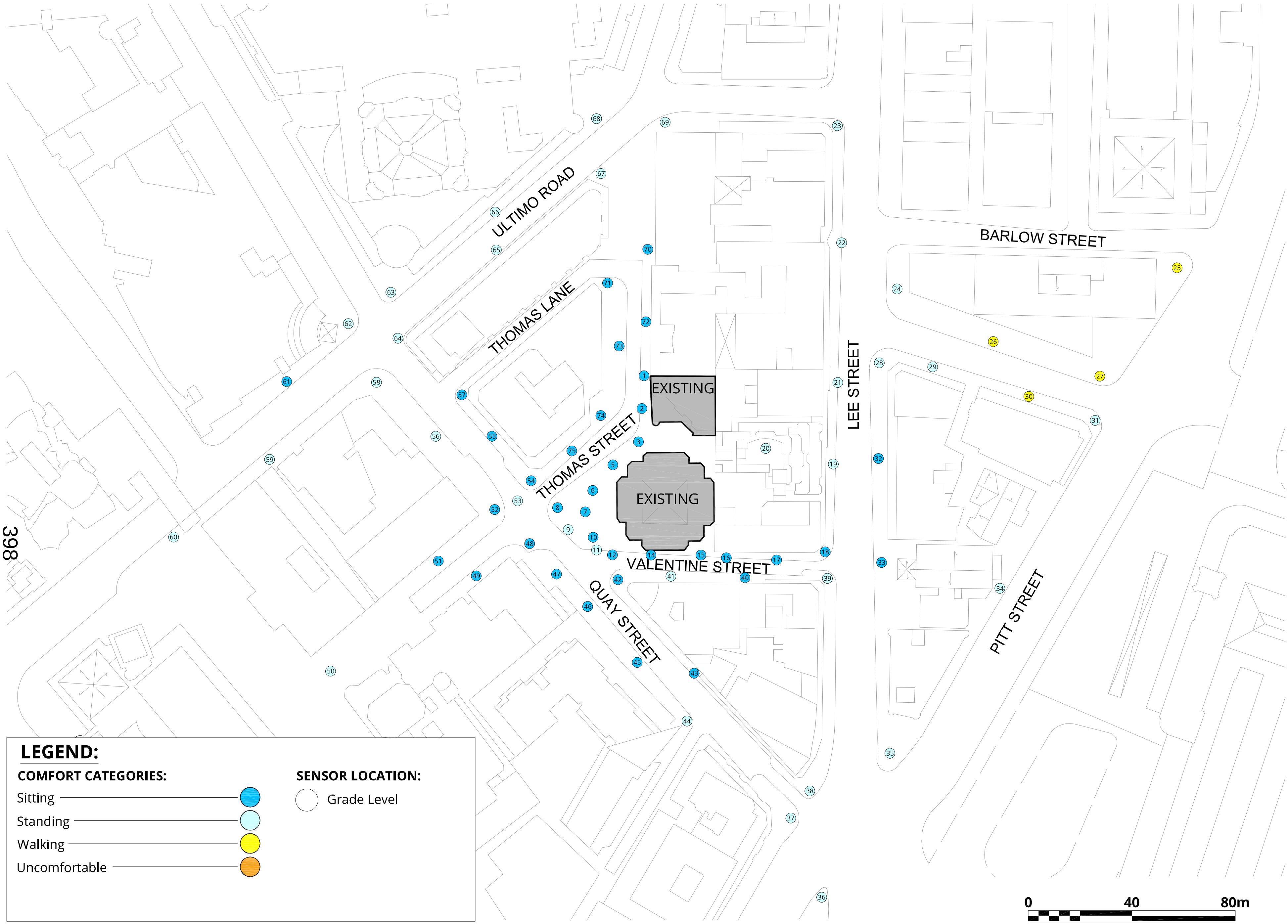


Pedestrian Wind Comfort Conditions

Existing

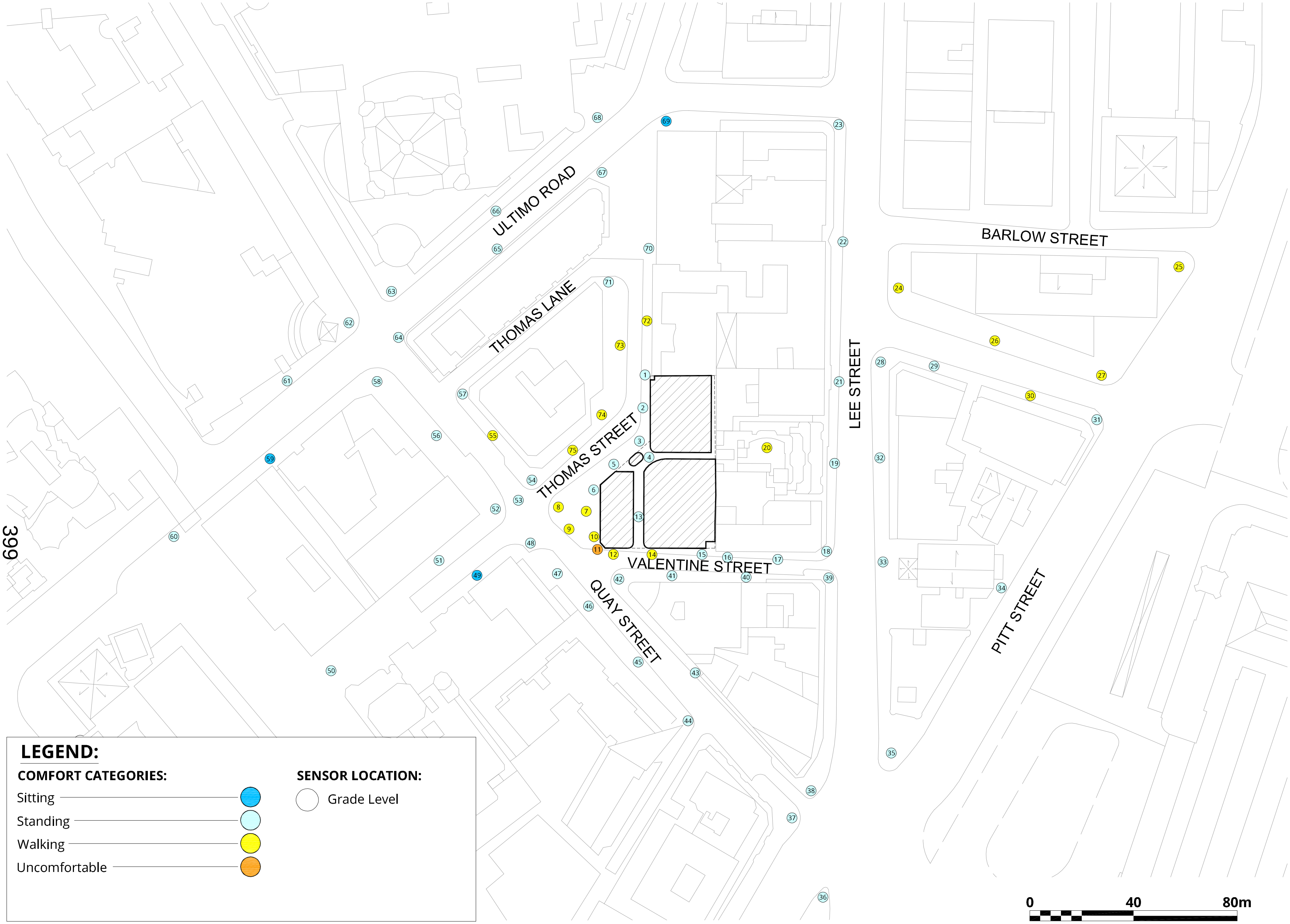
Annual (January to December, 6:00 to 22:00)

187 Thomas Street - Sydney,Australia

Project #2000023

Drawn by: MBR	Figure: 2A
Approx. Scale:	1:2000
Date Revised:	Feb. 13, 2020

399



Pedestrian Wind Comfort Conditions
Proposed
Annual (January to December, 6:00 to 22:00)

187 Thomas Street - Sydney,Australia

True North

Project #2000023

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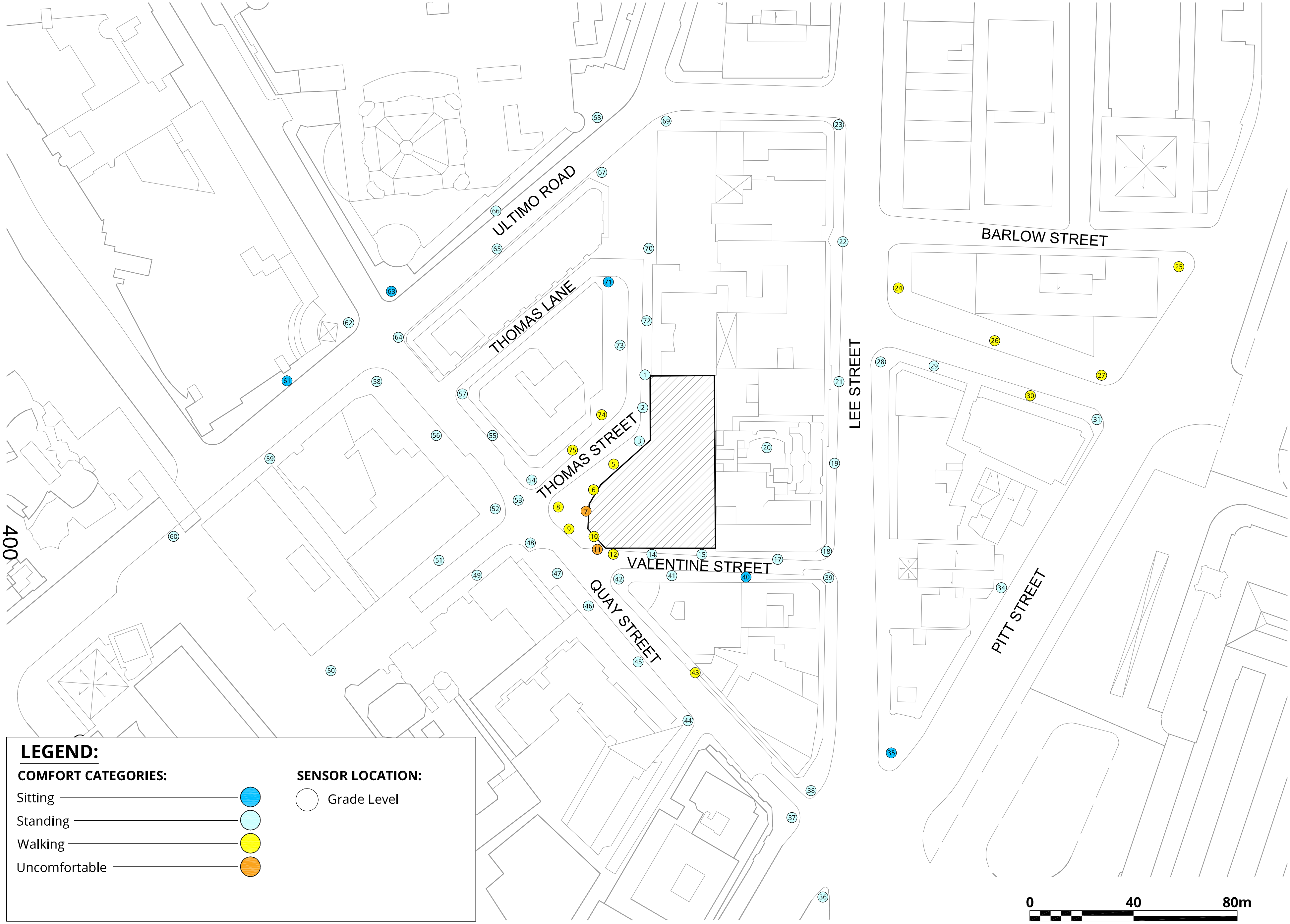


Pedestrian Wind Comfort Conditions
Baseline
Annual (January to December, 6:00 to 22:00)

187 Thomas Street - Sydney,Australia

True North

Project #2000023

Drawn by: MBR	Figure: 2C
Approx. Scale:	1:2000
Date Revised:	Feb. 13, 2020

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort		Wind Safety	
		Annual		Annual	
		Speed (m/s)	Rating	Speed (m/s)	Rating
1	Existing	3.3	Sitting	13.5	Pass
	Proposed	5.8	Standing	21.9	Pass
	Baseline	5.8	Standing	21.9	Pass
2	Existing	3.3	Sitting	15.2	Pass
	Proposed	4.7	Standing	17.0	Pass
	Baseline	5.6	Standing	24.9	Exceeded
3	Existing	3.6	Sitting	14.3	Pass
	Proposed	5.0	Standing	19.3	Pass
	Baseline	5.8	Standing	23.4	Pass
4	Existing	–	–	–	–
	Proposed	5.6	Standing	21.9	Pass
	Baseline	–	–	–	–
5	Existing	3.6	Sitting	13.5	Pass
	Proposed	5.0	Standing	19.0	Pass
	Baseline	6.4	Walking	23.4	Pass
6	Existing	3.6	Sitting	13.5	Pass
	Proposed	5.6	Standing	20.5	Pass
	Baseline	6.7	Walking	25.4	Exceeded
7	Existing	3.6	Sitting	13.5	Pass
	Proposed	6.1	Walking	22.5	Pass
	Baseline	8.1	Uncomfortable	29.0	Exceeded
8	Existing	3.9	Sitting	15.5	Pass
	Proposed	6.4	Walking	23.1	Pass
	Baseline	6.4	Walking	22.5	Pass
9	Existing	4.2	Standing	16.4	Pass
	Proposed	6.9	Walking	22.8	Pass
	Baseline	7.8	Walking	26.6	Exceeded
10	Existing	3.9	Sitting	13.7	Pass
	Proposed	6.1	Walking	24.6	Exceeded
	Baseline	6.7	Walking	23.7	Pass
11	Existing	4.2	Standing	14.0	Pass
	Proposed	8.3	Uncomfortable	25.2	Exceeded
	Baseline	8.6	Uncomfortable	27.8	Exceeded
12	Existing	3.9	Sitting	13.7	Pass
	Proposed	6.4	Walking	20.5	Pass
	Baseline	6.9	Walking	23.7	Pass
13	Existing	–	–	–	–
	Proposed	5.8	Standing	19.0	Pass
	Proposed	–	–	–	–
14	Existing	3.9	Sitting	13.7	Pass
	Proposed	6.1	Walking	22.2	Pass
	Baseline	5.3	Standing	19.3	Pass
15	Existing	3.6	Sitting	13.5	Pass
	Proposed	5.6	Standing	23.4	Pass
	Baseline	5.0	Standing	20.5	Pass
16	Existing	3.3	Sitting	11.4	Pass
	Proposed	5.6	Standing	24.0	Pass
	Baseline	–	–	–	–
17	Existing	3.1	Sitting	10.8	Pass
	Proposed	5.6	Standing	22.8	Pass
	Baseline	4.4	Standing	17.8	Pass
18	Existing	3.9	Sitting	14.0	Pass
	Proposed	5.0	Standing	19.0	Pass
	Baseline	4.4	Standing	19.3	Pass
19	Existing	4.2	Standing	15.5	Pass
	Proposed	4.7	Standing	19.9	Pass
	Baseline	4.2	Standing	17.3	Pass
20	Existing	4.7	Standing	18.4	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort		Wind Safety	
		Annual		Annual	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	Proposed	6.1	Walking	26.9	Exceeded
	Baseline	5.6	Standing	25.7	Exceeded
21	Existing	5.0	Standing	19.0	Pass
	Proposed	5.0	Standing	18.4	Pass
	Baseline	5.0	Standing	18.1	Pass
22	Existing	4.7	Standing	17.8	Pass
	Proposed	4.7	Standing	17.8	Pass
	Baseline	5.3	Standing	21.9	Pass
23	Existing	5.3	Standing	19.3	Pass
	Proposed	5.3	Standing	19.6	Pass
	Baseline	5.6	Standing	20.5	Pass
24	Existing	5.8	Standing	22.2	Pass
	Proposed	6.1	Walking	22.8	Pass
	Baseline	6.4	Walking	24.0	Pass
25	Existing	6.1	Walking	24.6	Exceeded
	Proposed	6.1	Walking	25.4	Exceeded
	Baseline	6.1	Walking	25.4	Exceeded
26	Existing	6.1	Walking	23.1	Pass
	Proposed	6.1	Walking	24.3	Exceeded
	Baseline	6.4	Walking	25.4	Exceeded
27	Existing	7.2	Walking	27.5	Exceeded
	Proposed	7.5	Walking	28.4	Exceeded
	Baseline	7.8	Walking	29.0	Exceeded
28	Existing	5.3	Standing	21.1	Pass
	Proposed	5.6	Standing	20.8	Pass
	Baseline	5.6	Standing	21.1	Pass
29	Existing	5.3	Standing	18.1	Pass
	Proposed	5.6	Standing	18.4	Pass
	Baseline	5.8	Standing	18.7	Pass
30	Existing	6.4	Walking	21.6	Pass
	Proposed	6.1	Walking	22.5	Pass
	Baseline	6.7	Walking	24.3	Exceeded
31	Existing	5.6	Standing	21.1	Pass
	Proposed	5.6	Standing	21.1	Pass
	Baseline	5.8	Standing	22.2	Pass
32	Existing	3.6	Sitting	14.3	Pass
	Proposed	5.0	Standing	19.0	Pass
	Baseline	–	–	–	–
33	Existing	3.6	Sitting	12.6	Pass
	Proposed	4.2	Standing	15.5	Pass
	Baseline	–	–	–	–
34	Existing	5.8	Standing	19.9	Pass
	Proposed	5.8	Standing	19.3	Pass
	Baseline	4.2	Standing	18.7	Pass
35	Existing	4.7	Standing	17.8	Pass
	Proposed	4.7	Standing	19.0	Pass
	Baseline	3.9	Sitting	15.8	Pass
36	Existing	4.7	Standing	17.0	Pass
	Proposed	4.4	Standing	16.1	Pass
	Baseline	5.8	Standing	19.6	Pass
37	Existing	4.2	Standing	15.2	Pass
	Proposed	4.2	Standing	15.2	Pass
	Baseline	4.7	Standing	16.7	Pass
38	Existing	4.2	Standing	16.1	Pass
	Proposed	4.2	Standing	15.8	Pass
	Baseline	4.4	Standing	16.4	Pass
39	Existing	4.4	Standing	16.7	Pass
	Proposed	4.7	Standing	18.4	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort		Wind Safety	
		Annual		Annual	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	Baseline	4.4	Standing	15.2	Pass
40	Existing	3.1	Sitting	10.8	Pass
	Proposed	5.0	Standing	25.4	Exceeded
	Baseline	3.9	Sitting	15.2	Pass
41	Existing	4.2	Standing	15.2	Pass
	Proposed	5.6	Standing	24.0	Pass
	Baseline	4.2	Standing	15.5	Pass
42	Existing	3.9	Sitting	13.5	Pass
	Proposed	5.6	Standing	21.4	Pass
	Baseline	4.4	Standing	21.1	Pass
43	Existing	3.9	Sitting	16.1	Pass
	Proposed	4.4	Standing	18.7	Pass
	Baseline	6.4	Walking	23.1	Pass
44	Existing	4.7	Standing	19.0	Pass
	Proposed	5.0	Standing	18.4	Pass
	Baseline	5.8	Standing	19.9	Pass
45	Existing	3.6	Sitting	13.7	Pass
	Proposed	5.0	Standing	19.6	Pass
	Baseline	4.7	Standing	16.7	Pass
46	Existing	3.3	Sitting	11.7	Pass
	Proposed	5.0	Standing	18.7	Pass
	Baseline	5.0	Standing	18.4	Pass
47	Existing	3.6	Sitting	12.6	Pass
	Proposed	5.8	Standing	20.5	Pass
	Baseline	5.6	Standing	19.9	Pass
48	Existing	3.6	Sitting	13.5	Pass
	Proposed	5.3	Standing	20.5	Pass
	Baseline	5.0	Standing	18.1	Pass
49	Existing	3.6	Sitting	13.2	Pass
	Proposed	3.9	Sitting	16.4	Pass
	Baseline	5.8	Standing	20.2	Pass
50	Existing	4.2	Standing	19.3	Pass
	Proposed	4.2	Standing	17.8	Pass
	Baseline	5.3	Standing	21.1	Pass
51	Existing	3.6	Sitting	14.0	Pass
	Proposed	4.2	Standing	15.8	Pass
	Baseline	4.7	Standing	19.3	Pass
52	Existing	3.6	Sitting	14.6	Pass
	Proposed	5.0	Standing	17.8	Pass
	Baseline	4.2	Standing	17.3	Pass
53	Existing	4.2	Standing	18.1	Pass
	Proposed	5.6	Standing	19.9	Pass
	Baseline	4.4	Standing	16.4	Pass
54	Existing	3.9	Sitting	17.0	Pass
	Proposed	5.3	Standing	20.5	Pass
	Baseline	5.3	Standing	21.6	Pass
55	Existing	3.9	Sitting	17.8	Pass
	Proposed	6.1	Walking	23.1	Pass
	Baseline	5.8	Standing	24.3	Exceeded
56	Existing	4.4	Standing	22.2	Pass
	Proposed	5.3	Standing	21.1	Pass
	Baseline	5.8	Standing	23.7	Pass
57	Existing	3.9	Sitting	16.4	Pass
	Proposed	5.8	Standing	22.2	Pass
	Baseline	5.8	Standing	21.4	Pass
58	Existing	5.0	Standing	19.9	Pass
	Proposed	5.0	Standing	19.0	Pass
	Baseline	5.0	Standing	21.4	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort Annual Speed (m/s)	Wind Comfort Annual Rating	Wind Safety Annual Speed (m/s)	Wind Safety Annual Rating
59	Existing	4.2	Standing	17.0	Pass
	Proposed	3.9	Sitting	15.8	Pass
	Baseline	5.3	Standing	20.8	Pass
60	Existing	4.7	Standing	17.3	Pass
	Proposed	5.0	Standing	18.1	Pass
	Baseline	5.0	Standing	19.3	Pass
61	Existing	3.9	Sitting	15.2	Pass
	Proposed	4.2	Standing	15.8	Pass
	Baseline	3.9	Sitting	16.4	Pass
62	Existing	4.7	Standing	17.3	Pass
	Proposed	4.7	Standing	16.4	Pass
	Baseline	5.0	Standing	17.8	Pass
63	Existing	5.0	Standing	19.6	Pass
	Proposed	4.7	Standing	18.4	Pass
	Baseline	3.9	Sitting	15.5	Pass
64	Existing	5.0	Standing	20.8	Pass
	Proposed	5.0	Standing	19.3	Pass
	Baseline	4.7	Standing	17.0	Pass
65	Existing	5.0	Standing	22.5	Pass
	Proposed	5.3	Standing	20.8	Pass
	Baseline	5.3	Standing	19.0	Pass
66	Existing	5.0	Standing	21.4	Pass
	Proposed	5.3	Standing	19.9	Pass
	Baseline	5.0	Standing	19.6	Pass
67	Existing	5.3	Standing	21.1	Pass
	Proposed	4.7	Standing	18.4	Pass
	Baseline	5.0	Standing	21.9	Pass
68	Existing	4.7	Standing	18.7	Pass
	Proposed	5.0	Standing	18.7	Pass
	Baseline	5.0	Standing	20.5	Pass
69	Existing	4.2	Standing	14.6	Pass
	Proposed	3.9	Sitting	15.2	Pass
	Baseline	4.2	Standing	16.1	Pass
70	Existing	3.9	Sitting	16.7	Pass
	Proposed	5.0	Standing	21.4	Pass
	Baseline	4.7	Standing	17.6	Pass
71	Existing	3.6	Sitting	15.2	Pass
	Proposed	4.4	Standing	18.4	Pass
	Baseline	3.6	Sitting	14.3	Pass
72	Existing	3.3	Sitting	12.9	Pass
	Proposed	6.1	Walking	23.4	Pass
	Baseline	5.3	Standing	23.4	Pass
73	Existing	3.6	Sitting	15.5	Pass
	Proposed	6.1	Walking	23.4	Pass
	Baseline	5.0	Standing	20.8	Pass
74	Existing	3.9	Sitting	14.0	Pass
	Proposed	6.4	Walking	25.7	Exceeded
	Baseline	6.7	Walking	26.0	Exceeded
75	Existing	3.3	Sitting	11.4	Pass
	Proposed	6.7	Walking	22.8	Pass
	Baseline	6.1	Walking	24.3	Exceeded

Annual	Hours	Comfort Speed (m/s)	Safety Speed (m/s)
January - December	6:00 - 22:00 for comfort 6:00 - 22:00 for safety	(5% Annual Exceedance) ≤ 4 Sitting 4.1 - 6 Standing 6.1 - 8 Walking > 8 Uncomfortable	(> 0.017% Annual Exceedance) ≤ 24 Pass > 24 Exceeded

Configurations

Existing Without the proposed development

Proposed With the proposed development

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort		Wind Safety	
		Annual		Annual	
		Speed (m/s)	Rating	Speed (m/s)	Rating
Baseline	With the baseline massing				

APPENDIX A

Configuration A (Existing): Mean Velocity Ratios

Dir	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
1	0.13252	0.142	0.154	0.111	0.113	0.167	0.171	0.174	0.171	0.158	0.143	0.123	0.113	0.124	0.112	0.111	0.115	0.130
2	0.13457	0.138	0.140	0.116	0.105	0.119	0.121	0.127	0.132	0.135	0.145	0.133	0.118	0.115	0.116	0.120	0.124	0.133
3	0.17571	0.184	0.158	0.122	0.130	0.150	0.161	0.150	0.136	0.131	0.172	0.177	0.138	0.117	0.130	0.131	0.138	0.147
4	0.20511	0.217	0.210	0.184	0.179	0.197	0.201	0.182	0.179	0.174	0.170	0.162	0.154	0.155	0.161	0.168	0.169	0.171
5	0.18066	0.191	0.173	0.132	0.128	0.198	0.215	0.209	0.151	0.144	0.138	0.133	0.117	0.144	0.160	0.169	0.176	0.191
6	0.16924	0.169	0.145	0.127	0.114	0.186	0.192	0.200	0.169	0.203	0.252	0.221	0.165	0.141	0.155	0.152	0.148	0.147
7	0.15539	0.157	0.150	0.149	0.151	0.236	0.238	0.258	0.237	0.258	0.318	0.313	0.247	0.201	0.199	0.183	0.170	0.170
8	0.14507	0.142	0.135	0.164	0.136	0.213	0.215	0.246	0.253	0.260	0.278	0.258	0.232	0.193	0.170	0.181	0.168	0.150
9	0.16846	0.169	0.164	0.176	0.125	0.210	0.219	0.263	0.279	0.299	0.319	0.290	0.267	0.234	0.191	0.178	0.168	0.167
10	0.14582	0.159	0.158	0.169	0.168	0.261	0.267	0.294	0.289	0.311	0.354	0.343	0.292	0.268	0.263	0.241	0.223	0.233
11	0.17322	0.196	0.205	0.166	0.159	0.248	0.252	0.288	0.305	0.316	0.338	0.315	0.287	0.276	0.270	0.257	0.241	0.257
12	0.18417	0.192	0.182	0.158	0.149	0.219	0.222	0.222	0.206	0.242	0.296	0.293	0.244	0.239	0.274	0.261	0.243	0.261
13	0.12852	0.134	0.134	0.123	0.126	0.137	0.141	0.134	0.138	0.136	0.135	0.130	0.122	0.121	0.126	0.126	0.126	0.127
14	0.22364	0.225	0.207	0.168	0.195	0.206	0.204	0.179	0.172	0.248	0.333	0.344	0.272	0.221	0.267	0.262	0.239	0.237
15	0.18945	0.187	0.171	0.149	0.181	0.202	0.189	0.169	0.190	0.310	0.413	0.421	0.330	0.247	0.259	0.233	0.208	0.212
16	0.18252	0.164	0.153	0.137	0.152	0.181	0.163	0.151	0.173	0.239	0.218	0.184	0.176	0.178	0.159	0.164	0.165	0.172
17	0.13779	0.127	0.112	0.131	0.192	0.202	0.190	0.183	0.204	0.233	0.211	0.187	0.185	0.195	0.146	0.136	0.132	0.141
18	0.14554	0.160	0.151	0.196	0.154	0.198	0.230	0.287	0.316	0.283	0.211	0.197	0.236	0.272	0.220	0.193	0.156	0.129
19	0.17537	0.146	0.111	0.164	0.133	0.161	0.163	0.236	0.307	0.258	0.250	0.239	0.276	0.410	0.304	0.202	0.189	0.178
20	0.29078	0.290	0.252	0.146	0.116	0.132	0.148	0.235	0.310	0.291	0.295	0.284	0.249	0.201	0.211	0.219	0.211	0.216
21	0.11802	0.109	0.112	0.159	0.208	0.259	0.321	0.421	0.475	0.451	0.421	0.435	0.472	0.528	0.387	0.276	0.308	0.326
22	0.12957	0.110	0.120	0.232	0.237	0.227	0.301	0.380	0.397	0.388	0.408	0.448	0.483	0.537	0.397	0.294	0.261	0.235
23	0.15687	0.153	0.139	0.224	0.242	0.283	0.309	0.326	0.343	0.392	0.448	0.499	0.527	0.570	0.484	0.373	0.288	0.278
24	0.11987	0.123	0.139	0.178	0.138	0.144	0.166	0.206	0.215	0.235	0.305	0.383	0.448	0.525	0.440	0.359	0.406	0.437
25	0.21735	0.151	0.108	0.149	0.170	0.212	0.252	0.291	0.307	0.316	0.333	0.336	0.336	0.346	0.298	0.250	0.306	0.421
26	0.27654	0.229	0.141	0.237	0.266	0.271	0.327	0.401	0.458	0.489	0.525	0.563	0.582	0.609	0.466	0.319	0.290	0.292
27	0.27776	0.204	0.159	0.279	0.349	0.439	0.496	0.610	0.674	0.634	0.557	0.487	0.418	0.392	0.374	0.305	0.389	0.522
28	0.15838	0.119	0.111	0.136	0.162	0.199	0.222	0.298	0.395	0.407	0.333	0.322	0.358	0.467	0.352	0.253	0.334	0.392
29	0.15802	0.166	0.151	0.241	0.312	0.385	0.443	0.550	0.582	0.515	0.448	0.454	0.462	0.481	0.352	0.264	0.318	0.358
30	0.28632	0.185	0.170	0.343	0.427	0.519	0.574	0.675	0.707	0.616	0.528	0.484	0.438	0.401	0.275	0.200	0.242	0.293
31	0.23239	0.174	0.190	0.267	0.259	0.279	0.298	0.335	0.368	0.361	0.341	0.313	0.261	0.241	0.236	0.220	0.286	0.344
32	0.15611	0.143	0.120	0.105	0.109	0.129	0.136	0.148	0.179	0.197	0.213	0.225	0.212	0.217	0.188	0.178	0.169	0.164
33	0.11623	0.153	0.113	0.137	0.135	0.148	0.143	0.162	0.191	0.229	0.244	0.279	0.253	0.209	0.182	0.163	0.133	0.122
34	0.15380	0.147	0.198	0.339	0.401	0.488	0.552	0.633	0.609	0.506	0.474	0.544	0.550	0.439	0.381	0.378	0.338	0.233
35	0.17202	0.186	0.157	0.182	0.218	0.221	0.265	0.345	0.359	0.325	0.297	0.275	0.280	0.302	0.312	0.316	0.301	0.212
36	0.18790	0.199	0.197	0.224	0.232	0.227	0.307	0.313	0.258	0.213	0.220	0.239	0.286	0.316	0.310	0.319	0.289	0.231
37	0.25049	0.283	0.245	0.154	0.154	0.157	0.194	0.227	0.229	0.212	0.219	0.248	0.294	0.269	0.257	0.252	0.212	0.172
38	0.15058	0.152	0.151	0.132	0.165	0.175	0.192	0.236	0.242	0.221	0.217	0.229	0.251	0.258	0.282	0.284	0.248	0.199
39	0.14951	0.170	0.128	0.217	0.220	0.257	0.288	0.360	0.366	0.322	0.271	0.237	0.284	0.371	0.329	0.279	0.207	0.141
40	0.17353	0.169	0.121	0.118	0.113	0.130	0.120	0.117	0.141	0.166	0.150	0.137	0.132	0.136	0.128	0.134	0.128	0.126
41	0.25278	0.217	0.197	0.157	0.108	0.142	0.132	0.121	0.160	0.289	0.372	0.367	0.295	0.263	0.309	0.300	0.271	0.289
42	0.16215	0.199	0.176	0.161	0.153	0.211	0.207	0.238	0.254	0.231	0.222	0.185	0.199	0.200	0.196	0.218	0.212	0.222
43	0.13656	0.148	0.145	0.119	0.134	0.139	0.133	0.172	0.211	0.223	0.230	0.251	0.321	0.346	0.217	0.259	0.298	0.282
44	0.24350	0.277	0.247	0.141	0.146	0.149	0.144	0.174	0.195	0.183	0.188	0.220	0.298	0.319	0.262	0.333	0.391	0.352
45	0.16240	0.170	0.145	0.124	0.130	0.158	0.155	0.189	0.220	0.221	0.219	0.195	0.214	0.232	0.177	0.179	0.206	0.212
46	0.13753	0.144	0.157	0.120	0.133	0.199	0.193	0.233	0.280	0.298	0.308	0.279	0.290	0.301	0.171	0.141	0.151	0.160
47	0.14312	0.132	0.135	0.117	0.116	0.179	0.181	0.227	0.283	0.317	0.338	0.313	0.319	0.319	0.182	0.149	0.148	0.178
48	0.15406	0.158	0.171	0.136	0.106	0.159	0.166	0.209	0.269	0.313	0.341	0.317	0.315	0.297	0.191	0.183	0.172	0.178
49	0.19613	0.174	0.153	0.118	0.114	0.114	0.126	0.173	0.193	0.182	0.182	0.166	0.146	0.145	0.146	0.151	0.140	0.115
50	0.13144	0.137	0.144	0.125	0.189	0.164	0.141	0.160	0.201	0.227	0.254	0.208	0.218	0.262	0.173	0.143	0.135	0.137
51	0.12137	0.129	0.139	0.110	0.138	0.135	0.177	0.261	0.337	0.398	0.433	0.389	0.364	0.320	0.169	0.138	0.122	0.128
52	0.18496	0.183	0.187	0.154	0.148	0.179	0.178	0.201	0.216	0.229	0.249	0.225	0.230	0.230	0.198	0.221	0.212	0.169
53	0.18235	0.206	0.179	0.165	0.126	0.181	0.190	0.223	0.247	0.271	0.299	0.267	0.270	0.261	0.191	0.215	0.203	0.177
54	0.15724	0.156	0.145	0.147	0.117	0.162	0.165	0.179	0.185	0.198	0.219	0.199	0.186	0.183	0.166	0.172	0.169	0.185
55	0.11922	0.150	0.107	0.115	0.150	0.223	0.205	0.254	0.280	0.283	0.308	0.274	0.236	0.218	0.206	0.215	0.194	0.164
56	0.14569	0.137	0.145	0.139	0.108	0.183	0.234	0.282	0.332	0.355	0.376	0.322	0.306	0.298	0.189	0.150	0.140	0.133

Dir	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
1	0.124	0.102	0.101	0.125	0.149	0.162	0.148	0.141	0.170	0.195	0.199	0.194	0.189	0.146	0.126	0.118	0.123	0.130
2	0.127	0.105	0.109	0.133	0.180	0.213	0.182	0.147	0.171	0.223	0.255	0.247	0.234	0.225	0.176	0.148	0.145	0.134
3	0.144	0.120	0.103	0.107	0.142	0.177	0.163	0.156	0.146	0.177	0.212	0.228	0.259	0.239	0.187	0.148	0.147	0.168
4	0.172	0.169	0.172	0.172	0.178	0.184	0.184	0.179	0.174	0.177	0.192	0.194	0.216	0.212	0.197	0.187	0.198	0.204
5	0.179	0.111	0.103	0.124	0.146	0.183	0.168	0.147	0.142	0.168	0.209	0.224	0.227	0.232	0.195	0.175	0.180	0.166
6	0.154	0.111	0.101	0.118	0.146	0.169	0.208	0.172	0.143	0.156	0.185	0.199	0.218	0.266	0.233	0.201	0.193	0.172
7	0.163	0.125	0.103	0.111	0.142	0.159	0.213	0.173	0.159	0.173	0.184	0.194	0.223	0.247	0.207	0.177	0.159	0.156
8	0.156	0.115	0.096	0.100	0.122	0.126	0.148	0.184	0.211	0.237	0.244	0.238	0.226	0.208	0.204	0.183	0.137	0.136
9	0.179	0.125	0.100	0.107	0.135	0.137	0.174	0.206	0.243	0.280	0.295	0.290	0.276	0.252	0.254	0.229	0.168	0.160
10	0.227	0.158	0.104	0.097	0.120	0.124	0.176	0.160	0.153	0.169	0.169	0.165	0.188	0.231	0.208	0.187	0.160	0.143
11	0.252	0.181	0.113	0.108	0.134	0.136	0.195	0.184	0.188	0.211	0.214	0.207	0.228	0.249	0.225	0.204	0.166	0.164
12	0.245	0.185	0.114	0.101	0.115	0.114	0.158	0.167	0.167	0.175	0.165	0.158	0.189	0.233	0.225	0.214	0.197	0.183
13	0.128	0.125	0.126	0.127	0.130	0.130	0.133	0.130	0.128	0.126	0.128	0.130	0.139	0.140	0.135	0.124	0.126	0.123
14	0.231	0.185	0.122	0.098	0.104	0.102	0.123	0.124	0.124	0.129	0.117	0.114	0.172	0.181	0.170	0.179	0.202	0.223
15	0.199	0.172	0.130	0.109	0.101	0.105	0.118	0.116	0.111	0.118	0.113	0.113	0.158	0.158	0.150	0.145	0.172	0.208
16	0.170	0.155	0.130	0.118	0.111	0.127	0.128	0.108	0.106	0.110	0.109	0.115	0.127	0.150	0.150	0.148	0.175	0.202
17	0.142	0.135	0.131	0.129	0.105	0.115	0.117	0.115	0.110	0.100	0.100	0.102	0.118	0.131	0.135	0.149	0.173	0.153
18	0.125	0.157	0.160	0.161	0.167	0.220	0.255	0.237	0.249	0.258	0.254	0.242	0.212	0.149	0.158	0.136	0.120	0.138
19	0.186	0.173	0.154	0.136	0.141	0.195	0.242	0.256	0.266	0.271	0.279	0.293	0.256	0.269	0.278	0.269	0.259	0.211
20	0.210	0.189	0.151	0.123	0.136	0.164	0.238	0.269	0.265	0.248	0.289	0.315	0.343	0.306	0.249	0.254	0.299	0.303
21	0.297	0.230	0.187	0.146	0.134	0.192	0.216	0.214	0.225	0.212	0.203	0.211	0.183	0.189	0.210	0.182	0.169	0.150
22	0.217	0.194	0.167	0.127	0.189	0.239	0.247	0.291	0.306	0.274	0.267	0.271	0.243	0.243	0.244	0.211	0.189	0.162
23	0.270	0.198	0.138	0.159	0.173	0.199	0.230	0.298	0.272	0.170	0.142	0.151	0.159	0.172	0.186	0.165	0.157	0.144
24	0.429	0.354	0.267	0.175	0.174	0.215	0.218	0.291	0.310	0.246	0.195	0.190	0.172	0.151	0.158	0.143	0.134	0.130
25	0.464	0.392	0.329	0.267	0.155	0.226	0.298	0.295	0.261	0.211	0.186	0.157	0.128	0.159	0.205	0.229	0.220	0.225
26	0.305	0.299	0.275	0.219	0.156	0.258	0.321	0.404	0.506	0.518	0.452	0.411	0.379	0.406	0.466	0.401	0.337	0.314
27	0.569	0.537	0.474	0.358	0.172	0.250	0.332	0.327	0.426	0.435	0.351	0.334	0.328	0.379	0.479	0.417	0.357	0.328
28	0.375	0.296	0.255	0.205	0.174	0.249	0.279	0.312	0.355	0.321	0.240	0.229	0.181	0.237	0.303	0.257	0.219	0.207
29	0.383	0.376	0.333	0.237	0.129	0.171	0.205	0.190	0.224	0.255	0.240	0.218	0.209	0.170	0.188	0.166	0.151	0.164
30	0.317	0.306	0.276	0.203	0.137	0.239	0.300	0.367	0.435	0.413	0.344	0.350	0.339	0.417	0.504	0.449	0.391	0.352
31	0.408	0.405	0.357	0.254	0.152	0.244	0.296	0.308	0.339	0.275	0.200	0.239	0.245	0.312	0.383	0.354	0.319	0.279
32	0.171	0.182	0.158	0.133	0.129	0.165	0.221	0.221	0.241	0.277	0.287	0.270	0.278	0.261	0.276	0.243	0.247	0.175
33	0.123	0.138	0.134	0.136	0.122	0.139	0.175	0.176	0.159	0.177	0.192	0.180	0.203	0.173	0.184	0.162	0.238	0.120
34	0.215	0.204	0.177	0.163	0.150	0.110	0.118	0.124	0.115	0.117	0.124	0.151	0.134	0.150	0.167	0.173	0.153	0.149
35	0.181	0.170	0.166	0.156	0.149	0.129	0.137	0.157	0.174	0.172	0.188	0.224	0.246	0.257	0.232	0.185	0.174	0.159
36	0.184	0.151	0.148	0.146	0.160	0.142	0.107	0.124	0.124	0.122	0.123	0.128	0.134	0.170	0.147	0.126	0.183	0.152
37	0.159	0.147	0.138	0.129	0.120	0.109	0.115	0.130	0.123	0.113	0.102	0.101	0.118	0.143	0.134	0.119	0.149	0.214
38	0.165	0.153	0.146	0.127	0.122	0.110	0.137	0.142	0.131	0.111	0.109	0.108	0.134	0.147	0.117	0.102	0.123	0.153
39	0.137	0.158	0.161	0.154	0.125	0.153	0.188	0.207	0.190	0.194	0.200	0.240	0.180	0.157	0.167	0.154	0.144	0.170
40	0.120	0.112	0.102	0.099	0.104	0.127	0.133	0.126	0.125	0.127	0.135	0.184	0.116	0.136	0.147	0.155	0.148	0.203
41	0.275	0.223	0.144	0.112	0.112	0.114	0.129	0.133	0.144	0.159	0.144	0.124	0.156	0.194	0.194	0.206	0.249	0.260
42	0.206	0.180	0.137	0.117	0.131	0.129	0.170	0.189	0.178	0.183	0.183	0.209	0.185	0.231	0.217	0.202	0.133	0.157
43	0.265	0.169	0.104	0.094	0.091	0.090	0.090	0.102	0.117	0.124	0.116	0.151	0.118	0.105	0.099	0.098	0.170	0.126
44	0.340	0.188	0.117	0.117	0.124	0.110	0.106	0.120	0.135	0.161	0.157	0.139	0.120	0.128	0.117	0.108	0.128	0.203
45	0.209	0.153	0.114	0.124	0.132	0.133	0.144	0.162	0.161	0.183	0.207	0.239	0.222	0.219	0.216	0.190	0.138	0.155
46	0.160	0.122	0.110	0.110	0.127	0.138	0.147	0.146	0.132	0.158	0.195	0.199	0.238	0.223	0.207	0.168	0.177	0.128
47	0.200	0.152	0.107	0.110	0.142	0.155	0.165	0.165	0.166	0.203	0.244	0.248	0.281	0.241	0.231	0.183	0.149	0.129
48	0.210	0.139	0.104	0.103	0.129	0.138	0.151	0.164	0.204	0.242	0.242	0.232	0.278	0.254	0.245	0.220	0.205	0.127
49	0.106	0.116	0.133	0.153	0.188	0.215	0.184	0.148	0.202	0.213	0.201	0.176	0.169	0.158	0.160	0.173	0.128	0.176
50	0.139	0.125	0.120	0.117	0.147	0.220	0.275	0.345	0.368	0.331	0.318	0.276	0.239	0.198	0.226	0.259	0.223	0.120
51	0.176	0.129	0.100	0.097	0.100	0.097	0.105	0.147	0.202	0.192	0.156	0.115	0.129	0.127	0.144	0.149	0.134	0.108
52	0.154	0.114	0.121	0.137	0.176	0.202	0.188	0.143	0.161	0.200	0.217	0.258	0.298	0.256	0.203	0.155	0.150	0.149
53	0.180	0.116	0.112	0.123	0.166	0.189	0.207	0.199	0.211	0.267	0.317	0.378	0.359	0.284	0.269	0.208	0.139	0.149
54	0.185	0.113	0.101	0.106	0.125	0.128	0.154	0.206	0.222	0.254	0.284	0.297	0.276	0.223	0.241	0.216	0.150	0.131
55	0.148	0.095	0.095	0.098	0.129	0.147	0.193	0.213	0.207	0.244	0.306	0.372	0.315	0.252	0.263	0.254	0.163	0.123
56	0.131	0.112	0.153	0.178	0.237	0.267	0.251	0.215	0.241	0.330	0.402	0.446	0.462	0.385	0.350	0.276	0.200	0.154

57	0.12953	0.136	0.144	0.145	0.150	0.242	0.245	0.264	0.282	0.263	0.279	0.242	0.201	0.192	0.174	0.166	0.127	0.105	0.109	0.101	0.119	0.130	0.165	0.185	0.210	0.217	0.212	0.228	0.266	0.295	0.288	0.240	0.243	0.241	0.196	0.149
58	0.17526	0.201	0.197	0.160	0.152	0.156	0.212	0.257	0.318	0.352	0.387	0.335	0.318	0.325	0.211	0.171	0.165	0.170	0.152	0.157	0.194	0.233	0.290	0.312	0.339	0.361	0.390	0.428	0.464	0.491	0.489	0.419	0.402	0.383	0.313	0.206
59	0.17613	0.173	0.155	0.144	0.129	0.092	0.113	0.113	0.137	0.169	0.194	0.179	0.176	0.201	0.161	0.164	0.206	0.223	0.175	0.140	0.132	0.147	0.171	0.182	0.203	0.223	0.225	0.232	0.242	0.240	0.253	0.221	0.236	0.270	0.292	0.195
60	0.19335	0.221	0.243	0.260	0.177	0.208	0.172	0.155	0.179	0.137	0.142	0.179	0.152	0.146	0.139	0.150	0.139	0.121	0.115	0.134	0.174	0.158	0.163	0.175	0.196	0.232	0.229	0.196	0.201	0.229	0.254	0.271	0.298	0.311	0.287	0.221
61	0.16267	0.171	0.160	0.148	0.145	0.126	0.178	0.223	0.279	0.303	0.340	0.312	0.303	0.323	0.220	0.156	0.122	0.109	0.107	0.101	0.116	0.116	0.135	0.148	0.175	0.218	0.235	0.261	0.299	0.297	0.320	0.279	0.290	0.285	0.257	0.137
62	0.16955	0.184	0.194	0.174	0.123	0.149	0.203	0.190	0.267	0.281	0.273	0.202	0.194	0.201	0.188	0.240	0.307	0.314	0.226	0.210	0.237	0.291	0.301	0.315	0.299	0.257	0.252	0.222	0.188	0.192	0.196	0.176	0.188	0.164	0.123	0.151
63	0.20726	0.211	0.216	0.200	0.123	0.109	0.124	0.177	0.132	0.112	0.139	0.196	0.241	0.252	0.206	0.214	0.234	0.228	0.177	0.148	0.181	0.221	0.257	0.295	0.337	0.376	0.398	0.386	0.356	0.317	0.323	0.292	0.236	0.202	0.167	0.176
64	0.16737	0.175	0.183	0.172	0.143	0.202	0.222	0.203	0.262	0.257	0.242	0.168	0.151	0.149	0.154	0.210	0.279	0.292	0.211	0.204	0.240	0.312	0.353	0.390	0.384	0.354	0.345	0.312	0.307	0.350	0.346	0.306	0.320	0.295	0.195	0.172
65	0.19117	0.173	0.184	0.143	0.109	0.117	0.119	0.183	0.137	0.123	0.150	0.183	0.220	0.247	0.154	0.168	0.201	0.185	0.160	0.138	0.173	0.245	0.300	0.340	0.388	0.420	0.436	0.430	0.372	0.320	0.388	0.331	0.151	0.111	0.118	0.170
66	0.13334	0.138	0.154	0.138	0.110	0.121	0.121	0.179	0.138	0.128	0.151	0.180	0.220	0.245	0.180	0.203	0.226	0.259	0.197	0.150	0.174	0.256	0.323	0.366	0.403	0.412	0.426	0.422	0.349	0.238	0.332	0.255	0.139	0.117	0.119	0.128
67	0.17462	0.197	0.197	0.151	0.112	0.093	0.113	0.154	0.123	0.132	0.173	0.227	0.291	0.316	0.244	0.257	0.312	0.338	0.259	0.153	0.159	0.214	0.268	0.337	0.390	0.398	0.383	0.326	0.238	0.155	0.184	0.155	0.129	0.148	0.172	0.158
68	0.13647	0.152	0.145	0.135	0.172	0.132	0.121	0.145	0.127	0.131	0.148	0.156	0.180	0.214	0.182	0.211	0.256	0.276	0.202	0.157	0.183	0.272	0.332	0.352	0.369	0.291	0.294	0.287	0.222	0.160	0.158	0.134	0.149	0.139	0.143	0.139
69	0.17936	0.186	0.173	0.097	0.088	0.085	0.103	0.176	0.164	0.200	0.222	0.260	0.299	0.337	0.207	0.150	0.167	0.213	0.212	0.129	0.127	0.169	0.182	0.175	0.170	0.137	0.143	0.147	0.153	0.147	0.141	0.140	0.149	0.170	0.187	0.178
70	0.11398	0.121	0.122	0.128	0.117	0.141	0.139	0.106	0.098	0.098	0.112	0.136	0.145	0.124	0.105	0.109	0.125	0.147	0.148	0.108	0.112	0.139	0.178	0.215	0.226	0.280	0.272	0.230	0.188	0.139	0.145	0.126	0.117	0.110	0.118	0.106
71	0.18072	0.151	0.136	0.114	0.096	0.091	0.097	0.102	0.102	0.106	0.101	0.108	0.110	0.105	0.099	0.112	0.139	0.134	0.149	0.112	0.106	0.130	0.168	0.201	0.196	0.218	0.234	0.229	0.190	0.180	0.170	0.181	0.128	0.122	0.139	0.169
72	0.13825	0.139	0.133	0.128	0.132	0.197	0.201	0.180	0.175	0.166	0.131	0.106	0.100	0.122	0.134	0.135	0.141	0.160	0.145	0.103	0.096	0.114	0.142	0.156	0.150	0.164	0.181	0.181	0.175	0.156	0.148	0.145	0.132	0.137	0.153	0.129
73	0.13506	0.155	0.162	0.126	0.110	0.152	0.148	0.132	0.146	0.135	0.112	0.099	0.091	0.116	0.134	0.136	0.138	0.179	0.143	0.103	0.107	0.138	0.192	0.221	0.187	0.169	0.195	0.224	0.235	0.195	0.200	0.176	0.150	0.139	0.144	0.127
74	0.18900	0.178	0.168	0.114	0.145	0.255	0.247	0.275	0.258	0.288	0.298	0.254	0.205	0.222	0.221	0.222	0.228	0.218	0.186	0.112	0.097	0.115	0.149	0.183	0.158	0.130	0.147	0.186	0.213	0.225	0.211	0.212	0.156	0.141	0.156	0.175
75	0.16133	0.170	0.149	0.109	0.150	0.215	0.217	0.250	0.257	0.270	0.299	0.287	0.236	0.184	0.160	0.160	0.151	0.131	0.132	0.103	0.096	0.112	0.133	0.156	0.172	0.144	0.129	0.140	0.159	0.176	0.199	0.206	0.153	0.126	0.132	0.148

APPENDIX A

Configuration A (Existing): Peak Velocity Ratios

Dir	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
1	0.3676	0.4131	0.3849	0.2885	0.2692	0.3650	0.3449	0.3297	0.3484	0.3379	0.3447	0.3152	0.2552	0.2557	0.2570	0.2720	0.2822	0.3171	0.3344	0.2721	0.2550	0.3349	0.4063	0.4473	0.4041	0.4268	0.4881	0.4901	0.4784	0.4852	0.4240	0.3691	0.3150	0.3266	0.3396	0.3887
2	0.3596	0.3825	0.3739	0.2978	0.2278	0.3032	0.3025	0.2919	0.2975	0.3146	0.3532	0.3124	0.2640	0.2571	0.2726	0.2973	0.2861	0.3032	0.3159	0.2415	0.2573	0.3453	0.4630	0.5051	0.4504	0.4119	0.4947	0.5319	0.5301	0.5343	0.5334	0.5056	0.4036	0.3439	0.3597	0.3795
3	0.4732	0.4809	0.4336	0.3554	0.3157	0.3586	0.3751	0.3425	0.3166	0.3201	0.3630	0.3732	0.3168	0.2805	0.3363	0.3458	0.3537	0.3793	0.3711	0.3155	0.2594	0.2575	0.3997	0.4637	0.3998	0.3956	0.3962	0.4617	0.4716	0.5242	0.5737	0.5245	0.4119	0.3642	0.4190	0.4765
4	0.4802	0.5441	0.5170	0.4162	0.3876	0.4091	0.4423	0.3862	0.3820	0.3781	0.3678	0.3288	0.3215	0.3242	0.3379	0.3526	0.3498	0.3560	0.3455	0.3535	0.3439	0.3716	0.3846	0.4138	0.3980	0.4011	0.3772	0.3887	0.4195	0.4484	0.4909	0.4695	0.4235	0.3961	0.4616	0.5085
5	0.4552	0.4841	0.4605	0.3354	0.3462	0.4521	0.4384	0.4355	0.3662	0.3777	0.3868	0.3497	0.2738	0.3475	0.3377	0.3543	0.3826	0.4299	0.4432	0.2868	0.2608	0.3004	0.4094	0.4760	0.3953	0.3781	0.3733	0.4299	0.4592	0.4794	0.5093	0.4905	0.3983	0.3824	0.4441	0.4717
6	0.4604	0.4755	0.4512	0.3223	0.3298	0.4490	0.4253	0.4621	0.4027	0.4388	0.5029	0.4819	0.3866	0.3665	0.3706	0.3556	0.3809	0.3959	0.4230	0.2941	0.2658	0.3005	0.3855	0.4214	0.4595	0.4492	0.3685	0.3915	0.4143	0.4889	0.5153	0.5333	0.4600	0.4047	0.4580	0.5089
7	0.4483	0.4649	0.4208	0.3772	0.3826	0.5205	0.4853	0.5326	0.4948	0.4770	0.5638	0.5388	0.4777	0.4200	0.4333	0.4171	0.4141	0.3991	0.4167	0.3520	0.2744	0.2902	0.3923	0.3894	0.4585	0.4280	0.3880	0.3958	0.4068	0.4705	0.5151	0.5287	0.4492	0.3845	0.4309	0.4855
8	0.4304	0.4527	0.4484	0.4197	0.3469	0.5096	0.5026	0.5643	0.5111	0.4792	0.5010	0.4548	0.4431	0.4032	0.4042	0.4213	0.3831	0.3871	0.4173	0.3294	0.2689	0.2771	0.3667	0.3647	0.4042	0.4500	0.4608	0.5309	0.5558	0.5629	0.5691	0.5764	0.5590	0.5257	0.3830	0.4369
9	0.4388	0.5416	0.5137	0.4608	0.3662	0.5256	0.5071	0.5615	0.5252	0.5345	0.5560	0.5050	0.4881	0.4480	0.3947	0.4204	0.3793	0.3829	0.4097	0.3419	0.2771	0.3013	0.3690	0.3967	0.4203	0.4463	0.4651	0.5539	0.5870	0.5901	0.5976	0.5785	0.5743	0.5455	0.3934	0.4536
10	0.4086	0.5083	0.4827	0.4188	0.4214	0.5768	0.5291	0.5574	0.5104	0.5307	0.5530	0.5404	0.5034	0.5008	0.5230	0.5160	0.4829	0.4719	0.4670	0.4205	0.3346	0.2497	0.3687	0.3434	0.4258	0.4084	0.3577	0.3906	0.4064	0.4181	0.4506	0.4974	0.4498	0.3925	0.3914	0.4504
11	0.4356	0.5636	0.5121	0.4308	0.4253	0.5906	0.5071	0.5493	0.5223	0.5321	0.5362	0.4853	0.4815	0.5174	0.5280	0.5131	0.4781	0.4886	0.4777	0.4253	0.3213	0.2743	0.3876	0.3419	0.4325	0.4078	0.3646	0.4270	0.4489	0.4261	0.4810	0.4946	0.4514	0.4159	0.4000	0.4694
12	0.4321	0.5190	0.4681	0.3964	0.3718	0.4822	0.4492	0.4670	0.4144	0.4219	0.4989	0.4702	0.4432	0.4874	0.5264	0.5271	0.4958	0.5009	0.4697	0.4213	0.3184	0.2721	0.3412	0.2973	0.3741	0.3683	0.3369	0.3740	0.3584	0.3550	0.4215	0.4487	0.4135	0.3894	0.4334	0.4775
13	0.2739	0.2894	0.2825	0.2594	0.2732	0.2918	0.3014	0.2687	0.2839	0.2900	0.2914	0.2783	0.2583	0.2564	0.2690	0.2615	0.2638	0.2588	0.2645	0.2647	0.2657	0.2768	0.2780	0.2789	0.2836	0.2813	0.2623	0.2568	0.2593	0.2676	0.2903	0.2970	0.2993	0.2557	0.2624	0.2784
14	0.4595	0.5122	0.4747	0.3772	0.3668	0.4212	0.3920	0.3679	0.3809	0.4583	0.5724	0.5630	0.5129	0.4676	0.5393	0.5444	0.5385	0.4818	0.4850	0.4294	0.3436	0.2485	0.2831	0.2522	0.3351	0.3241	0.3051	0.3409	0.3038	0.2817	0.3727	0.3904	0.3586	0.3588	0.4284	0.5090
15	0.4512	0.4722	0.4457	0.3495	0.3561	0.4352	0.3957	0.3745	0.4605	0.5657	0.6966	0.6742	0.5952	0.4988	0.5243	0.5255	0.4663	0.4902	0.4544	0.4138	0.3060	0.2732	0.2668	0.2528	0.3434	0.3165	0.2408	0.2850	0.2684	0.2606	0.3194	0.3618	0.3515	0.3368	0.4414	0.5167
16	0.4402	0.4427	0.4321	0.3117	0.4277	0.4693	0.4103	0.3942	0.4808	0.5197	0.4515	0.3879	0.3882	0.3965	0.4211	0.4330	0.4186	0.3992	0.4025	0.3718	0.3284	0.3110	0.2820	0.3050	0.3431	0.3057	0.2599	0.2668	0.2719	0.2744	0.2782	0.3268	0.3383	0.3315	0.4358	0.5061
17	0.4287	0.3804	0.3545	0.3289	0.4439	0.4539	0.4044	0.4035	0.4808	0.4988	0.4292	0.3952	0.4232	0.4411	0.3903	0.3584	0.3651	0.3658	0.3647	0.3804	0.3887	0.3794	0.2533	0.3092	0.3070	0.3112	0.2764	0.2597	0.2577	0.2795	0.2798	0.3276	0.3158	0.3090	0.4113	0.4600
18	0.3787	0.3643	0.3332	0.4804	0.5039	0.5277	0.5427	0.5895	0.6065	0.5747	0.4793	0.4653	0.5813	0.5779	0.5603	0.5525	0.5057	0.3917	0.3466	0.3724	0.3748	0.3767	0.3481	0.4177	0.4592	0.4769	0.4430	0.4587	0.4800	0.4691	0.4041	0.3609	0.3828	0.3649	0.3483	0.3269
19	0.4127	0.3583	0.3059	0.3758	0.4125	0.4648	0.4881	0.5934	0.6736	0.5996	0.5614	0.5546	0.6661	0.7690	0.6978	0.5477	0.4988	0.4717	0.4605	0.4241	0.4139	0.3845	0.3304	0.3887	0.4513	0.4766	0.4733	0.4648	0.4762	0.4766	0.4089	0.4302	0.4869	0.4858	0.4788	0.4316
20	0.6501	0.6932	0.6080	0.3839	0.3305	0.4357	0.4550	0.6125	0.7197	0.7047	0.6673	0.6094	0.5357	0.4772	0.4749	0.4837	0.4871	0.4990	0.4616	0.4613	0.4009	0.3388	0.4165	0.4726	0.5691	0.6379	0.6572	0.5871	0.5949	0.6441	0.7054	0.6450	0.5348	0.5590	0.6459	0.6902
21	0.3023	0.3206	0.3615	0.4719	0.5489	0.5780	0.7186	0.8189	0.8726	0.7919	0.7367	0.7617	0.7952	0.8540	0.7677	0.6339	0.6303	0.6625	0.6680	0.6126	0.5168	0.4318	0.3460	0.3733	0.4001	0.4062	0.4019	0.3924	0.3571	0.3665	0.3126	0.3553	0.3852	0.3733	0.3551	0.3288
22	0.2959	0.2766	0.2876	0.4926	0.5245	0.5677	0.6848	0.7499	0.7811	0.7201	0.7365	0.8036	0.8440	0.8790	0.7938	0.6215	0.5188	0.5172	0.5226	0.4716	0.4532	0.3553	0.4417	0.5053	0.5053	0.5807	0.5560	0.5264	0.4548	0.4616	0.4220	0.4889	0.5182	0.4337	0.3993	0.3473
23	0.3918	0.4087	0.3761	0.3942	0.4172	0.5175	0.5930	0.6668	0.7396	0.7360	0.7572	0.8469	0.8751	0.9408	0.8797	0.7265	0.5769	0.6122	0.6255	0.5197	0.3751	0.4308	0.4965	0.5552	0.5955	0.7271	0.6358	0.5102	0.3772	0.3621	0.3414	0.4151	0.4357	0.4100	0.4018	0.3664
24	0.3463	0.3241	0.3272	0.4302	0.4048	0.4287	0.4421	0.5256	0.5484	0.5736	0.6605	0.7658	0.8633	0.9410	0.8872	0.7578	0.7786	0.7649	0.7983	0.7671	0.6505	0.5310	0.4899	0.5551	0.5480	0.6785	0.6298	0.5872	0.4742	0.5089	0.3713	0.3681	0.3980	0.3737	0.3781	0.3515
25	0.5612	0.4231	0.2992	0.3500	0.4496	0.5491	0.6626	0.7203	0.6948	0.6942	0.7240	0.7039	0.6622	0.6368	0.5929	0.5869	0.7793	0.8906	0.8953	0.8685	0.8011	0.7548	0.4673	0.5571	0.6450	0.6309	0.6350	0.5781	0.5430	0.4582	0.4031	0.4533	0.5874	0.6342	0.6108	0.6033
26	0.6066	0.4966	0.3623	0.4905	0.5582	0.6345	0.7381	0.8169	0.9027	0.8725	0.8676	0.8289	0.8559	0.8747	0.8033	0.6508	0.5617	0.5706	0.5729	0.5662	0.5517	0.5065	0.4554	0.6131	0.6820	0.7605	0.8441	0.8506	0.7408	0.7229	0.6065	0.6971	0.7918	0.7404	0.7199	0.6198
27	0.6335	0.4978	0.4034	0.5334	0.6237	0.7970	0.8495	0.9377	0.9982	0.9628	0.9056	0.8077	0.7535	0.6765	0.7325	0.6868	0.8832	0.9480	0.9669	0.9569	0.8508	0.8008	0.5479	0.5847	0.6854	0.6914	0.8120	0.8219	0.6863	0.7041	0.6175	0.7815	0.8939	0.8627	0.7966	0.6962
28	0.4614	0.3550	0.3433	0.3956	0.4971	0.4751	0.5680	0.6614	0.7258	0.7312	0.6465	0.6077	0.6613	0.7724	0.7449	0.6084	0.6900	0.7329	0.7705	0.6544	0.5960	0.5247	0.4396	0.5292	0.5510	0.5923	0.6154	0.6166	0.4980	0.5167	0.3697	0.5150	0.6270	0.5997	0.5841	0.5193
29	0.4438	0.4212	0.3319	0.5092	0.6023	0.7215	0.8165	0.9308	0.9465	0.8650	0.7415	0.7028	0.6883	0.6707	0.6075	0.5200	0.5888	0.6194	0.6446	0.6241	0.6023	0.5217	0.3362	0.4045	0.4711	0.4342	0.4542	0.4825	0.4336	0.4401	0.3702	0.3812	0.4581	0.4497	0.4429	0.4533
30	0.6253	0.4741	0.4404	0.6116	0.7128	0.8792	0.9068	1.0318	1.0713	0.9721	0.8314	0.7142	0.6458	0.6095	0.5333	0.4602	0.5538	0.5495	0.5702	0.5722	0.5569	0.4810	0.3903	0.5590	0.6071	0.6884	0.7369	0.7196	0.6334	0.6549	0.5860	0.7909	0.8826	0.8351	0.8009	0.7017
31	0.5749	0.4613	0.4340	0.5207	0.5351	0.5935	0.6072	0.6068	0.6212	0.6232	0.6002	0.5658	0.5206	0.5106	0.5354	0.6006	0.7020	0.7332	0.7298	0.7090	0.6533	0.5979	0.4211	0.5142	0.5875	0.6346	0.6638	0.6199	0.5060	0.5731	0.5217	0.6834	0.8077	0.7663	0.7612	0.6458
32	0.3864	0.3719	0.3363	0.2487	0.2960	0.3303	0.3298	0.3702	0.4129	0.3980	0.4561	0.4584	0.4508	0.4830	0.4428	0.4581	0.4346	0.3969	0.3819	0.4212	0.4259	0.3948	0.3258	0.3894	0.4677	0.4844	0.4800	0.5040	0.5163	0.4959	0.4591	0.4367	0.5071	0.4682	0.4658	0.4211
33	0.3492	0.3710	0.3187	0.4131	0.4263	0.3934	0.3612	0.3780	0.4509	0.4755	0.5155	0.5135	0.4850	0.4773	0.4352	0.4395	0.4070	0.3755	0.3773	0.4222	0.4565	0.4840	0.3034	0.3486	0.3956	0.4284	0.3947	0.3787	0.4040	0.3846	0.4076	0.3710	0.3819	0.3597	0.4091	0.3388
34	0.4790	0.4078	0.5210	0.6655	0.7003	0.8397	0.9207	0.9519	0.9434	0.8872	0.8797	0.9272	0.9381	0.8768	0.7948	0.7672	0.7775	0.6240	0.5956	0.5597	0.5017	0.4558	0.4138	0.3014	0.3299	0.3444	0.3149	0.2991	0.3111	0.3368	0.3415	0.3520	0.3825	0.4102	0.4296	0.4259
35	0.4789	0.4896	0.3761	0.4837	0.5710	0.5773	0.6171	0.6616	0.6778	0.6731	0.6875	0.6276	0.6049	0.6478	0.6918	0.7166	0.7298	0.5875	0.5109	0.4556	0.4580	0.4294	0.4028	0.3328	0.3488	0.4042	0.4699	0.4126	0.4760	0.5249	0.5442	0.5920	0.5090	0.4192	0.4265	0.4388
36	0.5291	0.5822	0.5228	0.5546	0.5382	0.5599	0.6448	0.6367	0.5659	0.5162	0.5472	0.5660	0.6809	0.6501	0.7094	0.6977	0.6754	0.5692	0.5046	0.4535	0.4616	0.4455	0.4582	0.3915	0.2771	0.3133	0.3192	0.3095	0.3216	0.3186	0.3036	0.3859	0.3539	0.3318	0.4293	0.4849
37	0.5971	0.6902	0.6101	0.4107	0.4102	0.3978	0.4681	0.5048	0.5625	0.5622	0.5621	0.6282	0.6668	0.6406	0.5826	0.6199	0.5460	0.4553	0.4419	0.4082	0.3779	0.3835	0.3467	0.2931	0.2751	0.2883	0.2667	0.2565	0.2462	0.2472	0.2676	0.3175	0.3088	0.3070	0.4388	0.5626
38	0.4598	0.4834	0.4035	0.3680	0.4379	0.4391	0.4479	0.4929	0.5123	0.5175	0.5281	0.5769	0.5790	0.6018	0.6318	0.6830	0.6563	0.5388	0.5179	0.4406	0.4083	0.3615	0.3470	0.2934	0.3336	0.3284	0.3000	0.2696	0.2720	0.2804	0.3008	0.3424	0.2831	0.2612	0.3578	0.4783
39	0.3825	0.3664	0.3449	0.5157	0.5610	0.6040	0.6305	0.6531	0.6563	0.6150	0.5596	0.5256	0.6910	0.7291	0.7033	0.6917	0.6481	0.4444	0.4000	0.4322	0.4353	0.4486	0.3041	0.3531	0.3860	0.3995	0.3582	0.3638	0.3689	0.3960	0.3457	0.3424	0.3648	0.3565	0.3297	0.4172
40	0.4490	0.4329	0.3931	0.2690	0.3066	0.3654	0.3132	0.2977	0.3568	0.3745	0.3462	0.3224	0.3320	0.3539	0.4150	0.4268	0.4016	0.3724	0.3407	0.3004	0.2702	0.2736	0.2763	0.3342	0.3576	0.3439	0.3290	0.3311	0.3527	0.3812	0.3308	0.3321	0.3432	0.3312	0.4056	0.5163
41	0.5177	0.5360	0.5186	0.4046	0.3336	0.4167	0.3820	0.3514	0.4318	0.5203	0.5864	0.5605	0.5093	0.5171	0.6002	0.5793	0.5673	0.5746	0.5231	0.4758	0.3634	0.2853	0.3005	0.2799	0.3344	0.3352	0.3387	0.4138	0.4083	0.3333	0.3825	0.3930	0.4133	0.4241	0.4898	0.5849
42	0.4379	0.5262	0.4823	0.4089	0.3873	0.4879	0.4316	0.4584	0.4477	0.4499	0.4437	0.3804	0.4017	0.3984	0.4899	0.5070	0.5059	0.4683	0.4616	0.4214	0.3563	0.2952	0.3571	0.3346	0.4034	0.4041	0.3460	0.3590	0.3890	0.3924	0.4210	0.4576	0.4062	0.3825	0.3631	0.4600
43	0.3826	0.3935	0.4185	0.3322	0.3642	0.3555	0.3121	0.3843	0.4536	0.4698	0.4840	0.5381	0.6093	0.6276	0.5189	0.6267	0.6395	0.5808	0.5430	0.4264	0.3014	0.2416	0.2003	0.1844	0.1828	0.2120	0.2599	0.2879	0.2646	0.2444	0.2617	0.2441	0.2458	0.2235	0.3213	0.3588
44	0.5401	0.5962	0.5361	0.3557	0.4298	0.4381	0.4022	0.4172	0.4358	0.4458	0.4951	0.6489	0.7190	0.7567	0.6280	0.7368	0.7566	0.6825	0.6528	0.5327	0.3295	0.2946	0.2851	0.2856	0.2691	0.2908	0.2781	0.3091	0.3404	0.3198	0.3102	0.3399	0.3087	0.2904	0.3907	0.4807
45	0.4256	0.4605	0.4300	0.3518	0.3650	0.4131	0.4195	0.4080	0.4572	0.4969	0.4987	0.4256	0.4549	0.4754	0.4258	0.4803	0.5023	0.4954	0.4812	0.4275	0.2860	0.2986	0.3055	0.3267	0.3281	0.3250	0.3112	0.3643	0.3959	0.4337	0.4453	0.4285	0.4448	0.3750	0.3426	0.3955
46	0.3440	0.4356	0.4099	0.3499	0.3713	0.4951	0.4402	0.4673	0.4903	0.5134	0.5385	0.4911	0.4986	0.4916	0.3770	0.3745	0.3952	0.3978	0.3731	0.3236	0.3026	0.2577	0.2919	0.3314	0.3429	0.3221	0.2955	0.3626	0.4024	0.4304	0.4438	0.4283	0.4151	0.3515	0.3309	0.3418
47	0.3636	0.3907	0.3951	0.3580	0.3311	0.4813	0.4209	0.4712	0.4990	0.5259	0.5450	0.5217	0.5256	0.5274	0.4045	0.3831	0.3829	0.4035	0.4082	0.3630	0.2827	0.2541	0.3201	0.3546	0.3606	0.3319	0.3479	0.3977	0.4470	0.4520	0.4794	0.4428	0.4538	0.3968	0.3077	0.3490
48	0.4309	0.4680	0.4856	0.3813	0.3027	0.4677	0.4287	0.4696	0.5167	0.5385	0.5657	0.5386	0.5362	0.5308	0.4458	0.4613	0.4297	0.3773	0.3978	0.3465	0.2689	0.2549	0.3186	0.3363	0.3699	0.3673	0.3844	0.4349	0.4599	0.4919	0.5129	0.5001	0.4992	0.4173	0.3635	0.3461
49	0.4543	0.4806	0.4411	0.3755	0.2669	0.3207	0.4074	0.5227	0.5210	0.4794	0.4817	0.4386	0.4041	0.4511	0.4114	0.3974	0.3413	0.2858	0.2709	0.2761	0.3256	0.3555	0.4276	0.4433	0.3923	0.4311	0.4677	0.4729	0.4430	0.3965	0.3696	0.4380	0.4104	0.4362	0.3521	0.4536
50	0.3480	0.4313	0.3889	0.3461	0.4315	0.4451	0.3934	0.4325	0.5306	0.5004	0.5669	0.5304	0.5632	0.5903	0.4919	0.3830	0.3306	0.3226	0.3246	0.3147	0.2724	0.3498	0.4357	0.5355	0.5930	0.7129	0.7344	0.6514	0.6097	0.5313	0.4856	0.4453	0.4857	0.5495	0.4797	0.3444
51	0.3471	0.3947	0.3928	0.3318	0.3142	0.4082	0.5239	0.6231	0.6435	0.6774	0.7183	0.6806	0.6691	0.7049	0.5077	0.3847	0.3087	0.3358	0.3777	0.3353	0.2499	0.2493	0.2674	0.2648	0.2614	0.3975	0.4547	0.4567	0.4161	0.2876	0.2624	0.3104	0.3305	0.3499	0.3091	0.2820
52	0.4530	0.4818	0.4827	0.4109	0.3134	0.4414	0.4467	0.4888	0.4749	0.4480	0.4707	0.4365	0.4453	0.4334	0.4600	0.4718	0.4561	0.3800	0.3451	0.2888	0.2858	0.3337	0.3962	0.4242	0.4244	0.3397	0.3751	0.4634	0.4841	0.5440	0.5654	0.5519	0.4831	0.3898	0.3483	0.4164
53	0.4619	0.5256	0.5188	0.4498	0.3126	0.4946	0.4998	0.5831	0.5422	0.5474	0.5558	0.5246	0.5435	0.5105	0.4642	0.5222	0.4992	0.4162	0.4472	0.3211	0.2735	0.3287	0.4044	0.4290	0.4921	0.4561	0.4439	0.5863	0.6199	0.7027	0.6936	0.6454	0.6247	0.5732	0.3416	0.4004
54	0.4102	0.4357	0.4217	0.3721	0.2862	0.3776	0.4276	0.3936	0.3775	0.3816	0.4003	0.3803	0.3663	0.3671	0.3871	0.4282	0.4090	0.4288	0.4627	0.3355	0.2632	0.3137	0.3849	0.4038	0.4627	0.5132	0.4944	0.5876	0.5981	0.6184	0.6247	0.6130	0.5965	0.5725	0.3839	0.3550
55	0.2994	0.3318	0.3042	0.2879	0.3736	0.4885	0.4712	0.5120	0.5232	0.5072	0.5149	0.4846	0.4564	0.4446	0.4436	0.4918	0.4676	0.4097	0.4218	0.2750	0.2684	0.3032	0.3944	0.4515	0.5356	0.5427	0.4957	0.5656	0.6232	0.6902	0.6728	0.6113	0.6067	0.5998	0.4266	0.3349
56	0.3816	0.3914	0.4067	0.3503	0.2741	0.4968	0.5445	0.6039	0.6116	0.6423	0.6518	0.5805	0.5696	0.5780	0.4546	0.4342	0.3689	0.3385	0.3648	0.2768	0.3771	0.4267	0.5254	0.5576	0.5704	0.5441	0.5783	0.7298	0.7776	0.8327	0.8558	0.7880	0.7350	0.6602	0.4675	0.3893
57	0.3515	0.3845	0.4062	0.3908	0.3589	0.4959	0.5212	0.5196	0.5292	0.5053	0.4955	0.4448	0.4095	0.4100	0.3871	0.4255	0.3592	0.2985	0.3142	0.2605	0.3114	0.3374	0.4032	0.4616	0.5565	0.5488	0.4957	0.5180	0.5541	0.5945	0.6352	0.5496	0.6013	0.6165	0.5320	0.4006
58	0.4599	0.5036	0.5057	0.4441	0.3964	0.4405	0.5399	0.5625	0.6248	0.6345	0.6611	0.5718	0.5895	0.6281	0.4804	0.3896	0.3738	0.3896	0.3593	0.3627	0.4313	0.4798	0.5311	0.5714	0.6167	0.6077	0.6217	0.6656	0.6902	0.7249	0.7307	0.6782	0.6736	0.7534	0.6617	0.5217

59	0.4877	0.4926	0.4635	0.4184	0.3517	0.2398	0.4276	0.3688	0.3608	0.4121	0.4467	0.4253	0.3995	0.4202	0.3764	0.3858	0.4475	0.4743	0.3866	0.3732	0.3743	0.4085	0.4584	0.4565	0.4968	0.5168	0.5221	0.5646	0.5958	0.6444	0.6169	0.5065	0.5322	0.6125	0.6285	0.5287
60	0.4739	0.5534	0.6255	0.6435	0.5007	0.4519	0.4226	0.3676	0.4251	0.3440	0.3805	0.4346	0.3857	0.3223	0.3223	0.3567	0.3284	0.2938	0.3224	0.4432	0.5625	0.4508	0.4381	0.5206	0.5802	0.6213	0.6473	0.5334	0.4959	0.5455	0.5903	0.6169	0.6656	0.6504	0.6395	0.5224
61	0.4346	0.4644	0.4678	0.3954	0.3355	0.3607	0.5428	0.5264	0.6021	0.6405	0.6428	0.5729	0.5708	0.6298	0.5091	0.4121	0.3224	0.2668	0.2488	0.2434	0.3297	0.3312	0.3812	0.3941	0.4406	0.4434	0.4607	0.5059	0.5299	0.5488	0.5516	0.5245	0.5239	0.5508	0.4977	0.3720
62	0.4587	0.5390	0.5809	0.5375	0.3555	0.3914	0.5112	0.4474	0.5267	0.5580	0.5720	0.4380	0.4424	0.4335	0.4286	0.5404	0.5881	0.5704	0.4983	0.4781	0.5552	0.6239	0.6536	0.6717	0.6223	0.6097	0.5629	0.5242	0.4657	0.4889	0.5391	0.5162	0.5183	0.4986	0.3903	0.4450
63	0.4666	0.5736	0.5896	0.5242	0.3477	0.2983	0.3946	0.4871	0.3592	0.2838	0.3147	0.4014	0.4601	0.4718	0.4324	0.4629	0.4678	0.4752	0.4126	0.3692	0.5293	0.6011	0.5833	0.6164	0.6793	0.6979	0.7041	0.7066	0.6510	0.6040	0.5974	0.5661	0.4927	0.4668	0.3980	0.4456
64	0.4368	0.4764	0.4974	0.4236	0.3464	0.4646	0.4995	0.4568	0.5201	0.5181	0.4817	0.3726	0.3643	0.3511	0.4046	0.5008	0.5800	0.5602	0.4975	0.5082	0.6017	0.6472	0.6911	0.7263	0.7307	0.7391	0.7219	0.7165	0.6161	0.6594	0.7043	0.6489	0.6309	0.6248	0.4965	0.4415
65	0.4510	0.4114	0.4241	0.4223	0.2952	0.2621	0.3205	0.4467	0.3366	0.2932	0.3323	0.3914	0.4503	0.5459	0.3826	0.3951	0.4158	0.4078	0.3917	0.3723	0.4848	0.5854	0.6198	0.6538	0.6580	0.7169	0.7343	0.7741	0.6946	0.7145	0.8602	0.7872	0.4838	0.3197	0.3450	0.4081
66	0.3378	0.3624	0.3892	0.3618	0.2810	0.2806	0.3693	0.4626	0.3313	0.3434	0.3684	0.4195	0.5098	0.5474	0.4639	0.5117	0.5566	0.5874	0.4769	0.4212	0.4648	0.5671	0.6021	0.6428	0.6702	0.6955	0.7140	0.7750	0.6952	0.6161	0.7445	0.7014	0.3969	0.3103	0.3080	0.2918
67	0.4597	0.4825	0.4558	0.3729	0.2825	0.2141	0.3436	0.4335	0.3344	0.3520	0.4039	0.4699	0.5614	0.6229	0.4819	0.5351	0.6361	0.6229	0.5728	0.4348	0.5011	0.6229	0.6810	0.7397	0.7512	0.7740	0.7911	0.7582	0.6525	0.4726	0.5291	0.4895	0.3284	0.3211	0.3995	0.4137
68	0.3207	0.3432	0.3330	0.3163	0.3414	0.2788	0.3698	0.3893	0.3562	0.3327	0.3895	0.4039	0.4319	0.4991	0.4544	0.4865	0.5851	0.6124	0.5296	0.4281	0.4834	0.6563	0.7054	0.7425	0.7423	0.6336	0.6116	0.5808	0.5065	0.4045	0.4189	0.3782	0.3127	0.2947	0.3333	0.3160
69	0.4903	0.5028	0.4701	0.2846	0.2335	0.2272	0.3360	0.4884	0.3784	0.4066	0.4350	0.4819	0.5566	0.6081	0.4617	0.4007	0.4685	0.5188	0.4944	0.3669	0.4212	0.5224	0.5512	0.4959	0.4911	0.4151	0.5001	0.4829	0.4625	0.4039	0.4592	0.4303	0.3701	0.4002	0.4361	0.4694
70	0.3453	0.3416	0.3266	0.3029	0.2821	0.3372	0.3430	0.2930	0.2571	0.2427	0.2666	0.3342	0.3785	0.3564	0.2979	0.3059	0.3252	0.3685	0.4032	0.3213	0.3943	0.4458	0.5218	0.5583	0.5895	0.6447	0.6128	0.5861	0.4962	0.4016	0.3986	0.3683	0.3395	0.2797	0.2837	0.2837
71	0.3814	0.3977	0.3487	0.2960	0.2302	0.2277	0.2966	0.2708	0.2539	0.2907	0.2541	0.2715	0.2855	0.2808	0.225	0.2593	0.3317	0.4027	0.4122	0.3370	0.2804	0.3315	0.4341	0.5076	0.4775	0.5307	0.5543	0.5601	0.5079	0.4826	0.4913	0.4298	0.3450	0.3238	0.3558	0.3550
72	0.4184	0.4090	0.3995	0.2987	0.2988	0.4084	0.4115	0.3833	0.3787	0.3692	0.3389	0.2829	0.2281	0.2741	0.3135	0.3223	0.3472	0.3783	0.3761	0.2911	0.2543	0.3152	0.3804	0.4153	0.4002	0.4416	0.4535	0.4457	0.4595	0.4374	0.4496	0.4443	0.3757	0.3288	0.3609	0.3633
73	0.4232	0.4267	0.4138	0.2971	0.2564	0.3594	0.3796	0.3307	0.3890	0.3249	0.2952	0.2441	0.2149	0.2852	0.3071	0.3308	0.3763	0.4299	0.4053	0.2815	0.2474	0.3218	0.4885	0.5404	0.4666	0.4474	0.5088	0.5505	0.5315	0.4979	0.5161	0.4969	0.3962	0.3267	0.3556	0.3780
74	0.4869	0.4900	0.5150	0.3014	0.3889	0.5260	0.5060	0.5292	0.5108	0.5386	0.5480	0.4870	0.4126	0.4314	0.4400	0.4550	0.4562	0.4738	0.4799	0.3211	0.2415	0.2972	0.4201	0.4908	0.4031	0.3436	0.4437	0.5012	0.4818	0.4761	0.4626	0.4436	0.3386	0.3141	0.4078	0.4323
75	0.4209	0.4392	0.4486	0.2712	0.3633	0.4800	0.4624	0.5097	0.4922	0.4934	0.5261	0.5037	0.4611	0.4134	0.3853	0.4121	0.3631	0.3593	0.3699	0.3152	0.2534	0.2704	0.3183	0.3543	0.3561	0.3423	0.3159	0.3400	0.3551	0.3871	0.4189	0.4092	0.3188	0.2745	0.3674	0.3956

Configuration B (Proposed): Mean Velocity Ratios

Dir	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
1	0.1310	0.1504	0.1499	0.1150	0.1155	0.1883	0.2741	0.2698	0.2050	0.2986	0.3272	0.2853	0.2577	0.4061	0.3658	0.3406	0.3653	0.3929	0.3813	0.2122	0.1409	0.1416	0.2068	0.3184	0.3968	0.4203	0.4047	0.4011	0.4338	0.4493	0.4275	0.3361	0.2470	0.1598	0.1113	0.1190
2	0.1373	0.1520	0.1434	0.1216	0.1024	0.1500	0.1494	0.1461	0.1567	0.1861	0.1965	0.2013	0.2452	0.3043	0.2825	0.2732	0.2704	0.2654	0.2631	0.1965	0.1129	0.1061	0.1322	0.1882	0.2311	0.2919	0.2823	0.2772	0.3116	0.3182	0.3032	0.2644	0.2106	0.1609	0.1224	0.1265
3	0.1335	0.1343	0.1178	0.1172	0.0974	0.1187	0.2038	0.2220	0.2086	0.2399	0.2561	0.2652	0.3910	0.3792	0.3205	0.3060	0.2862	0.2910	0.2911	0.1713	0.1217	0.1288	0.1729	0.2184	0.2299	0.1840	0.1785	0.1861	0.1978	0.2125	0.2201	0.1739	0.1544	0.1289	0.1180	0.1325
4	0.2282	0.2079	0.1677	0.1480	0.1253	0.2347	0.2514	0.2487	0.2557	0.2913	0.3506	0.3772	0.3114	0.4260	0.4611	0.4113	0.3014	0.2344	0.1951	0.1716	0.1282	0.1175	0.2110	0.3178	0.3993	0.4451	0.4499	0.4716	0.5078	0.5193	0.5058	0.4268	0.3427	0.2678	0.2261	0.2521
5	0.2030	0.2227	0.2021	0.1538	0.1077	0.1276	0.1245	0.1513	0.3236	0.4689	0.5072	0.5084	0.4086	0.3317	0.3639	0.3323	0.3163	0.3186	0.2997	0.2071	0.1208	0.1075	0.1472	0.2012	0.2333	0.2233	0.1872	0.1813	0.1976	0.1993	0.1884	0.1712	0.1591	0.1466	0.1692	0.1966
6	0.3571	0.3796	0.3260	0.2471	0.1290	0.1420	0.1567	0.1825	0.3306	0.3676	0.3697	0.3425	0.3089	0.3684	0.3885	0.3959	0.3898	0.3808	0.3326	0.2482	0.1335	0.1217	0.1557	0.2191	0.2750	0.3075	0.2883	0.3023	0.3225	0.3305	0.3387	0.3168	0.2751	0.2669	0.3051	0.3488
7	0.3187	0.3277	0.2772	0.2126	0.1312	0.1886	0.1916	0.2171	0.2692	0.3009	0.2921	0.2916	0.4089	0.5364	0.5142	0.4956	0.4452	0.4184	0.3996	0.2584	0.1386	0.1232	0.1697	0.2336	0.2757	0.2887	0.3013	0.3168	0.3201	0.3297	0.3345	0.2992	0.2649	0.2470	0.2773	0.3192
8	0.2780	0.2609	0.2108	0.1830	0.1447	0.2868	0.2695	0.3175	0.4748	0.5556	0.6019	0.6215	0.5684	0.5243	0.5019	0.4514	0.3785	0.3330	0.3119	0.2536	0.1444	0.1231	0.2026	0.3213	0.4320	0.5167	0.5020	0.4832	0.4998	0.4847	0.4726	0.3981	0.3035	0.2619	0.2749	0.3118
9	0.3199	0.3052	0.2466	0.1854	0.1629	0.3379	0.3825	0.4312	0.5514	0.6372	0.6882	0.7123	0.6603	0.6156	0.5759	0.5126	0.4482	0.4050	0.3939	0.3233	0.1754	0.1430	0.2208	0.3129	0.4129	0.4881	0.4964	0.4888	0.4950	0.4906	0.4815	0.3984	0.3322	0.2988	0.3037	0.3351
10	0.2656	0.2516	0.1902	0.1548	0.1319	0.2006	0.1484	0.1636	0.2887	0.3713	0.3808	0.3956	0.4883	0.6014	0.5526	0.5100	0.4477	0.4440	0.4282	0.2731	0.1204	0.1018	0.1325	0.1848	0.2258	0.2267	0.2135	0.2141	0.1965	0.1820	0.1758	0.1726	0.1653	0.1816	0.2351	0.2782
11	0.3609	0.3424	0.2674	0.2097	0.1898	0.4126	0.4621	0.5034	0.6397	0.7317	0.7802	0.8095	0.8095	0.8171	0.7882	0.7171	0.6189	0.5549	0.5280	0.3914	0.2329	0.1515	0.2108	0.3079	0.4030	0.4437	0.4405	0.4556	0.4544	0.4298	0.4084	0.3522	0.3035	0.2904	0.3325	0.3811
12	0.1731	0.1601	0.1421	0.1540	0.1336	0.2864	0.3269	0.3440	0.4707	0.5182	0.5591	0.5928	0.5905	0.5832	0.5914	0.5473	0.4749	0.4256	0.3945	0.2890	0.2097	0.1467	0.1256	0.1770	0.2571	0.3364	0.3400	0.3483	0.3502	0.3266	0.2986	0.2538	0.2067	0.1809	0.1747	0.1879
13	0.2817	0.2713	0.2155	0.1429	0.1125	0.2406	0.2064	0.2197	0.3697	0.4325	0.4806	0.5127	0.4967	0.5479	0.5687	0.5161	0.3980	0.3120	0.2154	0.1771	0.1275	0.1045	0.1807	0.2812	0.3795	0.4375	0.4253	0.4187	0.4051	0.3853	0.3805	0.3467	0.3092	0.2794	0.2741	0.2871
14	0.2729	0.2603	0.2207	0.2185	0.1381	0.2846	0.3353	0.3444	0.4411	0.4779	0.5278	0.5614	0.5635	0.5303	0.5547	0.5260	0.4390	0.3777	0.2921	0.2048	0.1828	0.1530	0.1349	0.1959	0.2517	0.3279	0.4073	0.4482	0.4624	0.4673	0.4631	0.4107	0.3374	0.2801	0.2880	0.3129
15	0.2095	0.1733	0.1529	0.1820	0.1414	0.2639	0.3353	0.3384	0.3807	0.4618	0.4957	0.4917	0.4640	0.4158	0.4304	0.4038	0.3329	0.3005	0.2859	0.2065	0.1931	0.1673	0.1738	0.2488	0.2926	0.2797	0.3451	0.4262	0.5233	0.5732	0.5481	0.4620	0.3605	0.2866	0.2712	0.2690
16	0.2162	0.1888	0.1512	0.1624	0.1564	0.2612	0.3438	0.3561	0.2996	0.3320	0.3941	0.4003	0.3665	0.3892	0.4322	0.4282	0.3781	0.3659	0.3453	0.2699	0.2051	0.1644	0.1919	0.2844	0.3313	0.3140	0.3430	0.4069	0.5090	0.5463	0.5043	0.4409	0.3611	0.2914	0.2633	0.2551
17	0.2172	0.2247	0.1508	0.1361	0.1555	0.2191	0.2253	0.2052	0.2046	0.1801	0.2031	0.2320	0.2680	0.2381	0.3423	0.3648	0.3378	0.3346	0.3017	0.2222	0.1816	0.1760	0.1753	0.2644	0.3470	0.3347	0.2708	0.2970	0.3868	0.3943	0.3353	0.3294	0.2877	0.2326	0.2090	0.2010
18	0.2657	0.2750	0.2054	0.1639	0.2129	0.2692	0.3351	0.3456	0.2848	0.2398	0.1952	0.2103	0.1946	0.2399	0.2912	0.3246	0.3092	0.3100	0.3045	0.2443	0.2242	0.2362	0.2484	0.3350	0.4405	0.3806	0.2575	0.2508	0.2715	0.2787	0.3067	0.1813	0.1485	0.1643	0.2118	0.2565
19	0.2674	0.2395	0.1651	0.1301	0.1101	0.1272	0.2275	0.2243	0.2793	0.2159	0.2149	0.1773	0.1789	0.2825	0.2064	0.1844	0.1685	0.1702	0.1733	0.1920	0.1306	0.1352	0.1444	0.2037	0.3034	0.3332	0.2410	0.2130	0.2214	0.2818	0.3190	0.3381	0.3265	0.3036	0.3002	0.2878
20	0.3437	0.3464	0.2916	0.2224	0.2381	0.3138	0.3125	0.3007	0.3027	0.2676	0.2480	0.2411	0.2141	0.1932	0.2569	0.2887	0.2680	0.2603	0.2398	0.1983	0.1524	0.1449	0.2145	0.3619	0.4210	0.4701	0.4872	0.5103	0.5193	0.4447	0.3527	0.2912	0.2302	0.2235	0.2910	0.3414
21	0.1495	0.1334	0.1252	0.1621	0.1629	0.1704	0.2735	0.3905	0.4309	0.3622	0.3165	0.3050	0.3603	0.4363	0.2548	0.2130	0.2524	0.2881	0.2615	0.2078	0.1825	0.1403	0.1049	0.1263	0.1605	0.1848	0.2189	0.2556	0.2854	0.3160	0.3040	0.2607	0.2420	0.2066	0.1861	0.1718
22	0.1414	0.1098	0.0995	0.2076	0.2097	0.2160	0.2784	0.3582	0.4147	0.4189	0.4176	0.4361	0.5101	0.5326	0.3714	0.3158	0.2757	0.2472	0.2006	0.1795	0.1481	0.1195	0.1542	0.1485	0.1515	0.2335	0.3171	0.3355	0.3111	0.2930	0.2627	0.2757	0.2576	0.2210	0.1942	0.1681
23	0.1437	0.1460	0.1271	0.2397	0.2214	0.2707	0.2890	0.3221	0.4141	0.4699	0.4934	0.5223	0.5890	0.6194	0.4968	0.4152	0.3405	0.3221	0.2709	0.1709	0.1364	0.1535	0.1730	0.1756	0.1640	0.1818	0.1907	0.1673	0.1268	0.1324	0.1232	0.1644	0.1579	0.1410	0.1376	0.1428
24	0.1435	0.1397	0.1269	0.1946	0.1739	0.1913	0.2537	0.2767	0.2217	0.2746	0.3745	0.4427	0.5089	0.5571	0.4358	0.4234	0.4742	0.4987	0.4525	0.3505	0.2849	0.1965	0.1974	0.1868	0.2065	0.2344	0.3079	0.3089	0.2554	0.2471	0.2445	0.1764	0.1729	0.1543	0.1506	0.1494
25	0.1996	0.1413	0.1046	0.1370	0.1729	0.2178	0.2231	0.2557	0.2996	0.3181	0.3213	0.3303	0.3299	0.3399	0.2823	0.2746	0.3638	0.4681	0.4558	0.3849	0.3212	0.2542	0.1520	0.2032	0.2146	0.2488	0.2127	0.1709	0.1661	0.1494	0.1274	0.1487	0.1834	0.2014	0.2069	0.2010
26	0.3055	0.2692	0.1614	0.2304	0.2356	0.2677	0.3299	0.3916	0.4458	0.4671	0.5073	0.5399	0.5789	0.5749	0.3894	0.3097	0.2999	0.3041	0.3048	0.2938	0.2726	0.2206	0.1425	0.2247	0.2386	0.3242	0.4840	0.5686	0.5261	0.4658	0.4060	0.3938	0.4195	0.3837	0.3448	0.3259
27	0.3074	0.2539	0.1593	0.2767	0.3423	0.4467	0.5318	0.6461	0.6583	0.5941	0.5293	0.4475	0.3708	0.3698	0.3258	0.3379	0.4648	0.5810	0.5836	0.5389	0.4839	0.3778	0.2193	0.3208	0.3487	0.3053	0.4001	0.5050	0.4756	0.4425	0.4055	0.3725	0.4230	0.3953	0.3599	0.3375
28	0.1849	0.1417	0.1228	0.1575	0.1468	0.1492	0.2239	0.2875	0.3020	0.2427	0.2074	0.2074	0.2404	0.3194	0.2402	0.2330	0.3002	0.3552	0.3372	0.2758	0.2565	0.2107	0.1612	0.2083	0.2716	0.2673	0.3454	0.4092	0.3976	0.3910	0.3497	0.2996	0.3147	0.2834	0.2469	0.2238
29	0.1800	0.1903	0.1462	0.2196	0.2778	0.3467	0.4906	0.6013	0.5584	0.4769	0.4026	0.4014	0.4477	0.4501	0.2856	0.2930	0.3593	0.3991	0.4108	0.3666	0.3376	0.2663	0.1828	0.2119	0.2324	0.1747	0.2314	0.2856	0.2899	0.2894	0.2898	0.1874	0.1843	0.1777	0.1690	0.1761
30	0.3207	0.2539	0.1435	0.3315	0.3950	0.4961	0.5479	0.6657	0.6887	0.5862	0.4921	0.4430	0.4170	0.3589	0.2168	0.2074	0.2663	0.3093	0.3117	0.2892	0.2731	0.2096	0.1324	0.2123	0.2311	0.2914	0.4347	0.5029	0.4687	0.4443	0.4151	0.4254	0.4758	0.4391	0.3996	0.3611
31	0.2622	0.2249	0.1554	0.2621	0.2508	0.2723	0.2788	0.3192	0.3524	0.3451	0.3175	0.2836	0.2293	0.2296	0.2163	0.2438	0.3218	0.3716	0.3994	0.3930	0.3393	0.2378	0.1436	0.2444	0.2601	0.2718	0.3526	0.3667	0.3159	0.3143	0.3158	0.3465	0.3884	0.3586	0.3226	0.2871
32	0.2496	0.2499	0.1675	0.1215	0.1409	0.1511	0.1794	0.2073	0.1798	0.1823	0.2217	0.2400	0.2067	0.2157	0.2724	0.3210	0.2683	0.3013	0.2845	0.2405	0.2001	0.2164	0.1969	0.3013	0.3660	0.3743	0.2655	0.2123	0.2646	0.3492	0.4086	0.3548	0.3376	0.3114	0.2825	0.2631
33	0.1538	0.2202	0.1225	0.1200	0.1684	0.1738	0.2642	0.2770	0.1875	0.2003	0.2265	0.2530	0.2665	0.1987	0.2069	0.3231	0.2119	0.2822	0.2227	0.1824	0.1842	0.2506	0.2025	0.3059	0.2845	0.2341	0.2285	0.2323	0.2648	0.2743	0.2856	0.1787	0.1739	0.1657	0.1588	0.1521
34	0.1613	0.1460	0.1808	0.3365	0.3811	0.4665	0.5532	0.6407	0.6104	0.4962	0.4400	0.4993	0.5154	0.3748	0.3811	0.3777	0.3307	0.2197	0.2115	0.1918	0.1727	0.1626	0.1309	0.1204	0.1037	0.1061	0.0976	0.1018	0.1122	0.1352	0.1371	0.1694	0.1739	0.1739	0.1717	0.1578
35	0.1805	0.2125	0.1460	0.1772	0.2072	0.2227	0.3512	0.4165	0.3617	0.3109	0.2729	0.2493	0.2417	0.2829	0.2802	0.3241	0.2943	0.2552	0.2232	0.1738	0.1723	0.1857	0.1700	0.1763	0.1758	0.1424	0.1610	0.1939	0.2869	0.3484	0.2739	0.2191	0.1862	0.1481	0.1544	0.1676
36	0.1767	0.2269	0.1781	0.2369	0.2466	0.2285	0.2986	0.3215	0.2822	0.2768	0.2920	0.2877	0.3193	0.3312	0.3098	0.3249	0.2676	0.2707	0.1928	0.1664	0.1508	0.1958	0.1786	0.2119	0.1535	0.1547	0.1445	0.1352	0.1491	0.1559	0.1562	0.1571	0.1376	0.1173	0.1279	0.1514
37	0.2231	0.2484	0.2099	0.1732	0.1606	0.1775	0.2088	0.2374	0.2012	0.2024	0.2153	0.2131	0.2643	0.2765	0.2253	0.2744	0.2335	0.2029	0.1571	0.1433	0.1318	0.1424	0.1234	0.1574	0.2062	0.2306	0.1889	0.1772	0.1954	0.2168	0.2115	0.2300	0.1826	0.1489	0.1712	0.2220
38	0.1253	0.1424	0.1267	0.1329	0.1721	0.1994	0.2894	0.3221	0.2313	0.2314	0.2431	0.2450	0.2478	0.2675	0.2695	0.3140	0.2710	0.2486	0.2143	0.1682	0.1604	0.1760	0.1638	0.1954	0.1798	0.1281	0.1531	0.1650	0.1918	0.2020	0.1925	0.1212	0.1074	0.1018	0.1098	0.1174
39	0.1586	0.1551	0.1373	0.1870	0.1946	0.2492	0.3410	0.3689	0.3165	0.2573	0.2213	0.2267	0.2163	0.2693	0.2549	0.2158	0.2695	0.2361	0.2567	0.1881	0.1858	0.1978	0.2045	0.2180	0.3036	0.2643	0.2389	0.2759	0.3177	0.3110	0.3130	0.2373	0.2019	0.1777	0.1599	0.1605
40	0.1978	0.1804	0.1253	0.1297	0.1221	0.1480	0.1783	0.1885	0.2119	0.1571	0.1396	0.1450	0.1496	0.1852	0.2032	0.1872	0.1848	0.1977	0.2191	0.2020	0.1747	0.1672	0.1587	0.2138	0.3194	0.3412	0.3189	0.3670	0.4720	0.4931	0.4133	0.4045	0.3477	0.2747	0.2243	0.2029
41	0.3424	0.3189	0.2634	0.2254	0.1424	0.2309	0.2275	0.2205	0.2993	0.3833	0.4873	0.5046	0.4028	0.2946	0.2917	0.2873	0.2171	0.2131	0.1977	0.1884	0.1352	0.1324	0.1281	0.1787	0.2429	0.3905	0.4454	0.4936	0.5457	0.5679	0.5510	0.4817	0.3882	0.3296	0.3616	0.4019
42	0.2830	0.2564	0.2389	0.2043	0.1430	0.2296	0.2563	0.2555	0.3174	0.3051	0.2902	0.2967	0.3163	0.3777	0.4007	0.3503	0.3606	0.3385	0.3677	0.2923	0.1886	0.1606	0.1871	0.2329	0.3759	0.4563	0.4300	0.4231	0.4307	0.4129	0.3944	0.3486	0.2829	0.2492	0.2645	0.2955
43	0.2358	0.2635	0.2008	0.1608	0.1385	0.1524	0.2456	0.2752	0.2065	0.2325	0.2285	0.2236	0.3049	0.3417	0.2450	0.2847	0.2488	0.2972	0.2479	0.1661	0.1265	0.1803	0.1856	0.2801	0.3019	0.3220	0.3248	0.3480	0.3900	0.3785	0.3583	0.2916	0.2402	0.2013	0.2252	0.2594
44	0.2485	0.2583	0.2297	0.1769	0.1446	0.1840	0.1480	0.1707	0.1927	0.1877	0.1757	0.1769	0.2148	0.2599	0.2194	0.2106	0.2682	0.2542	0.2742	0.1610	0.1195	0.1384	0.1852	0.2068	0.2805	0.3113	0.2887	0.2836	0.3099	0.3096	0.2756	0.2514	0.1941	0.1519	0.1984	0.2529
45	0.2778	0.2728	0.2474	0.1989	0.1230	0.1552	0.1691	0.1606	0.2383	0.2577	0.2542	0.2321	0.2259	0.2505	0.2261	0.1559	0.1734	0.1544	0.1514	0.1353	0.1638	0.1426	0.1973	0.2502	0.3604	0.4184	0.3881	0.3950	0.4080	0.3747	0.3226	0.3010	0.2557	0.2318	0.2557	0.2887
46	0.2599	0.2775	0.2048	0.1600	0.1510	0.2089	0.1759	0.2255	0.3501	0.4146	0.4258	0.4064	0.4153	0.4262	0.3481	0.3102	0.2430	0.2496	0.2156	0.1854	0.1428	0.1602	0.2008	0.2975	0.3611	0.4072	0.3927	0.3955	0.4055	0.3819	0.3604	0.3005	0.2609	0.2396	0.2429	0.2665
47	0.2204	0.2269	0.1723	0.1448	0.1532	0.2668	0.3501	0.3938	0.4391	0.5090	0.5366	0.5279	0.5177	0.5237	0.4393	0.3972	0.3653	0.3996	0.4014	0.3122	0.1753	0.1698	0.2054	0.2972	0.3676	0.4133	0.3967	0.3838	0.4095	0.3951	0.3712	0.3035	0.2539	0.2231	0.1992	0.2280
48	0.2046	0.2452	0.1746	0.1632	0.1555	0.2433	0.2516	0.2776	0.4064	0.4527	0.4891	0.4847	0.4481	0.3874	0.3199	0.3205	0.2583	0.3169	0.3361	0.2997	0.1439	0.1423	0.1381	0.2674	0.3396	0.4267	0.3446	0.3076	0.3188	0.3110	0.2681	0.2631	0.2335	0.2090	0.2053	0.2263
49	0.2367	0.2188	0.1839	0.1452	0.1112	0.1613	0.2615	0.2701	0.1923	0.1407	0.1651	0.1930	0.1736	0.2206	0.2318	0.2077	0.1922	0.1693	0.1415	0.1089	0.1369	0.1647	0.2021	0.2343	0.2419	0.2133	0.2244	0.2427	0.2890	0.3036	0.3123	0.2449	0.1859	0.1568	0.1933	0.2331
50	0.1672	0.2061	0.1672	0.1390	0.1789	0.1780	0.1402	0.1495	0.2683	0.3248	0.3151	0.3170	0.3135	0.2117	0.1799	0.2278	0.1236	0.1753	0.1133	0.1426	0.1316	0.1444	0.1197	0.2074	0.2069	0.2837	0.2857	0.2438	0.1891	0.1485	0.1142	0.1176	0.1602	0.2108	0.1452	0.1401
51	0.1713	0.2152	0.1786	0.1537	0.1475	0.2241	0.3606	0.3750	0.2668	0.2010	0.2107	0.2168	0.2126	0.1810	0.1777	0.1917	0.1430	0.1711	0.2035	0.2266	0.1511	0.1367	0.1352	0.1850	0.1835	0.1775	0.1737	0.1760	0.1505	0.1349	0.1197	0.1157	0.1196	0.1250	0.1281	0.1691
52	0.2070	0.2373	0.2108	0.1949	0.1493	0.2353	0.2484	0.2449	0.2947	0.4098	0.4767	0.4863	0.4345	0.4113	0.4184	0.4027	0.3441	0.3248	0.2840	0.2250	0.1349	0.1555	0.1822	0.2576	0.2989	0.2827	0.2273	0.2356	0.2732	0.3111	0.3112	0.2685	0.2262	0.1759	0.1776	0.1917
53	0.1756	0.1739	0.1889	0.1872	0.1526	0.2682	0.3086	0.3249	0.3889	0.4825	0.5387	0.5452	0.4794	0.4657	0.4052	0.3118	0.3213	0.2759	0.3239	0.2256	0.1421	0.1542	0.2004	0.2300	0.3663	0.3817	0.3177	0.3068	0.3341	0.3507	0.3300	0.2873	0.2468	0.2092	0.1768	0.1891
54	0.1443	0.1429	0.1561	0.1697	0.1366	0.1823	0.1940	0.2087	0.2569	0.2828	0.3103	0.3316	0.3225	0.3218	0.2791	0.2429	0.2630	0.2863	0.3083	0.2196	0.1429	0.1310	0.1899	0.2646	0.3716	0.4064	0.3381	0.3011	0.3115	0.2979	0.2880	0.2713	0.2087	0.1767	0.1544	0.1626
55	0.1084	0.1501	0.1088	0.1245	0.1354	0.2482	0.2051	0.2241	0.3488	0.4591	0.5057	0.5539	0.5739	0.6127	0.5888	0.4645	0.4427	0.4065	0.4207	0.2593	0.1198	0.1528	0.1218	0.2041	0.1606	0.1894	0.1708	0.1958	0.2379	0.2802	0.2293	0.2085	0.2145	0.2055	0.1390	0.1007
56	0.1387	0.1673	0.1625	0.1848	0.1502	0.2582	0.3166	0.3258	0.2954	0.3131	0.3491	0.4071	0.4244	0.3932	0.3671	0.3651	0.3080	0.3293	0.3521	0.2285	0.1374	0.1782	0.2082	0.2560	0.2492	0.2194	0.2330	0.2971	0.3552	0.4109	0.4148	0.3153	0.2909	0.2352	0.1630	0.1325
57	0.1302	0.1325	0.1433	0.1609	0.1405	0.2837	0.3125	0.3205	0.2539	0.2516	0.2830	0.4436	0.5017	0.5361	0.5498	0.5250	0.4711	0.4574	0.4108	0.2472	0.1475	0.1346	0.1698	0.1810	0.2208	0.2086	0.1974	0.2152	0.2479	0.2809	0.2748	0.2133	0.2113	0.2215	0.1844	0.1365
58	0.1604	0.1830	0.1753	0.1597	0.1461	0.2005	0.3257	0.3453	0.3071	0.3279	0.3436	0.3692	0.3763	0.3664	0.2885	0.2057	0.1900	0.2396	0.2844	0.1997	0.1965	0.2393	0.2826	0.3087	0.3390	0.3313	0.3473	0.3837	0.4150	0.4552	0.4585	0.3649	0.3447	0.3367	0.2625	0.1526

APPENDIX A

59	0.1752	0.1822	0.1424	0.1517	0.1534	0.1059	0.1041	0.1040	0.1369	0.1687	0.1829	0.2062	0.2565	0.1871	0.1447	0.1941	0.1256	0.1414	0.1009	0.1151	0.1235	0.1506	0.1403	0.1823	0.1631	0.2009	0.2002	0.2105	0.2176	0.2265	0.2202	0.2075	0.2181	0.2543	0.2415	0.1656
60	0.2043	0.2098	0.2419	0.2815	0.2199	0.1835	0.2085	0.2309	0.1867	0.1820	0.1830	0.2188	0.2268	0.2214	0.2114	0.2259	0.2052	0.1357	0.1396	0.1421	0.1858	0.1691	0.1801	0.1839	0.2189	0.2352	0.2159	0.1967	0.2061	0.2386	0.2825	0.2696	0.2850	0.2986	0.2830	0.2143
61	0.1681	0.2073	0.1532	0.1407	0.1380	0.1174	0.1631	0.2000	0.2616	0.2559	0.2416	0.2537	0.2793	0.2971	0.2698	0.2193	0.1319	0.2057	0.2015	0.1573	0.1141	0.1480	0.1229	0.1911	0.1559	0.1902	0.2036	0.2342	0.2680	0.2991	0.2923	0.2490	0.2570	0.2577	0.1882	0.1358
62	0.1644	0.1658	0.1890	0.1851	0.1482	0.2068	0.2553	0.2521	0.2097	0.2114	0.2395	0.2828	0.2789	0.2436	0.2434	0.2413	0.2041	0.2214	0.2057	0.1753	0.2411	0.2846	0.2917	0.2907	0.2921	0.2525	0.2443	0.2111	0.1940	0.2177	0.2286	0.1800	0.1788	0.1611	0.1273	0.1467
63	0.1987	0.2142	0.2219	0.2134	0.1501	0.1353	0.1297	0.1844	0.2157	0.2710	0.3125	0.3593	0.3909	0.3277	0.2665	0.1746	0.1637	0.1914	0.1691	0.1688	0.1899	0.2086	0.2431	0.2755	0.3211	0.3426	0.3600	0.3592	0.3214	0.3034	0.2942	0.2596	0.2119	0.1929	0.1559	0.1766
64	0.1538	0.1758	0.1790	0.1866	0.1679	0.2763	0.2685	0.2511	0.1868	0.1659	0.1874	0.2295	0.2342	0.2231	0.2215	0.2874	0.2418	0.2480	0.2359	0.1756	0.2289	0.3034	0.3345	0.3612	0.3595	0.3167	0.3106	0.2746	0.2988	0.3639	0.3508	0.2731	0.2688	0.2559	0.1685	0.1436
65	0.1562	0.1967	0.1539	0.1404	0.1554	0.2171	0.2757	0.3306	0.2737	0.3321	0.3867	0.4260	0.4409	0.3972	0.3544	0.1880	0.2736	0.2462	0.2221	0.2520	0.2339	0.2644	0.3380	0.3504	0.3999	0.3875	0.4012	0.3964	0.3424	0.3100	0.3635	0.2865	0.1441	0.1191	0.1234	0.1418
66	0.1396	0.1541	0.1544	0.1481	0.1311	0.1436	0.1775	0.2411	0.2482	0.3091	0.3423	0.3775	0.4205	0.4461	0.2863	0.1996	0.1949	0.2521	0.2138	0.1746	0.1774	0.2679	0.2721	0.3646	0.3887	0.3849	0.3899	0.3802	0.3185	0.2670	0.3150	0.2490	0.1339	0.1208	0.1200	0.1247
67	0.1585	0.1869	0.1796	0.2060	0.1575	0.1116	0.1172	0.1697	0.2162	0.2760	0.3112	0.3540	0.3833	0.3748	0.3483	0.2444	0.2263	0.2251	0.1757	0.1290	0.1322	0.1946	0.2005	0.2192	0.2035	0.2075	0.2423	0.2241	0.1619	0.1505	0.1416	0.1308	0.1210	0.1096	0.1203	0.1387
68	0.1394	0.1288	0.1401	0.1452	0.1664	0.1154	0.1786	0.2041	0.1623	0.2106	0.2308	0.2691	0.2860	0.3047	0.1922	0.2268	0.1909	0.2554	0.2452	0.1476	0.1801	0.3036	0.3513	0.4121	0.4144	0.3605	0.3319	0.3253	0.2532	0.1977	0.2193	0.1561	0.1290	0.1183	0.1282	0.1392
69	0.1653	0.1572	0.1499	0.1338	0.0902	0.0995	0.1342	0.1608	0.1911	0.2578	0.2944	0.3598	0.3699	0.3015	0.1930	0.1698	0.1567	0.1726	0.1426	0.1112	0.1108	0.1449	0.1416	0.1266	0.1229	0.1210	0.1457	0.1499	0.1325	0.1283	0.1238	0.1207	0.1409	0.1459	0.1607	0.1625
70	0.1134	0.1145	0.1085	0.1219	0.1240	0.1023	0.1053	0.1351	0.2271	0.3008	0.3746	0.4103	0.3684	0.2953	0.2390	0.1828	0.1546	0.1548	0.1882	0.1342	0.1150	0.1258	0.2099	0.3047	0.4294	0.4374	0.3125	0.2359	0.2298	0.1919	0.1779	0.1789	0.1319	0.1015	0.1033	0.1085
71	0.1398	0.1810	0.1299	0.1361	0.1373	0.1874	0.1377	0.1776	0.2966	0.3550	0.4091	0.3945	0.3465	0.2003	0.2636	0.1575	0.2306	0.1521	0.1426	0.2250	0.1653	0.1427	0.2538	0.2932	0.3811	0.4027	0.3361	0.2962	0.2770	0.2428	0.2547	0.2124	0.1489	0.1152	0.1155	0.1262
72	0.1265	0.1449	0.1212	0.1139	0.1023	0.1448	0.2005	0.1939	0.2780	0.3911	0.4620	0.4308	0.3081	0.2041	0.2513	0.2260	0.3450	0.3794	0.3389	0.2197	0.1294	0.1219	0.2200	0.3415	0.4650	0.5026	0.4081	0.3424	0.3428	0.3145	0.2727	0.2769	0.2085	0.1430	0.1161	0.1155
73	0.1377	0.1449	0.1438	0.1276	0.1153	0.1194	0.1139	0.1136	0.2106	0.3320	0.3962	0.3705	0.2593	0.2838	0.2666	0.2730	0.2974	0.3452	0.3360	0.1671	0.1187	0.1223	0.2085	0.3605	0.4644	0.5002	0.4361	0.4006	0.4135	0.3953	0.3602	0.3347	0.2446	0.1614	0.1289	0.1291
74	0.1787	0.2205	0.1777	0.1405	0.1195	0.2356	0.2105	0.1901	0.1666	0.1931	0.2208	0.2165	0.2140	0.2970	0.4761	0.4774	0.5257	0.5289	0.4754	0.3282	0.1875	0.1203	0.2163	0.2765	0.3333	0.3495	0.3376	0.3526	0.3818	0.3876	0.3727	0.3180	0.2505	0.1893	0.1489	0.1662
75	0.2332	0.2553	0.2210	0.1677	0.1281	0.2738	0.2872	0.3406	0.5349	0.6834	0.7358	0.7324	0.6722	0.6288	0.6128	0.5506	0.4600	0.4027	0.3454	0.2274	0.1303	0.1118	0.1814	0.2602	0.3286	0.3792	0.3822	0.3944	0.4169	0.4249	0.4226	0.3632	0.2896	0.2340	0.2122	0.2402

APPENDIX A

Configuration B (Proposed): Peak Velocity Ratios

Dir	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
1	0.3918	0.4116	0.3685	0.3241	0.2958	0.3723	0.4178	0.4339	0.4589	0.5448	0.5928	0.5382	0.7063	0.7272	0.7064	0.6942	0.7361	0.7820	0.7514	0.5771	0.3166	0.3124	0.4598	0.5830	0.6701	0.6992	0.7044	0.7024	0.7403	0.7438	0.7126	0.6461	0.6133	0.5760	0.3914	0.3333
2	0.3989	0.4047	0.3451	0.3031	0.2781	0.3318	0.3572	0.4205	0.4377	0.4532	0.4400	0.5552	0.7073	0.6882	0.6636	0.6759	0.6555	0.5921	0.5689	0.4828	0.2767	0.2719	0.3594	0.4602	0.4952	0.5111	0.5143	0.5280	0.5512	0.5521	0.5343	0.5121	0.4783	0.4655	0.3671	0.3501
3	0.3734	0.3419	0.3316	0.2942	0.2527	0.2751	0.3566	0.4258	0.5067	0.5710	0.5650	0.6347	0.9044	0.8328	0.6915	0.6481	0.6644	0.7104	0.6950	0.5235	0.2635	0.2910	0.4178	0.4925	0.5245	0.5207	0.4910	0.4896	0.5119	0.5467	0.5234	0.4844	0.4632	0.3776	0.3365	0.3657
4	0.5037	0.4486	0.3925	0.3585	0.3296	0.4237	0.4279	0.4194	0.4663	0.5182	0.5805	0.6097	0.5816	0.6976	0.6720	0.6446	0.5264	0.4749	0.4490	0.3797	0.2882	0.2960	0.4601	0.5803	0.6431	0.7024	0.7098	0.7618	0.7752	0.7801	0.7616	0.7117	0.6319	0.5537	0.4480	0.5206
5	0.4821	0.4842	0.4333	0.3697	0.2984	0.3103	0.3380	0.5186	0.7824	0.9133	0.9184	0.9534	0.9147	0.6782	0.6905	0.7143	0.6682	0.6725	0.6469	0.5509	0.3411	0.2963	0.4091	0.5073	0.5598	0.5402	0.4872	0.4902	0.4867	0.5006	0.4766	0.5169	0.5145	0.4586	0.4409	0.4900
6	0.6954	0.7205	0.6175	0.5193	0.4005	0.4466	0.4389	0.6431	0.8582	0.7748	0.7442	0.6919	0.7366	0.7821	0.7571	0.7489	0.7256	0.7098	0.6847	0.5928	0.3772	0.3652	0.4837	0.5624	0.6878	0.7024	0.6400	0.6237	0.6275	0.6349	0.6455	0.6725	0.6293	0.6504	0.6447	0.7042
7	0.6346	0.6555	0.5708	0.4853	0.3869	0.5823	0.5343	0.7050	0.8291	0.7510	0.7732	0.7881	0.9992	0.9916	0.9342	0.8327	0.7779	0.7514	0.7980	0.7113	0.3860	0.3497	0.4465	0.5155	0.5981	0.6073	0.5868	0.5642	0.5818	0.5809	0.5844	0.5870	0.5004	0.5446	0.5854	0.6306
8	0.6609	0.5863	0.4903	0.4476	0.4470	0.6301	0.6488	0.6535	0.8211	0.8356	0.8637	0.8799	0.8442	0.7755	0.7426	0.6981	0.6228	0.5927	0.6119	0.5830	0.3736	0.3600	0.5148	0.6010	0.7439	0.8475	0.8180	0.7985	0.8097	0.7947	0.7510	0.7040	0.5888	0.5657	0.6034	0.6524
9	0.6516	0.6005	0.5156	0.4364	0.4747	0.6748	0.7149	0.7488	0.8693	0.8893	0.9193	0.9457	0.9284	0.8548	0.8044	0.7550	0.7099	0.6569	0.7315	0.7028	0.4579	0.3577	0.5084	0.6015	0.7156	0.8052	0.8058	0.8031	0.7981	0.7974	0.7528	0.6893	0.5692	0.5566	0.5801	0.6216
10	0.5595	0.5568	0.4695	0.4154	0.4317	0.6100	0.5086	0.6433	0.8222	0.8172	0.8408	0.8508	1.0420	1.0665	0.9835	0.9036	0.8599	0.8485	0.8943	0.7987	0.3961	0.2868	0.3571	0.4742	0.5906	0.5622	0.5201	0.5052	0.4622	0.4330	0.4064	0.4163	0.4105	0.4731	0.5525	0.5908
11	0.6664	0.6555	0.5783	0.4719	0.5307	0.7302	0.7835	0.8448	0.9859	1.0147	1.0346	1.0781	1.1158	1.1234	1.0692	1.0126	0.9089	0.8565	0.8618	0.7559	0.5229	0.4130	0.4522	0.5848	0.7139	0.7587	0.7184	0.6971	0.6986	0.6684	0.6288	0.5877	0.5161	0.5278	0.6158	0.6788
12	0.4332	0.4128	0.3830	0.3459	0.4625	0.5977	0.6702	0.6647	0.7812	0.7666	0.7962	0.8218	0.8510	0.8502	0.8330	0.8260	0.7324	0.7037	0.7034	0.6155	0.5040	0.4640	0.3972	0.4272	0.5572	0.6632	0.6532	0.6377	0.6492	0.6468	0.5830	0.5227	0.4476	0.3900	0.3894	0.4290
13	0.4867	0.4805	0.3955	0.3195	0.3318	0.4831	0.4800	0.4613	0.5999	0.6450	0.6822	0.7248	0.7332	0.7928	0.7684	0.7391	0.6441	0.5731	0.5216	0.4642	0.3208	0.2729	0.3814	0.4811	0.5898	0.6820	0.6505	0.6368	0.6158	0.5646	0.5518	0.5238	0.4715	0.4513	0.4350	0.4758
14	0.5836	0.5733	0.5039	0.4476	0.4501	0.5988	0.6859	0.6719	0.7310	0.7295	0.7714	0.7886	0.8191	0.8150	0.8123	0.8014	0.7069	0.6661	0.5724	0.5019	0.4234	0.4267	0.4039	0.4626	0.5703	0.6628	0.6951	0.7632	0.7976	0.7525	0.7444	0.7112	0.5948	0.4943	0.5593	0.6134
15	0.5792	0.4642	0.4067	0.3904	0.4389	0.6262	0.7182	0.6943	0.7301	0.7129	0.7201	0.6899	0.7426	0.8204	0.8352	0.8073	0.6749	0.5936	0.5829	0.5369	0.5187	0.4761	0.4128	0.4767	0.5377	0.5836	0.6304	0.7535	0.8566	0.8782	0.8483	0.7852	0.6457	0.5488	0.5532	0.5934
16	0.5511	0.4734	0.3903	0.3828	0.4536	0.5903	0.6858	0.7200	0.6425	0.5822	0.6200	0.6144	0.6225	0.7412	0.7417	0.7486	0.7102	0.6611	0.6327	0.5743	0.4859	0.4657	0.4318	0.5341	0.6138	0.5891	0.6368	0.7593	0.8740	0.9203	0.8516	0.7838	0.6550	0.5720	0.5394	0.5898
17	0.4726	0.4639	0.3385	0.3314	0.5207	0.6137	0.6539	0.5816	0.5031	0.4662	0.4958	0.5554	0.5673	0.6195	0.6733	0.7262	0.6643	0.6649	0.6704	0.5611	0.4926	0.5397	0.4896	0.5921	0.6809	0.6754	0.5968	0.7255	0.8473	0.8688	0.7601	0.6861	0.5792	0.4586	0.4320	0.4484
18	0.5230	0.5431	0.4134	0.4015	0.5723	0.6378	0.6238	0.5908	0.5553	0.4939	0.4727	0.5278	0.5185	0.5500	0.5760	0.6369	0.5691	0.5672	0.6080	0.5054	0.4472	0.5027	0.4931	0.6260	0.7593	0.7288	0.6008	0.6097	0.6538	0.6292	0.6637	0.5114	0.3939	0.4020	0.4509	0.5022
19	0.5126	0.5337	0.4178	0.3330	0.3396	0.3919	0.4530	0.5407	0.6330	0.5701	0.5088	0.4237	0.4906	0.6378	0.5685	0.5647	0.5126	0.4946	0.4980	0.4673	0.3842	0.3381	0.3524	0.6137	0.8148	0.7692	0.6080	0.5428	0.4866	0.5617	0.5855	0.5556	0.5087	0.4849	0.4811	0.4918
20	0.7625	0.7295	0.6302	0.5388	0.7089	0.7252	0.7817	0.8095	0.6800	0.6196	0.5586	0.5218	0.4786	0.4809	0.5708	0.6166	0.5724	0.5766	0.5473	0.4675	0.4194	0.4375	0.6069	0.8169	0.8642	0.9034	0.8867	0.9661	0.9797	0.9366	0.8045	0.6939	0.6025	0.5643	0.6600	0.7211
21	0.3357	0.3252	0.3417	0.4326	0.4953	0.5408	0.7523	0.8185	0.8214	0.7515	0.7062	0.6426	0.6837	0.7831	0.6564	0.5761	0.6176	0.6903	0.6548	0.5798	0.5076	0.4124	0.2758	0.3788	0.4513	0.4459	0.4373	0.4488	0.4736	0.4840	0.4450	0.3995	0.3885	0.3634	0.3579	0.3478
22	0.3269	0.2854	0.2225	0.4437	0.5141	0.5694	0.7000	0.7550	0.7967	0.7934	0.7519	0.7960	0.8312	0.8565	0.7192	0.5797	0.5230	0.5295	0.5049	0.4876	0.4123	0.3418	0.4196	0.4178	0.4659	0.5081	0.5684	0.5841	0.5374	0.4736	0.4357	0.4873	0.4808	0.4233	0.4039	0.3729
23	0.3929	0.4142	0.3555	0.4191	0.4302	0.5177	0.6332	0.7332	0.7671	0.8023	0.8122	0.8819	0.9485	1.0043	0.8689	0.7298	0.6140	0.6994	0.6288	0.5028	0.4048	0.3882	0.5166	0.5404	0.5180	0.5497	0.5598	0.4596	0.3510	0.3432	0.3121	0.4041	0.3807	0.3335	0.3493	0.3696
24	0.3715	0.3852	0.2950	0.4436	0.4403	0.4645	0.5569	0.5658	0.5632	0.6405	0.7046	0.8267	0.8827	0.9236	0.8460	0.7816	0.8010	0.8447	0.8212	0.7231	0.6842	0.5416	0.5114	0.5214	0.5731	0.6268	0.6574	0.6579	0.5800	0.5213	0.4716	0.3746	0.4114	0.3782	0.3748	0.4011
25	0.5316	0.4136	0.2862	0.3429	0.4681	0.5704	0.6778	0.7434	0.6787	0.7234	0.7305	0.6954	0.6445	0.6039	0.5625	0.7280	0.8595	0.9189	0.9374	0.8655	0.8096	0.7872	0.5025	0.4879	0.5629	0.5653	0.5522	0.5290	0.5313	0.4840	0.4042	0.4426	0.5365	0.5367	0.5729	0.5926
26	0.6139	0.5299	0.3959	0.4680	0.5436	0.6348	0.7811	0.8379	0.8622	0.8498	0.8426	0.8345	0.8289	0.8508	0.7169	0.5960	0.5482	0.5745	0.5868	0.5726	0.5503	0.5418	0.4416	0.5453	0.5476	0.7611	0.8422	0.8933	0.8696	0.7869	0.6624	0.6386	0.7010	0.6993	0.6419	0.6287
27	0.6400	0.5351	0.3868	0.5114	0.6465	0.8020	0.9058	1.0117	0.9855	0.9620	0.8564	0.7807	0.6922	0.6835	0.6909	0.8323	0.9444	1.0305	1.0199	0.9517	0.892	0.8114	0.5718	0.6026	0.6690	0.6547	0.8140	0.9051	0.8776	0.8292	0.6937	0.6862	0.8133	0.7951	0.7346	0.7248
28	0.4555	0.3626	0.3253	0.3981	0.4386	0.4020	0.5554	0.6378	0.6226	0.5933	0.4859	0.4929	0.5145	0.6852	0.5832	0.5739	0.6327	0.7423	0.7262	0.6207	0.5969	0.5257	0.3799	0.5816	0.7398	0.6581	0.6500	0.6960	0.6937	0.6709	0.5771	0.5155	0.5784	0.5849	0.5371	0.5025
29	0.4403	0.4483	0.3327	0.4496	0.5714	0.6726	0.8470	0.9809	0.9220	0.8643	0.6956	0.6497	0.6407	0.6515	0.5390	0.5498	0.5839	0.6352	0.6615	0.6231	0.5971	0.5301	0.3359	0.3712	0.4135	0.4684	0.4808	0.5154	0.5281	0.4919	0.4884	0.3888	0.4186	0.4037	0.4117	0.4222
30	0.6259	0.5249	0.4037	0.5901	0.6922	0.8462	0.9493	1.0734	1.0507	0.9770	0.7487	0.6932	0.6164	0.5636	0.4632	0.4956	0.5455	0.5691	0.5881	0.5685	0.5457	0.5089	0.3730	0.4750	0.4803	0.6594	0.7803	0.7908	0.7619	0.7348	0.6649	0.7023	0.8341	0.7918	0.7487	0.7025
31	0.5703	0.4921	0.4134	0.5161	0.5234	0.5856	0.6168	0.6165	0.6062	0.5966	0.5776	0.5568	0.4981	0.4977	0.5358	0.6331	0.7414	0.7372	0.7157	0.6642	0.6462	0.5976	0.4332	0.5394	0.5736	0.5867	0.6916	0.7043	0.6511	0.6471	0.6108	0.6462	0.7537	0.7331	0.7172	0.6404
32	0.4819	0.4955	0.3893	0.3155	0.3504	0.3416	0.3976	0.4355	0.4464	0.4063	0.4936	0.4824	0.4344	0.5249	0.5359	0.5791	0.5442	0.5593	0.5632	0.5071	0.4531	0.5165	0.5152	0.6183	0.7149	0.7143	0.6925	0.5848	0.5792	0.6422	0.6443	0.5561	0.5448	0.5091	0.5087	0.4848
33	0.4080	0.4364	0.3234	0.3405	0.4118	0.4310	0.4820	0.4965	0.4075	0.4578	0.5228	0.5189	0.4943	0.4506	0.5063	0.5685	0.4560	0.5026	0.4526	0.4320	0.4737	0.5282	0.4037	0.5033	0.5203	0.4846	0.4966	0.5230	0.5613	0.5449	0.5093	0.4133	0.3785	0.3779	0.4041	0.3955
34	0.4472	0.4047	0.5065	0.6312	0.6844	0.8100	0.9293	0.9764	0.9496	0.8972	0.8308	0.9214	0.8880	0.8028	0.7766	0.7750	0.7141	0.6497	0.6110	0.5213	0.4639	0.4581	0.3704	0.2555	0.2968	0.2892	0.2612	0.2812	0.3302	0.3747	0.3858	0.4024	0.3709	0.3813	0.4360	0.4252
35	0.5185	0.5352	0.4018	0.4626	0.5292	0.5774	0.6758	0.7279	0.7189	0.7063	0.6762	0.6367	0.5824	0.6518	0.6506	0.7136	0.6643	0.6145	0.5390	0.4817	0.4684	0.4744	0.4193	0.3608	0.4007	0.3915	0.4272	0.5514	0.6756	0.7440	0.6402	0.5526	0.4827	0.3688	0.4432	0.4799
36	0.4775	0.5390	0.4300	0.5342	0.5997	0.5462	0.6186	0.6317	0.5911	0.6056	0.5977	0.6142	0.6691	0.7261	0.6309	0.6618	0.5995	0.5756	0.4767	0.4076	0.4113	0.5022	0.4661	0.4086	0.3659	0.3915	0.3927	0.3350	0.3666	0.3989	0.4134	0.4115	0.3828	0.3437	0.4111	0.4659
37	0.5427	0.5837	0.5004	0.4170	0.4572	0.4994	0.4581	0.5038	0.4925	0.5318	0.5698	0.5614	0.6381	0.6686	0.5579	0.6041	0.5572	0.4950	0.4338	0.3752	0.3667	0.3914	0.3353	0.3367	0.3909	0.4220	0.3969	0.4231	0.5076	0.5354	0.5038	0.4879	0.4655	0.3939	0.4872	0.5409
38	0.3463	0.3586	0.3310	0.3568	0.4331	0.4546	0.5048	0.5469	0.5416	0.5283	0.5575	0.5329	0.5695	0.5856	0.6211	0.6630	0.6264	0.5588	0.4996	0.4234	0.4009	0.3969	0.3487	0.3400	0.3340	0.3116	0.3332	0.3668	0.4166	0.4434	0.3882	0.3423	0.2775	0.2716	0.2997	0.3368
39	0.3751	0.3400	0.3213	0.4315	0.5156	0.6063	0.6704	0.6424	0.6063	0.5554	0.4767	0.5039	0.5715	0.6242	0.5574	0.5291	0.5968	0.5541	0.6254	0.5226	0.4650	0.5204	0.5004	0.5263	0.6356	0.5705	0.5247	0.5892	0.6666	0.6739	0.6338	0.5393	0.4552	0.3807	0.3732	0.3492
40	0.5132	0.4633	0.3490	0.3239	0.3685	0.4629	0.4976	0.5311	0.5094	0.4207	0.3849	0.3691	0.4102	0.4515	0.4526	0.4333	0.4722	0.4838	0.5604	0.5023	0.4613	0.4787	0.4240	0.4963	0.6313	0.6189	0.6236	0.7714	0.9217	0.9641	0.8648	0.8042	0.6807	0.5566	0.4975	0.5051
41	0.7147	0.6875	0.6132	0.4933	0.4430	0.5476	0.5647	0.5338	0.5669	0.6581	0.7657	0.7439	0.6920	0.5593	0.5436	0.5419	0.5001	0.4808	0.4879	0.4494	0.3697	0.3555	0.3887	0.4382	0.5790	0.7176	0.7443	0.7922	0.8605	0.8484	0.8203	0.7888	0.6471	0.5679	0.6811	0.7439
42	0.5721	0.5674	0.5365	0.4483	0.4522	0.5625	0.6449	0.6065	0.6130	0.5650	0.4793	0.5287	0.5978	0.6470	0.6328	0.6180	0.6254	0.6316	0.7204	0.6325	0.4675	0.4031	0.4403	0.5150	0.7092	0.8173	0.7670	0.7203	0.6939	0.6761	0.6568	0.6182	0.5167	0.4476	0.4786	0.5467
43	0.5360	0.5376	0.4670	0.3869	0.3411	0.3784	0.4166	0.4286	0.4210	0.4685	0.4665	0.4696	0.5847	0.6182	0.4754	0.5254	0.5607	0.5554	0.5212	0.3854	0.2669	0.3435	0.3675	0.4558	0.4890	0.5505	0.5284	0.5887	0.6835	0.7127	0.6205	0.5479	0.4792	0.4112	0.4819	0.5367
44	0.5805	0.5634	0.5375	0.4279	0.5297	0.5821	0.5187	0.4408	0.4663	0.4600	0.4484	0.4993	0.6346	0.6937	0.5468	0.5995	0.6802	0.6416	0.6516	0.4865	0.3004	0.3538	0.3874	0.4328	0.4936	0.5648	0.5357	0.5571	0.6235	0.6445	0.5668	0.5116	0.4537	0.3837	0.5051	0.5669
45	0.6321	0.6272	0.5844	0.4885	0.4327	0.4900	0.3782	0.3719	0.4617	0.4929	0.4876	0.4740	0.4920	0.4723	0.4546	0.4250	0.4765	0.4484	0.4088	0.3799	0.4061	0.4052	0.4364	0.4859	0.6132	0.7129	0.6550	0.6609	0.7142	0.7042	0.6148	0.5571	0.4836	0.4495	0.5121	0.5907
46	0.5273	0.5213	0.4538	0.3799	0.4378	0.5170	0.4946	0.4955	0.5736	0.6231	0.6565	0.6554	0.6446	0.6268	0.5572	0.5059	0.4592	0.4643	0.4687	0.4329	0.3576	0.3264	0.3874	0.4882	0.6092	0.7021	0.6557	0.6283	0.6529	0.6395	0.5854	0.5250	0.4545	0.4371	0.4431	0.5048
47	0.4819	0.4968	0.4142	0.3578	0.4417	0.5598	0.6458	0.6383	0.6605	0.7093	0.7573	0.7581	0.7274	0.7387	0.6490	0.6389	0.6406	0.6620	0.7002	0.6166	0.4052	0.3466	0.4325	0.5082	0.6363	0.7190	0.7164	0.6950	0.7386	0.7380	0.6580	0.5845	0.4754	0.4377	0.4227	0.4782
48	0.5582	0.5600	0.4509	0.4095	0.4338	0.5628	0.6580	0.6315	0.6615	0.6723	0.7235	0.7260	0.6803	0.6711	0.5974	0.6067	0.5570	0.6108	0.6817	0.6163	0.4040	0.3494	0.4161	0.5383	0.6737	0.7872	0.7443	0.6829	0.7142	0.7097	0.6067	0.5687	0.4642	0.4513	0.5116	0.5537
49	0.4980	0.4997	0.4478	0.4024	0.2941	0.4395	0.5366	0.5856	0.5218	0.3697	0.3864	0.4386	0.4330	0.5285	0.5584	0.5106	0.4281	0.4099	0.3287	0.2812	0.3280	0.3693	0.4008	0.4561	0.4939	0.5048	0.4831	0.5336	0.5754	0.6056	0.6080	0.5855	0.4710	0.3986	0.4340	0.4829
50	0.4143	0.4352	0.4260	0.3896	0.4568	0.4842	0.4267	0.4191	0.5127	0.5472	0.5389	0.5390	0.5334	0.4426	0.4661	0.5167	0.3562	0.3788	0.2942	0.3382	0.3004	0.3134	0.3818	0.5277	0.5648	0.6386	0.6819	0.6154	0.5377	0.4418	0.3388	0.3187	0.4197	0.4659	0.3704	0.3483
51	0.4342	0.4917	0.4298	0.4002	0.3889	0.6097	0.7298	0.7532	0.6526	0.4013	0.4294	0.5106	0.4873	0.5213	0.5115	0.4958	0.4338	0.4352	0.5783	0.5615	0.3841	0.3169	0.3428	0.3956	0.4573	0.4751	0.4147	0.3887	0.3837	0.3315	0.2962	0.3105	0.2854	0.3257	0.3713	0.4461
52	0.5173	0.5556	0.5076	0.5075	0.3968	0.5378	0.5640	0.5341	0.5841	0.6702	0.7253	0.7217	0.6743	0.6762	0.7059	0.7186	0.6405	0.6124	0.6278	0.5136	0.3533	0.3512	0.3904	0.4683	0.5582	0.5990	0.5248	0.5170	0.5288	0.5685	0.5586	0.5247	0.4943	0.4421	0.4332	0.4443
53	0.5275	0.5091	0.4887	0.4743	0.4367	0.6296	0.6525	0.6385	0.6792	0.7382	0.7694	0.7842	0.7383	0.7359	0.6835	0.6262	0.5964	0.6397	0.7040	0.5603	0.4002	0.3877	0.4810	0.5168	0.6550	0.7366	0.6922	0.6334	0.6416	0.6352	0.6130	0.6001	0.5514	0.5628	0.4847	0.5030
54	0.4563	0.4283	0.4135	0.4114	0.3654	0.4478	0.4685	0.4708	0.4932	0.4933	0.5178	0.5501	0.5585	0.5525	0.5449	0.5609	0.6234	0.6464	0.7060	0.5571	0.3781	0.4013	0.4939	0.5397	0.6826	0.7494	0.7157	0.6940	0.6944	0.6692	0.6352	0.6450	0.5510	0.5664	0.4641	0.4593
55	0.2759	0.2785	0.2901	0.3138	0.3375	0.5175	0.5131	0.5213	0.6484	0.7242	0.7705	0.8143	0.8632	0.8896	0.8876	0.8222	0.8140	0.8190	0.8488	0.7043	0.3721	0.3099	0.3484	0.3822	0.4721	0.4969	0.4569	0.4928	0.5636	0.6362	0.5668	0.5551	0.5390	0.5022	0.3883	0.2706
56	0.3810	0.4270	0.4253	0.4356	0.4061	0.6003	0.6668	0.6679	0.6219	0.6263	0.6535	0.7205	0.7185	0.7582	0.6950	0.7111	0.6761	0.7275	0.7214	0.6110	0.3600	0.4147	0.4748	0.5255	0.5275	0.5073	0.5496	0.6551	0.7241	0.7815	0.7480	0.6896	0.6480	0.5912	0.4227	0.3432
57	0.3470	0.3895	0.3735	0.3882	0.3603	0.5566	0.5795	0.5736	0.5513	0.5841	0.6304	0.7632	0.8354	0.8473	0.8959	0.9017	0.8355	0.8277	0.7498	0.6001	0.3421	0.3324	0.4067	0.4540	0.5679	0.5756	0.4752	0.4721	0.5478	0.5952	0.5861	0.5599	0.5296	0.5483	0.5012	0.3583
58	0.4320	0.4686	0.4531	0.4303	0.3877	0.4983	0.6318	0.6473	0.6259	0.6345	0.6493	0.7189	0.7212	0.7004	0.6296	0.5541	0.5142	0.5700	0.5511	0.4784	0.4379	0.4754	0.5192	0.5300	0.6156	0.6261	0.5698	0.6108	0.6441	0.7031	0.6904	0.6246	0.6408	0.6625	0.6162	0.4127

59	0.4651	0.4688	0.4103	0.4181	0.3903	0.3189	0.3293	0.3195	0.4297	0.4473	0.4563	0.5376	0.5516	0.4994	0.3831	0.3624	0.3063	0.3208	0.2926	0.3071	0.3984	0.4217	0.4143	0.4365	0.4646	0.4884	0.4651	0.5449	0.5571	0.5943	0.5550	0.4863	0.5169	0.5724	0.5720	0.4739
60	0.4948	0.5297	0.6630	0.7018	0.5727	0.4447	0.3816	0.4155	0.4276	0.4145	0.4246	0.4782	0.4848	0.4404	0.3902	0.4232	0.4062	0.3369	0.3496	0.4373	0.5726	0.5242	0.4454	0.4905	0.5968	0.6756	0.6212	0.5439	0.5005	0.5405	0.6320	0.6170	0.5952	0.6309	0.6079	0.4979
61	0.4272	0.4500	0.4085	0.3933	0.3490	0.3984	0.4900	0.5340	0.6170	0.5855	0.6040	0.6955	0.7213	0.7909	0.6911	0.5507	0.4483	0.5240	0.5127	0.4282	0.3403	0.3652	0.3482	0.4102	0.4372	0.4269	0.4131	0.4633	0.5094	0.5454	0.5419	0.5000	0.4985	0.5086	0.4527	0.3492
62	0.4647	0.4968	0.5676	0.5458	0.4026	0.4494	0.5192	0.4788	0.4765	0.4972	0.5287	0.6130	0.5683	0.514	0.5464	0.5750	0.5063	0.5556	0.4866	0.4529	0.5701	0.6024	0.5881	0.6031	0.6074	0.5748	0.5407	0.4936	0.4725	0.5303	0.5514	0.5091	0.4999	0.4764	0.3842	0.4373
63	0.4647	0.5178	0.5439	0.5401	0.4178	0.3340	0.4217	0.4838	0.4302	0.5123	0.5647	0.6560	0.6767	0.6209	0.5880	0.4848	0.3965	0.5002	0.4237	0.3998	0.5782	0.5495	0.5499	0.6021	0.6659	0.6783	0.6599	0.6589	0.6271	0.6127	0.5627	0.4984	0.4574	0.4371	0.3926	0.4241
64	0.4273	0.4531	0.4622	0.4483	0.3734	0.5345	0.5429	0.4969	0.4720	0.3917	0.4436	0.5057	0.5039	0.5087	0.5687	0.6844	0.5955	0.5983	0.5115	0.4499	0.6041	0.6399	0.6346	0.6683	0.7203	0.6861	0.6742	0.6024	0.5875	0.6760	0.6635	0.6189	0.5756	0.5678	0.4803	0.3909
65	0.4213	0.4678	0.4016	0.3918	0.3664	0.3362	0.4460	0.5108	0.4806	0.5576	0.5991	0.6834	0.7076	0.7100	0.6990	0.5345	0.5447	0.5873	0.5016	0.4384	0.5576	0.5951	0.6147	0.6283	0.6587	0.6695	0.6752	0.6879	0.6307	0.7040	0.8064	0.6897	0.4376	0.3481	0.3575	0.4208
66	0.3723	0.4034	0.4174	0.3753	0.3446	0.2676	0.4060	0.4733	0.5083	0.5591	0.6323	0.7087	0.7611	0.8271	0.8173	0.6542	0.5456	0.6466	0.4947	0.3740	0.4563	0.5633	0.5650	0.6123	0.6453	0.6382	0.6535	0.6829	0.6228	0.6172	0.7076	0.6168	0.3799	0.3139	0.3088	0.3325
67	0.4541	0.4561	0.4188	0.4366	0.3541	0.2877	0.3949	0.4630	0.4955	0.5773	0.5983	0.6916	0.7261	0.7433	0.8080	0.7380	0.5802	0.6307	0.5441	0.4314	0.4376	0.5619	0.5673	0.5632	0.5637	0.5843	0.6587	0.6068	0.4979	0.4212	0.4505	0.3500	0.3077	0.2768	0.3311	0.4110
68	0.3264	0.3149	0.3200	0.3461	0.3757	0.2780	0.3824	0.4192	0.4297	0.4998	0.5014	0.6203	0.6097	0.6457	0.5393	0.6057	0.5883	0.6430	0.6305	0.4438	0.4878	0.6316	0.6762	0.7178	0.7366	0.6664	0.6155	0.6061	0.5357	0.5098	0.4919	0.4094	0.2909	0.2640	0.3027	0.3078
69	0.4433	0.4613	0.3987	0.3625	0.2419	0.2690	0.4184	0.4705	0.4523	0.5486	0.5793	0.6697	0.7261	0.6215	0.5760	0.5797	0.4895	0.5415	0.5029	0.3714	0.3368	0.4863	0.5171	0.4465	0.3603	0.4228	0.4651	0.5004	0.4321	0.3776	0.3650	0.3314	0.3292	0.3519	0.3963	0.4224
70	0.3569	0.3419	0.3031	0.3114	0.3176	0.2690	0.2491	0.3358	0.4112	0.5022	0.6027	0.6789	0.6161	0.5497	0.4896	0.4459	0.4506	0.4853	0.5602	0.4356	0.3271	0.3665	0.5759	0.6826	0.8232	0.8748	0.7811	0.6754	0.6002	0.5093	0.4760	0.4895	0.4223	0.3029	0.2909	0.3354
71	0.3932	0.3832	0.3419	0.3282	0.3533	0.3087	0.3810	0.4774	0.6026	0.6919	0.7519	0.7447	0.6930	0.5575	0.5427	0.4626	0.4897	0.4590	0.3929	0.3733	0.3158	0.3486	0.4510	0.5131	0.6533	0.7236	0.6531	0.6037	0.5729	0.5338	0.5510	0.4887	0.4037	0.3284	0.3478	0.3681
72	0.3895	0.3987	0.3644	0.3084	0.2778	0.3570	0.3081	0.2950	0.5531	0.6678	0.7590	0.7247	0.6259	0.5080	0.5666	0.6025	0.7405	0.7737	0.7555	0.5885	0.3376	0.3480	0.5595	0.6873	0.8211	0.8894	0.8627	0.7942	0.7755	0.7320	0.6813	0.6780	0.6236	0.5318	0.3366	0.3293
73	0.4478	0.4426	0.3977	0.3383	0.3046	0.3343	0.3549	0.3113	0.5010	0.6216	0.6948	0.6705	0.5870	0.6045	0.6852	0.6996	0.7086	0.7825	0.7688	0.5656	0.3190	0.3349	0.5182	0.6580	0.7915	0.8461	0.8413	0.7867	0.8104	0.7896	0.7515	0.7402	0.6685	0.6046	0.4079	0.3901
74	0.5399	0.5567	0.4864	0.3699	0.3079	0.4706	0.4932	0.4995	0.4526	0.5065	0.5135	0.5717	0.6422	0.7142	0.8166	0.9304	0.9688	0.9829	0.9019	0.7251	0.4468	0.3339	0.4464	0.5512	0.6136	0.6362	0.6237	0.6419	0.6701	0.6759	0.6606	0.6741	0.6023	0.5961	0.4385	0.4463
75	0.5558	0.5442	0.4760	0.3665	0.4203	0.6249	0.6438	0.7503	0.9833	1.0761	1.1195	1.0983	1.0059	0.9383	0.9057	0.8738	0.8070	0.8000	0.7245	0.6027	0.3537	0.3070	0.4298	0.5175	0.6078	0.6643	0.6398	0.6602	0.6851	0.6592	0.6521	0.6506	0.6011	0.5576	0.4768	0.5265

Configuration C (Baseline): Mean Velocity Ratios

Dir	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
1	0.1581	0.1432	0.1334	0.1091	0.1064	0.1984	0.2104	0.1616	0.2031	0.2510	0.3163	0.3134	0.3069	0.4897	0.4741	0.4206	0.3925	0.3864	0.3670	0.1758	0.1596	0.1826	0.2231	0.3272	0.3593	0.3413	0.3473	0.3822	0.4033	0.4264	0.4340	0.3272	0.2916	0.2163	0.1512	0.1563
2	0.1682	0.1433	0.1264	0.1141	0.1622	0.1542	0.1726	0.1477	0.1854	0.2270	0.2535	0.2576	0.2777	0.3858	0.3443	0.3072	0.2682	0.2436	0.2197	0.1714	0.1439	0.1389	0.1793	0.2918	0.2839	0.3331	0.3589	0.3823	0.3862	0.3999	0.4227	0.3203	0.2862	0.2594	0.1766	0.1587
3	0.1639	0.1473	0.1217	0.1117	0.1220	0.1266	0.1414	0.1759	0.2088	0.2387	0.2635	0.2804	0.3374	0.3840	0.4120	0.3715	0.3234	0.2861	0.2627	0.1326	0.1281	0.1536	0.2053	0.3117	0.3323	0.3069	0.3388	0.3773	0.3948	0.4059	0.4074	0.3080	0.2706	0.1991	0.1601	0.1668
4	0.0924	0.0942	0.0948	0.0836	0.1028	0.0842	0.0845	0.1058	0.0900	0.0871	0.0884	0.0880	0.1009	0.1029	0.0904	0.0995	0.1189	0.1284	0.1407	0.1085	0.1139	0.1140	0.1227	0.1467	0.1237	0.0976	0.0884	0.0914	0.0911	0.0922	0.0937	0.1102	0.1154	0.0945	0.1050	0.0908
5	0.2335	0.2180	0.1904	0.1371	0.1147	0.1759	0.2062	0.1882	0.4248	0.5917	0.6364	0.5979	0.5156	0.4870	0.4963	0.4505	0.3695	0.3171	0.2682	0.1694	0.1141	0.1151	0.1774	0.3012	0.3244	0.3681	0.3591	0.4045	0.4338	0.4396	0.4280	0.3460	0.3074	0.2740	0.2406	0.2294
6	0.3134	0.3050	0.2683	0.1574	0.1122	0.1832	0.2210	0.1864	0.3182	0.3437	0.3367	0.3360	0.2884	0.4027	0.5249	0.5147	0.4510	0.3721	0.2695	0.1746	0.1042	0.1234	0.2150	0.3780	0.4247	0.4840	0.4547	0.5088	0.5516	0.5643	0.5414	0.4612	0.4027	0.3524	0.3330	0.3265
7	0.3607	0.3271	0.2604	0.1561	0.1457	0.2616	0.3104	0.2563	0.3089	0.3228	0.2900	0.3117	0.4014	0.5790	0.6767	0.6466	0.5696	0.4747	0.3828	0.1863	0.1049	0.1321	0.2519	0.4512	0.5444	0.5918	0.5652	0.6267	0.6649	0.6781	0.6664	0.5505	0.4709	0.4031	0.3739	0.3800
8	0.2633	0.2287	0.1745	0.1421	0.1577	0.3206	0.3509	0.3400	0.4530	0.5511	0.6096	0.6285	0.5958	0.5940	0.5611	0.5121	0.4366	0.3613	0.3137	0.2337	0.1249	0.1237	0.1951	0.3160	0.3544	0.3841	0.3802	0.4363	0.4614	0.4698	0.4719	0.4215	0.3919	0.3213	0.2731	0.2815
9	0.3380	0.3006	0.2334	0.1790	0.1497	0.3349	0.3626	0.3505	0.5138	0.6068	0.6808	0.7031	0.6782	0.7037	0.6631	0.6047	0.5201	0.4411	0.4023	0.2709	0.1778	0.1922	0.2811	0.4362	0.5028	0.5188	0.5220	0.5767	0.5934	0.6031	0.5988	0.4802	0.4285	0.3973	0.3505	0.3518
10	0.2851	0.2714	0.2081	0.1289	0.2031	0.3187	0.3250	0.3360	0.4581	0.5639	0.6275	0.6516	0.6660	0.6903	0.6428	0.5611	0.4971	0.4026	0.3598	0.2225	0.1169	0.1111	0.1169	0.1655	0.2382	0.3160	0.3223	0.3573	0.3707	0.3638	0.3610	0.3257	0.2862	0.2455	0.2693	0.2894
11	0.4655	0.4455	0.3534	0.2039	0.1751	0.3267	0.3707	0.4120	0.5962	0.6949	0.7908	0.8109	0.7972	0.8003	0.7798	0.7119	0.6162	0.5201	0.4656	0.3244	0.1891	0.1521	0.2110	0.3689	0.4794	0.5256	0.5471	0.6151	0.6301	0.6291	0.6277	0.5134	0.4357	0.4123	0.4250	0.4699
12	0.4999	0.4916	0.3844	0.2388	0.1658	0.2117	0.2845	0.3401	0.4662	0.5545	0.6490	0.6698	0.6526	0.6215	0.6256	0.5743	0.4888	0.4138	0.3550	0.2576	0.1517	0.1187	0.1211	0.1422	0.2249	0.3341	0.3647	0.4347	0.4843	0.4849	0.4893	0.4306	0.3835	0.3539	0.4240	0.4973
13	0.0852	0.0892	0.0930	0.0845	0.0844	0.0862	0.0879	0.0843	0.0865	0.0849	0.0860	0.0860	0.0872	0.0913	0.0911	0.1054	0.1269	0.1449	0.1543	0.0950	0.0985	0.1111	0.1254	0.1557	0.1738	0.0884	0.0907	0.0925	0.0951	0.1012	0.1061	0.0867	0.0991	0.1096	0.1218	0.0837
14	0.4364	0.4347	0.3366	0.2200	0.2792	0.1453	0.1842	0.3092	0.2865	0.3459	0.4257	0.4350	0.4502	0.2668	0.3372	0.3060	0.2393	0.1988	0.1799	0.1631	0.1652	0.1459	0.1482	0.1673	0.2238	0.2626	0.2734	0.3308	0.3893	0.4027	0.3939	0.4053	0.3683	0.2787	0.3751	0.4422
15	0.4007	0.3854	0.3020	0.1934	0.2185	0.1569	0.1868	0.2630	0.2988	0.4004	0.4911	0.4938	0.4523	0.2945	0.3202	0.2955	0.2365	0.1883	0.1810	0.1409	0.1352	0.1375	0.1459	0.1702	0.2650	0.2220	0.2399	0.3144	0.4209	0.4614	0.4292	0.4212	0.3859	0.3144	0.3628	0.4188
16	0.3677	0.3192	0.2615	0.2887	0.2976	0.2410	0.2317	0.2275	0.2431	0.2196	0.2928	0.3602	0.3126	0.3251	0.4047	0.4138	0.4166	0.4087	0.3658	0.2710	0.2205	0.2024	0.2020	0.2474	0.2662	0.3564	0.4102	0.4503	0.4828	0.4984	0.4655	0.4484	0.4243	0.4148	0.4001	0.4031
17	0.2407	0.2363	0.1897	0.1366	0.2522	0.1943	0.2297	0.2963	0.2285	0.1921	0.2143	0.2480	0.3122	0.2143	0.3042	0.3224	0.2567	0.2091	0.1694	0.1399	0.1444	0.1436	0.1548	0.1811	0.1824	0.2138	0.1478	0.1613	0.2284	0.2697	0.2691	0.3121	0.3113	0.2297	0.2647	0.2585
18	0.1638	0.1600	0.1201	0.1977	0.1652	0.2422	0.2649	0.2408	0.2582	0.2346	0.1903	0.1961	0.1720	0.2530	0.2829	0.3195	0.2963	0.2751	0.2591	0.1606	0.1776	0.1921	0.2013	0.2528	0.2815	0.1915	0.2847	0.3422	0.3568	0.3845	0.4349	0.2521	0.1727	0.1851	0.1665	0.1603
19	0.2564	0.2117	0.1326	0.1405	0.1407	0.1798	0.1793	0.2351	0.3204	0.2592	0.2479	0.2059	0.1793	0.3359	0.2113	0.1803	0.1752	0.1703	0.1789	0.1861	0.1486	0.1425	0.1633	0.1773	0.2134	0.2244	0.2438	0.2750	0.2972	0.3230	0.3295	0.3212	0.3015	0.3360	0.3079	0.2939
20	0.3176	0.3166	0.2709	0.1713	0.1770	0.2271	0.2344	0.2522	0.2639	0.2617	0.2618	0.2524	0.2228	0.1902	0.2211	0.2435	0.2354	0.2111	0.1805	0.1712	0.1392	0.1288	0.1383	0.1872	0.2020	0.2973	0.3412	0.3771	0.3954	0.4163	0.4266	0.4219	0.3619	0.3064	0.3072	0.3297
21	0.1651	0.1363	0.1253	0.1639	0.1946	0.1696	0.2835	0.4026	0.4499	0.4112	0.3385	0.3041	0.3649	0.4373	0.2595	0.2075	0.2461	0.2594	0.2451	0.2035	0.1811	0.1399	0.1309	0.2022	0.2296	0.2662	0.2998	0.3069	0.3163	0.3356	0.3301	0.2678	0.2498	0.2291	0.2145	0.2034
22	0.1548	0.1238	0.1031	0.2326	0.2638	0.2345	0.2998	0.3957	0.4167	0.4193	0.4115	0.4264	0.5012	0.5121	0.3800	0.3150	0.2605	0.2189	0.1787	0.1712	0.1362	0.1181	0.1873	0.3227	0.3638	0.3706	0.3232	0.3022	0.2905	0.2814	0.2528	0.2887	0.2808	0.2347	0.2184	0.1901
23	0.1493	0.1552	0.1313	0.2282	0.2859	0.2860	0.3273	0.3853	0.4011	0.4438	0.4746	0.5097	0.5872	0.5850	0.4955	0.4137	0.3362	0.2988	0.2441	0.1618	0.1311	0.1451	0.1765	0.3217	0.3250	0.2835	0.2557	0.2081	0.1421	0.1241	0.1132	0.2091	0.2108	0.1399	0.1348	0.1521
24	0.1488	0.1434	0.1208	0.1779	0.1364	0.1703	0.1738	0.1791	0.2091	0.2558	0.3651	0.4397	0.4857	0.5599	0.4351	0.4168	0.4727	0.4767	0.4499	0.3550	0.2893	0.2207	0.2713	0.4093	0.4381	0.3398	0.3089	0.2834	0.2456	0.2412	0.2400	0.1581	0.1517	0.1692	0.1541	0.1539
25	0.2253	0.1655	0.1179	0.1481	0.1752	0.2254	0.2689	0.2886	0.2926	0.3080	0.3181	0.3278	0.3289	0.3434	0.2746	0.2493	0.3468	0.4374	0.4347	0.3782	0.3120	0.2348	0.1403	0.1882	0.1846	0.1951	0.1794	0.1755	0.1548	0.1483	0.1469	0.1520	0.1808	0.2248	0.2245	0.2158
26	0.3090	0.2733	0.1654	0.2438	0.2844	0.2885	0.3335	0.4127	0.4510	0.4805	0.5054	0.5359	0.5711	0.5623	0.3830	0.3011	0.2919	0.2876	0.2904	0.2861	0.2650	0.2033	0.1310	0.1951	0.2254	0.4183	0.5351	0.5789	0.5488	0.4950	0.4615	0.4313	0.4503	0.4190	0.3720	0.3524
27	0.3168	0.2566	0.1671	0.2840	0.3580	0.4463	0.5150	0.6096	0.6708	0.6186	0.5170	0.4384	0.3759	0.3737	0.3224	0.3317	0.4817	0.5815	0.5974	0.5372	0.4913	0.3826	0.2361	0.3342	0.3300	0.3222	0.4761	0.5369	0.5024	0.4727	0.4527	0.3942	0.4372	0.4459	0.3916	0.3673
28	0.2180	0.1632	0.1383	0.1353	0.1396	0.1467	0.1928	0.2490	0.3131	0.2917	0.2077	0.1919	0.2177	0.3224	0.2370	0.2203	0.2972	0.3349	0.3309	0.2565	0.2433	0.2020	0.1953	0.3011	0.3653	0.4154	0.4429	0.4472	0.4245	0.4112	0.3909	0.3001	0.3097	0.3170	0.2813	0.2621
29	0.1769	0.1841	0.1615	0.2562	0.3157	0.3532	0.4575	0.5832	0.6169	0.5280	0.4239	0.4173	0.4594	0.4784	0.2955	0.2976	0.3777	0.4127	0.4365	0.3716	0.3477	0.2783	0.2155	0.2709	0.3072	0.2378	0.2940	0.3263	0.3271	0.3281	0.3318	0.2014	0.1836	0.1855	0.1746	0.1769
30	0.3407	0.2736	0.1661	0.3482	0.4453	0.5152	0.5780	0.6931	0.7162	0.5950	0.4857	0.4299	0.4055	0.3287	0.2109	0.1835	0.2451	0.2777	0.2868	0.2708	0.2468	0.1790	0.1302	0.1777	0.2610	0.4259	0.4901	0.5080	0.4862	0.4754	0.4525	0.4599	0.5017	0.4886	0.4398	0.4028
31	0.2667	0.2159	0.1543	0.2701	0.2602	0.2786	0.3000	0.3257	0.3509	0.3419	0.3159	0.2796	0.2194	0.2376	0.2131	0.2278	0.3148	0.3558	0.3973	0.3849	0.3504	0.2284	0.1317	0.2167	0.2447	0.3823	0.4269	0.4162	0.3445	0.3409	0.3510	0.3464	0.3857	0.4083	0.3489	0.3122
32	0.1059	0.0871	0.1114	0.1015	0.1094	0.1182	0.0980	0.1356	0.0898	0.0903	0.0915	0.1037	0.1362	0.0980	0.0987	0.1202	0.1402	0.1522	0.1561	0.1310	0.0951	0.1475	0.1571	0.1696	0.2199	0.0984	0.1057	0.1033	0.1095	0.1092	0.1120	0.1274	0.1223	0.0966	0.0903	0.0868
33	0.1407	0.0836	0.1597	0.1202	0.1450	0.1711	0.1131	0.2290	0.0841	0.0844	0.0862	0.1140	0.1844	0.1026	0.1187	0.1906	0.2402	0.2672	0.2829	0.2236	0.1523	0.2537	0.2737	0.3071	0.3804	0.0914	0.1381	0.1640	0.1834	0.1880	0.2090	0.1805	0.1738	0.1080	0.0970	0.0832
34	0.2465	0.2147	0.1409	0.1168	0.1330	0.1784	0.1485	0.1919	0.2017	0.1813	0.2277	0.2369	0.1868	0.2069	0.2561	0.2538	0.2253	0.2029	0.1794	0.1784	0.1598	0.1326	0.1182	0.1389	0.1519	0.1674	0.2461	0.3094	0.3454	0.3962	0.4193	0.3780	0.3531	0.3287	0.3035	0.2760
35	0.1435	0.1550	0.1449	0.1236	0.1312	0.1465	0.1754	0.1773	0.1998	0.2207	0.2377	0.2578	0.2391	0.1917	0.2150	0.2373	0.2279	0.2181	0.2220	0.1662	0.1716	0.2013	0.1874	0.2221	0.2500	0.1538	0.2156	0.2678	0.2918	0.2863	0.2709	0.1874	0.1711	0.1763	0.1516	0.1574
36	0.1354	0.1369	0.2125	0.3430	0.3946	0.4712	0.5719	0.6465	0.6426	0.5091	0.4571	0.5102	0.5278	0.3827	0.3855	0.3997	0.3593	0.2637	0.2487	0.2342	0.1764	0.2162	0.1970	0.1635	0.2050	0.0987	0.1009	0.1052	0.1250	0.1498	0.1651	0.1601	0.1578	0.1906	0.1667	0.1534
37	0.1503	0.1697	0.1275	0.1795	0.2099	0.2007	0.2728	0.3576	0.3835	0.3330	0.2795	0.2442	0.2470	0.2608	0.2828	0.3088	0.2957	0.2311	0.2052	0.1743	0.1604	0.1739	0.1583	0.1499	0.1697	0.1330	0.1465	0.1536	0.1963	0.2182	0.1918	0.1799	0.1806	0.1609	0.1485	0.1590
38	0.1893	0.2142	0.2230	0.2288	0.2141	0.2102	0.3051	0.2950	0.2671	0.2711	0.2842	0.2915	0.3172	0.3379	0.3148	0.3046	0.3082	0.2778	0.2546	0.1857	0.1846	0.2178	0.2330	0.2463	0.2662	0.1552	0.1772	0.1797	0.2065	0.2185	0.2173	0.1461	0.1372	0.1381	0.1453	0.1699
39	0.3231	0.3163	0.2494	0.1914	0.1893	0.2113	0.1705	0.2750	0.2055	0.2060	0.2172	0.2127	0.2495	0.2819	0.2294	0.2390	0.2092	0.1671	0.1563	0.1415	0.1787	0.1273	0.1146	0.1382	0.1541	0.2072	0.2038	0.1969	0.2045	0.2186	0.2452	0.2566	0.2446	0.1974	0.2312	0.2731
40	0.1483	0.1164	0.1276	0.1605	0.1993	0.2195	0.1772	0.2791	0.2351	0.2228	0.2211	0.2122	0.1977	0.2330	0.2460	0.2554	0.2110	0.1707	0.1683	0.1363	0.1281	0.1523	0.1596	0.1669	0.2414	0.1232	0.1118	0.1201	0.1250	0.1233	0.1166	0.1787	0.1710	0.1252	0.1241	0.1264
41	0.1696	0.1747	0.1447	0.1996	0.2041	0.2219	0.2799	0.3247	0.3465	0.2654	0.2200	0.2235	0.2371	0.2607	0.2582	0.2607	0.2416	0.1993	0.1444	0.1572	0.1275	0.1332	0.1153	0.1347	0.1482	0.1869	0.2126	0.2476	0.2785	0.2705	0.2317	0.2102	0.2089	0.2210	0.2064	0.1962
42	0.3033	0.2581	0.1963	0.1578	0.1398	0.1670	0.1360	0.1999	0.1644	0.1648	0.1480	0.1522	0.1561	0.1455	0.1484	0.1486	0.1521	0.1528	0.1533	0.1366	0.1034	0.1453	0.1415	0.1617	0.1838	0.2612	0.2041	0.2280	0.3115	0.3307	0.2800	0.3172	0.3316	0.2908	0.2929	0.3134
43	0.4847	0.4702	0.3836	0.2086	0.1286	0.1483	0.2152	0.1730	0.3150	0.4320	0.5221	0.5333	0.4745	0.3702	0.3589	0.3590	0.3358	0.3198	0.3174	0.2423	0.1642	0.2138	0.2473	0.3156	0.4145	0.3429	0.4114	0.4851	0.5415	0.5617	0.5562	0.4589	0.4010	0.4102	0.4431	0.5065
44	0.4006	0.4296	0.3599	0.2468	0.1651	0.2210	0.2035	0.2358	0.2857	0.3024	0.3086	0.3095	0.3197	0.3323	0.3459	0.3432	0.3210	0.3249	0.3107	0.2345	0.1512	0.1181	0.1501	0.2553	0.3045	0.3594	0.3601	0.4000	0.4027	0.3958	0.3908	0.3533	0.3198	0.3103	0.3425	0.3832
45	0.3653	0.3599	0.2733	0.1866	0.1464	0.1634	0.1258	0.2198	0.2156	0.2426	0.2197	0.2026	0.2811	0.3464	0.2511	0.1910	0.2067	0.1877	0.1772	0.1285	0.1031	0.1428	0.1364	0.1416	0.1599	0.2808	0.2674	0.3001	0.3330	0.3376	0.3178	0.3265	0.2956	0.2615	0.3061	0.3543
46	0.2649	0.2869	0.2694	0.1440	0.1402	0.1587	0.1687	0.1612	0.1996	0.1945	0.1770	0.1898	0.2722	0.2799	0.2420	0.2545	0.3255	0.3083	0.3141	0.1978	0.1093	0.1774	0.1987	0.2059	0.2494	0.2003	0.2034	0.2137	0.2296	0.2336	0.2254	0.1938	0.1814	0.1964	0.2426	0.2729
47	0.3862	0.4176	0.3578	0.1995	0.1211	0.1468	0.1467	0.1373	0.2244	0.2447	0.2449	0.2349	0.2483	0.2423	0.2191	0.2236	0.2555	0.2629	0.2747	0.1875	0.1814	0.2227	0.2773	0.3681	0.4412	0.3708	0.3624	0.3984	0.4185	0.4165	0.4020	0.2976	0.2572	0.2693	0.3082	0.3799
48	0.2652	0.2904	0.2701	0.1590	0.1358	0.1957	0.1943	0.2087	0.3792	0.4316	0.4430	0.4347	0.4619	0.4482	0.3710	0.3058	0.2616	0.2102	0.1803	0.1994	0.1139	0.1490	0.1986	0.2747	0.3539	0.3668	0.3383	0.3720	0.3844	0.3757	0.3536	0.3192	0.2752	0.2697	0.2663	0.2928
49	0.2597	0.2198	0.1758	0.1368	0.1293	0.2274	0.2172	0.2671	0.4177	0.4851	0.5313	0.5295	0.5233	0.5435	0.4648	0.3946	0.3560	0.3435	0.3530	0.2263	0.1611	0.1591	0.2174	0.3220	0.3819	0.3760	0.3871	0.4359	0.4576	0.4605	0.4628	0.3728	0.3219	0.2797	0.2577	0.2697
50	0.2421	0.2500	0.2352	0.1511	0.1192	0.2061	0.2315	0.2297	0.3275	0.3746	0.4519	0.4577	0.4206	0.3555	0.2902	0.2583	0.2410	0.2348	0.2728	0.2431	0.1142	0.1335	0.1721	0.2708	0.3777	0.4204	0.3749	0.4117	0.4305	0.4383	0.4274	0.3552	0.3093	0.2770	0.2561	0.2621
51	0.2295	0.2570	0.2502	0.1401	0.1025	0.1448	0.2185	0.2264	0.1847	0.1360	0.1634	0.1804	0.1988	0.1880	0.2300	0.2249	0.2055	0.1798	0.1501	0.1402	0.1226	0.1853	0.2445	0.3244	0.3616	0.3307	0.3256	0.3581	0.3894	0.3979	0.3972	0.3255	0.2831	0.2560	0.2344	0.2409
52	0.2219	0.2562	0.2579	0.1436	0.1917	0.1728	0.1950	0.1975	0.2304	0.3035	0.3116	0.3234	0.3376	0.2392	0.1682	0.1594	0.1437	0.1304	0.1246	0.1524	0.1307	0.1529	0.1494	0.1972	0.2406	0.2623	0.2717	0.2425	0.1903	0.1645	0.1260	0.1188	0.1327	0.1670	0.1486	0.1999
53	0.2531	0.2552	0.2047	0.1632	0.1614	0.2683	0.3218	0.3978	0.3026	0.1834	0.2017	0.2027	0.1776	0.1576	0.1643	0.1500	0.1374	0.1236	0.1416	0.1464	0.1419	0.1153	0.1200	0.1719	0.1938	0.2512	0.2014	0.2127	0.1935	0.1854	0.1832	0.1775	0.1735	0.1454	0.1910	0.2321
54	0.2519	0.2459	0.2005	0.1634	0.1509	0.2215	0.2286	0.2425	0.2237	0.2920	0.4186	0.4395	0.3829	0.3810	0.4271	0.3939	0.3447	0.2763	0.2226	0.1590	0.1271	0.1366	0.1845	0.3091	0.3853	0.4284	0.3480	0.3577	0.3806	0.4012	0.4048	0.3440	0.3202	0.2730	0.2589	0.2548

APPENDIX A

55	0.2992	0.2550	0.1836	0.1806	0.1810	0.2862	0.2488	0.3317	0.2854	0.3548	0.4623	0.4780	0.3957	0.3908	0.3665	0.3150	0.2542	0.1950	0.1970	0.1623	0.1126	0.1799	0.1728	0.2646	0.3310	0.5139	0.4396	0.4616	0.4853	0.4993	0.4925	0.4645	0.4151	0.3155	0.2909	0.2944
56	0.2733	0.2755	0.2455	0.1749	0.1188	0.1815	0.2224	0.1985	0.2480	0.2518	0.2878	0.3112	0.2971	0.2825	0.2652	0.2594	0.2621	0.2669	0.2928	0.1812	0.1299	0.1641	0.2224	0.3687	0.4609	0.4773	0.4217	0.4446	0.4676	0.4733	0.4855	0.3953	0.3360	0.2802	0.2740	0.2881
57	0.1182	0.1312	0.1313	0.1380	0.1890	0.3006	0.2790	0.2757	0.2832	0.3839	0.4793	0.5217	0.5535	0.5995	0.5333	0.4524	0.3996	0.3843	0.3894	0.1950	0.1270	0.1157	0.1323	0.1625	0.2077	0.1947	0.1985	0.2338	0.2814	0.3093	0.2838	0.2011	0.2125	0.1906	0.1259	0.1000
58	0.1559	0.2223	0.2420	0.1827	0.1319	0.2894	0.3286	0.3194	0.2961	0.2410	0.3111	0.3775	0.3727	0.3356	0.3393	0.3322	0.3023	0.2833	0.3050	0.1711	0.1848	0.2206	0.2605	0.3076	0.3400	0.2604	0.2949	0.3573	0.4191	0.4559	0.4546	0.3309	0.3002	0.2325	0.1419	0.1353
59	0.1226	0.1652	0.1945	0.1627	0.1689	0.2940	0.3221	0.2809	0.2509	0.2293	0.257	0.3680	0.4504	0.4798	0.4678	0.4405	0.3840	0.3598	0.3311	0.2004	0.1019	0.1248	0.1501	0.1721	0.2134	0.2073	0.1906	0.1982	0.2210	0.2454	0.2332	0.1896	0.1929	0.2096	0.1598	0.1207
60	0.1618	0.1971	0.1868	0.1502	0.1285	0.2621	0.2896	0.2816	0.3064	0.2888	0.3274	0.3681	0.3628	0.3511	0.2852	0.2099	0.1914	0.2129	0.2341	0.1673	0.1954	0.2323	0.2714	0.2964	0.3313	0.3428	0.3620	0.3981	0.4313	0.4598	0.4562	0.3677	0.3501	0.3261	0.2357	0.1459
61	0.1698	0.1778	0.1773	0.1461	0.1281	0.1103	0.1446	0.1156	0.1602	0.1799	0.1984	0.2140	0.2558	0.2264	0.1592	0.1502	0.1427	0.1352	0.1430	0.1786	0.1282	0.1866	0.1955	0.1885	0.2509	0.1974	0.2147	0.2208	0.2338	0.2377	0.2408	0.1873	0.2014	0.2701	0.2516	0.1659
62	0.1972	0.2136	0.2274	0.2492	0.1719	0.2493	0.1740	0.1608	0.1575	0.1515	0.1648	0.2037	0.2261	0.2104	0.2140	0.2357	0.2117	0.1654	0.1536	0.1405	0.1904	0.1777	0.1819	0.2108	0.2387	0.2396	0.2134	0.2193	0.2343	0.2749	0.3297	0.2760	0.2947	0.3068	0.2719	0.1931
63	0.1652	0.1749	0.1587	0.1376	0.1383	0.1605	0.1978	0.2218	0.2665	0.2539	0.2667	0.2960	0.2777	0.2550	0.2312	0.1610	0.1278	0.1197	0.1430	0.1263	0.1131	0.1184	0.1231	0.1389	0.1661	0.1923	0.2024	0.2353	0.2745	0.2969	0.2822	0.2409	0.2519	0.2405	0.1654	0.1325
64	0.1537	0.1759	0.1806	0.1722	0.1229	0.2497	0.2308	0.1967	0.2362	0.1971	0.2261	0.2580	0.2583	0.2123	0.2242	0.2189	0.2090	0.2638	0.2546	0.2163	0.2563	0.3072	0.3113	0.3396	0.3304	0.2712	0.2635	0.2387	0.2172	0.2322	0.2480	0.1662	0.1672	0.1415	0.1170	0.1490
65	0.2028	0.2490	0.2613	0.2367	0.1378	0.1676	0.1507	0.1955	0.2018	0.2563	0.3028	0.3424	0.3776	0.3216	0.3076	0.2668	0.2322	0.2715	0.2800	0.2380	0.2245	0.2661	0.2944	0.3705	0.4199	0.3526	0.3845	0.3830	0.3616	0.3374	0.3281	0.2515	0.2060	0.1630	0.1449	0.1782
66	0.1982	0.2130	0.2235	0.1846	0.2276	0.2753	0.3081	0.2541	0.2190	0.1568	0.1759	0.2111	0.2073	0.2612	0.1884	0.1963	0.1832	0.2040	0.1890	0.1702	0.2406	0.2999	0.3258	0.3182	0.3049	0.3406	0.3303	0.2923	0.2962	0.3334	0.3338	0.2608	0.2708	0.2757	0.1902	0.1444
67	0.1640	0.1466	0.1394	0.1398	0.0997	0.1027	0.1274	0.2027	0.2218	0.2761	0.3358	0.3737	0.3837	0.3737	0.2726	0.1904	0.1688	0.2003	0.1940	0.1872	0.1846	0.2452	0.2781	0.3068	0.3467	0.3698	0.3881	0.3775	0.3386	0.3142	0.3660	0.3040	0.1867	0.1282	0.1313	0.1600
68	0.1693	0.1484	0.1498	0.1399	0.1691	0.1132	0.1649	0.2194	0.2099	0.2523	0.3014	0.3426	0.3636	0.3939	0.2864	0.1863	0.2045	0.2406	0.2444	0.1668	0.2088	0.2793	0.3217	0.3359	0.3645	0.3582	0.3698	0.3666	0.3324	0.3076	0.3463	0.2597	0.1699	0.1500	0.1262	0.1315
69	0.1596	0.1864	0.2049	0.1816	0.1479	0.1055	0.1522	0.1998	0.1983	0.2648	0.3053	0.3410	0.3623	0.3724	0.3137	0.2273	0.1723	0.1569	0.1564	0.1269	0.1307	0.1721	0.1564	0.1555	0.1556	0.1696	0.1574	0.1496	0.1434	0.1413	0.1340	0.1334	0.1315	0.1369	0.1310	0.1309
70	0.1255	0.1384	0.1346	0.1629	0.1666	0.1167	0.1314	0.1613	0.1564	0.1953	0.2207	0.2509	0.2690	0.2655	0.2263	0.2075	0.1774	0.1751	0.1667	0.1719	0.1777	0.2752	0.3128	0.3489	0.3646	0.3398	0.3009	0.2830	0.2438	0.2177	0.2186	0.1803	0.1480	0.1255	0.1268	0.1312
71	0.1395	0.1527	0.1424	0.1027	0.1599	0.1280	0.1390	0.1726	0.1817	0.2551	0.2970	0.3376	0.3488	0.2588	0.2414	0.2296	0.1750	0.1623	0.1464	0.1777	0.1179	0.1550	0.1355	0.1815	0.1712	0.0952	0.1059	0.1019	0.1095	0.1038	0.0950	0.1099	0.1183	0.1329	0.1374	0.1530
72	0.1554	0.1318	0.1157	0.1496	0.1167	0.1518	0.1094	0.1446	0.1818	0.2444	0.3259	0.3715	0.3362	0.2920	0.2475	0.1974	0.1431	0.1602	0.1881	0.1289	0.1126	0.1280	0.1628	0.3376	0.4600	0.4994	0.3623	0.3559	0.3709	0.3768	0.3528	0.3291	0.2923	0.1928	0.1594	0.1574
73	0.1814	0.1442	0.1325	0.1377	0.1633	0.1149	0.1578	0.1661	0.2520	0.3011	0.3821	0.3962	0.3209	0.2834	0.1915	0.1449	0.1353	0.1251	0.1244	0.1065	0.1002	0.1136	0.1765	0.3216	0.4034	0.4656	0.3997	0.4079	0.4142	0.4059	0.3911	0.3374	0.2756	0.2084	0.1608	0.1643
74	0.1795	0.1619	0.1391	0.1398	0.1241	0.2186	0.1675	0.1397	0.2189	0.3062	0.4268	0.4309	0.3085	0.2686	0.2990	0.3043	0.3524	0.3799	0.3379	0.1945	0.1122	0.1336	0.2137	0.3988	0.4990	0.5143	0.4441	0.4665	0.4995	0.5198	0.4978	0.4195	0.3745	0.2452	0.1837	0.1873
75	0.2096	0.1698	0.1418	0.1386	0.1089	0.1526	0.1295	0.1240	0.1813	0.2634	0.3678	0.3777	0.2794	0.2822	0.2992	0.2797	0.2719	0.3057	0.2847	0.1486	0.1072	0.1296	0.2109	0.3616	0.4571	0.4806	0.4325	0.4690	0.5086	0.5211	0.5061	0.4253	0.3832	0.2759	0.2130	0.2103

Configuration C (Baseline): Peak Velocity Ratios

Di	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
1	0.4425	0.3970	0.3429	0.2761	0.2946	0.4346	0.4716	0.4571	0.5435	0.5687	0.6434	0.6323	0.7022	0.8276	0.7503	0.7456	0.7769	0.7390	0.7196	0.5034	0.2709	0.3252	0.4590	0.6470	0.6803	0.7298	0.7348	0.7571	0.7445	0.7551	0.7418	0.7164	0.7180	0.6674	0.5854	0.4577
2	0.5087	0.4419	0.3347	0.2926	0.2829	0.3641	0.4115	0.4011	0.5264	0.6438	0.6864	0.6871	0.6754	0.7404	0.6956	0.6834	0.6527	0.5564	0.5359	0.4234	0.2744	0.3071	0.4778	0.6805	0.7415	0.7699	0.8064	0.8709	0.8512	0.8720	0.8274	0.7927	0.8039	0.7730	0.6516	0.5094
3	0.5026	0.4343	0.3374	0.2896	0.3244	0.3789	0.4191	0.4926	0.5725	0.6725	0.6801	0.6743	0.7490	0.8665	0.9552	0.9092	0.8224	0.6961	0.6445	0.4438	0.2420	0.2890	0.4250	0.6281	0.6422	0.6867	0.7317	0.7742	0.7789	0.7886	0.7568	0.7105	0.7236	0.6564	0.6034	0.4950
4	0.1811	0.1780	0.1781	0.1593	0.1793	0.1596	0.1618	0.1800	0.1750	0.1672	0.1706	0.1708	0.1860	0.1966	0.1741	0.1855	0.1981	0.2006	0.2061	0.1824	0.1878	0.1904	0.1959	0.2151	0.2029	0.1874	0.1709	0.1779	0.1822	0.1813	0.1831	0.1957	0.2011	0.1805	0.1898	0.1781
5	0.5767	0.5368	0.4480	0.3475	0.2930	0.4747	0.4803	0.6550	1.0508	1.0928	1.1209	1.0624	1.0450	0.9894	0.8894	0.9091	0.8093	0.6769	0.7230	0.5476	0.2465	0.2788	0.4483	0.6042	0.6591	0.7542	0.7163	0.7651	0.7768	0.7984	0.7615	0.7276	0.7163	0.6856	0.6277	0.5609
6	0.6599	0.6590	0.5907	0.3853	0.3309	0.5154	0.5379	0.5928	0.8564	0.7768	0.7552	0.7234	0.8012	0.9137	0.9101	0.8716	0.7939	0.7040	0.6401	0.4768	0.2678	0.3067	0.5311	0.7055	0.7969	0.8932	0.8056	0.8683	0.9173	0.9086	0.8783	0.8144	0.7667	0.7554	0.7339	0.6779
7	0.7345	0.7022	0.5978	0.4027	0.4382	0.6290	0.6610	0.6409	0.8230	0.8309	0.9065	0.9134	1.0276	1.0796	1.0621	1.0165	0.9491	0.8269	0.7545	0.5878	0.3035	0.3377	0.5764	0.7905	0.9006	1.0195	0.9402	1.0128	1.0183	1.0124	0.9840	0.9395	0.8907	0.8648	0.8478	0.7514
8	0.6080	0.5765	0.4715	0.3738	0.4763	0.6622	0.7021	0.6765	0.7550	0.8397	0.8849	0.9013	0.8458	0.8535	0.7959	0.7453	0.6719	0.6099	0.6082	0.5248	0.3658	0.3080	0.4953	0.6266	0.6682	0.7262	0.7073	0.7519	0.7938	0.8050	0.7969	0.7740	0.7862	0.7467	0.7242	0.6292
9	0.6837	0.6690	0.5352	0.4140	0.4530	0.6640	0.7003	0.6634	0.7987	0.8861	0.9373	0.9388	0.9060	0.9580	0.9169	0.8399	0.7871	0.6846	0.6348	0.5418	0.4179	0.3591	0.5599	0.7292	0.8392	0.8904	0.8762	0.9318	0.9149	0.9503	0.9250	0.8391	0.8218	0.7886	0.7786	0.6909
10	0.5401	0.5576	0.4789	0.3269	0.4987	0.6450	0.6310	0.6744	0.8592	0.8992	0.9654	0.9545	1.0124	1.0701	1.0353	0.9700	0.9112	0.8014	0.7346	0.5932	0.3669	0.2276	0.2908	0.4288	0.5163	0.6013	0.5646	0.6442	0.6510	0.6657	0.6482	0.5938	0.5434	0.5166	0.5504	0.5528
11	0.8403	0.8219	0.7018	0.4680	0.4451	0.6081	0.6439	0.7055	0.9005	0.9696	1.0852	1.0630	1.0523	1.1001	1.0745	1.0047	0.9393	0.8300	0.7625	0.6364	0.4735	0.3366	0.4562	0.6884	0.8244	0.8925	0.8671	0.9722	0.9755	0.9777	0.9633	0.8964	0.7893	0.7329	0.8048	0.8278
12	0.8991	0.8903	0.7768	0.5205	0.3579	0.4901	0.5519	0.6276	0.7440	0.8081	0.9017	0.8911	0.8910	0.8978	0.8910	0.8439	0.7968	0.7163	0.6442	0.5584	0.4273	0.3604	0.3459	0.4132	0.5386	0.6366	0.6761	0.7956	0.8570	0.8802	0.8539	0.7909	0.6881	0.7087	0.8767	0.8938
13	0.1627	0.1679	0.1717	0.1641	0.1642	0.1658	0.1695	0.1599	0.1675	0.1617	0.1664	0.1708	0.1762	0.1909	0.1927	0.2138	0.2021	0.2154	0.2283	0.2128	0.2132	0.1983	0.2008	0.2204	0.2360	0.1878	0.1750	0.1808	0.1773	0.1878	0.1893	0.1735	0.1787	0.1861	0.1899	0.1584
14	0.8241	0.8303	0.7115	0.4868	0.4417	0.4008	0.4438	0.5183	0.5513	0.5667	0.6639	0.6301	0.6311	0.5400	0.5520	0.5498	0.5047	0.4411	0.4112	0.3363	0.3130	0.3057	0.3307	0.3885	0.4922	0.5407	0.5475	0.6248	0.6788	0.7135	0.6989	0.6625	0.6231	0.6817	0.7984	0.8208
15	0.7838	0.7838	0.6461	0.4334	0.3489	0.3808	0.4170	0.4766	0.5415	0.6417	0.7512	0.7220	0.6771	0.5717	0.5629	0.5691	0.5134	0.4284	0.3883	0.3012	0.2792	0.2676	0.3279	0.4063	0.4501	0.4461	0.4829	0.5932	0.7290	0.7854	0.7496	0.7244	0.6864	0.6617	0.7541	0.7675
16	0.5821	0.5476	0.4816	0.4622	0.4949	0.5402	0.5165	0.4967	0.4794	0.4669	0.5716	0.6054	0.5839	0.6128	0.6475	0.6558	0.6851	0.6401	0.5991	0.5399	0.4897	0.4503	0.4172	0.4998	0.4925	0.5509	0.5807	0.6351	0.6768	0.7301	0.7159	0.6628	0.6316	0.6065	0.6001	0.6001
17	0.5925	0.5981	0.4871	0.3450	0.4487	0.5203	0.5433	0.5852	0.5039	0.4664	0.5119	0.5532	0.6164	0.5867	0.6514	0.6788	0.6224	0.5545	0.4144	0.3526	0.2935	0.3085	0.3389	0.4343	0.4973	0.4982	0.4077	0.4622	0.6106	0.6899	0.6112	0.5902	0.6273	0.5495	0.5515	0.5789
18	0.4424	0.4616	0.3348	0.4515	0.5135	0.5443	0.5446	0.5146	0.5374	0.5204	0.4791	0.5149	0.4963	0.5352	0.5594	0.5954	0.5586	0.4854	0.4347	0.3383	0.3494	0.3537	0.3611	0.4461	0.5036	0.4377	0.5079	0.5889	0.6501	0.7242	0.7746	0.6398	0.4689	0.4577	0.4451	0.4615
19	0.4837	0.4701	0.3895	0.3296	0.3743	0.4543	0.5335	0.6027	0.6513	0.6166	0.5507	0.4493	0.5124	0.6554	0.5615	0.5394	0.5266	0.4637	0.4404	0.4318	0.3950	0.3240	0.2621	0.4226	0.5209	0.5661	0.5079	0.5623	0.6102	0.6648	0.6219	0.5666	0.5113	0.5304	0.5196	0.5073
20	0.7317	0.7422	0.6490	0.4793	0.5617	0.5726	0.5704	0.6192	0.6064	0.5956	0.5804	0.5423	0.4913	0.4625	0.4862	0.5292	0.5173	0.5174	0.4615	0.4504	0.4258	0.4072	0.4218	0.5173	0.5709	0.6587	0.7653	0.8449	0.8621	0.9265	0.9594	0.9354	0.7845	0.6757	0.7302	0.7318
21	0.3413	0.3158	0.3206	0.4813	0.5540	0.5441	0.7424	0.8266	0.8386	0.7694	0.6931	0.6157	0.7098	0.7529	0.6849	0.5735	0.6283	0.6476	0.6415	0.5991	0.5073	0.4303	0.2937	0.3943	0.4455	0.4897	0.5171	0.5124	0.5200	0.5202	0.5131	0.4431	0.4008	0.3905	0.4115	0.3861
22	0.3714	0.3626	0.2547	0.5151	0.5612	0.5475	0.6843	0.7701	0.7936	0.7731	0.7265	0.7729	0.8445	0.8437	0.7407	0.6199	0.5364	0.5263	0.4795	0.4626	0.3949	0.3440	0.5639	0.7735	0.8923	0.8335	0.6555	0.5811	0.5267	0.4891	0.4274	0.4920	0.4919	0.4507	0.4293	0.4147
23	0.4021	0.4288	0.3868	0.4108	0.4797	0.5422	0.6359	0.7278	0.7634	0.7771	0.7977	0.8759	0.9506	0.9557	0.8834	0.7415	0.6393	0.6484	0.6104	0.4714	0.3527	0.4005	0.5206	0.7564	0.7830	0.7143	0.6234	0.5862	0.4250	0.3466	0.3011	0.3898	0.4074	0.3478	0.3793	0.3713
24	0.4167	0.4448	0.3330	0.4486	0.4267	0.4839	0.4764	0.5148	0.5490	0.6320	0.7052	0.7971	0.8925	0.9611	0.8672	0.7658	0.8242	0.8170	0.8522	0.7787	0.6893	0.5421	0.6202	0.7964	0.9120	0.8597	0.7568	0.6714	0.5877	0.5280	0.4942	0.3845	0.3942	0.4086	0.4117	0.4201
25	0.6034	0.4532	0.3195	0.3360	0.4433	0.5605	0.6761	0.7048	0.6854	0.7293	0.7126	0.6919	0.6744	0.6102	0.5591	0.6580	0.8654	0.8993	0.9389	0.8893	0.8107	0.7224	0.4758	0.5539	0.5564	0.5732	0.5779	0.5918	0.5296	0.4989	0.4845	0.4783	0.5384	0.6031	0.5997	0.6112
26	0.6211	0.5402	0.4169	0.5090	0.6112	0.6355	0.7494	0.8287	0.8648	0.8795	0.8401	0.8115	0.8230	0.8188	0.7513	0.5841	0.5411	0.5543	0.5675	0.5629	0.5526	0.4857	0.3790	0.5368	0.6703	0.8599	0.8996	0.9431	0.9146	0.8303	0.7576	0.7067	0.7568	0.7483	0.7000	0.6334
27	0.6941	0.5339	0.4145	0.5694	0.6749	0.8002	0.8955	0.9439	0.9868	0.9637	0.8582	0.7983	0.7066	0.6998	0.7166	0.7572	0.9818	1.0084	1.0204	0.9750	0.8801	0.8288	0.5161	0.6256	0.6321	0.7650	0.9085	0.9771	0.9593	0.8772	0.7754	0.7450	0.8254	0.8754	0.8153	0.7503
28	0.4830	0.3957	0.3461	0.3996	0.4544	0.3912	0.5168	0.6239	0.6286	0.6175	0.5174	0.4707	0.5348	0.6610	0.5893	0.5382	0.6428	0.7026	0.6862	0.6378	0.5761	0.5025	0.3866	0.5156	0.6178	0.7168	0.7662	0.7595	0.7413	0.7248	0.6973	0.5515	0.5792	0.6211	0.5634	0.5836
29	0.4270	0.4231	0.3618	0.5385	0.6483	0.7225	0.8542	0.9762	0.9910	0.9297	0.7311	0.6768	0.6709	0.6854	0.5513	0.5303	0.6060	0.6377	0.6768	0.6295	0.6043	0.5168	0.3344	0.4109	0.4785	0.5110	0.5481	0.5676	0.5658	0.5557	0.5466	0.4231	0.4227	0.4694	0.4736	0.4491
30	0.6818	0.5286	0.4447	0.6504	0.7531	0.8436	0.9454	1.0663	1.0687	0.9783	0.7676	0.6807	0.5966	0.5479	0.4708	0.4362	0.5416	0.5438	0.5668	0.5482	0.5329	0.4646	0.3603	0.4611	0.6445	0.8099	0.8551	0.8641	0.8083	0.7827	0.7117	0.7792	0.8586	0.8850	0.7862	0.7597
31	0.6036	0.4805	0.4217	0.5367	0.5529	0.5614	0.6147	0.6162	0.5956	0.5854	0.5636	0.5455	0.4744	0.5126	0.5561	0.5835	0.7201	0.6725	0.7116	0.7003	0.6676	0.5635	0.4138	0.5200	0.5794	0.7447	0.8135	0.8226	0.7338	0.6851	0.6704	0.6881	0.7909	0.8345	0.7391	0.7046
32	0.1926	0.1656	0.1972	0.2028	0.2044	0.2075	0.1971	0.2077	0.1725	0.1761	0.1770	0.2056	0.2326	0.1952	0.1835	0.2057	0.2153	0.2240	0.2311	0.2064	0.1936	0.2301	0.2460	0.2396	0.2884	0.2160	0.2264	0.2078	0.2120	0.2153	0.2166	0.2286	0.2270	0.1999	0.1781	0.1701
33	0.2487	0.1589	0.2599	0.2593	0.2622	0.2688	0.2476	0.2719	0.1606	0.1613	0.1703	0.2499	0.3095	0.2193	0.2042	0.2603	0.2963	0.3150	0.3352	0.2693	0.2213	0.2977	0.3105	0.3409	0.4066	0.1891	0.2115	0.2255	0.2358	0.2399	0.2574	0.3326	0.3317	0.2441	0.1824	0.1615
34	0.4867	0.4673	0.3772	0.2892	0.3177	0.3853	0.3623	0.4234	0.4566	0.4313	0.4939	0.4895	0.4223	0.5008	0.5165	0.5243	0.5180	0.4824	0.4331	0.4048	0.4176	0.4059	0.3136	0.4210	0.4521	0.4591	0.5540	0.6234	0.6445	0.7230	0.6921	0.6125	0.5506	0.5591	0.5612	0.5340
35	0.3616	0.4090	0.3306	0.3919	0.3700	0.3997	0.4036	0.4301	0.4190	0.4884	0.5390	0.5165	0.4603	0.4599	0.5010	0.4949	0.4671	0.4134	0.4099	0.4007	0.4706	0.4905	0.3662	0.4095	0.4228	0.3801	0.4688	0.5469	0.5506	0.6056	0.5700	0.4816	0.4340	0.4125	0.3926	0.3964
36	0.4321	0.4090	0.5472	0.6534	0.6949	0.8168	0.9425	0.9951	0.9996	0.9141	0.8901	0.8856	0.8853	0.8051	0.7709	0.7726	0.7567	0.6398	0.5888	0.5296	0.4818	0.4679	0.4100	0.3103	0.3379	0.2606	0.2596	0.2768	0.3347	0.3997	0.4435	0.4473	0.3883	0.4677	0.4780	0.4653
37	0.4857	0.5068	0.3861	0.4773	0.5693	0.5848	0.6426	0.6887	0.7033	0.7094	0.6652	0.6241	0.5553	0.6560	0.6309	0.6635	0.6586	0.5916	0.5094	0.4614	0.4349	0.4688	0.3921	0.3438	0.3529	0.3404	0.3761	0.3951	0.5493	0.5894	0.5155	0.5131	0.4719	0.4478	0.4320	0.4714
38	0.5655	0.5970	0.5003	0.5268	0.5466	0.5470	0.6153	0.6252	0.5522	0.6102	0.6084	0.5933	0.6686	0.7045	0.6173	0.5997	0.6402	0.5831	0.5057	0.4375	0.4420	0.4758	0.4954	0.4565	0.3955	0.3640	0.4026	0.3629	0.4189	0.4444	0.4100	0.4209	0.3942	0.3799	0.4892	0.5110
39	0.6446	0.7011	0.5684	0.4399	0.4482	0.4651	0.4275	0.5135	0.4942	0.5450	0.5574	0.5485	0.6259	0.6487	0.5585	0.5612	0.553	0.4532	0.4213	0.3384	0.3803	0.3702	0.2847	0.3236	0.3498	0.3985	0.3852	0.4054	0.4452	0.4913	0.4871	0.5100	0.5241	0.5236	0.6023	0.6283
40	0.3866	0.3682	0.3368	0.3841	0.4713	0.4858	0.4461	0.5475	0.5268	0.5310	0.5352	0.5357	0.5467	0.5680	0.6090	0.6077	0.6123	0.4974	0.4432	0.3835	0.3858	0.3587	0.2553	0.2514	0.3022	0.3061	0.2918	0.3136	0.3410	0.3481	0.3140	0.3697	0.3550	0.3251	0.3665	0.4175
41	0.4552	0.4616	0.3701	0.4769	0.5457	0.5603	0.6012	0.6149	0.6193	0.5683	0.5044	0.4878	0.5746	0.6068	0.5615	0.5642	0.5771	0.4797	0.4090	0.3730	0.3944	0.3977	0.3214	0.3872	0.4168	0.3993	0.4174	0.4781	0.5591	0.5922	0.5400	0.4915	0.5275	0.4808	0.4557	0.4710
42	0.7125	0.6952	0.5594	0.3894	0.3041	0.3593	0.3377	0.3890	0.3988	0.4075	0.3971	0.3596	0.3436	0.3648	0.3823	0.3764	0.3670	0.3930	0.3362	0.3177	0.2884	0.2749	0.3313	0.4324	0.4652	0.5267	0.4960	0.5554	0.7373	0.8227	0.7318	0.6822	0.6881	0.6261	0.6731	0.7141
43	0.9568	0.9341	0.8142	0.5262	0.2780	0.3724	0.4760	0.4443	0.5771	0.6618	0.7998	0.7547	0.6966	0.6295	0.6085	0.6246	0.5949	0.5517	0.5181	0.4331	0.3477	0.3434	0.4272	0.5574	0.6539	0.6661	0.6891	0.7697	0.8105	0.8551	0.8411	0.7776	0.7184	0.7708	0.9143	0.9342
44	0.8624	0.8689	0.7459	0.5163	0.3947	0.4964	0.4510	0.4618	0.5084	0.5096	0.5044	0.5252	0.5563	0.5925	0.6138	0.6506	0.6703	0.6709	0.6614	0.5572	0.4247	0.3630	0.3933	0.5194	0.5989	0.6762	0.6036	0.6855	0.6756	0.6740	0.6616	0.6252	0.5758	0.6291	0.7244	0.7851
45	0.7418	0.7351	0.6312	0.4341	0.3422	0.3656	0.3318	0.3961	0.4175	0.4644	0.4461	0.4526	0.5876	0.6220	0.5162	0.5127	0.5429	0.5010	0.4886	0.3645	0.2290	0.2354	0.2649	0.3466	0.3961	0.4774	0.4415	0.5296	0.5942	0.6180	0.5768	0.5392	0.5339	0.5582	0.6542	0.6881
46	0.6411	0.6697	0.5802	0.4046	0.4573	0.5002	0.4508	0.4211	0.4729	0.4822	0.4617	0.4945	0.6898	0.7278	0.5999	0.6564	0.7138	0.6645	0.6377	0.4762	0.2899	0.3280	0.3496	0.4067	0.4336	0.4166	0.4194	0.4677	0.5231	0.5643	0.5076	0.4776	0.4906	0.5606	0.5992	0.6493
47	0.8477	0.8712	0.7726	0.4929	0.3724	0.4753	0.3937	0.3702	0.4468	0.4786	0.4462	0.4377	0.4630	0.4697	0.4216	0.4390	0.5100	0.4840	0.4884	0.3754	0.3629	0.3654	0.4275	0.5469	0.6453	0.6567	0.5933	0.6575	0.6985	0.6992	0.6487	0.5454	0.5523	0.6099	0.7378	0.8108
48	0.6129	0.6625	0.5657	0.3984	0.3852	0.4997	0.4552	0.4845	0.6071	0.6643	0.6641	0.6799	0.6689	0.6599	0.5712	0.4949	0.4681	0.4273	0.4130	0.3805	0.2956	0.2946	0.3836	0.5108	0.6155	0.6697	0.5665	0.6327	0.6396	0.6387	0.5916	0.5725	0.5019	0.5223	0.5712	0.6230
49	0.5624	0.5359	0.4596	0.3636	0.3872	0.5094	0.4964	0.5301	0.6485	0.7098	0.7482	0.7467	0.7396	0.7536	0.6693	0.6038	0.6047	0.5990	0.6154	0.5002	0.3775	0.3084	0.3830	0.5419	0.6360	0.6791	0.6330	0.6940	0.7154	0.7354	0.6941	0.6458	0.5915	0.5358	0.5605	0.5635
50	0.6357	0.6511	0.6064	0.4253	0.3501	0.5179	0.5071	0.5067	0.5931	0.6427	0.6916	0.6931	0.6670	0.6354	0.5848	0.5449	0.5443	0.5240	0.5956	0.5075	0.3548	0.2932	0.3823	0.5465	0.6676	0.7834	0.6986	0.7280	0.7346	0.7691	0.7291	0.6566	0.5990	0.5781	0.6032	0.5914
51	0.6019	0.6434	0.5558	0.3942	0.2487	0.5291	0.5750	0.6336	0.5496	0.4136	0.4632	0.4656	0.4637	0.4717	0.5178	0.4903	0.4437	0.3684	0.3382	0.2859	0.2959	0.3643	0.4469	0.5395	0.5979	0.5959	0.5808	0.6509	0.6829	0.7007	0.6729	0.6343	0.5907	0.5326	0.5355	0.5392
52	0.5177	0.5998	0.5606	0.3702	0.4584	0.4839	0.4784	0.5052	0.4875	0.5202	0.5234	0.5264	0.5283	0.4662	0.4504	0.3956	0.3573	0.2946	0.3101	0.3261	0.3243	0.3301	0.3996	0.5149	0.5656	0.6301	0.6573	0.6169	0.5133	0.4209	0.3582	0.3215	0.3778	0.4425	0.4055	0.4977
53	0.5656	0.5796	0.4803	0.3737	0.3590	0.6728	0.7049	0.7450	0.7674	0.4694	0.4911	0.5828	0.5330	0.4077	0.4179	0.3782	0.3439	0.3048	0.4166	0.4138	0.3249	0.2439	0.3357	0.4753	0.5220	0.6514	0.5345	0.5248	0.4998	0.5210	0.5293	0.4502	0.4779	0.4649	0.5313	0.5365
54	0.5443	0.5695	0.5185	0.4300	0.3849	0.5341	0.5478	0.5533	0.5609	0.5614	0.6520	0.6884	0.6168	0.6497	0.6998	0.6708	0.6166	0.5384	0.5494	0.4136	0.2998	0.3120	0.4086	0.5747	0.6668	0.7760	0.7103	0.7430	0.7382	0.7348	0.7303	0.7030	0.6771	0.6387	0.6312	0.5445
55	0.6486	0.6287	0.4798	0.4155	0.4484	0.6229	0.6185	0.6953	0.6383	0.6311	0.7062	0.7217	0.6799	0.6856	0.6580	0.6496	0.6121	0.5226	0.5796	0.4402	0.3251	0.2872	0.4231	0.6095	0.6963	0.8512	0.8015	0.8421	0.8418	0.8661	0.8312	0.8532	0.8029	0.7666	0.6924	0.6464
56	0.6272	0.6333	0.5249	0.4080	0.3262	0.4441	0.4909	0.5158	0.5946	0.4827	0.4896	0.5355	0.5431	0.5191	0.5201	0.5351	0.5884	0.5919	0.6308	0.4561	0.3040	0.3494	0.4889	0.6462	0.7439	0.8109	0.7860	0.8133	0.8150	0.8395	0.8160	0.7953	0.7695	0.7155	0.6700	0.6152
57	0.3191	0.3794	0.3551	0.3283	0.4341	0.5981	0.5865	0.5823	0.6329	0.6831	0.7514	0.7841	0.8207	0.8885	0.8597	0.7891	0.7708	0.7498	0.7501	0.5295	0.2928	0.3175	0.3422	0.3918	0.5065	0.4914	0.4516	0.5064	0.5741	0.6152	0.6147	0.5348	0.5369	0.5377	0.3941	0.3224
58	0.4858	0.5530	0.5124	0.4155	0.3933	0.6291	0.6918	0.6702	0.6884	0.5693	0.6454	0.7271	0.7752	0.7232	0.6672	0.6193	0.5896	0.5675	0.6079	0.4413	0.3637	0.4148	0.4877	0.5721	0.5828	0.5428	0.5741	0.6696	0.7440	0.8062	0.8163	0.7171	0.6748	0.6300	0.4182	0.4029

59	0.3540	0.4541	0.4291	0.3737	0.4118	0.5818	0.6094	0.5836	0.5770	0.5656	0.6192	0.7668	0.7883	0.8299	0.8836	0.8297	0.7909	0.7272	0.6534	0.4715	0.2904	0.3403	0.3964	0.4520	0.5435	0.5473	0.4485	0.4654	0.4911	0.6002	0.5526	0.4893	0.5124	0.5542	0.4944	0.3470
60	0.4338	0.4930	0.4546	0.3968	0.3552	0.5836	0.6478	0.6087	0.6729	0.6019	0.6687	0.7647	0.7458	0.6881	0.6472	0.5323	0.4936	0.4665	0.5013	0.3823	0.4142	0.4607	0.4840	0.5492	0.6066	0.6263	0.5912	0.6343	0.6421	0.7103	0.6905	0.6450	0.6431	0.6819	0.6103	0.4085
61	0.4675	0.4538	0.4275	0.3954	0.3397	0.2460	0.4305	0.2788	0.4614	0.4851	0.4602	0.5228	0.5297	0.5542	0.4151	0.3401	0.2873	0.3207	0.3382	0.3638	0.3770	0.4378	0.4211	0.4456	0.5155	0.4906	0.5057	0.5713	0.5743	0.6002	0.5528	0.4750	0.4796	0.6178	0.5685	0.4519
62	0.4861	0.5527	0.6359	0.6685	0.4403	0.5080	0.4183	0.3734	0.3804	0.3827	0.4044	0.4585	0.4727	0.4555	0.4206	0.4389	0.3946	0.3587	0.3686	0.4441	0.5355	0.4916	0.4545	0.5146	0.5838	0.6679	0.5929	0.5346	0.5255	0.5821	0.6726	0.6135	0.6061	0.6316	0.5894	0.4779
63	0.4161	0.4363	0.4225	0.3579	0.3383	0.4882	0.5532	0.5240	0.6439	0.5922	0.6397	0.7964	0.7579	0.6786	0.6418	0.5055	0.3889	0.3653	0.4179	0.3177	0.3299	0.3440	0.3307	0.3836	0.4273	0.4435	0.4260	0.4677	0.4967	0.5290	0.5347	0.4973	0.4953	0.5121	0.4366	0.3418
64	0.4877	0.5099	0.5488	0.5090	0.3360	0.5033	0.5175	0.4630	0.5549	0.4815	0.5565	0.5833	0.5563	0.4866	0.5128	0.4995	0.4556	0.5592	0.5607	0.5235	0.5346	0.6159	0.5882	0.6490	0.6322	0.6223	0.5563	0.5250	0.4688	0.5560	0.5394	0.4760	0.4859	0.4666	0.3645	0.4783
65	0.5559	0.6202	0.6317	0.5820	0.3167	0.3661	0.3871	0.4910	0.4231	0.4823	0.5582	0.6304	0.6515	0.6283	0.6077	0.5196	0.4339	0.4952	0.4999	0.4552	0.5455	0.5916	0.6001	0.6654	0.6956	0.6944	0.6823	0.6907	0.6601	0.6218	0.5870	0.5255	0.4675	0.4473	0.4038	0.4985
66	0.4660	0.5032	0.4980	0.4606	0.4049	0.5493	0.5790	0.5344	0.5472	0.3958	0.4340	0.5062	0.5110	0.5054	0.5549	0.5674	0.4892	0.5160	0.4933	0.5023	0.5586	0.6353	0.6370	0.6613	0.6532	0.7250	0.6747	0.6564	0.5997	0.6910	0.6855	0.5922	0.5907	0.5948	0.4719	0.4136
67	0.4902	0.4374	0.4076	0.3771	0.2612	0.2528	0.3554	0.4539	0.4039	0.5080	0.5516	0.5955	0.6495	0.6405	0.5754	0.5106	0.4685	0.5249	0.4960	0.4714	0.4674	0.5544	0.5782	0.6180	0.6348	0.6834	0.6875	0.7345	0.7230	0.7789	0.8635	0.7539	0.5033	0.4044	0.3875	0.4412
68	0.4123	0.4398	0.3961	0.3558	0.3180	0.2619	0.4225	0.4973	0.4422	0.5112	0.5714	0.6375	0.6777	0.7310	0.7369	0.5521	0.5259	0.5393	0.5192	0.4459	0.4676	0.5676	0.5694	0.5893	0.6102	0.6316	0.6669	0.7086	0.7134	0.6838	0.7659	0.6464	0.4566	0.3609	0.3291	0.3558
69	0.4375	0.4780	0.4958	0.3899	0.2901	0.2613	0.3891	0.4581	0.4470	0.5559	0.5830	0.6600	0.6868	0.6987	0.7241	0.6178	0.5405	0.5240	0.4578	0.4636	0.4523	0.5630	0.5092	0.4685	0.4206	0.4756	0.5263	0.4490	0.4114	0.4082	0.3830	0.3463	0.3547	0.3382	0.3350	0.3678
70	0.3095	0.3484	0.3255	0.3504	0.3402	0.2674	0.3716	0.4043	0.3942	0.4623	0.5004	0.5784	0.5815	0.5739	0.5481	0.5760	0.5626	0.5852	0.5439	0.4584	0.4967	0.6053	0.6300	0.6853	0.6787	0.6573	0.5919	0.5592	0.5508	0.4934	0.4582	0.4045	0.3555	0.2956	0.2999	0.3107
71	0.4313	0.4491	0.4279	0.2693	0.2372	0.3011	0.3729	0.4773	0.4180	0.5462	0.5503	0.6344	0.6598	0.5973	0.5873	0.5889	0.4589	0.4976	0.4371	0.3852	0.3714	0.4850	0.4552	0.3843	0.3280	0.3276	0.3550	0.3290	0.3202	0.3662	0.2419	0.3522	0.4484	0.4371	0.3656	0.4174
72	0.4394	0.3879	0.3444	0.3313	0.2888	0.3682	0.3116	0.3387	0.3516	0.4498	0.5329	0.5884	0.5605	0.5569	0.4694	0.4521	0.4264	0.4408	0.5123	0.3880	0.2591	0.3046	0.4771	0.7196	0.8341	0.9208	0.8214	0.7880	0.7466	0.7542	0.7074	0.6585	0.6307	0.5367	0.4546	0.4388
73	0.4008	0.3794	0.3566	0.3125	0.2827	0.2885	0.3719	0.4131	0.5509	0.6054	0.7248	0.7638	0.6907	0.6434	0.4936	0.4154	0.4006	0.3746	0.3751	0.2634	0.2418	0.3244	0.4468	0.6165	0.6706	0.7766	0.7529	0.7192	0.6815	0.6807	0.6542	0.6164	0.5764	0.5129	0.4433	0.4231
74	0.4659	0.4212	0.3642	0.3305	0.2913	0.4356	0.4236	0.3628	0.4626	0.5703	0.7218	0.7373	0.6476	0.6463	0.6598	0.6898	0.7951	0.7838	0.7401	0.5232	0.2721	0.3516	0.5409	0.7556	0.8335	0.9047	0.9149	0.8988	0.8798	0.9113	0.8614	0.8542	0.8327	0.7551	0.6366	0.5089
75	0.5212	0.4526	0.4127	0.3266	0.2714	0.3941	0.3749	0.3313	0.4305	0.5456	0.6821	0.6883	0.5927	0.6149	0.6247	0.6600	0.7113	0.7382	0.7301	0.4660	0.2620	0.3207	0.4819	0.6859	0.7497	0.8158	0.8217	0.8327	0.8270	0.8556	0.8307	0.8375	0.8519	0.7870	0.6975	0.5606

APPENDIX B

APPENDIX B: DIRECTIONAL WEIGHTING

This appendix contains directional weighting charts for each measurement location in each test configuration. They show the percentage of time for which each comfort threshold is exceeded (as per the Draft Sydney Planning Strategy 2016 - 2036, presented below for reference).

The wind tunnel measurement data is weighted by the probability of occurrence, which is derived from historical wind data acquired at Sydney International Airport.

The thresholds defined in the criteria are based on a relatively low frequency of occurrence (5% for Comfort and 0.017% for Safety), and so the directional weighting charts in this appendix have been scaled appropriately to show these infrequent events. The radial axes of the subsequent charts are scaled from 0% to 2%.

Criteria

Define the mandatory ***Wind Safety Standard*** *as an annual maximum peak 0.5 second gust wind speed in one hour measured between 6am and 10pm Eastern Standard Time (EST) of* ***24 metres per second.***

Define the mandatory ***Wind Comfort Standard for Walking*** *as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST (i.e 5 percent of those hours) of* ***8 metres per second****.*

Define the mandatory ***Wind Comfort Standard for Sitting*** *in Parks as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST of* ***4 metres per second*** *and applies to parks protected by Sun Access Planes and/or No Additional Overshadowing Controls.*

Define the desirable ***Wind Comfort Standard for Sitting and Standing*** *as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST of:*

4 metres per second for Sitting
6 metres per second for standing

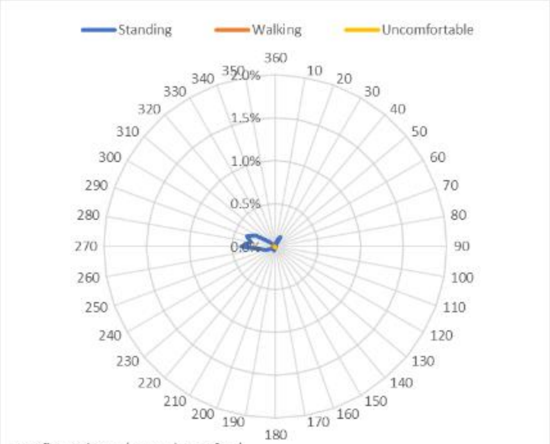
Configurations

A: Existing site with existing and approved surroundings

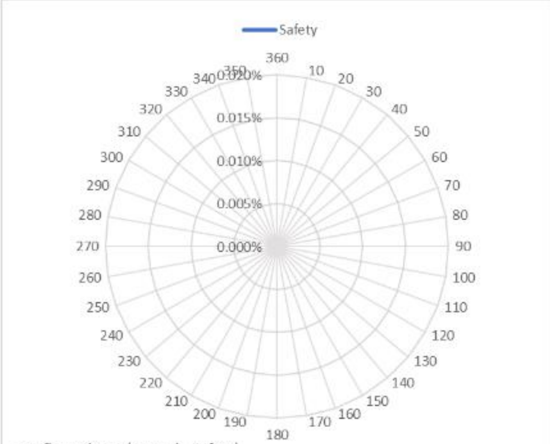
B: Proposed development with existing and approved surroundings

C: Proposed development (Baseline) with existing and approved surroundings

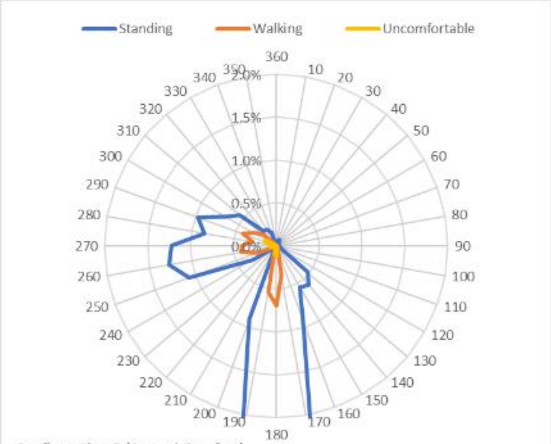
Measurement Location:1



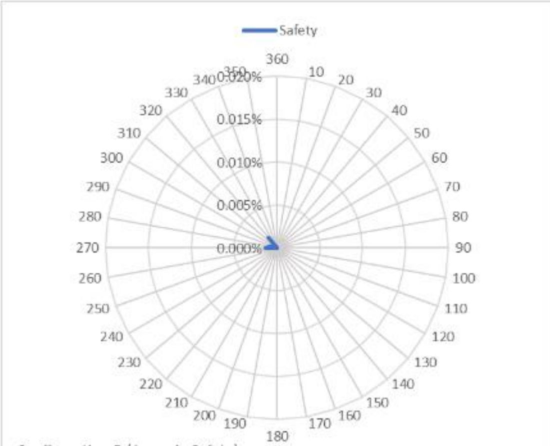
Configuration A (Annual-Comfort)



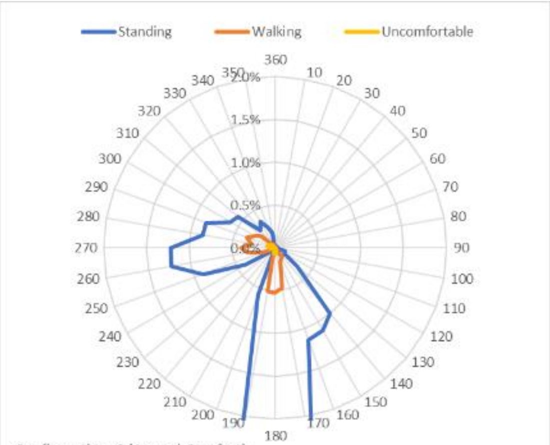
Configuration A (Annual - Safety)



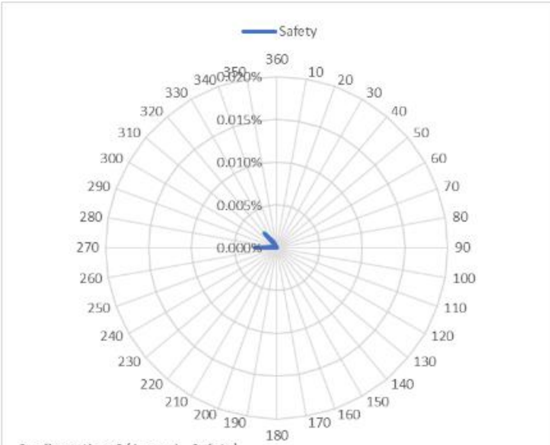
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

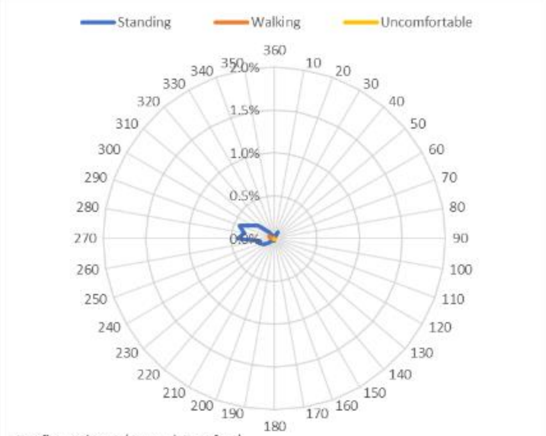


Configuration C (Annual-Comfort)

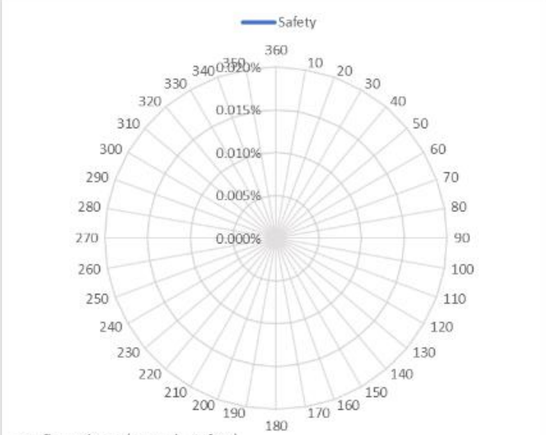


Configuration C (Annual - Safety)

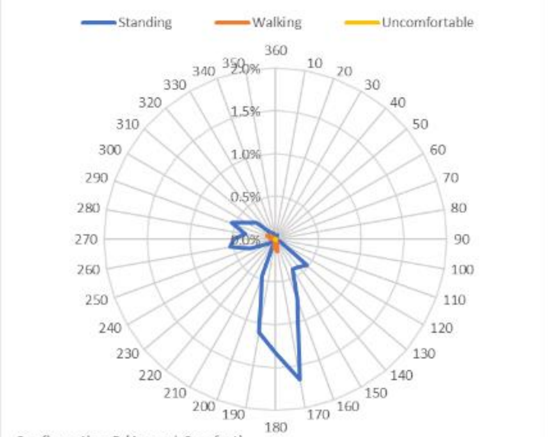
Measurement Location:2



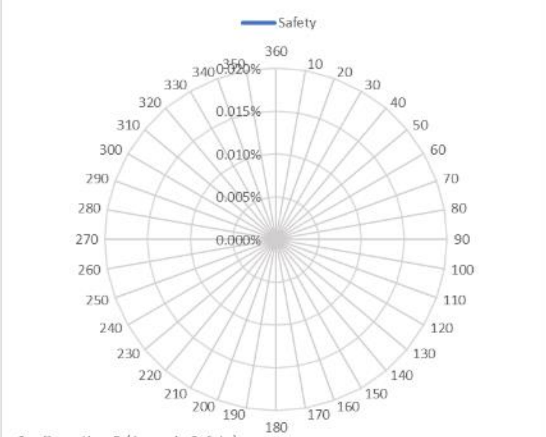
Configuration A (Annual-Comfort)



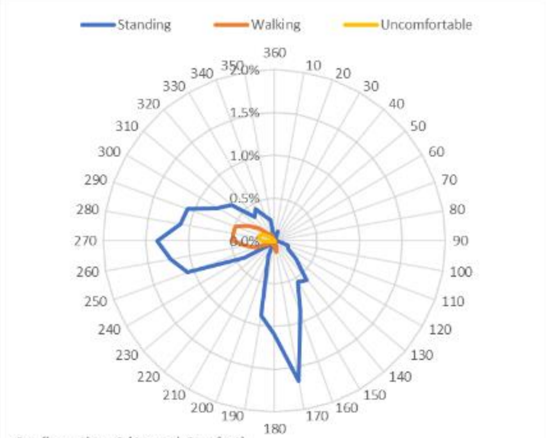
Configuration A (Annual - Safety)



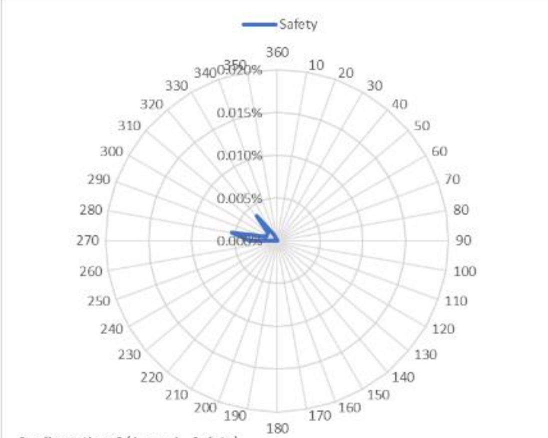
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

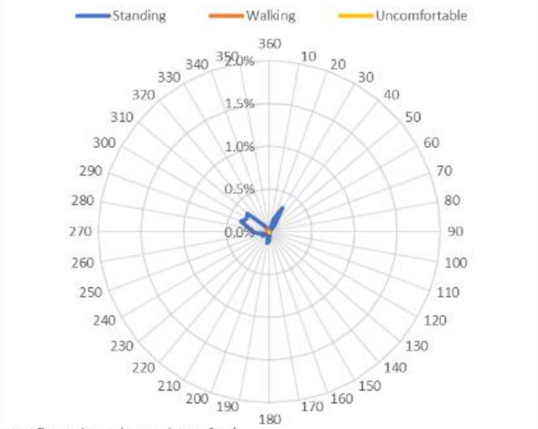


Configuration C (Annual-Comfort)

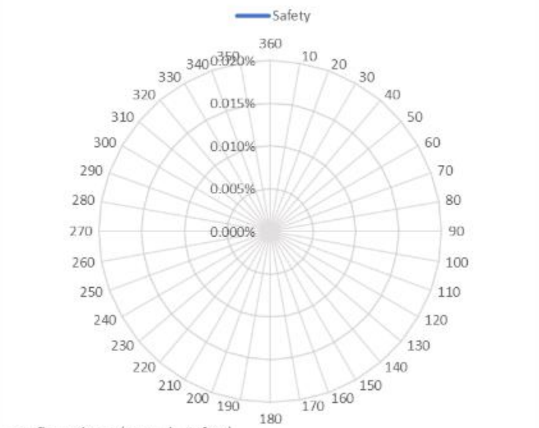


Configuration C (Annual - Safety)

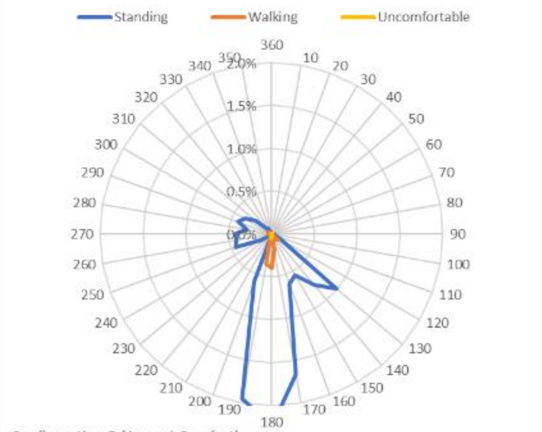
Measurement Location: 3



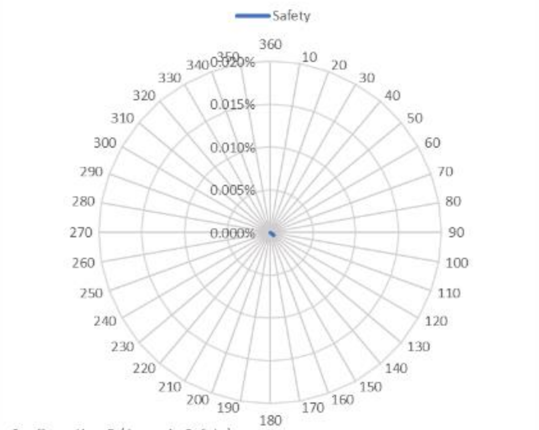
Configuration A (Annual-Comfort)



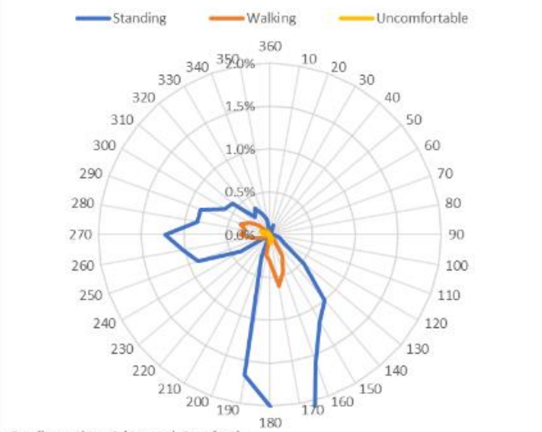
Configuration A (Annual - Safety)



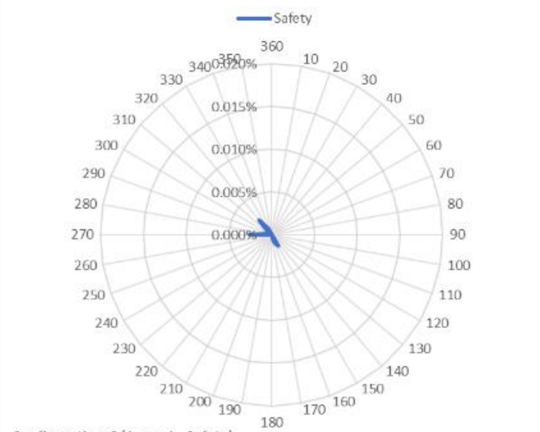
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

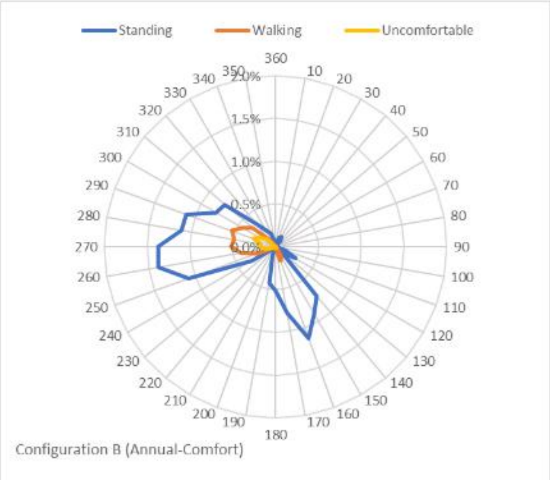


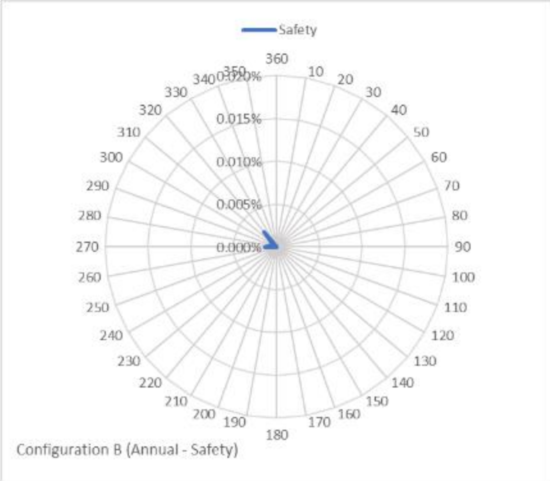
Configuration C (Annual-Comfort)



Configuration C (Annual - Safety)

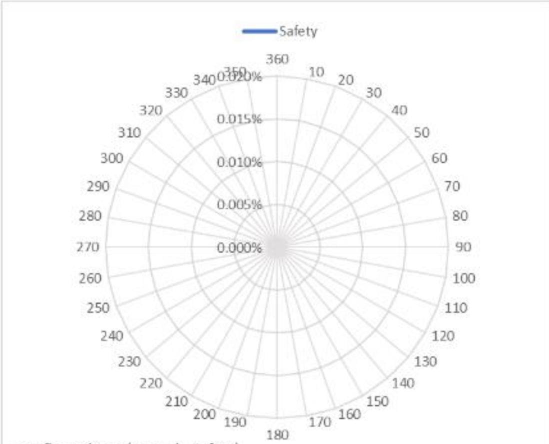
Measurement Location: 4



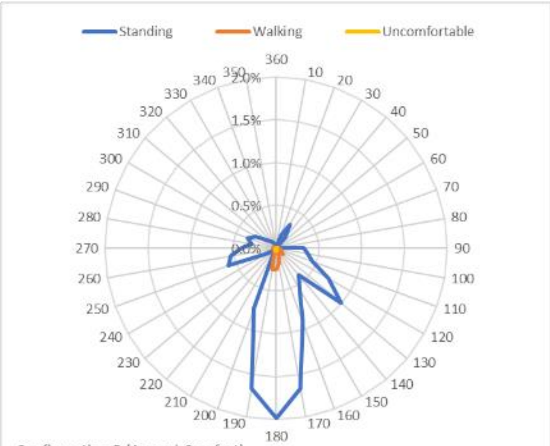


Measurement Location: 5

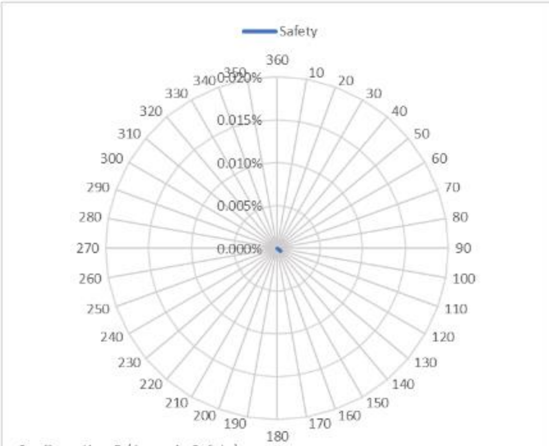
Configuration A (Annual-Comfort)



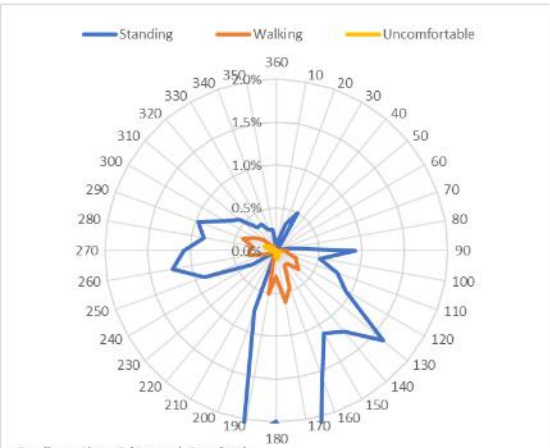
Configuration A (Annual - Safety)



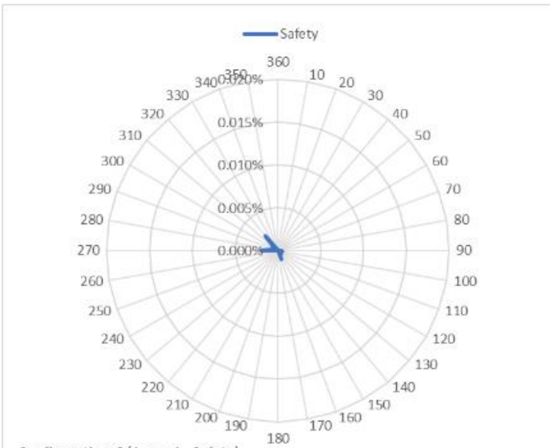
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

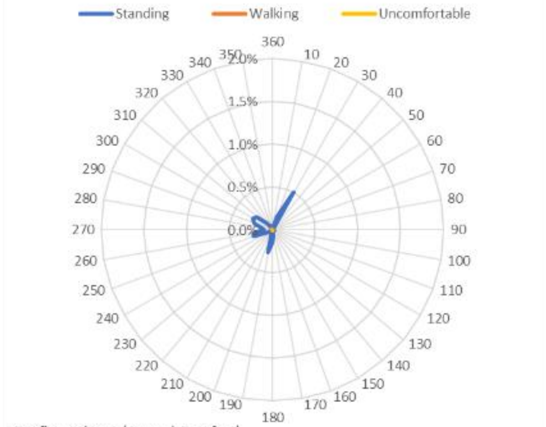


Configuration C (Annual-Comfort)

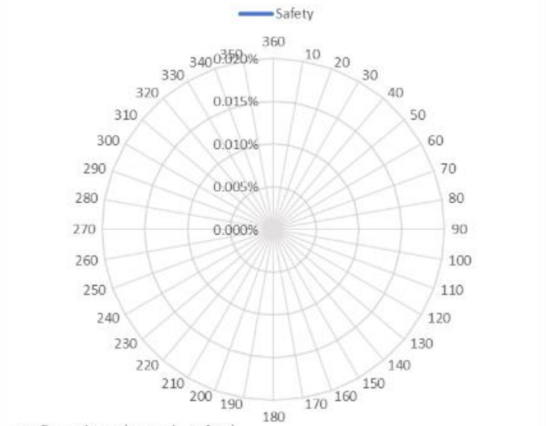


Configuration C (Annual - Safety)

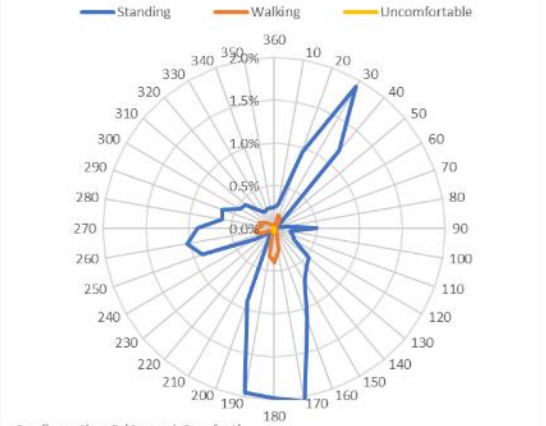
Measurement Location: 6



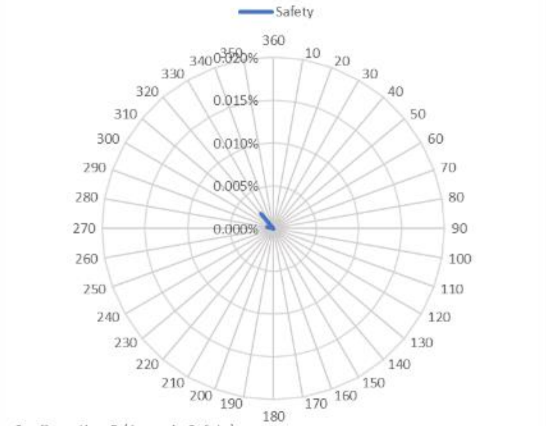
Configuration A (Annual-Comfort)



Configuration A (Annual - Safety)



Configuration B (Annual-Comfort)



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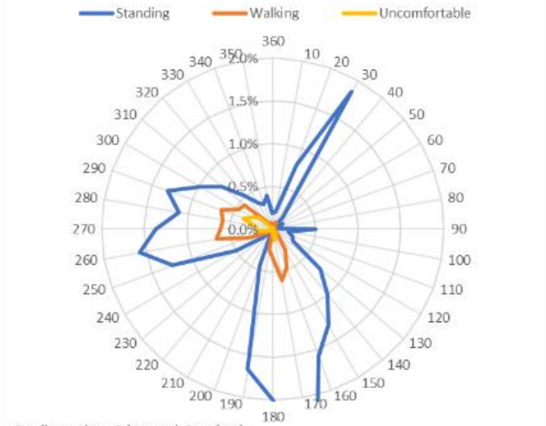
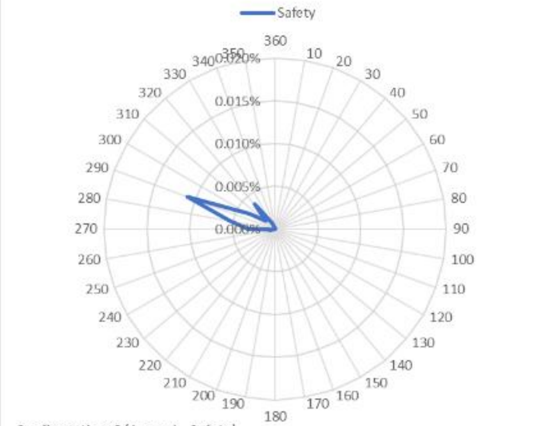
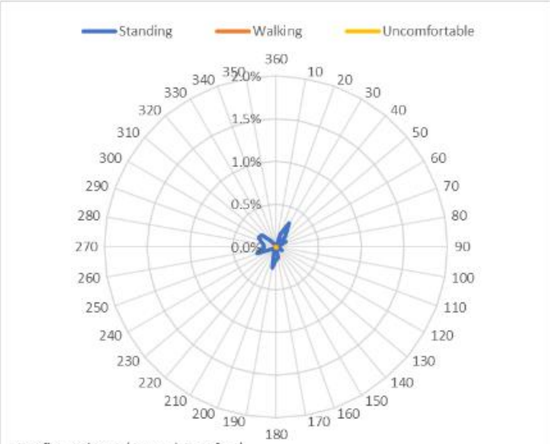


Configuration C (Annual-Comfort)

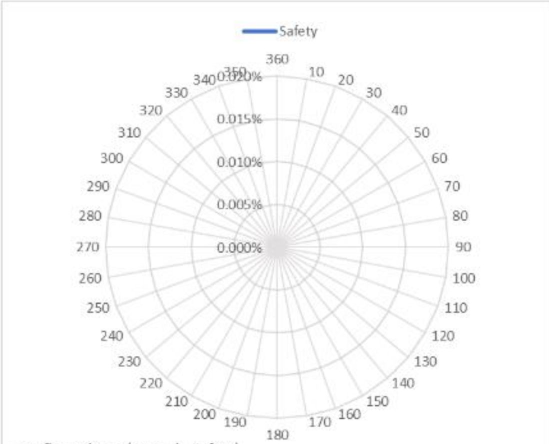


Configuration C (Annual - Safety)

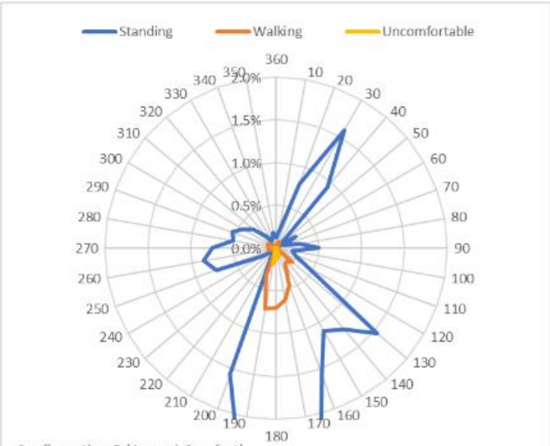
Measurement Location: 7



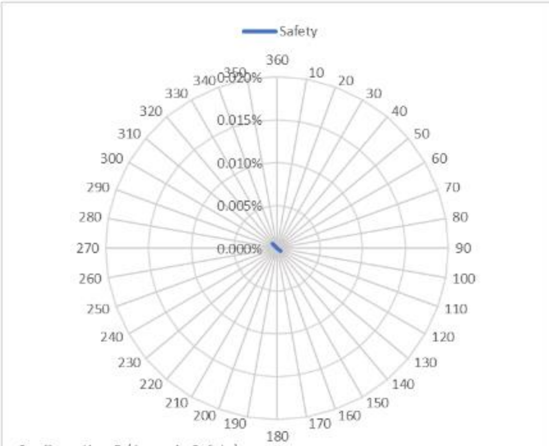
Configuration A (Annual-Comfort)



Configuration A (Annual - Safety)



Configuration B (Annual-Comfort)



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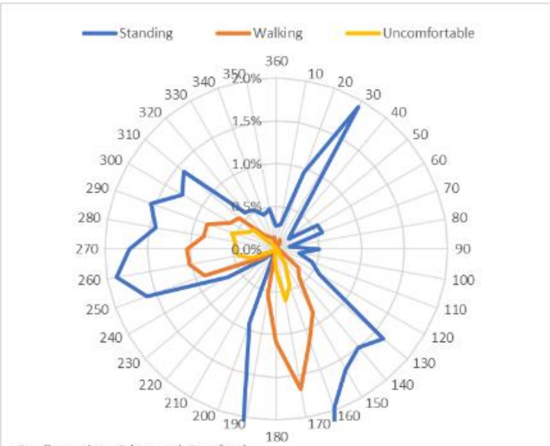
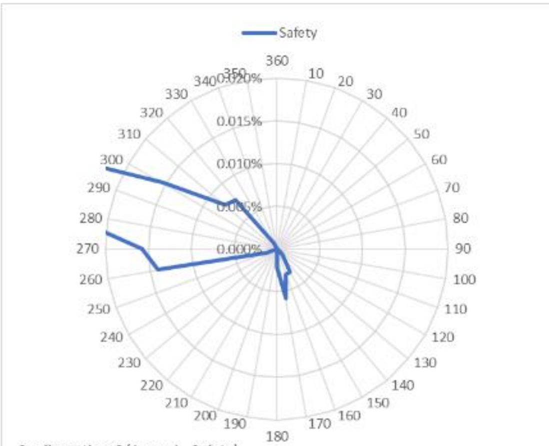
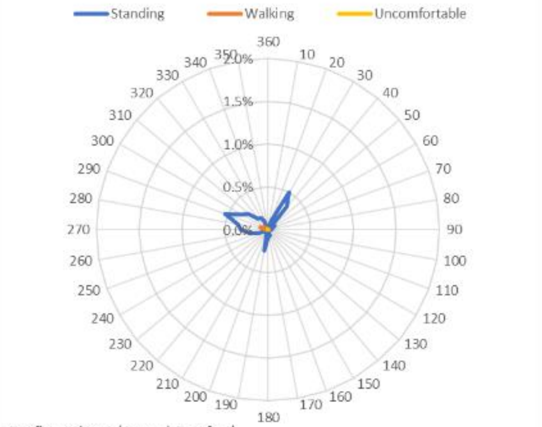


Configuration C (Annual-Comfort)

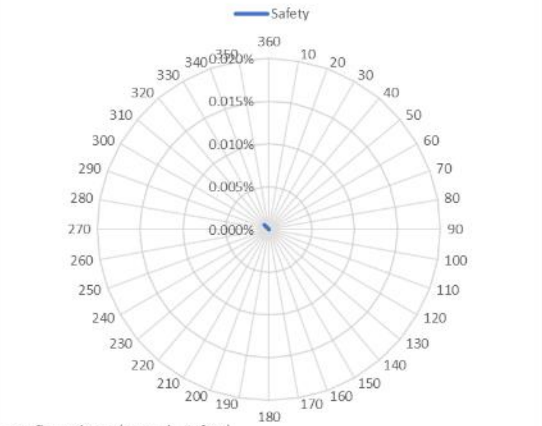


Configuration C (Annual - Safety)

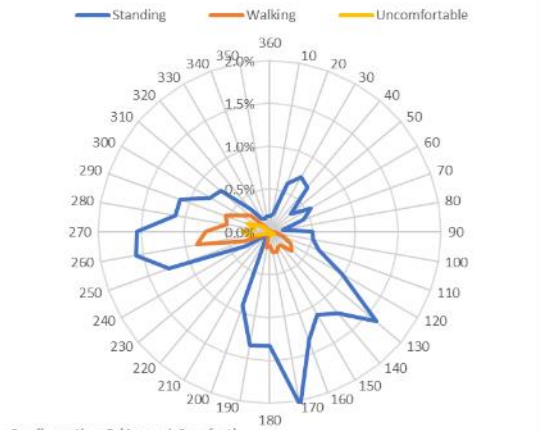
Measurement Location: 8



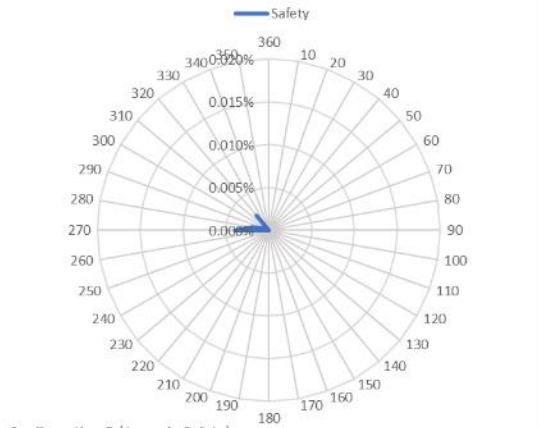
Configuration A (Annual-Comfort)



Configuration A (Annual - Safety)



Configuration B (Annual-Comfort)



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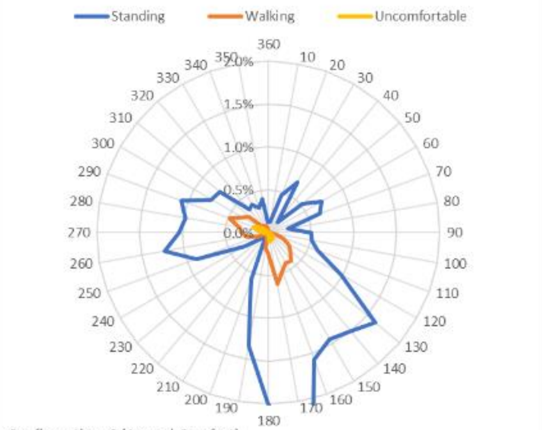
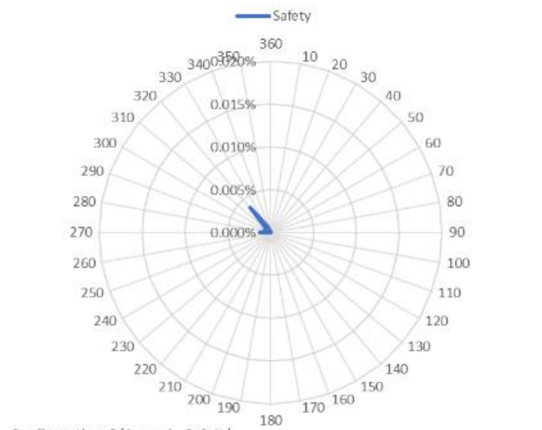
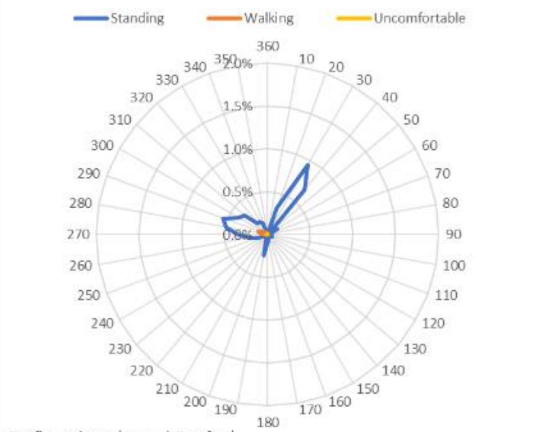


Configuration C (Annual-Comfort)

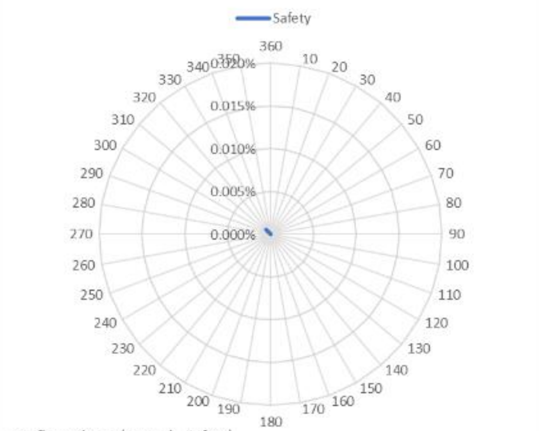


Configuration C (Annual - Safety)

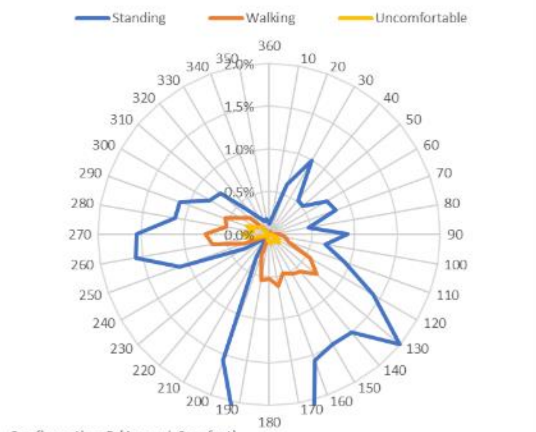
Measurement Location: 9



Configuration A (Annual-Comfort)



Configuration A (Annual - Safety)



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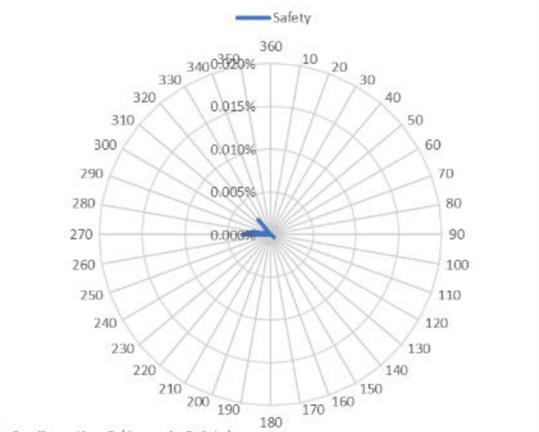

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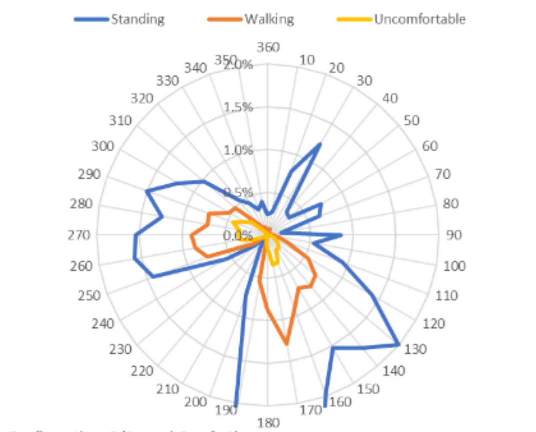
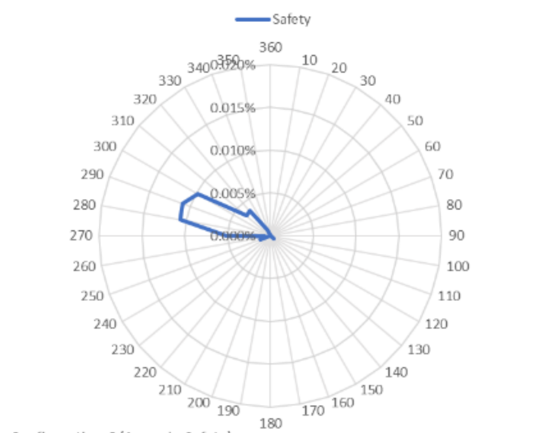
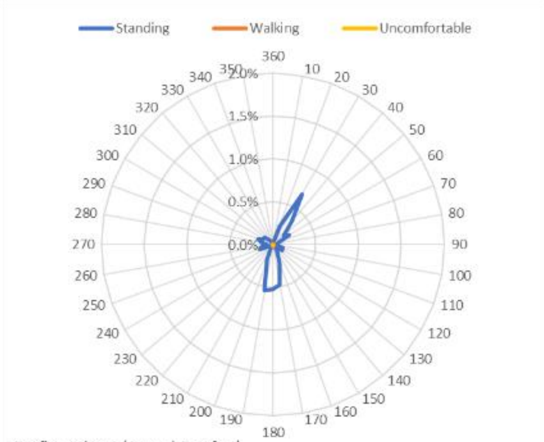


Configuration C (Annual-Comfort)

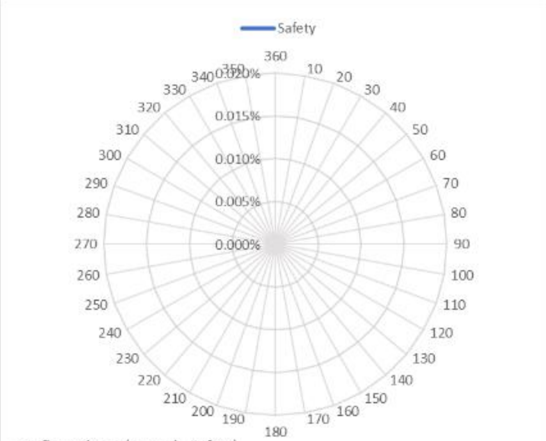


Configuration C (Annual - Safety)

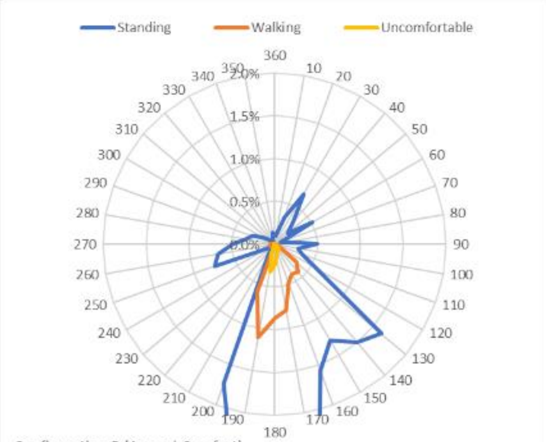
Measurement Location: 10



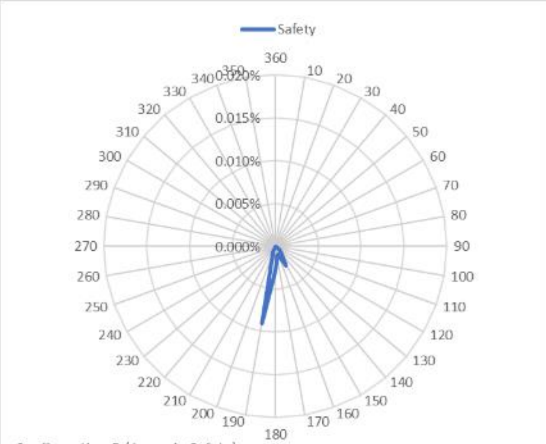
Configuration A (Annual-Comfort)



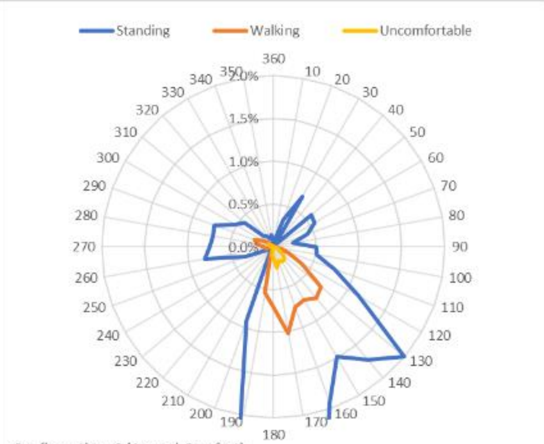
Configuration A (Annual - Safety)



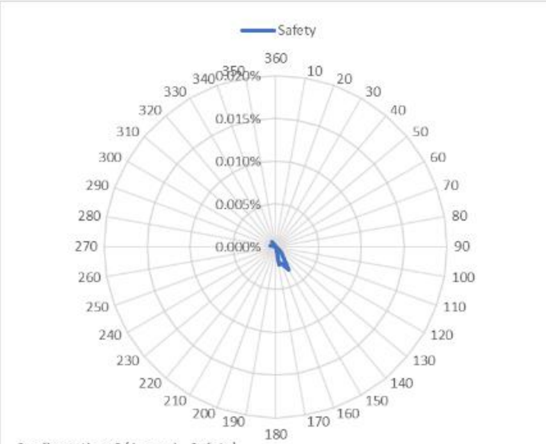
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

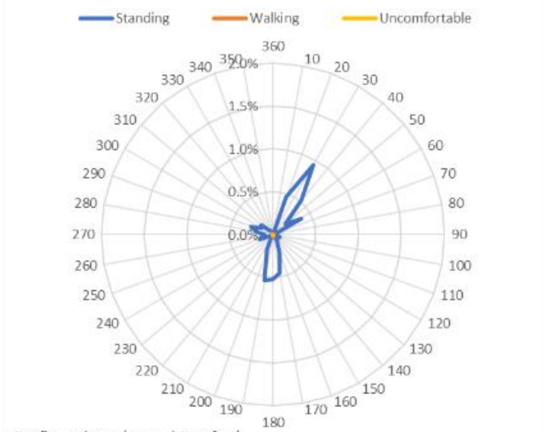


Configuration C (Annual-Comfort)

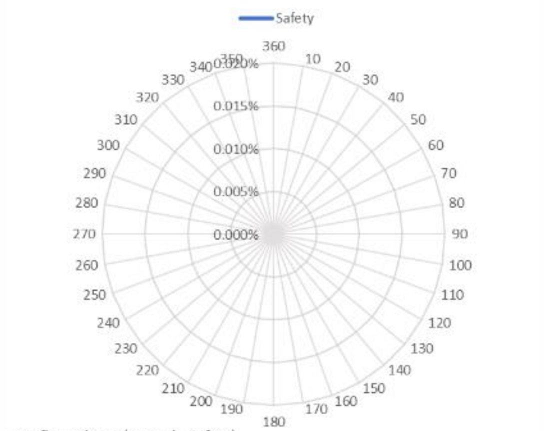


Configuration C (Annual - Safety)

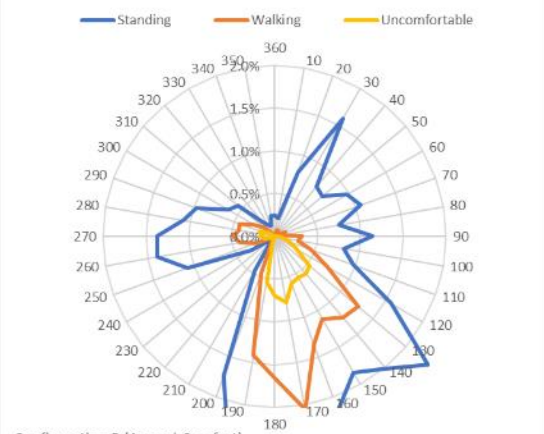
Measurement Location: 11



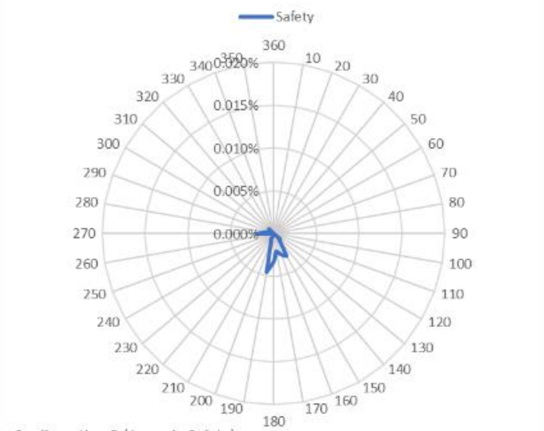
Configuration A (Annual-Comfort)



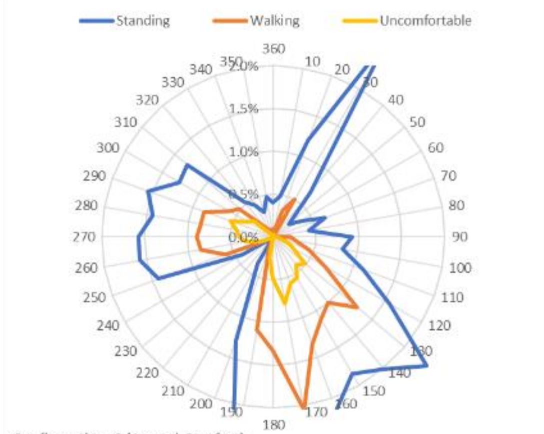
Configuration A (Annual - Safety)



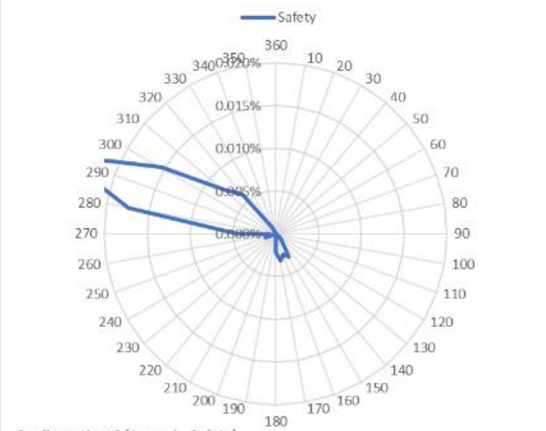
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

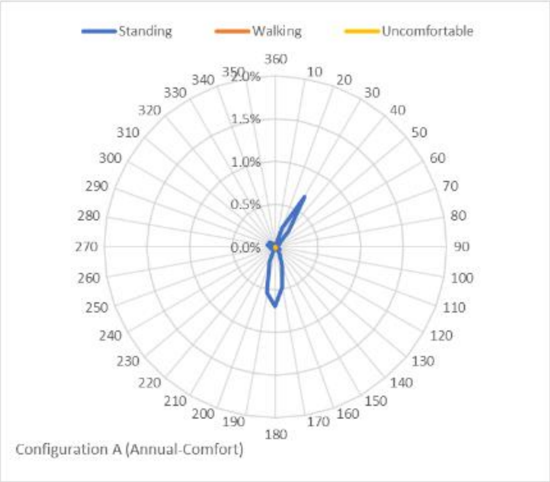


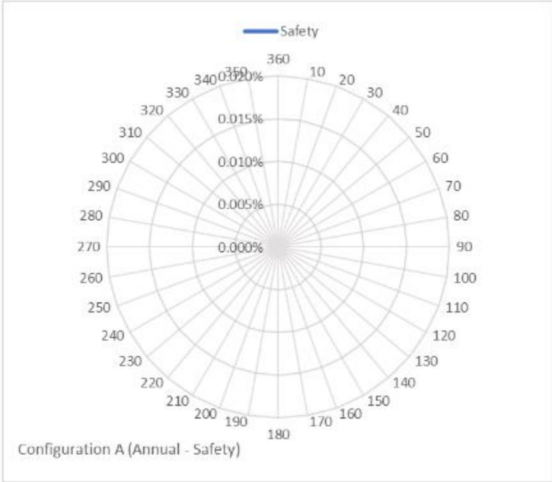
Configuration C (Annual-Comfort)

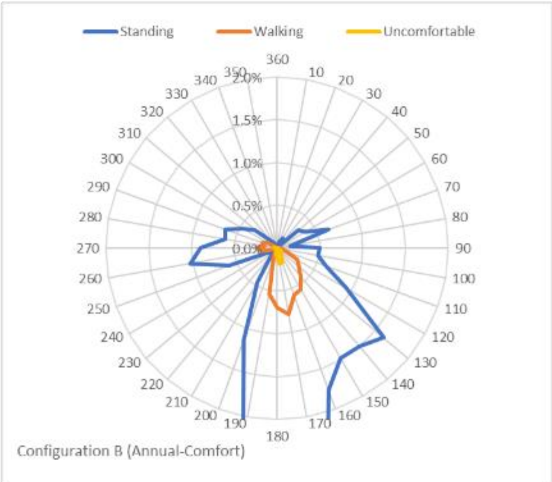


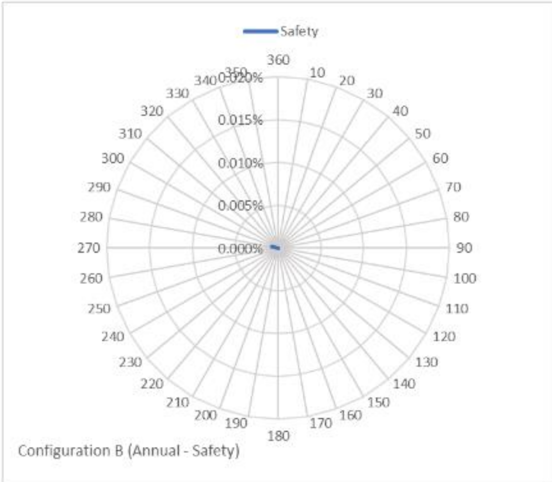
Configuration C (Annual - Safety)

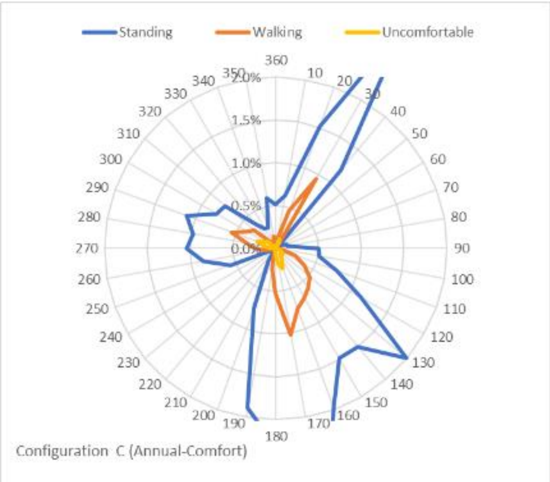
Measurement Location: 12

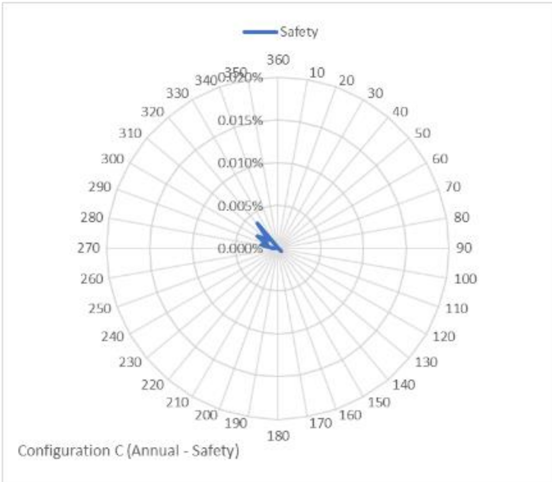




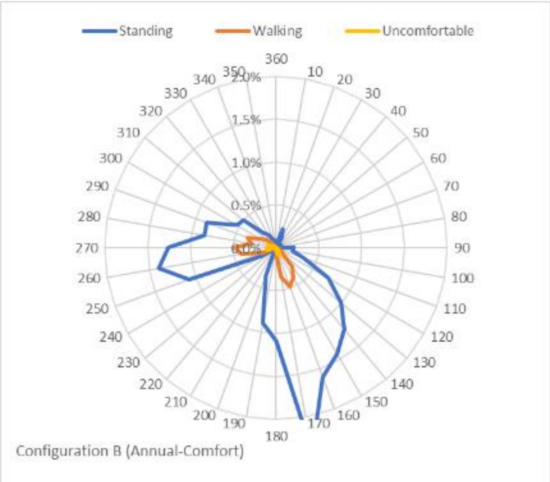


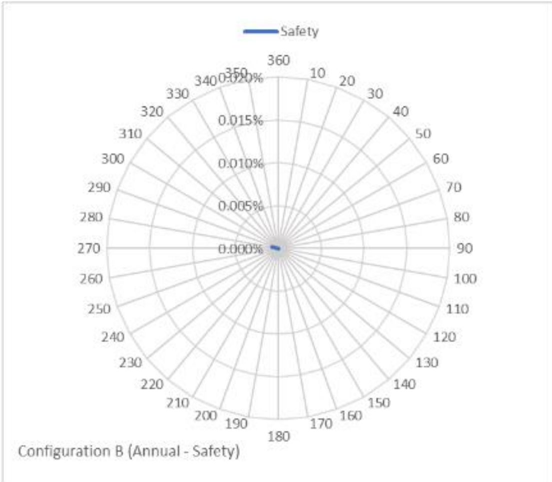




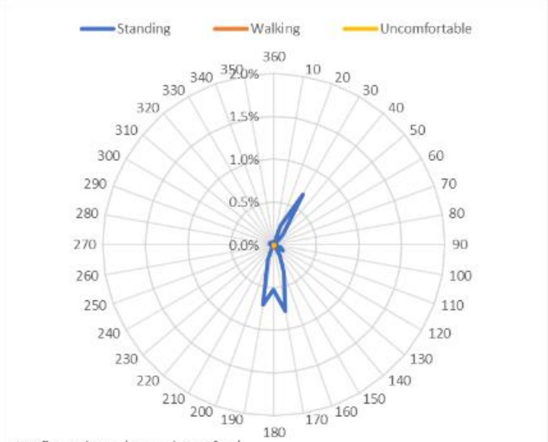


Measurement Location: 13

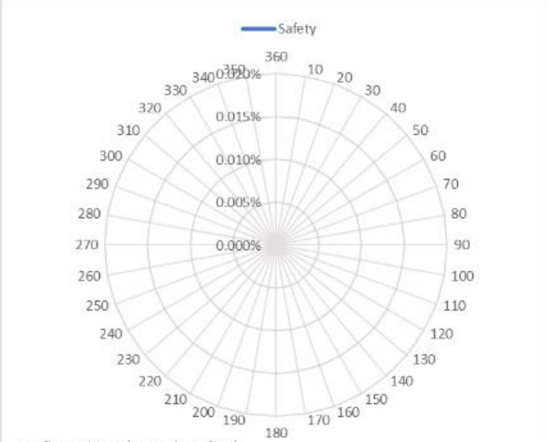




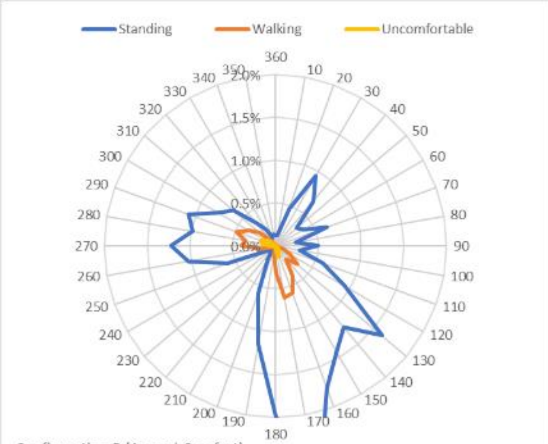
Measurement Location: 14



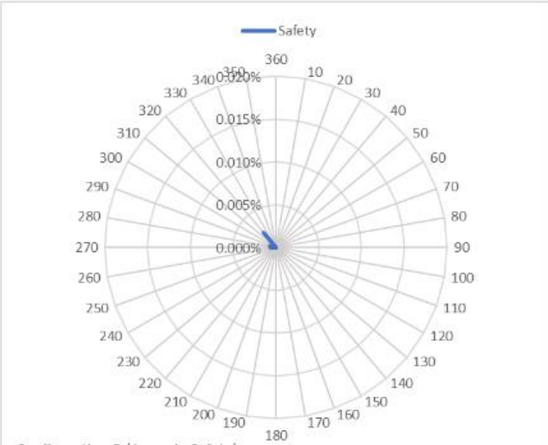
Configuration A (Annual-Comfort)



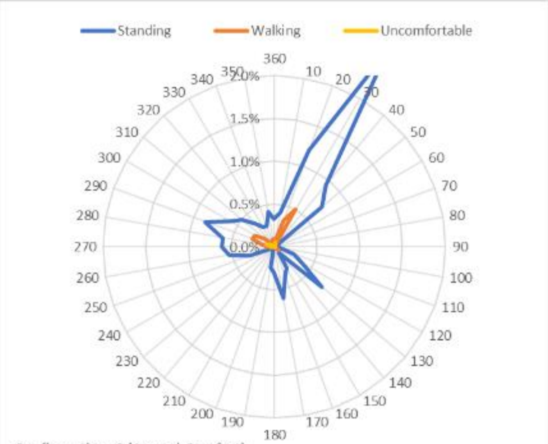
Configuration A (Annual - Safety)



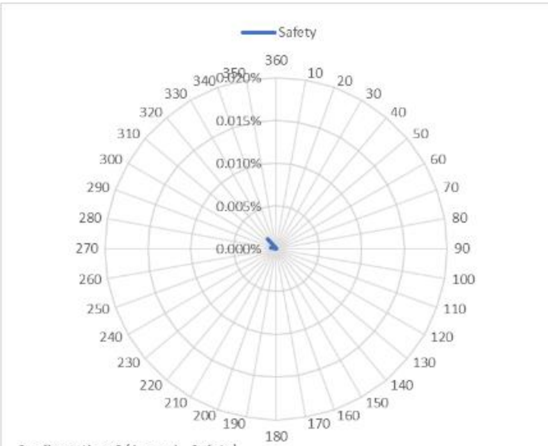
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

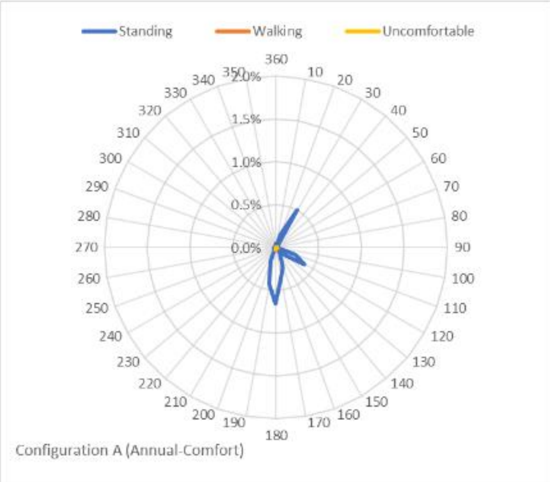


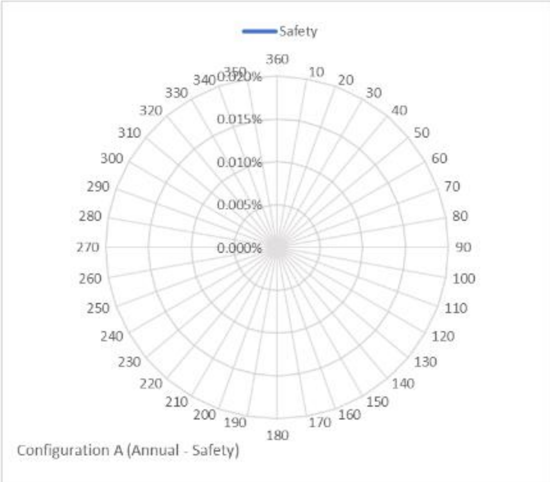
Configuration C (Annual-Comfort)

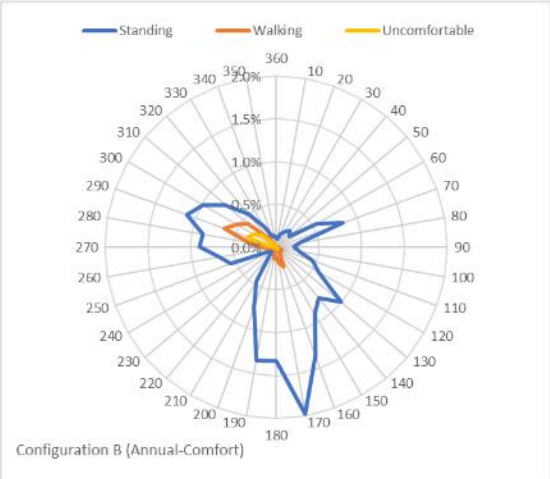


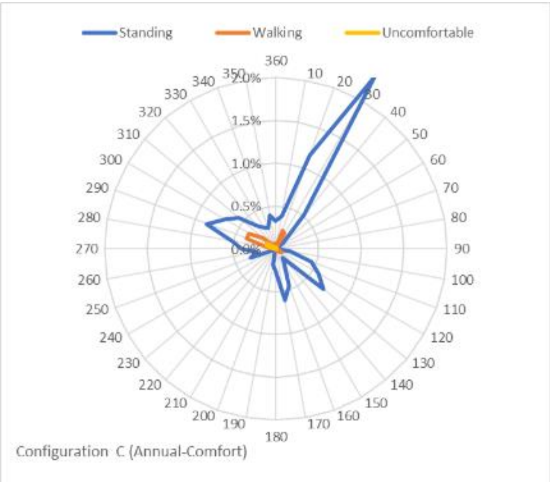
Configuration C (Annual - Safety)

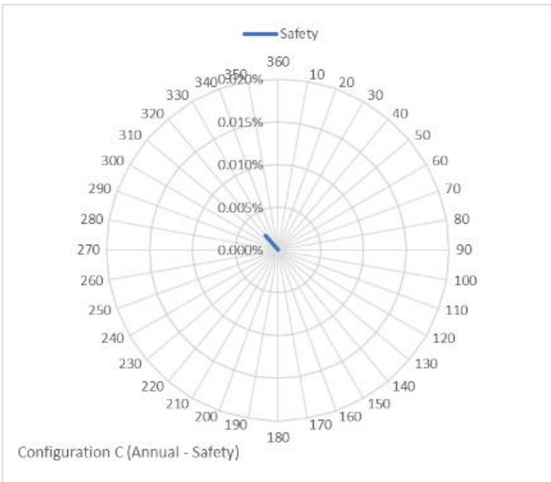
Measurement Location: 15



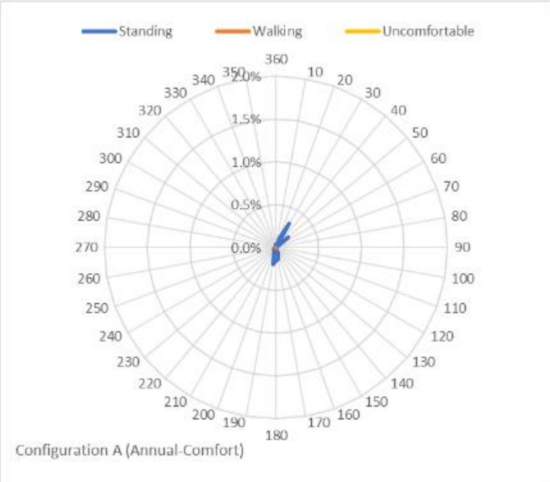


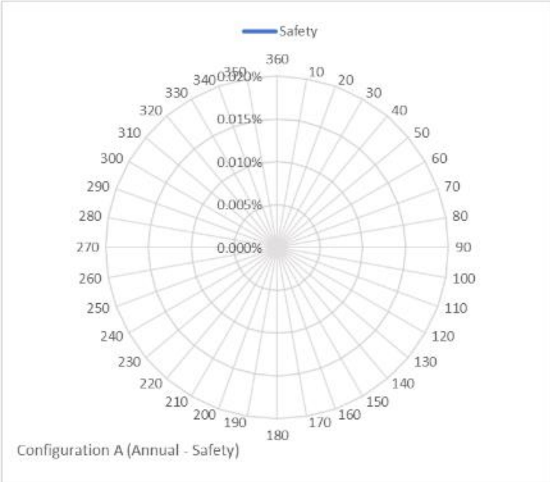


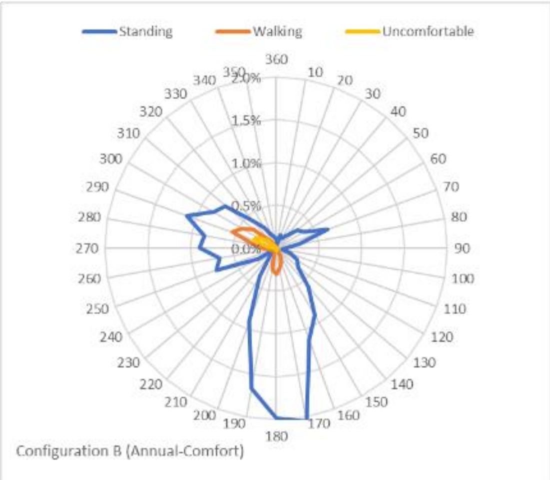


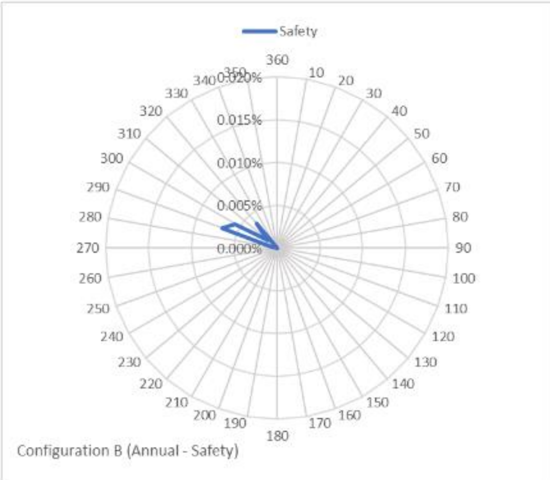


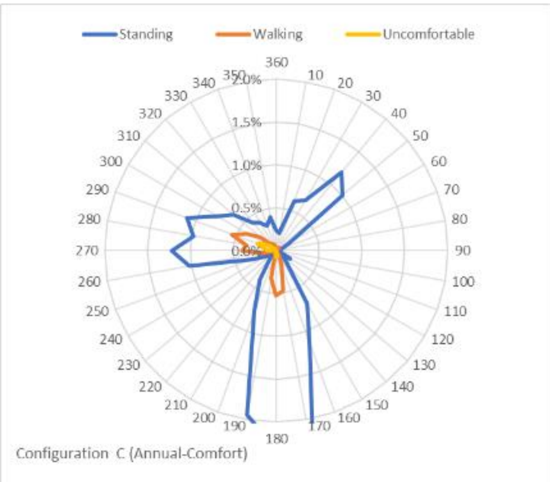
Measurement Location: 16

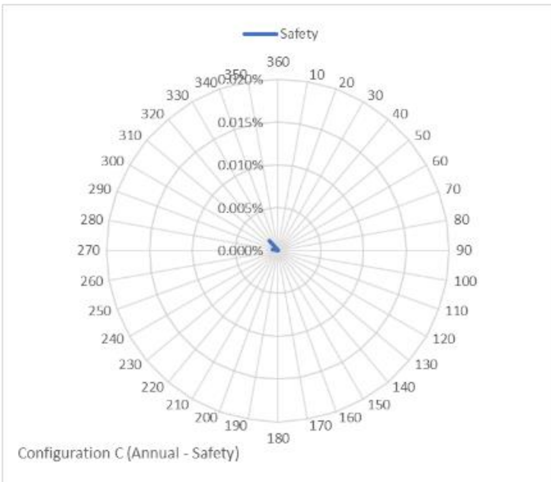




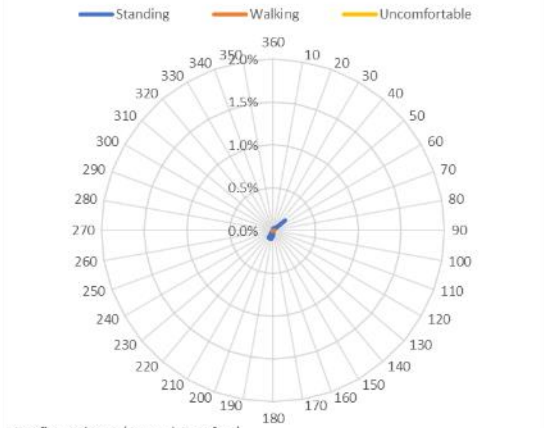




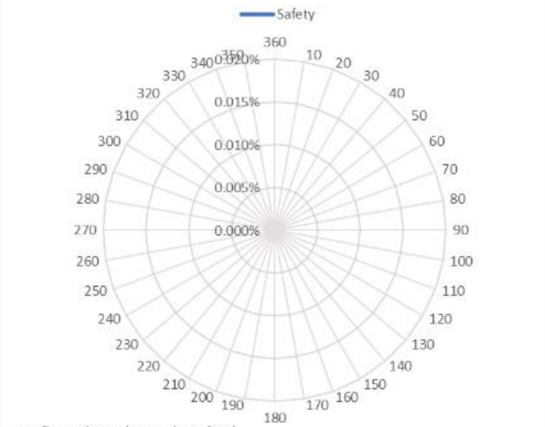




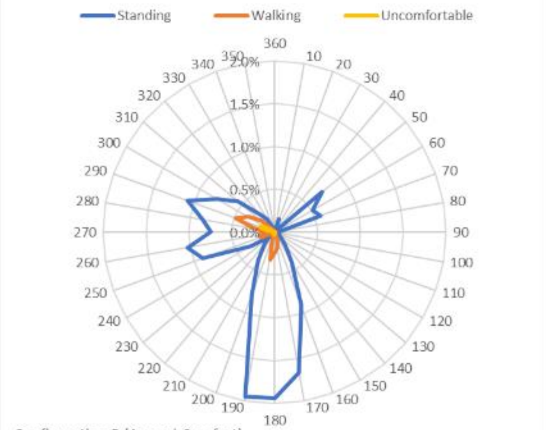
Measurement Location: 17



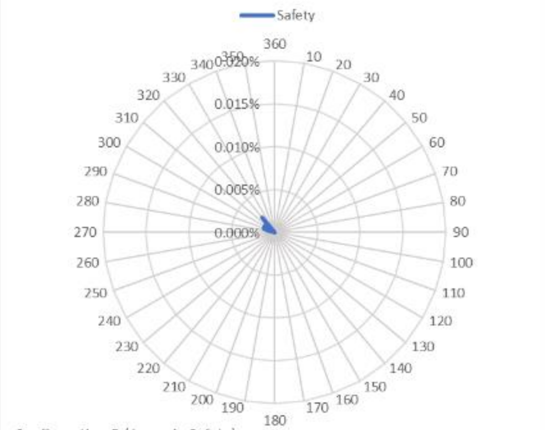
Configuration A (Annual-Comfort)



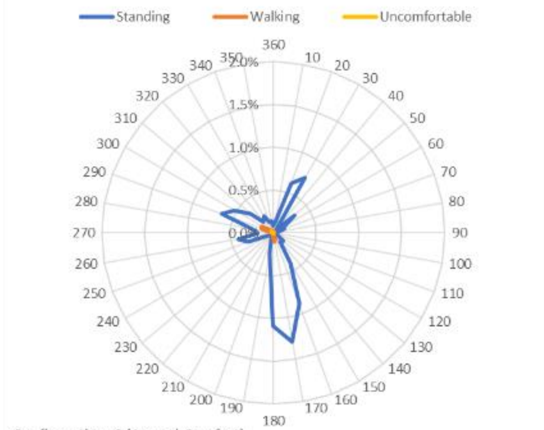
Configuration A (Annual - Safety)



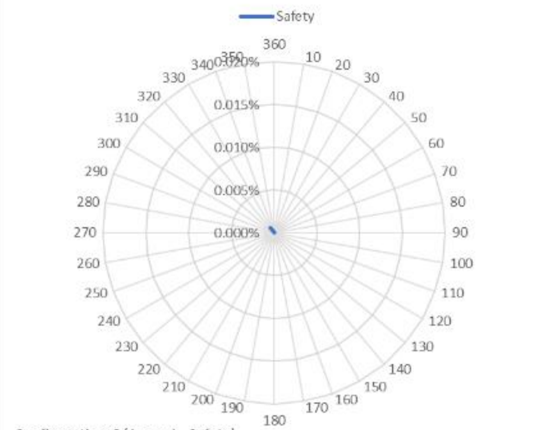
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

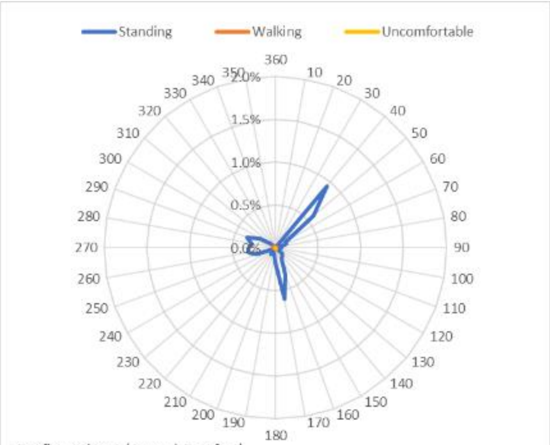


Configuration C (Annual-Comfort)

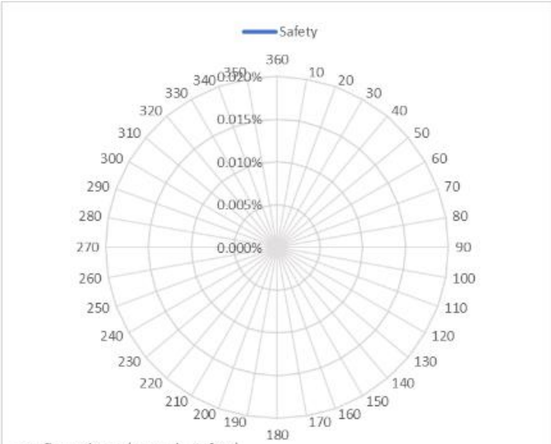


Configuration C (Annual - Safety)

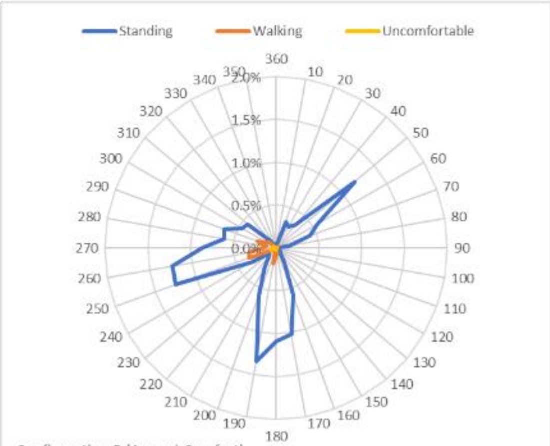
Measurement Location: 18



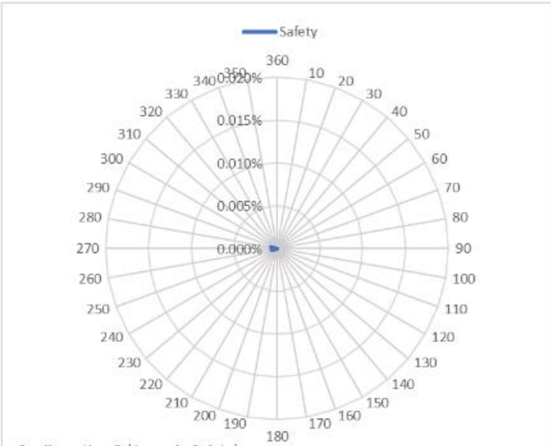
Configuration A (Annual-Comfort)



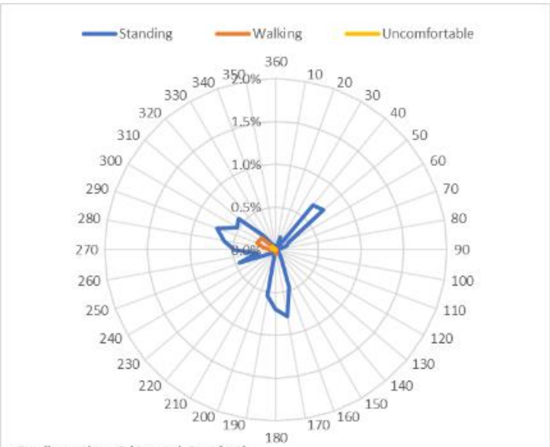
Configuration A (Annual - Safety)



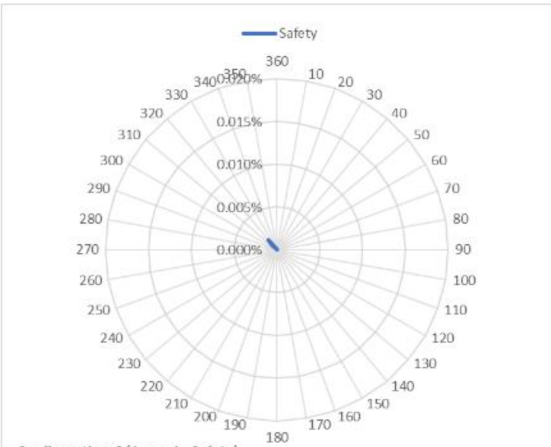
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)



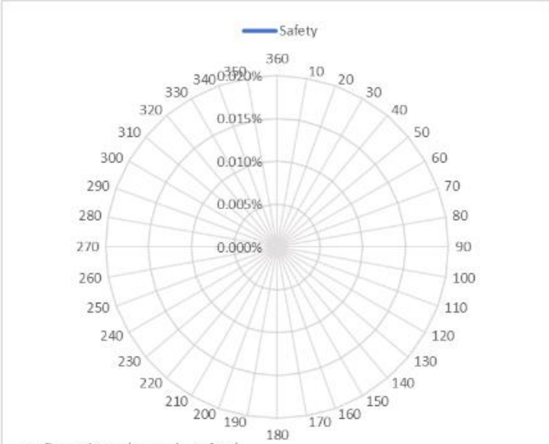
Configuration C (Annual-Comfort)



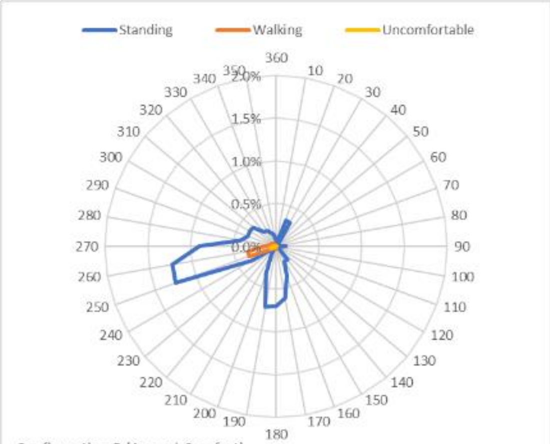
Configuration C (Annual - Safety)

Measurement Location: 19

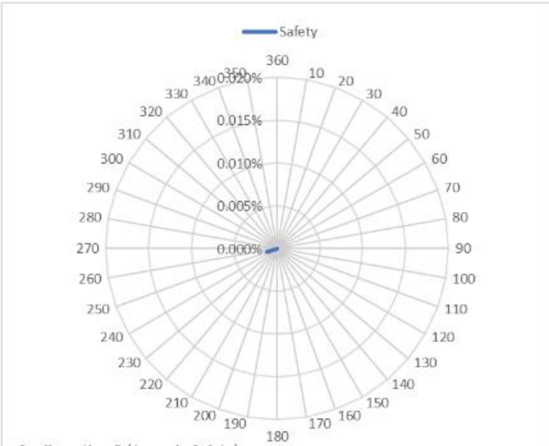
Configuration A (Annual-Comfort)



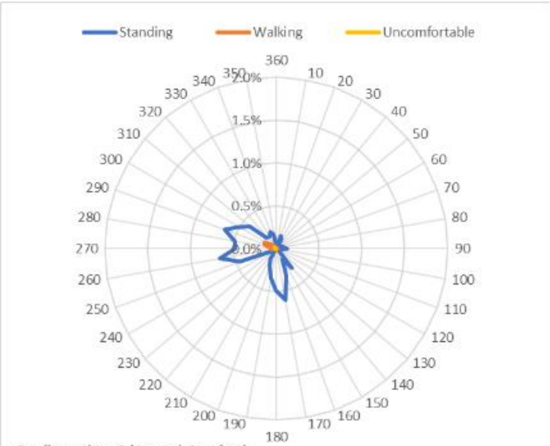
Configuration A (Annual - Safety)



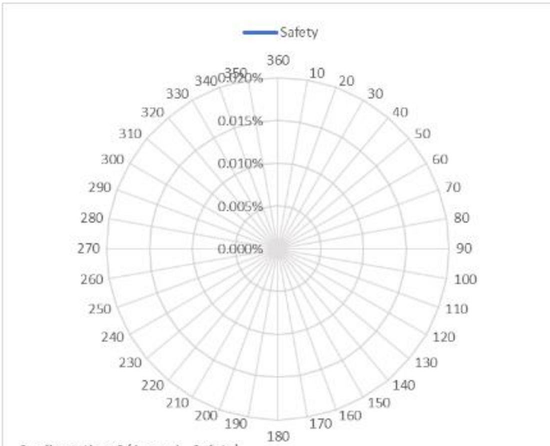
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

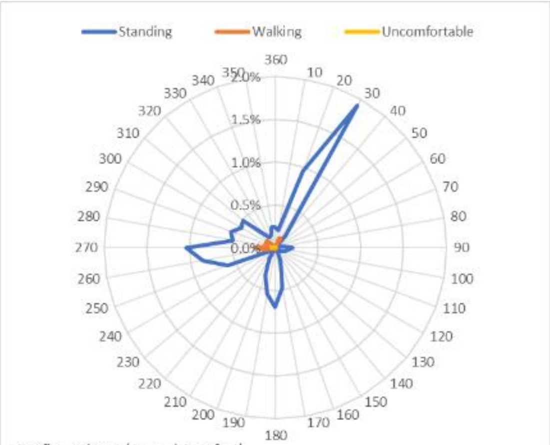


Configuration C (Annual-Comfort)

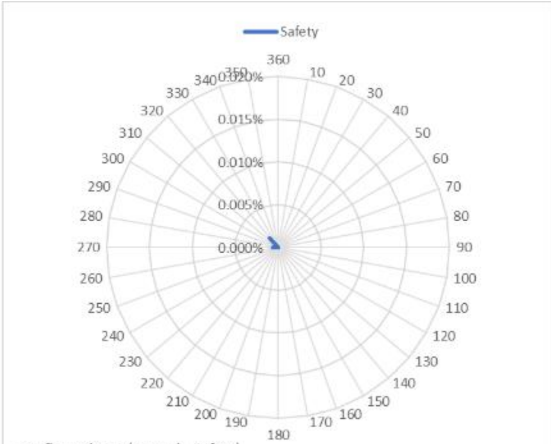


Configuration C (Annual - Safety)

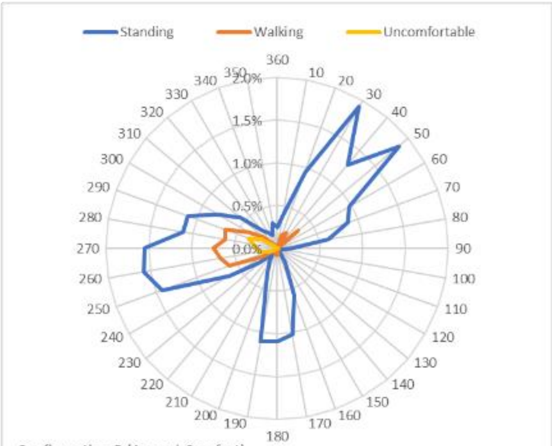
Measurement Location: 20



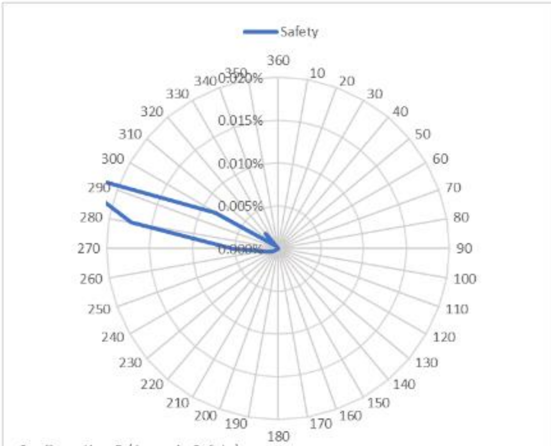
Configuration A (Annual-Comfort)



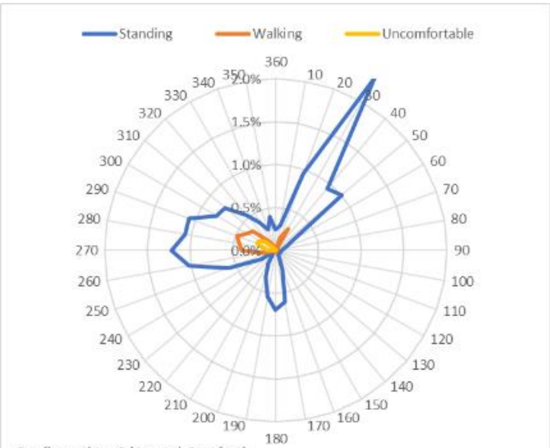
Configuration A (Annual - Safety)



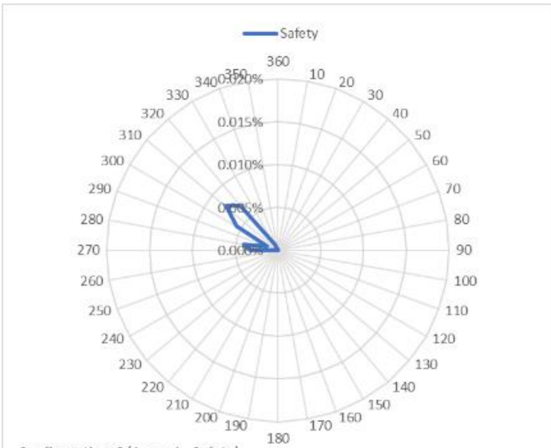
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

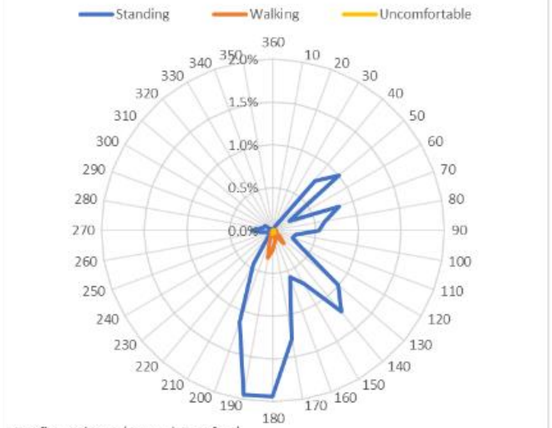


Configuration C (Annual-Comfort)

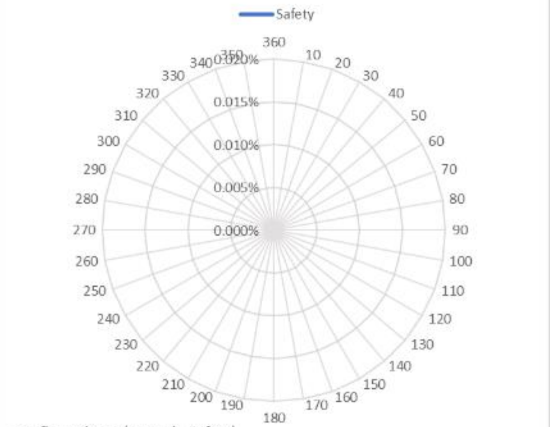


Configuration C (Annual - Safety)

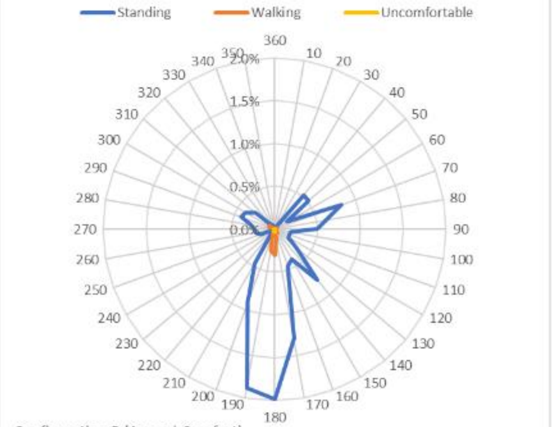
Measurement Location: 21



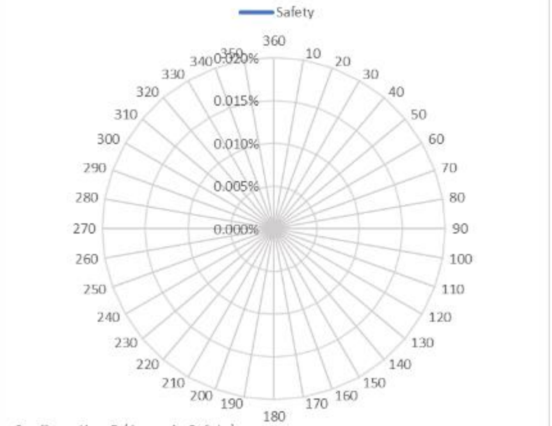
Configuration A (Annual-Comfort)



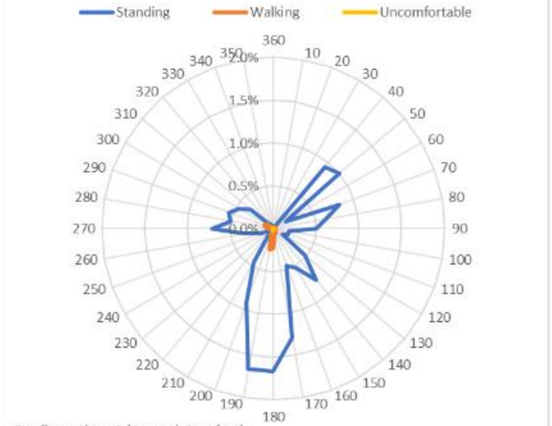
Configuration A (Annual - Safety)



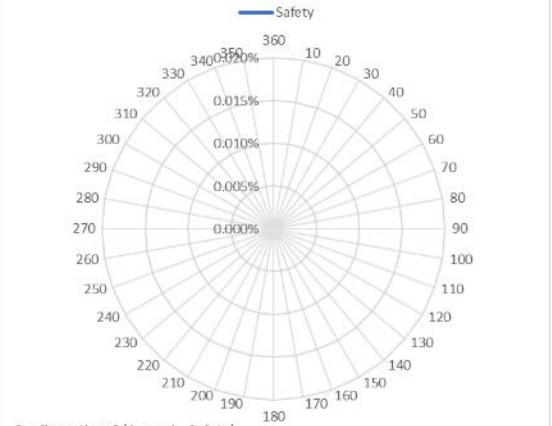
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

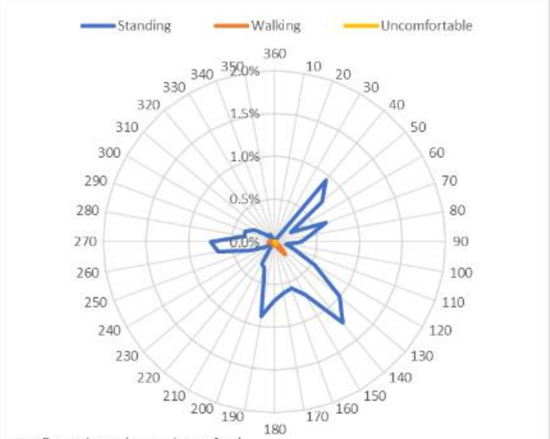


Configuration C (Annual-Comfort)

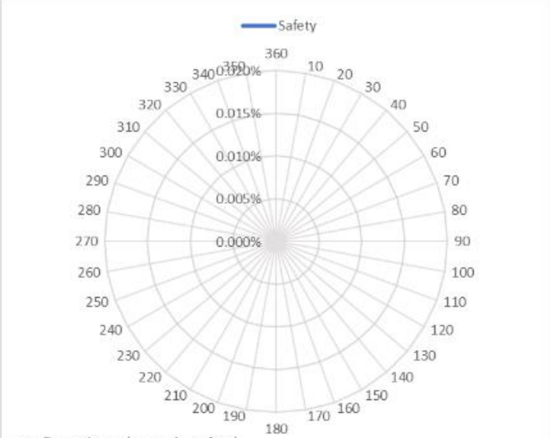


Configuration C (Annual - Safety)

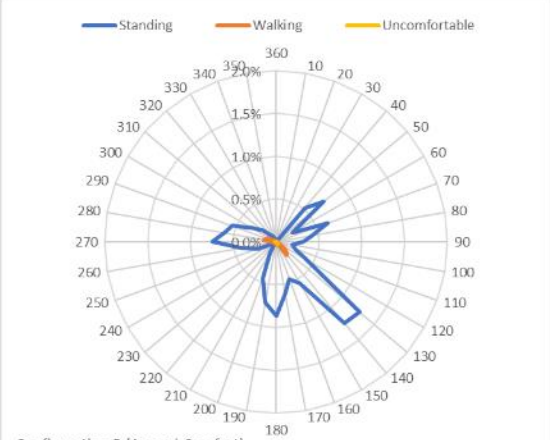
Measurement Location: 22



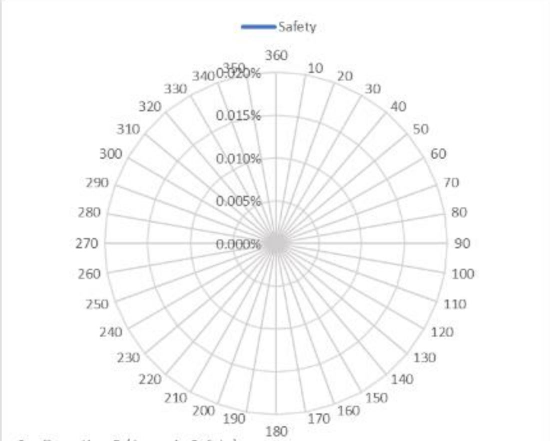
Configuration A (Annual-Comfort)



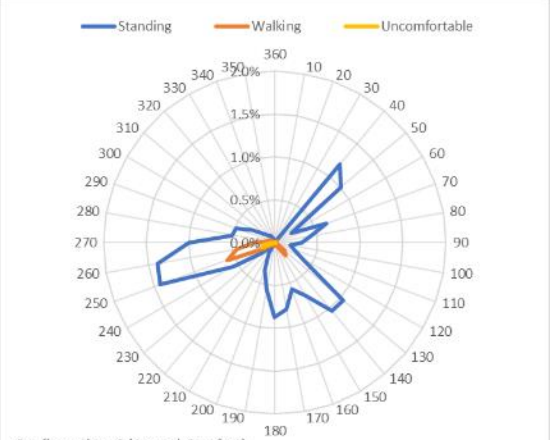
Configuration A (Annual - Safety)



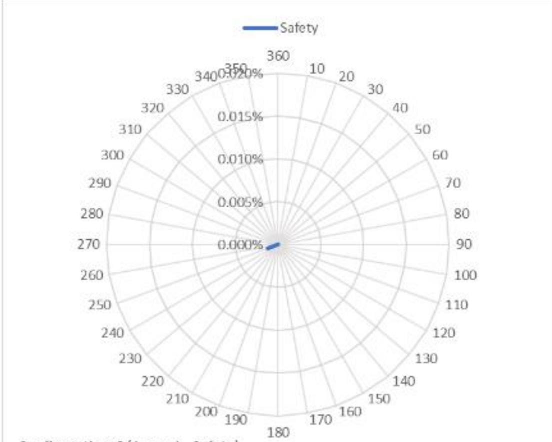
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

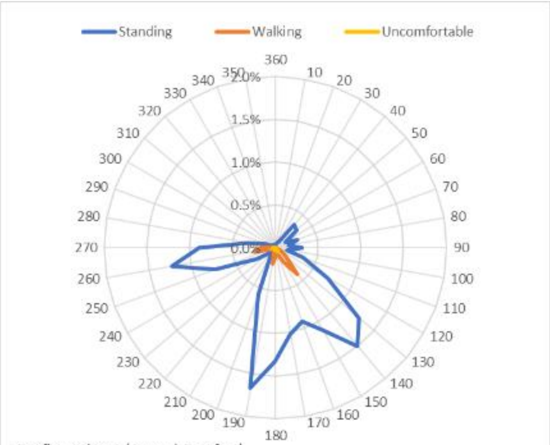


Configuration C (Annual-Comfort)

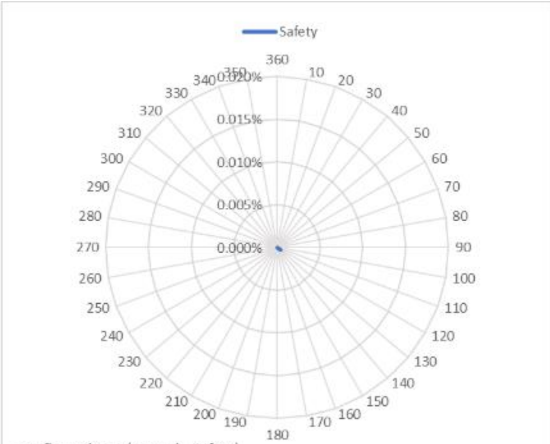


Configuration C (Annual - Safety)

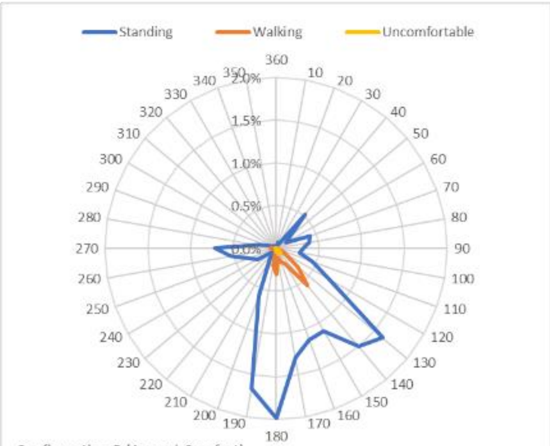
Measurement Location: 23



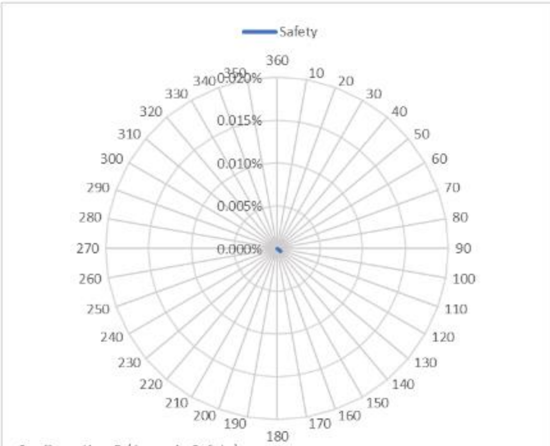
Configuration A (Annual-Comfort)



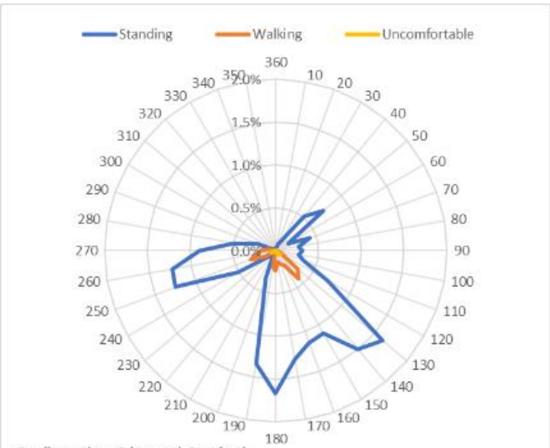
Configuration A (Annual - Safety)



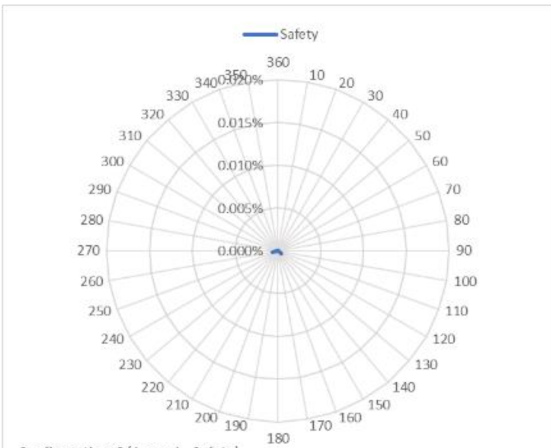
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

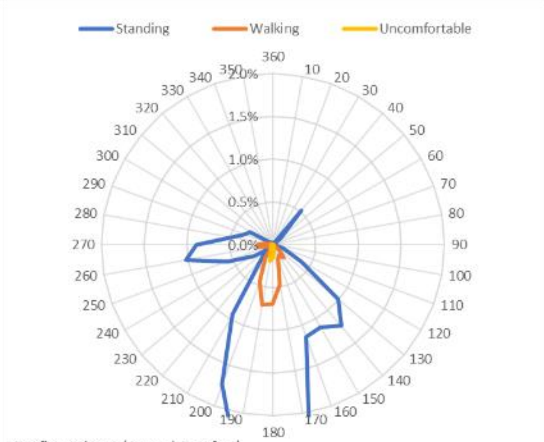


Configuration C (Annual-Comfort)

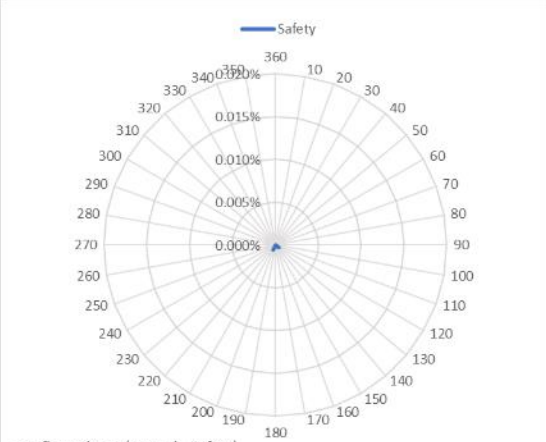


Configuration C (Annual - Safety)

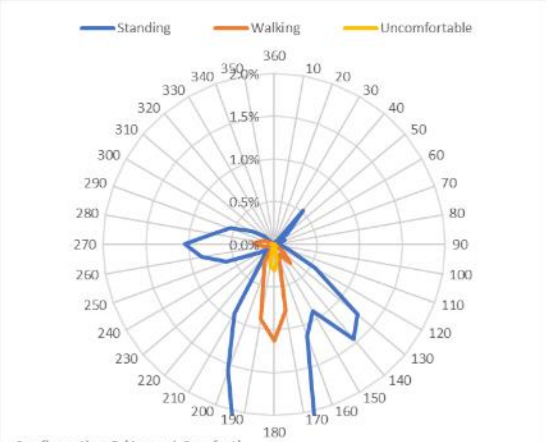
Measurement Location: 24



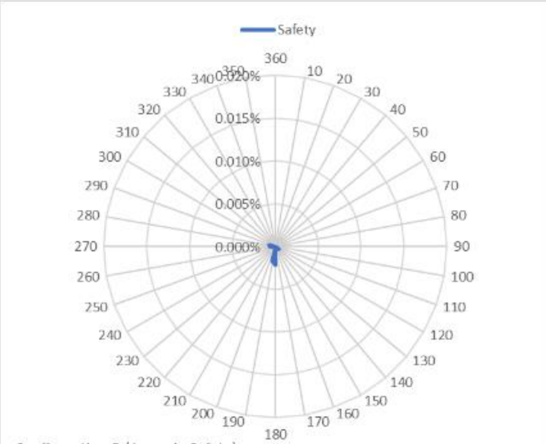
Configuration A (Annual-Comfort)



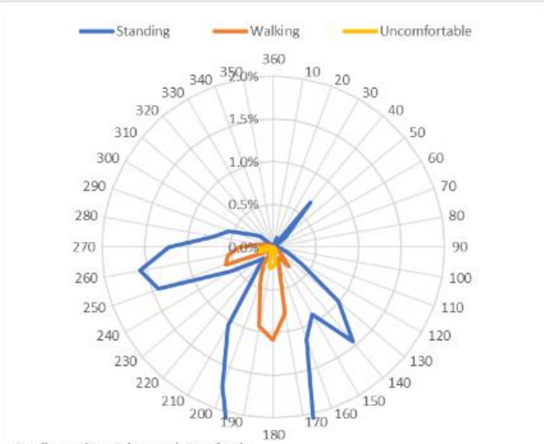
Configuration A (Annual - Safety)



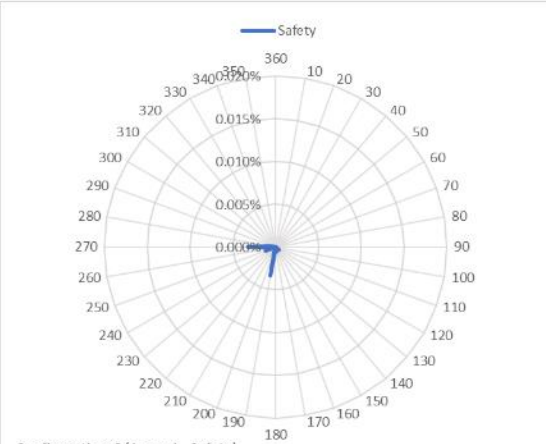
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

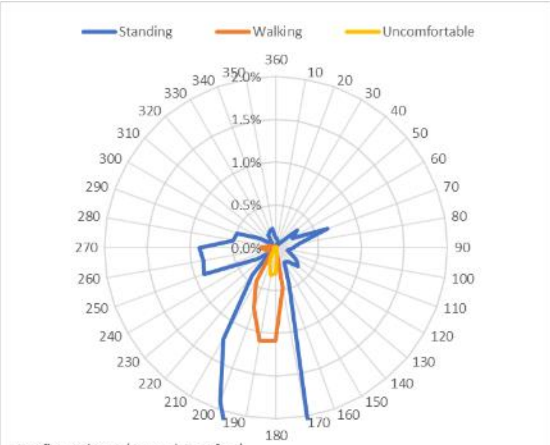


Configuration C (Annual-Comfort)

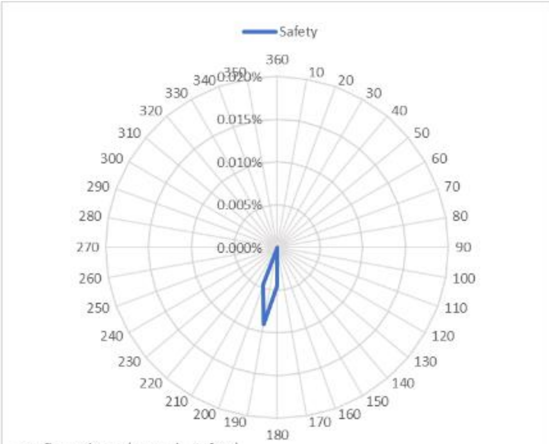


Configuration C (Annual - Safety)

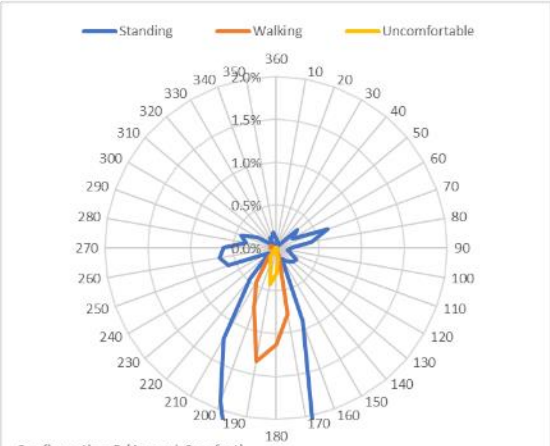
Measurement Location: 25



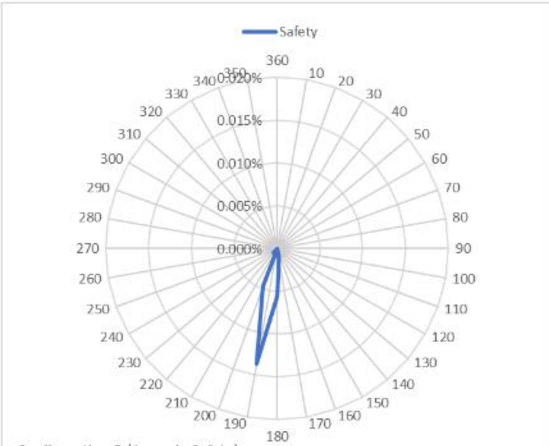
Configuration A (Annual-Comfort)



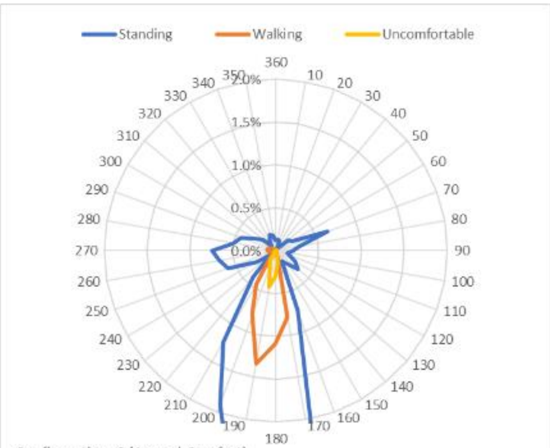
Configuration A (Annual - Safety)



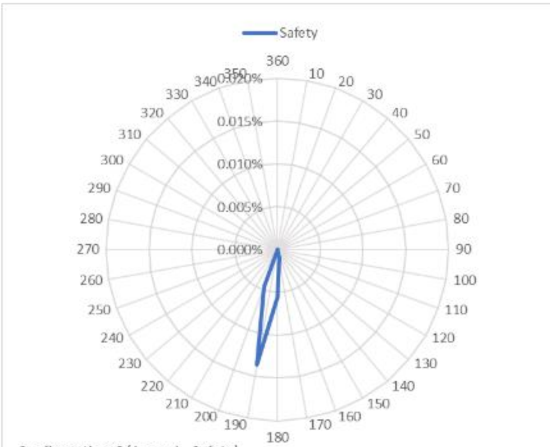
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

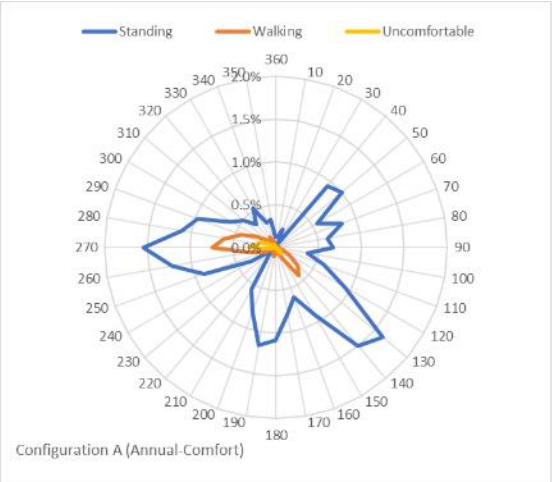


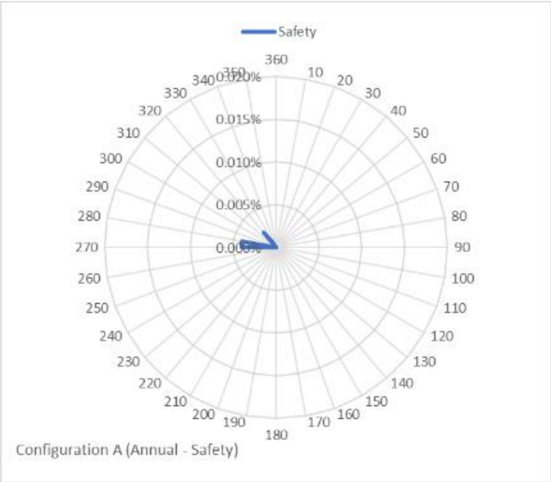
Configuration C (Annual-Comfort)

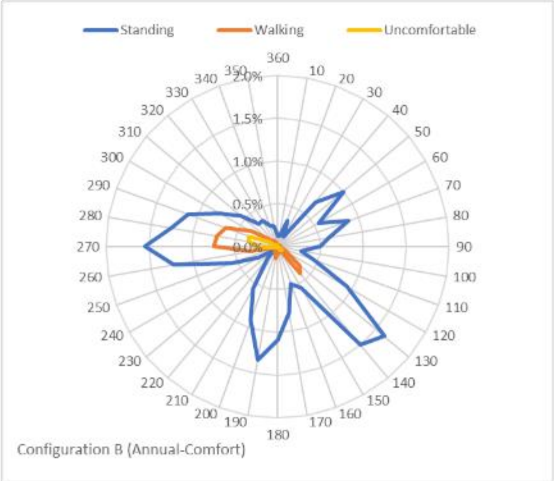


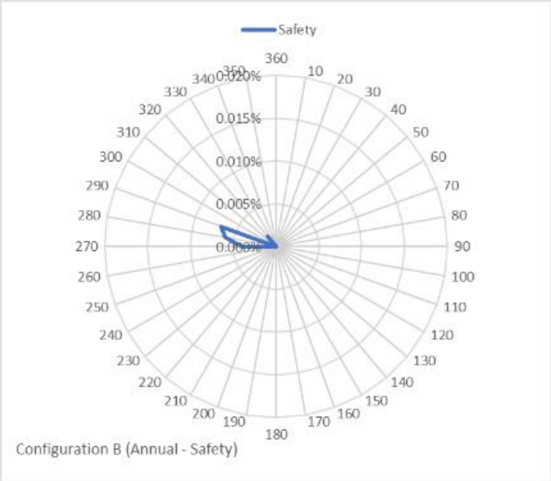
Configuration C (Annual - Safety)

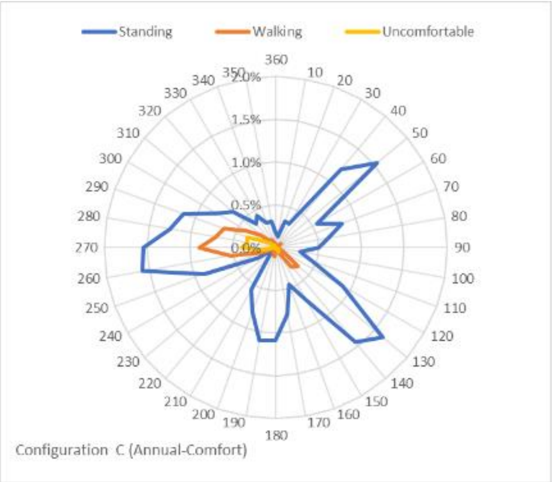
Measurement Location: 26

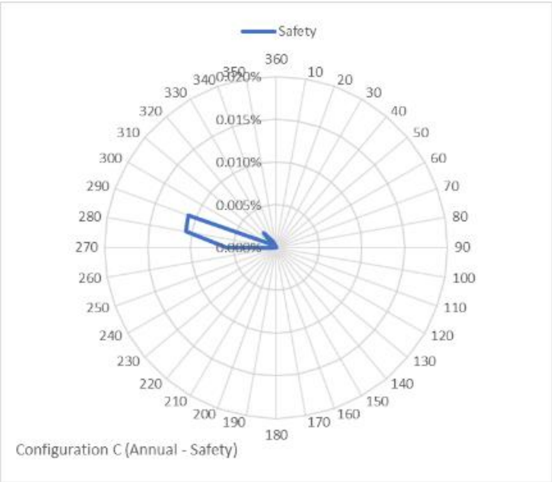




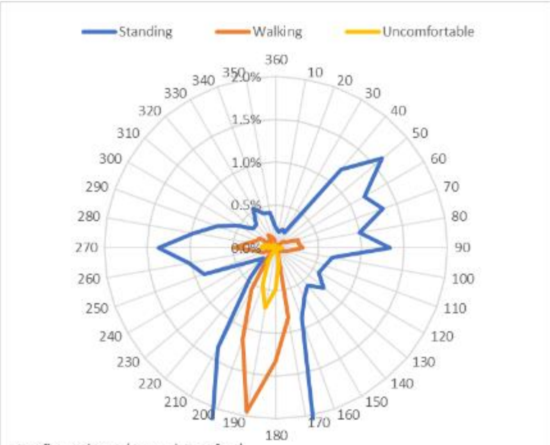




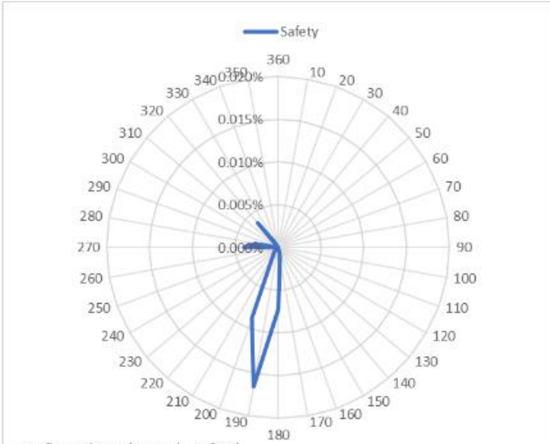




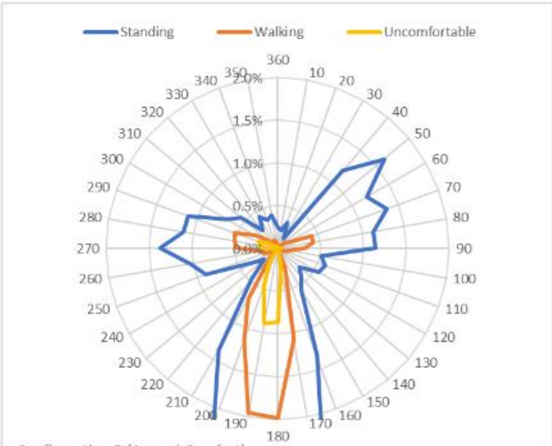
Measurement Location: 27



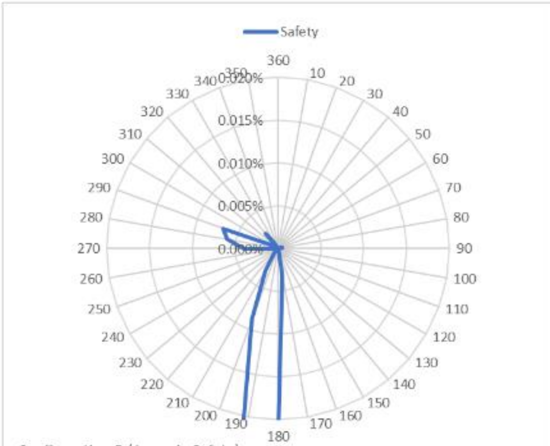
Configuration A (Annual-Comfort)



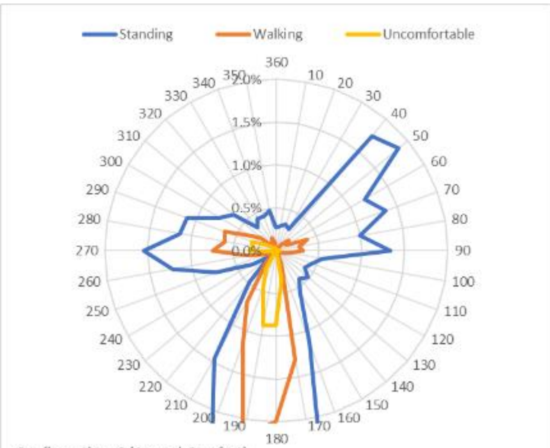
Configuration A (Annual - Safety)



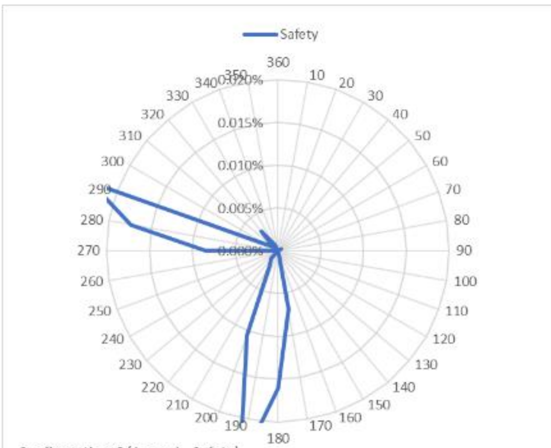
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

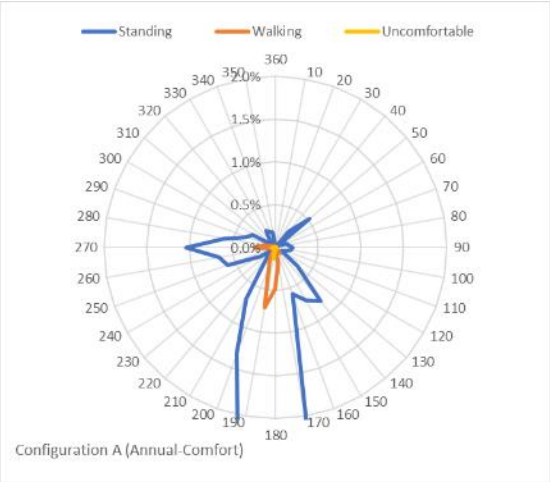


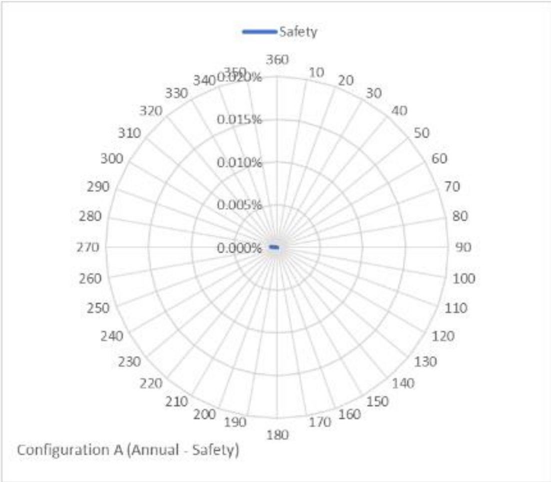
Configuration C (Annual-Comfort)

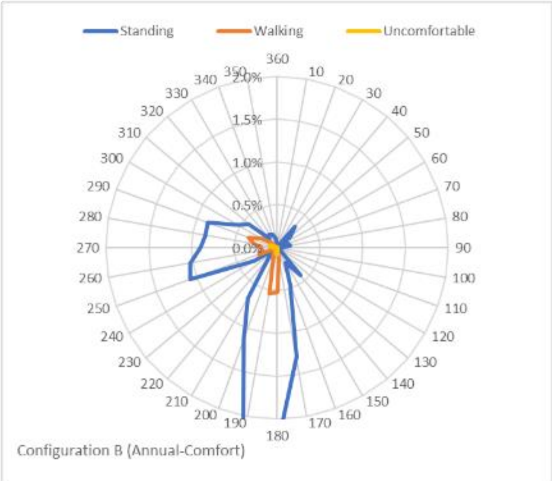


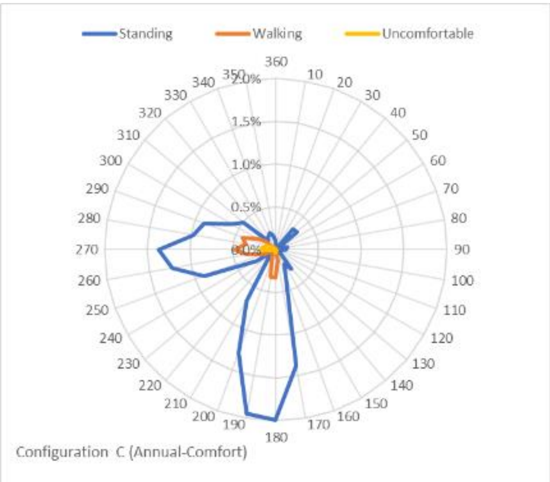
Configuration C (Annual - Safety)

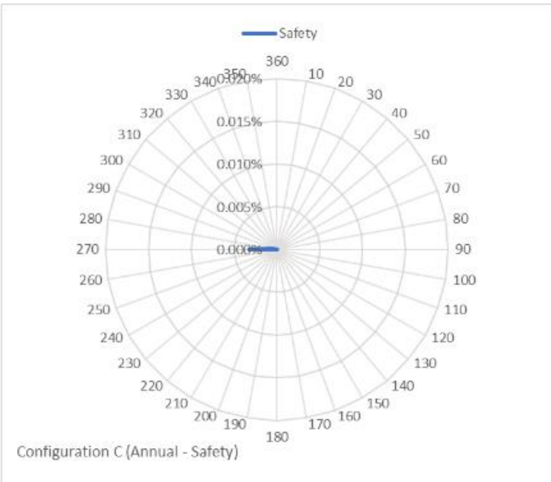
Measurement Location: 28



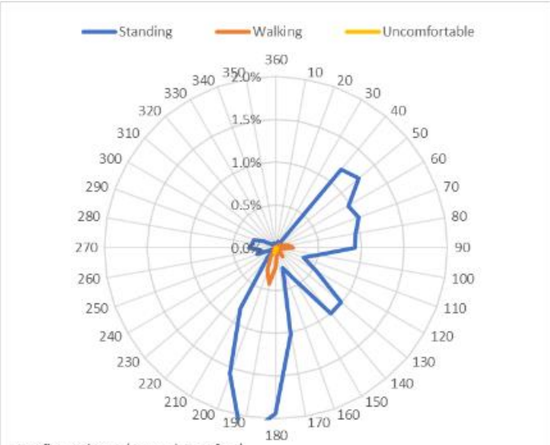




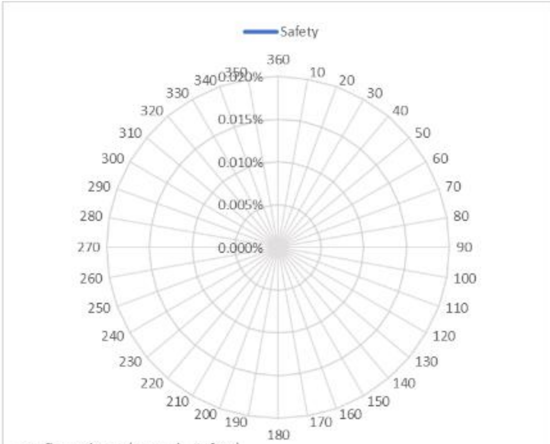




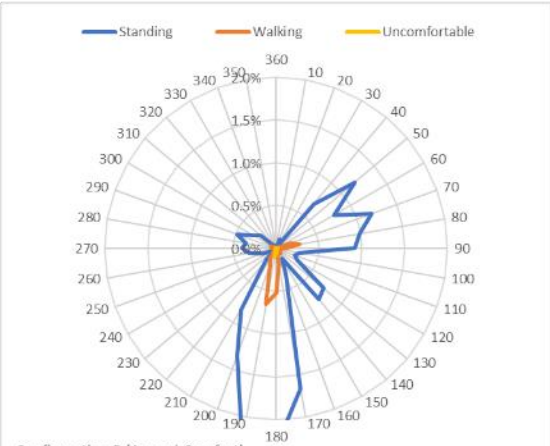
Measurement Location: 29



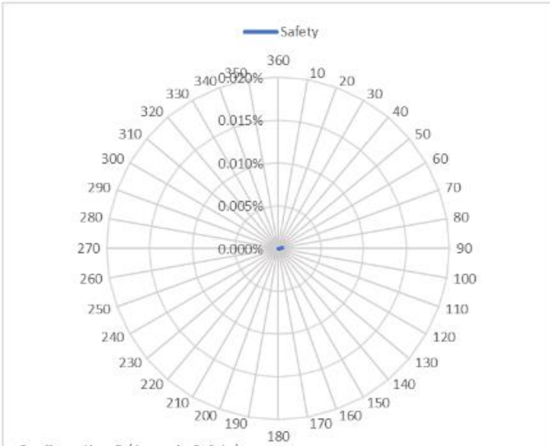
Configuration A (Annual-Comfort)



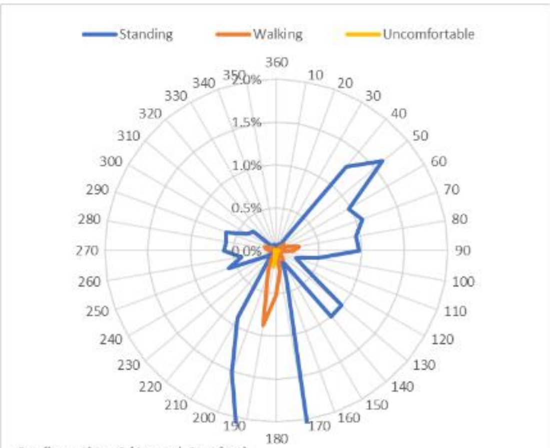
Configuration A (Annual - Safety)



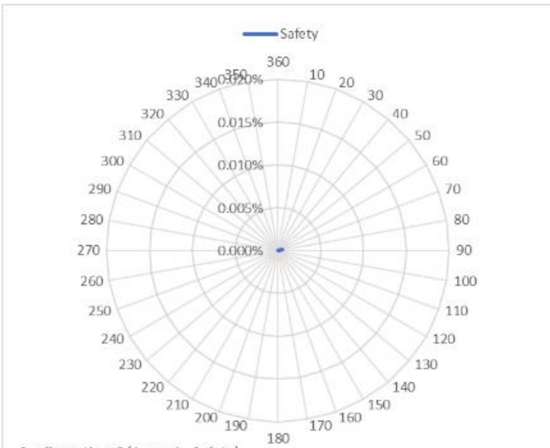
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

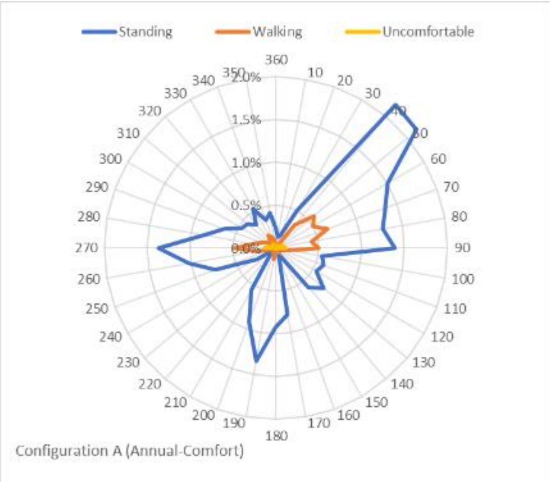


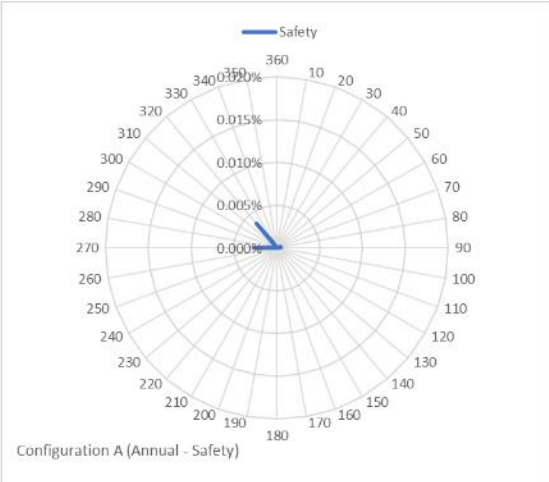
Configuration C (Annual-Comfort)

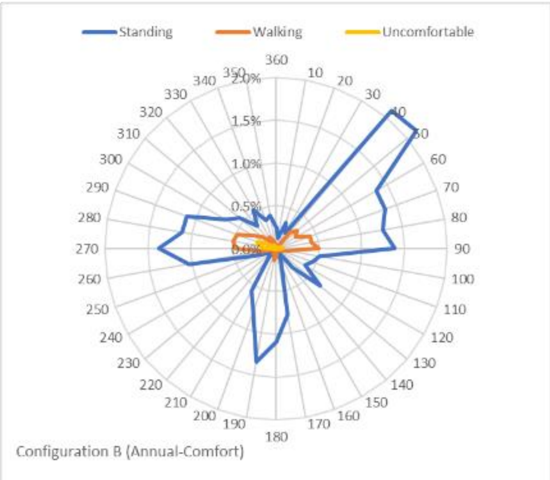


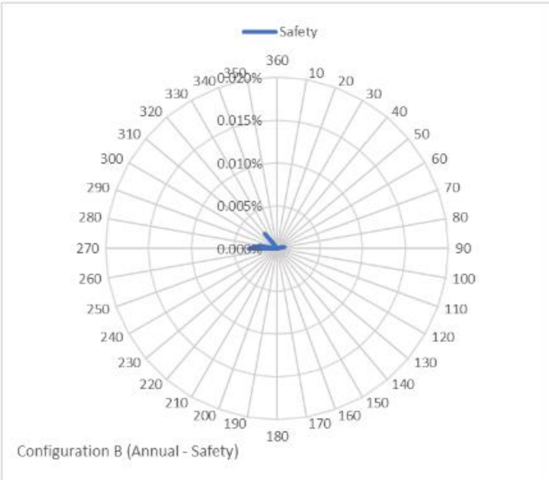
Configuration C (Annual - Safety)

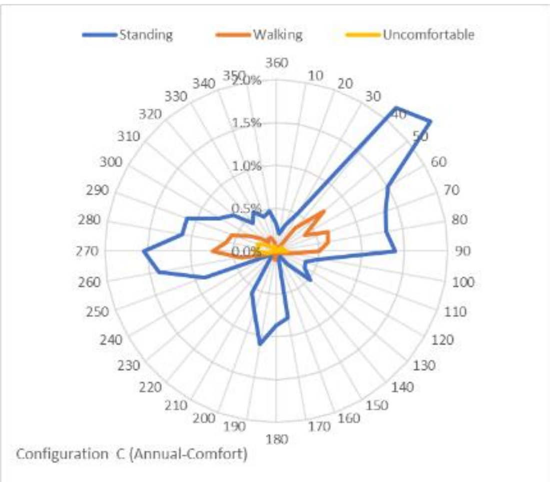
Measurement Location: 30

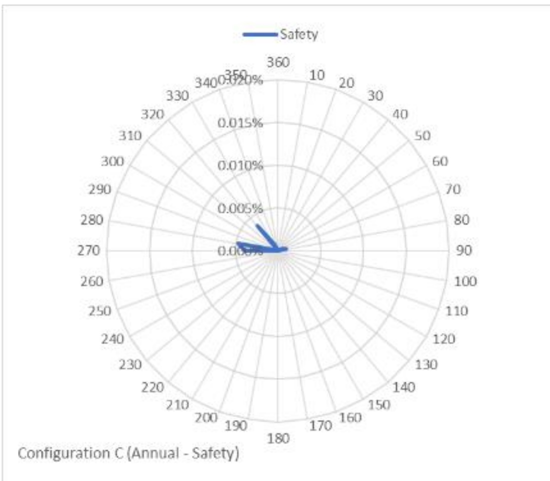




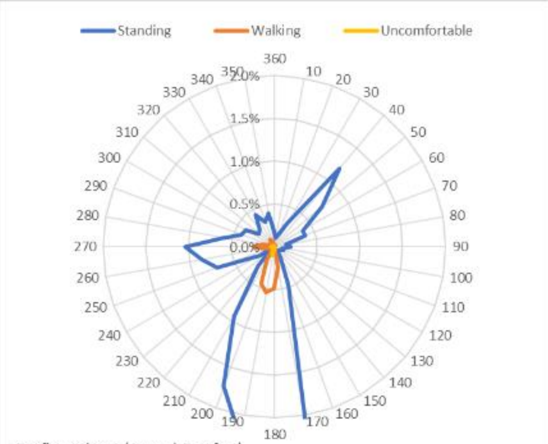




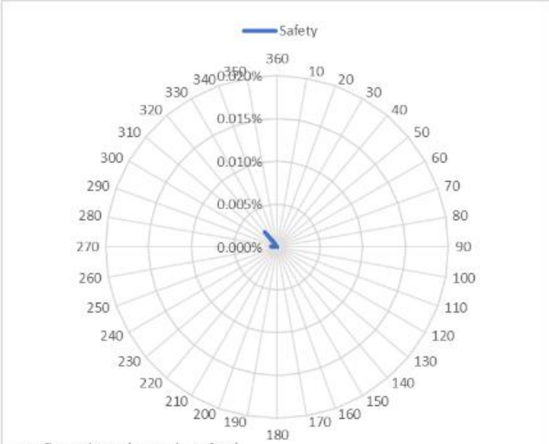




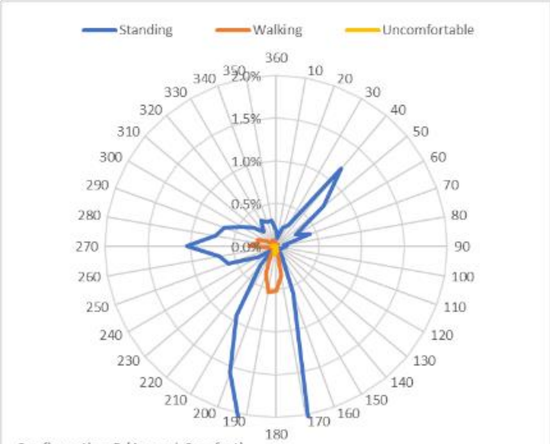
Measurement Location: 31



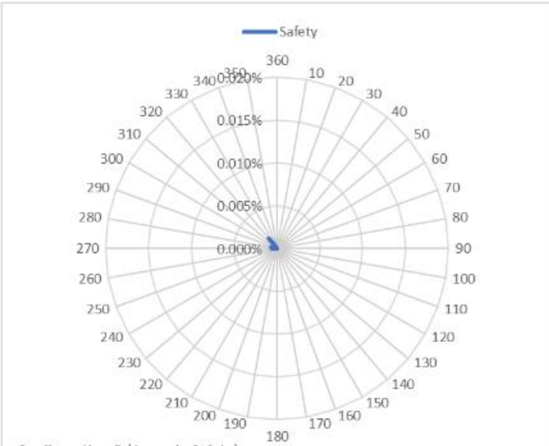
Configuration A (Annual-Comfort)



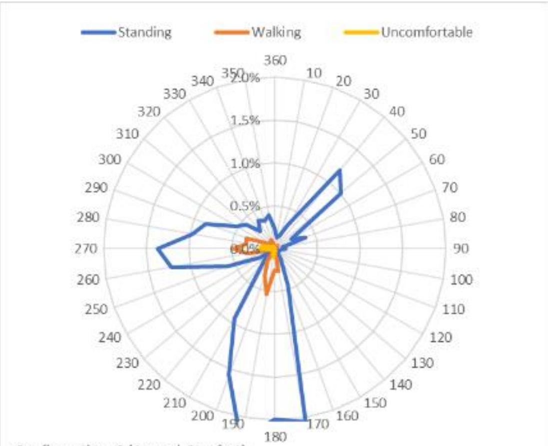
Configuration A (Annual - Safety)



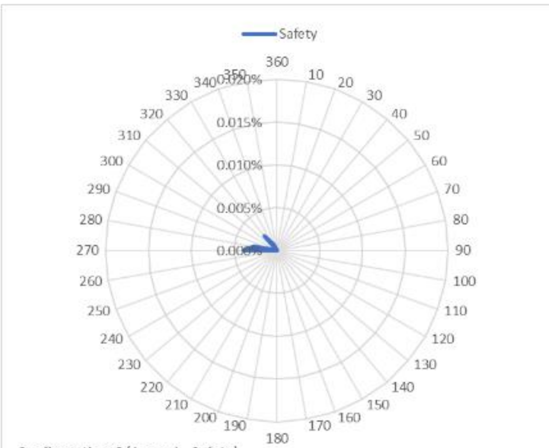
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

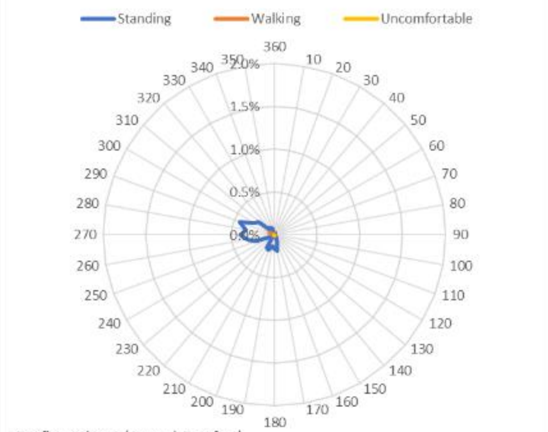


Configuration C (Annual-Comfort)

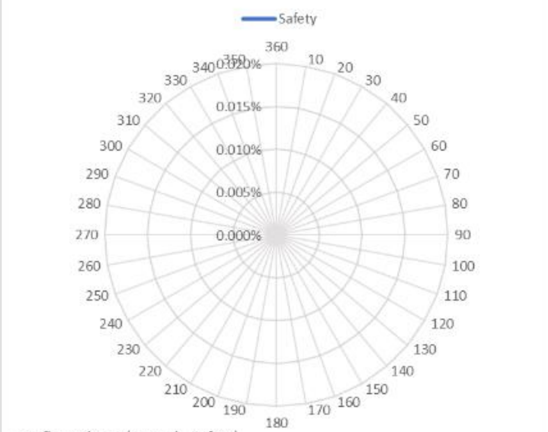


Configuration C (Annual - Safety)

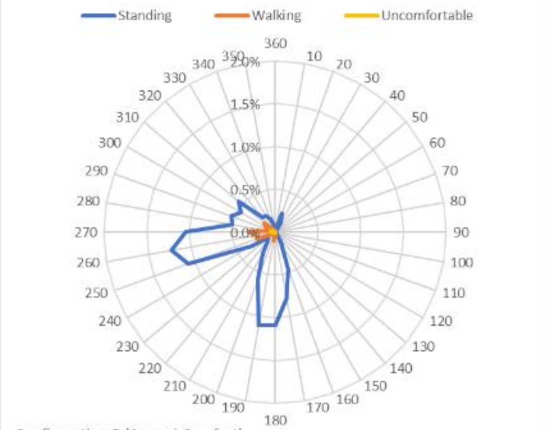
Measurement Location: 32



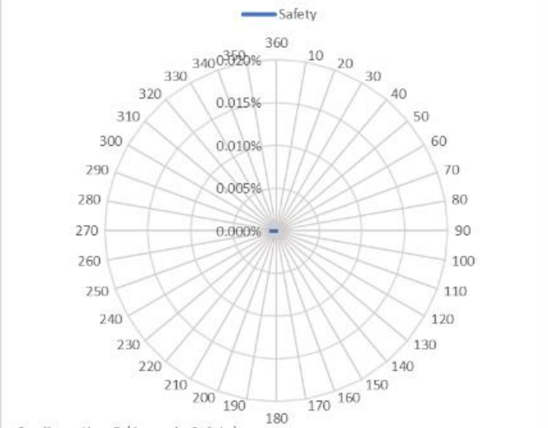
Configuration A (Annual-Comfort)



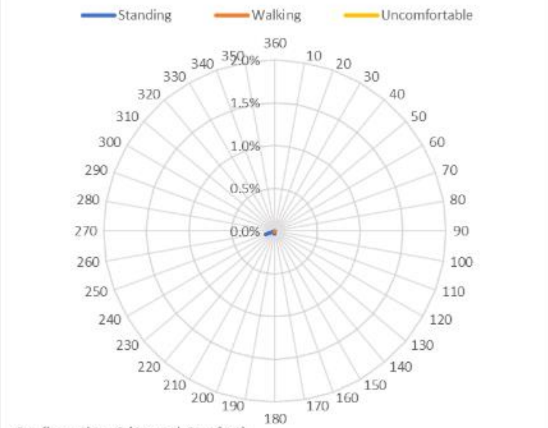
Configuration A (Annual - Safety)



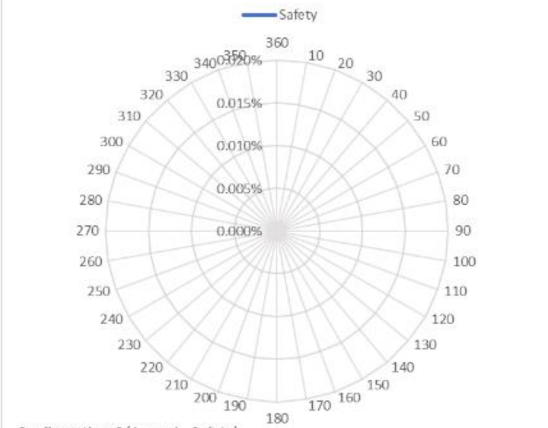
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

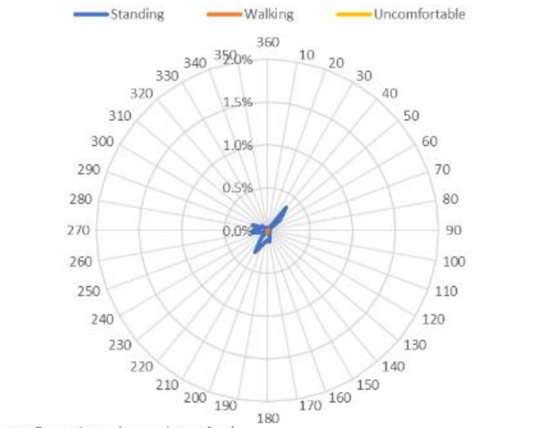


Configuration C (Annual-Comfort)

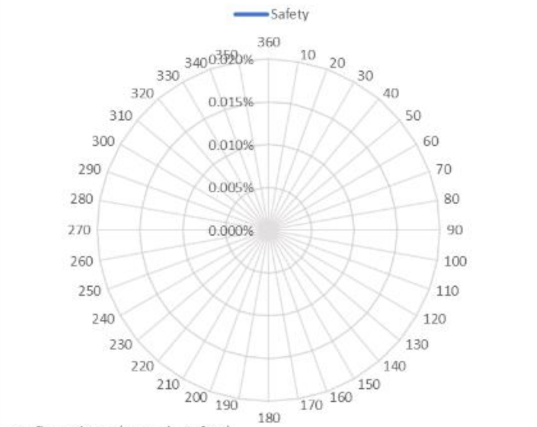


Configuration C (Annual - Safety)

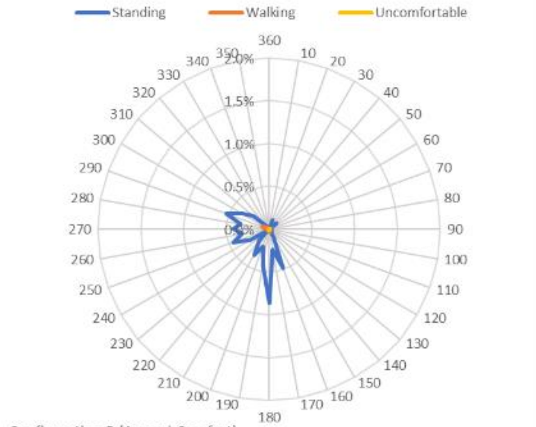
Measurement Location: 33



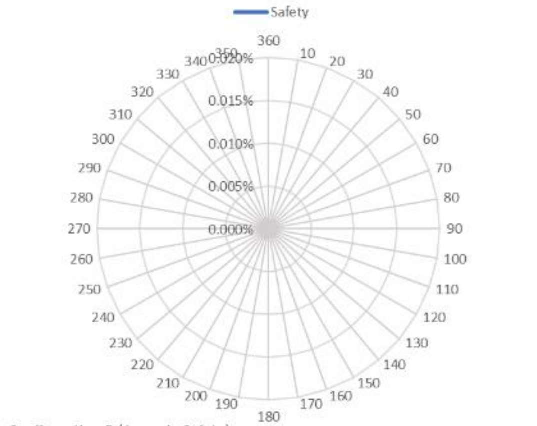
Configuration A (Annual-Comfort)



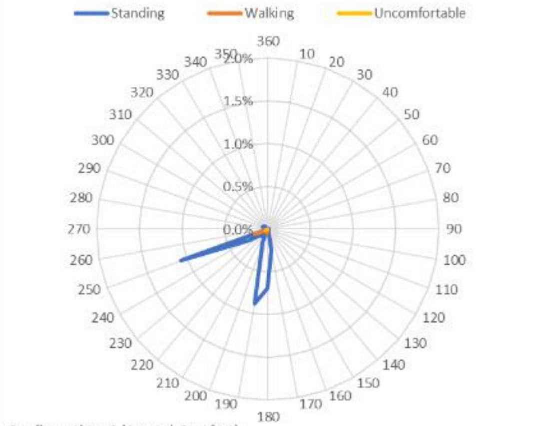
Configuration A (Annual - Safety)



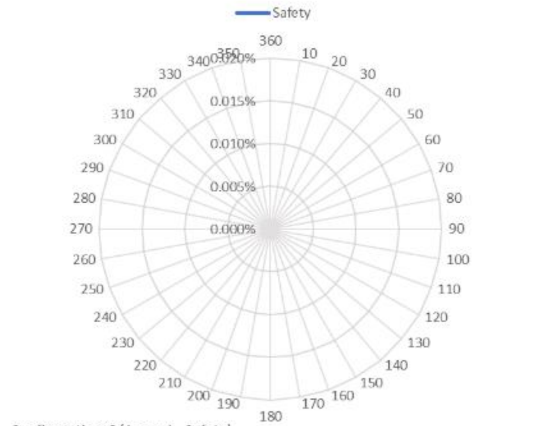
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

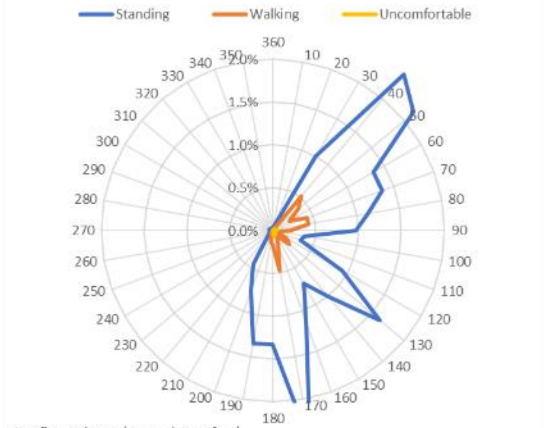


Configuration C (Annual-Comfort)

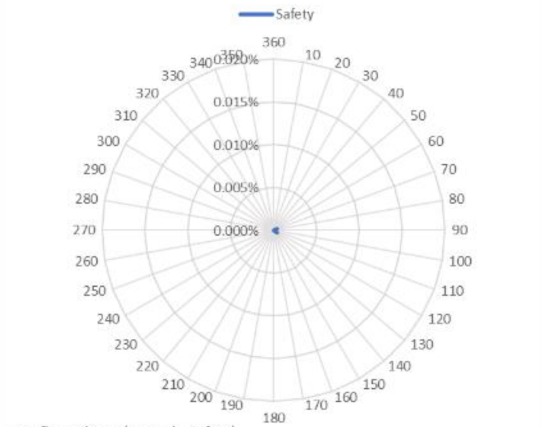


Configuration C (Annual - Safety)

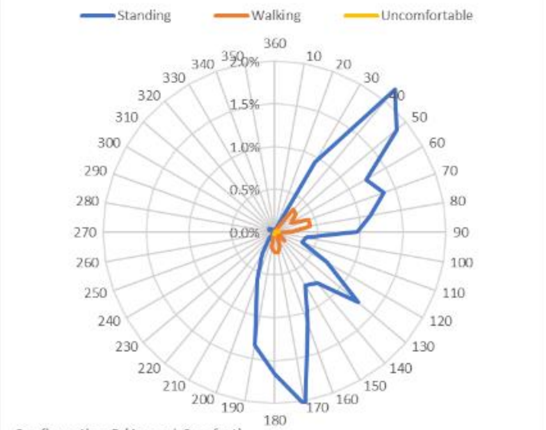
Measurement Location: 34



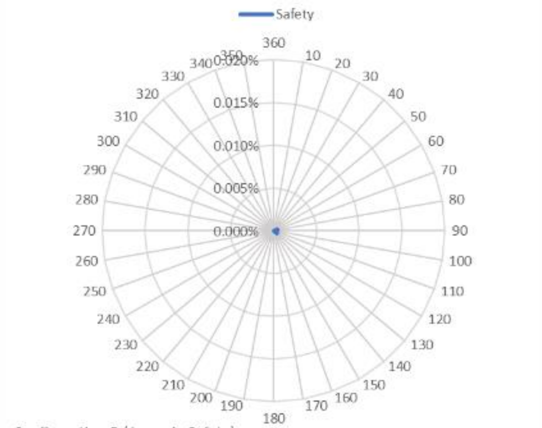
Configuration A (Annual-Comfort)



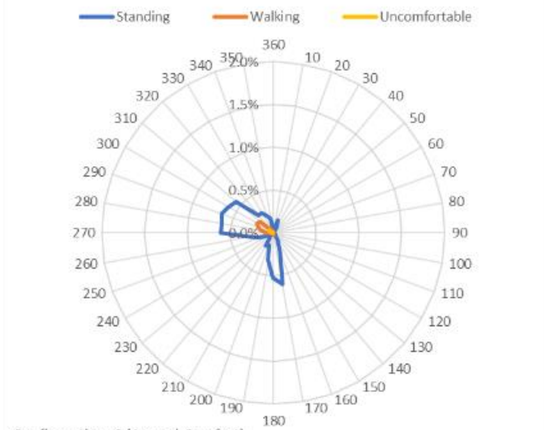
Configuration A (Annual - Safety)



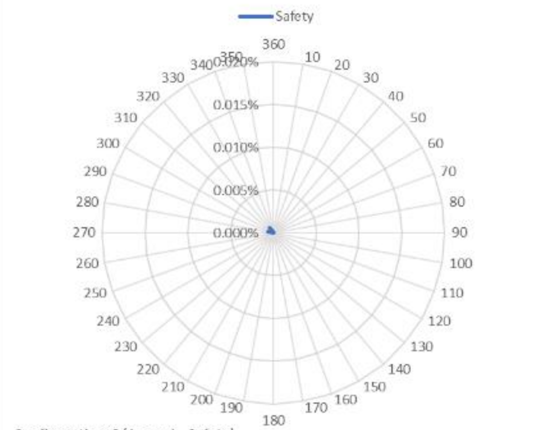
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

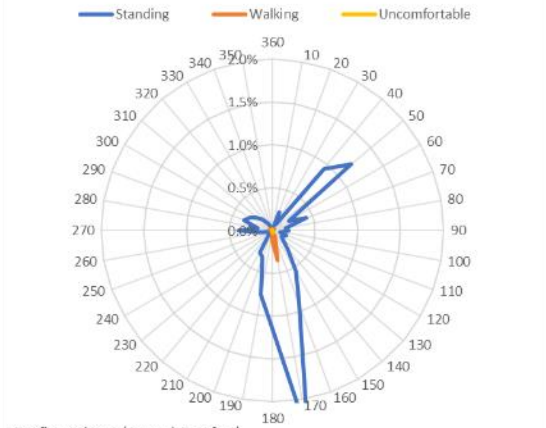


Configuration C (Annual-Comfort)

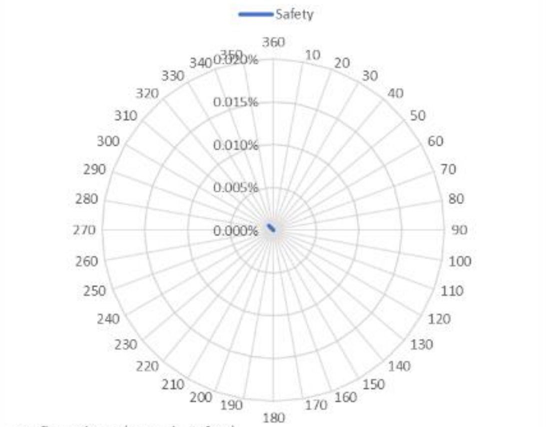


Configuration C (Annual - Safety)

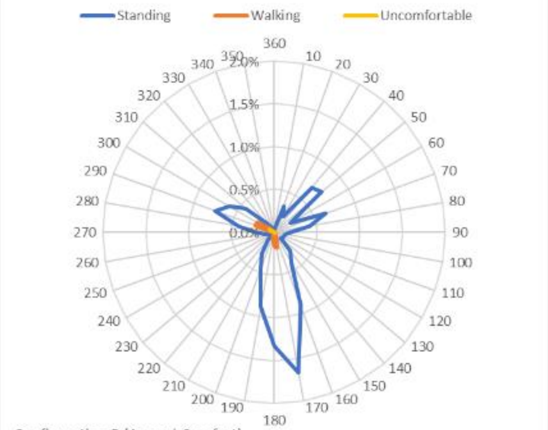
Measurement Location: 35



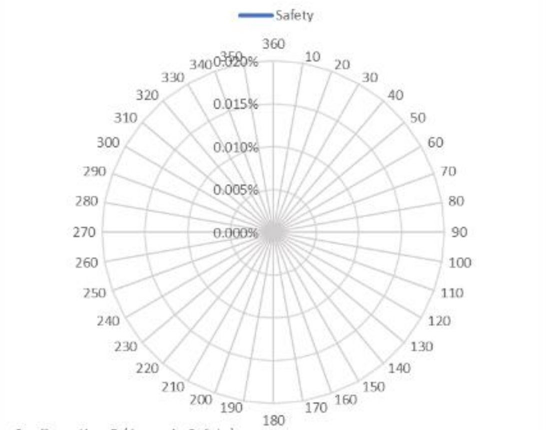
Configuration A (Annual-Comfort)



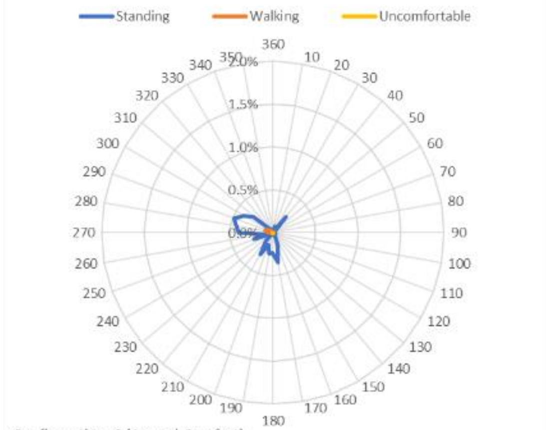
Configuration A (Annual - Safety)



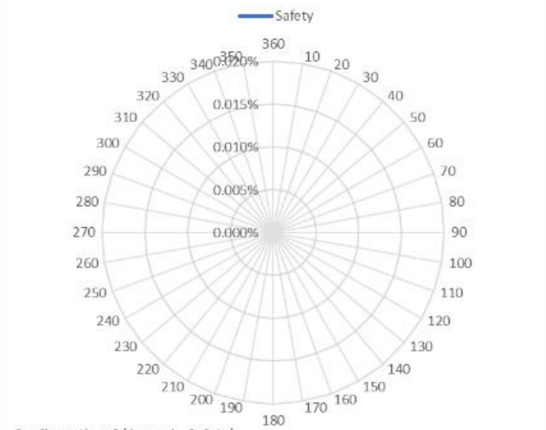
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

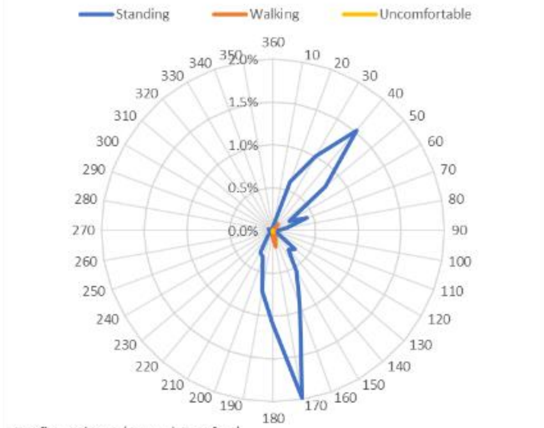


Configuration C (Annual-Comfort)

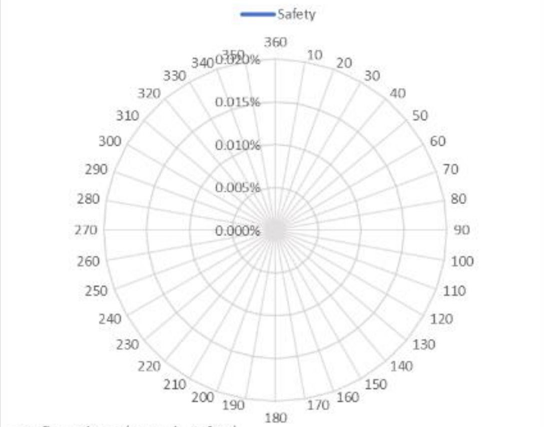


Configuration C (Annual - Safety)

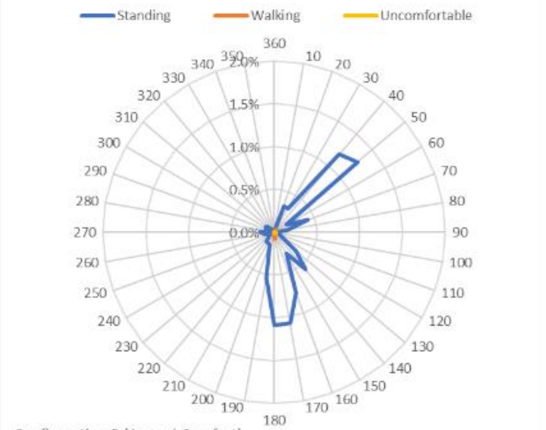
Measurement Location: 36



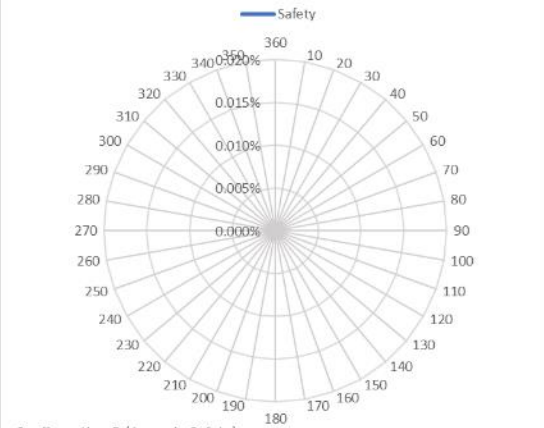
Configuration A (Annual-Comfort)



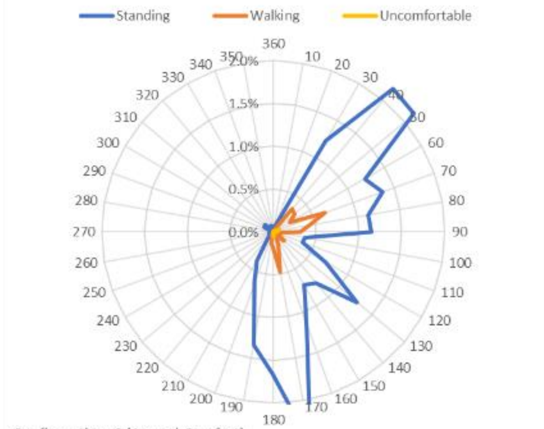
Configuration A (Annual - Safety)



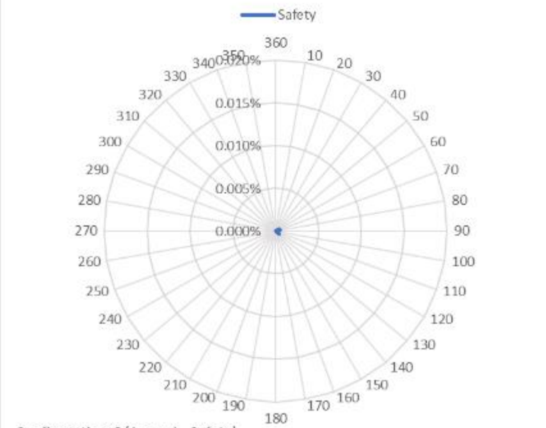
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

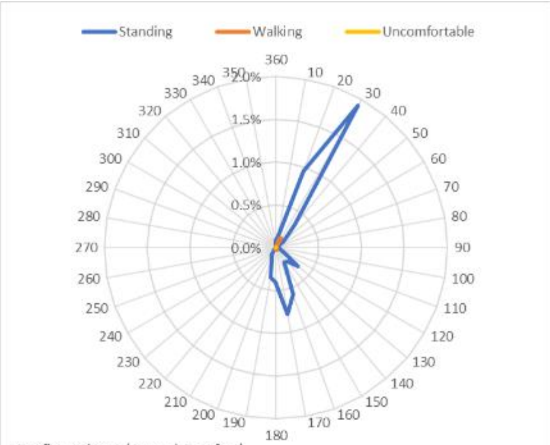


Configuration C (Annual-Comfort)

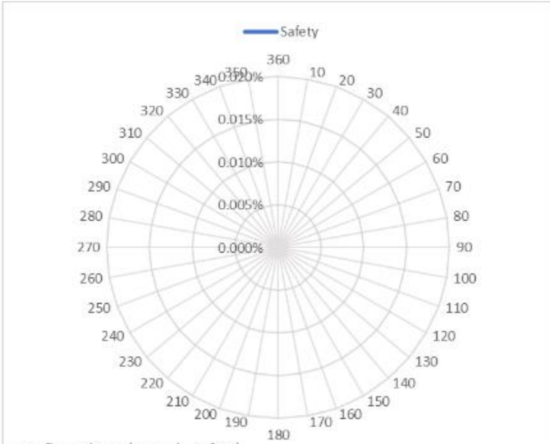


Configuration C (Annual - Safety)

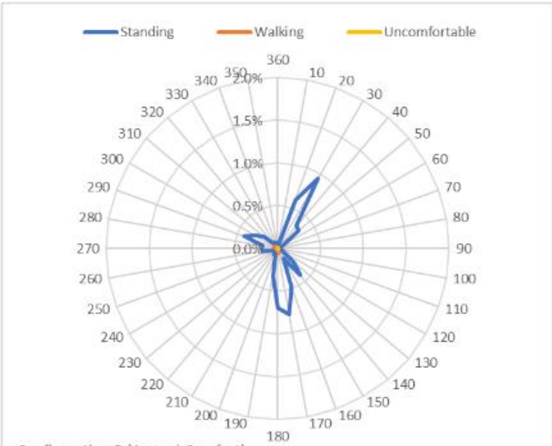
Measurement Location: 37



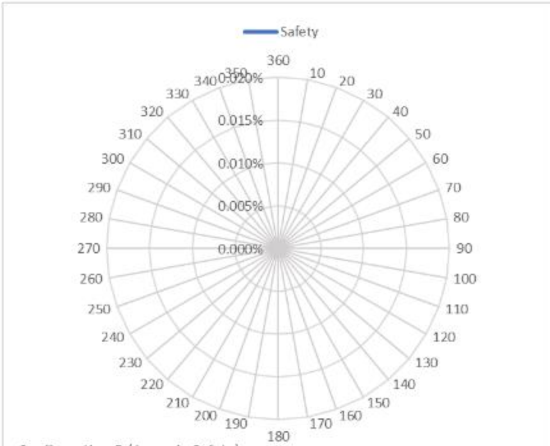
Configuration A (Annual-Comfort)



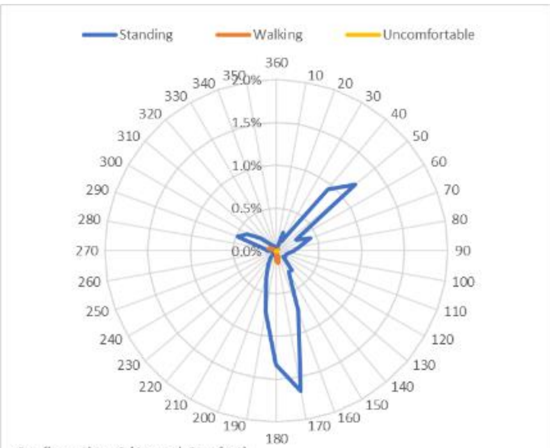
Configuration A (Annual - Safety)



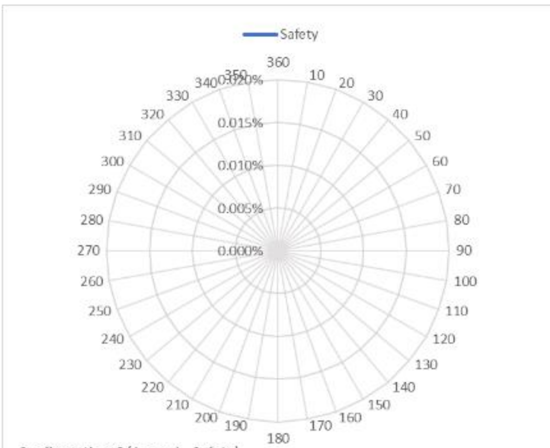
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

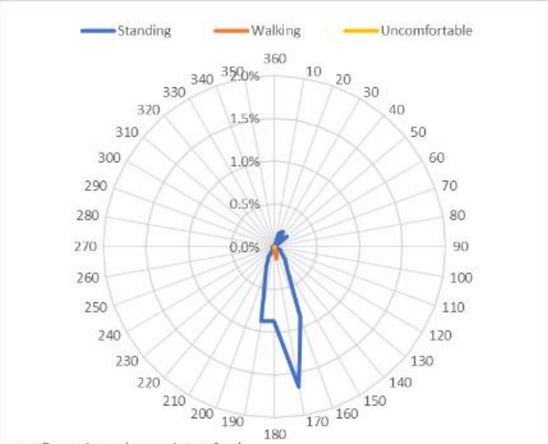


Configuration C (Annual-Comfort)

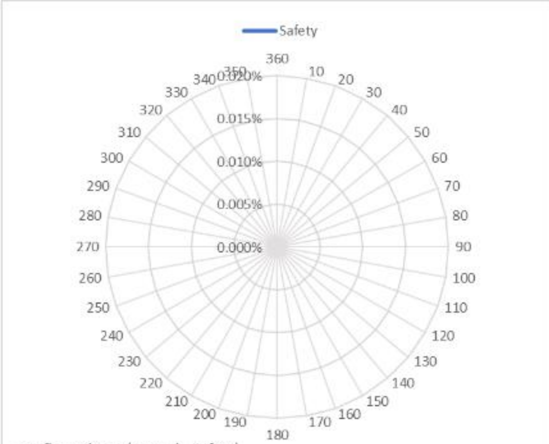


Configuration C (Annual - Safety)

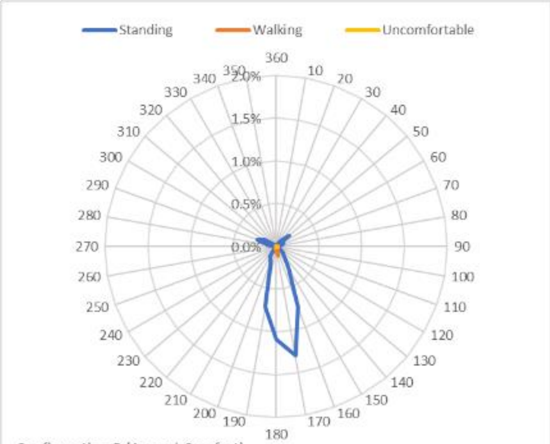
Measurement Location: 38



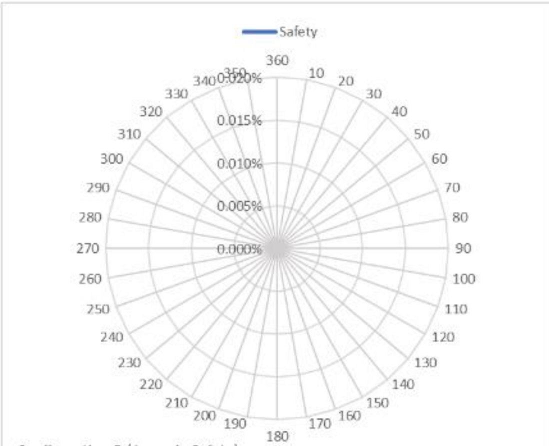
Configuration A (Annual-Comfort)



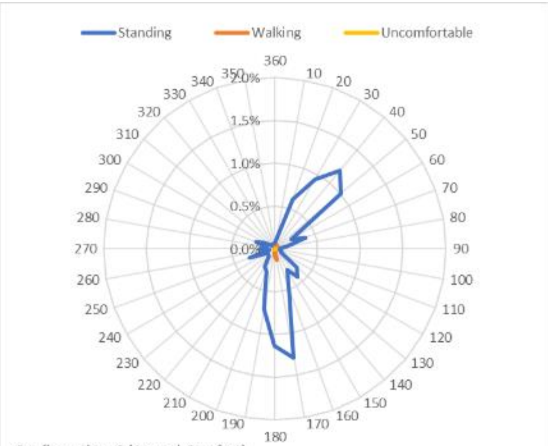
Configuration A (Annual - Safety)



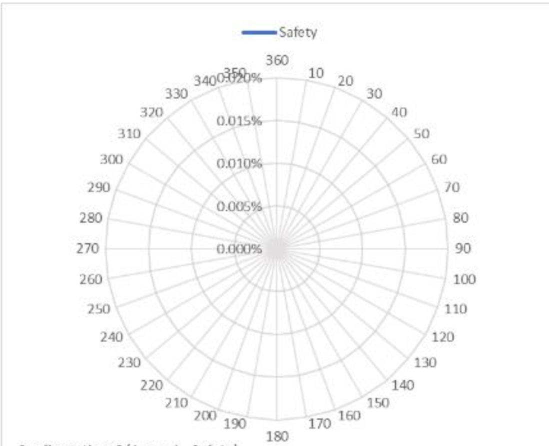
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

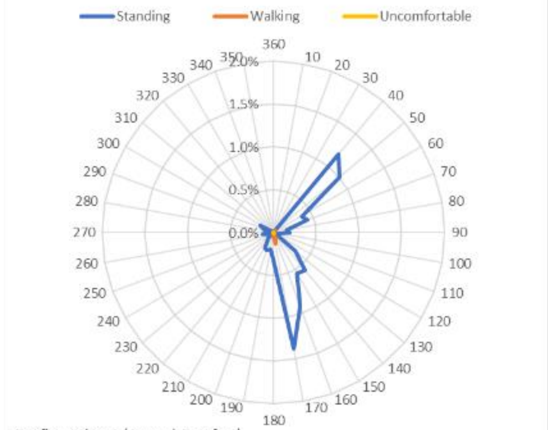


Configuration C (Annual-Comfort)

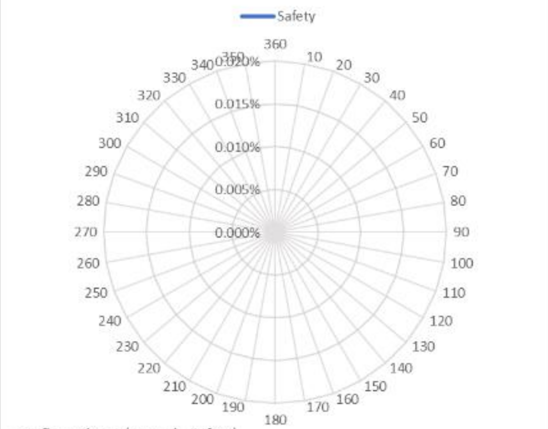


Configuration C (Annual - Safety)

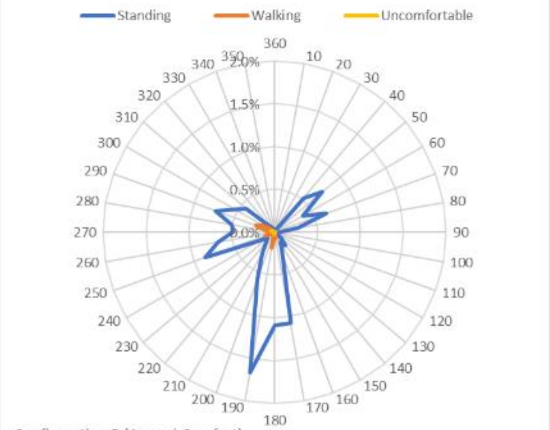
Measurement Location: 39



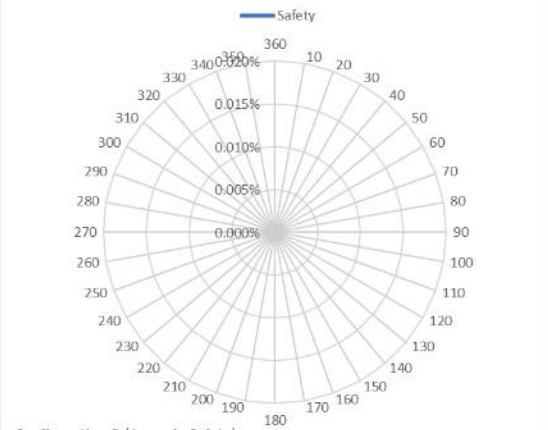
Configuration A (Annual-Comfort)



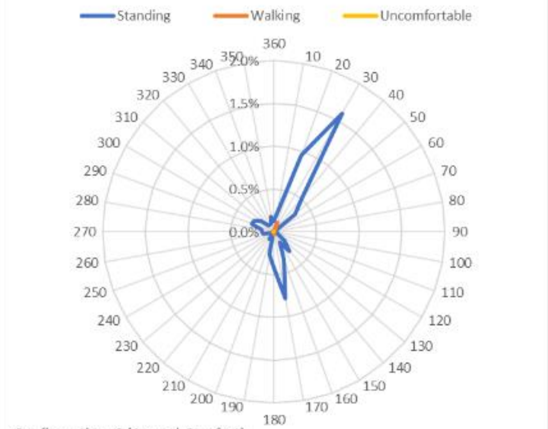
Configuration A (Annual - Safety)



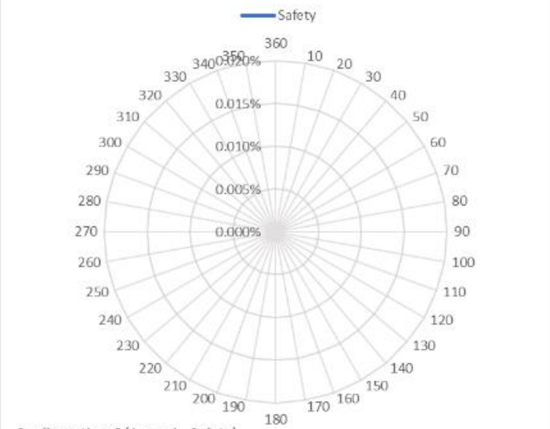
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

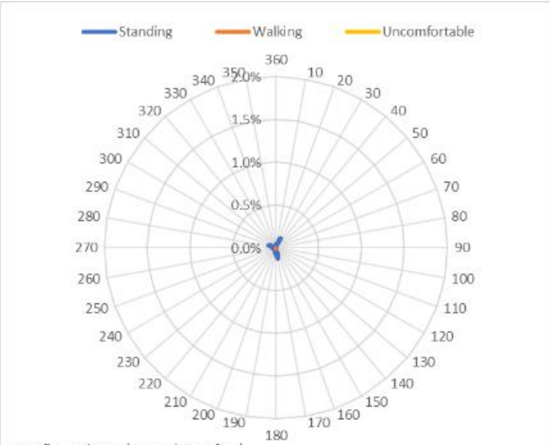


Configuration C (Annual-Comfort)

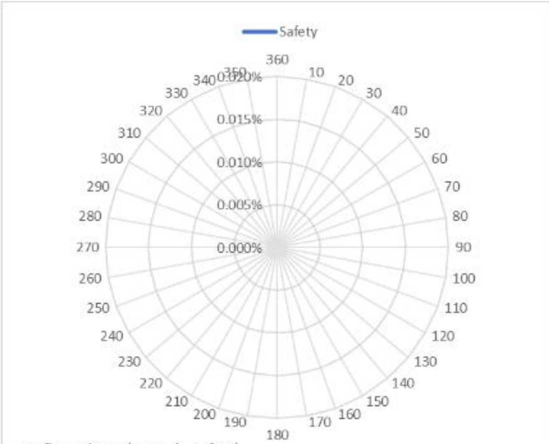


Configuration C (Annual - Safety)

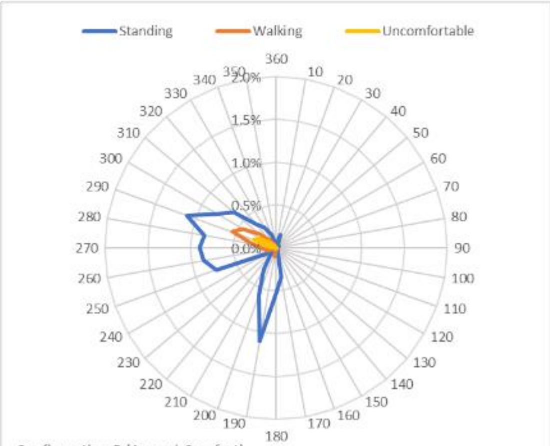
Measurement Location: 40



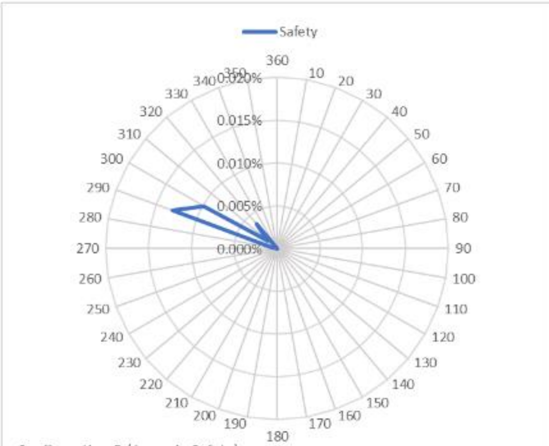
Configuration A (Annual-Comfort)



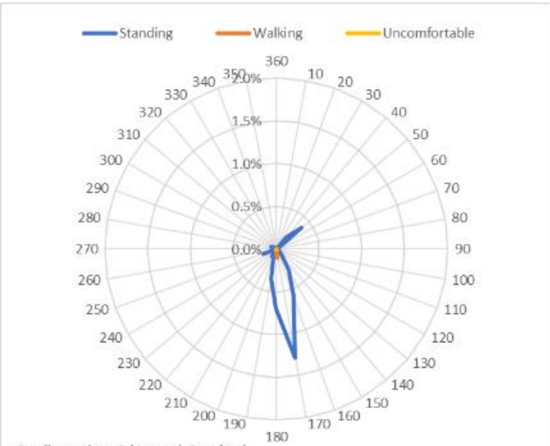
Configuration A (Annual - Safety)



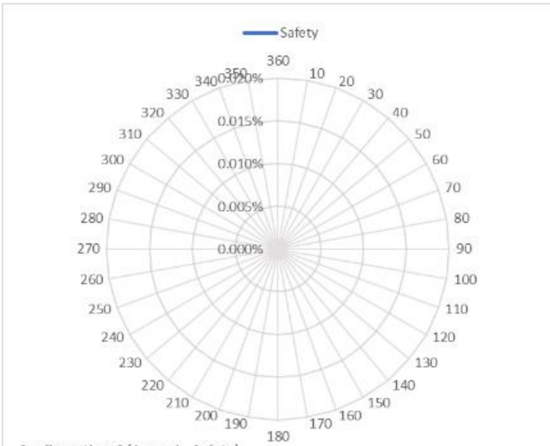
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

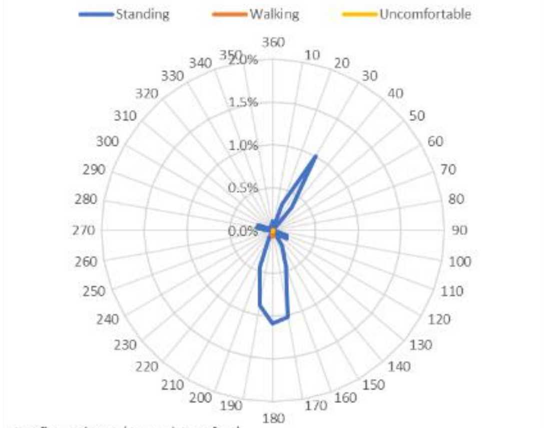


Configuration C (Annual-Comfort)

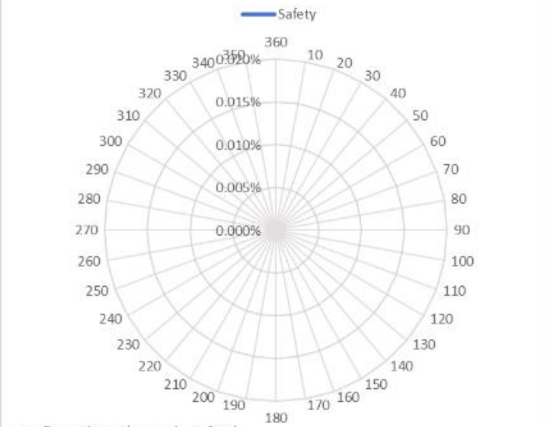


Configuration C (Annual - Safety)

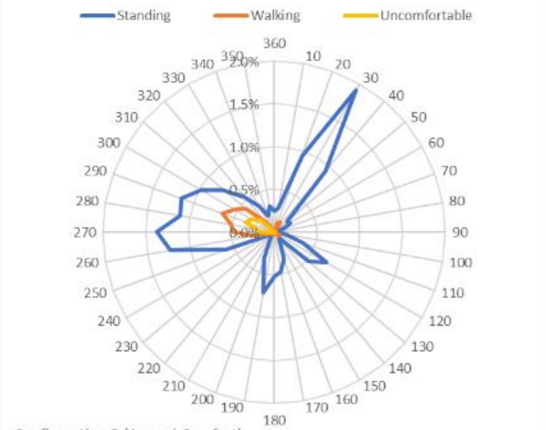
Measurement Location: 41



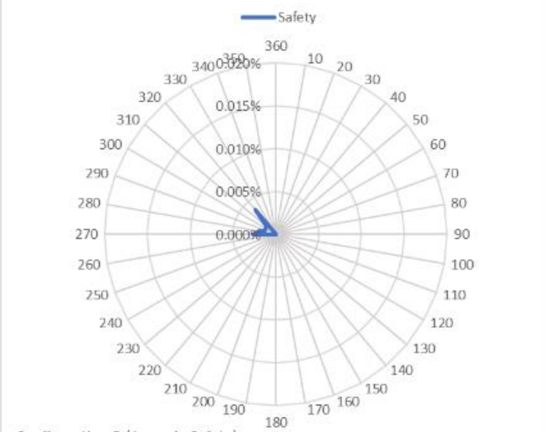
Configuration A (Annual-Comfort)



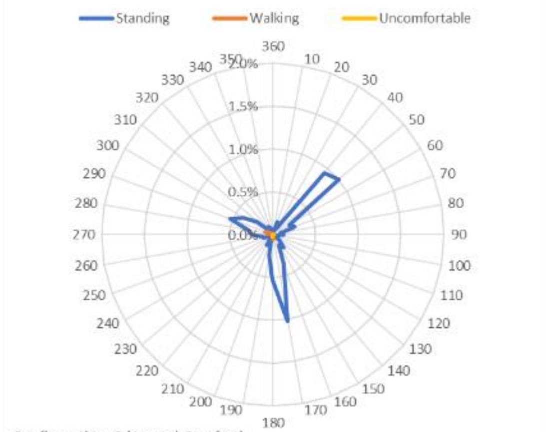
Configuration A (Annual - Safety)



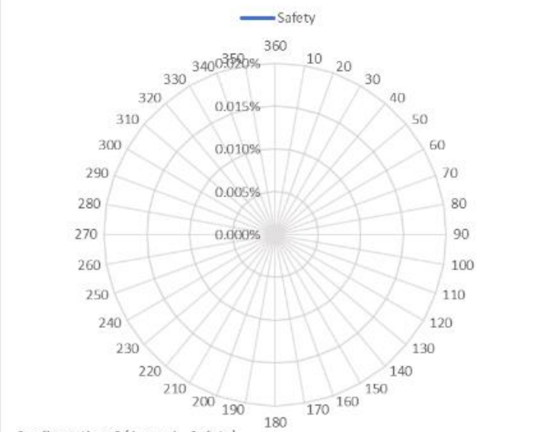
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

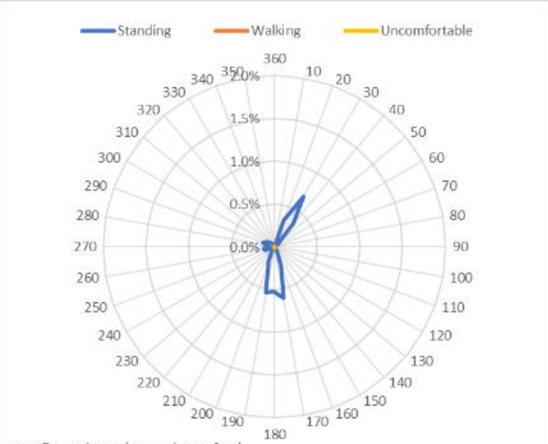


Configuration C (Annual-Comfort)

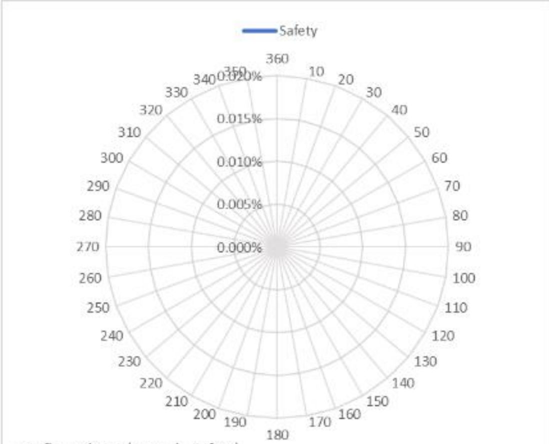


Configuration C (Annual - Safety)

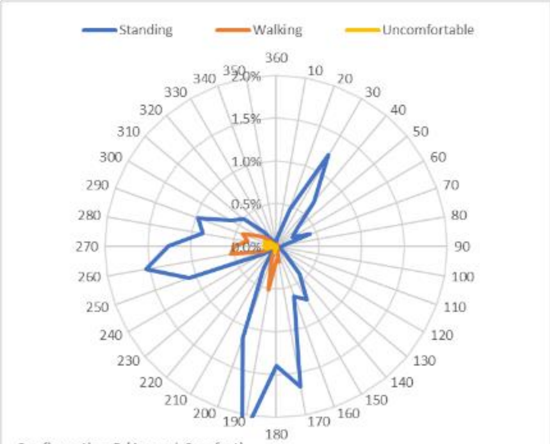
Measurement Location: 42



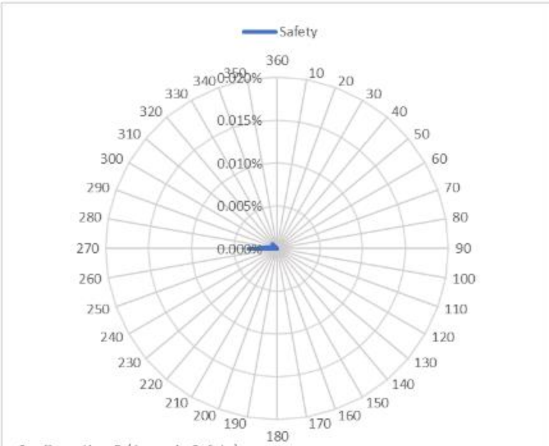
Configuration A (Annual-Comfort)



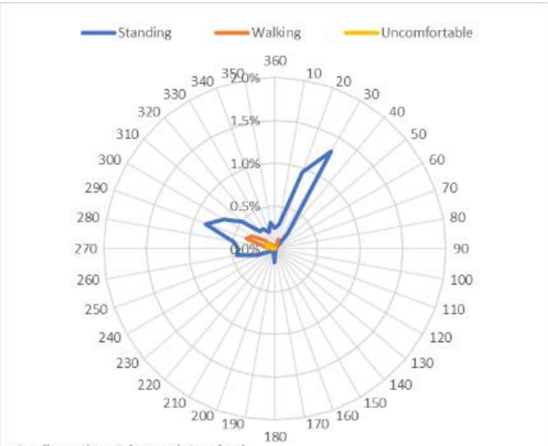
Configuration A (Annual - Safety)



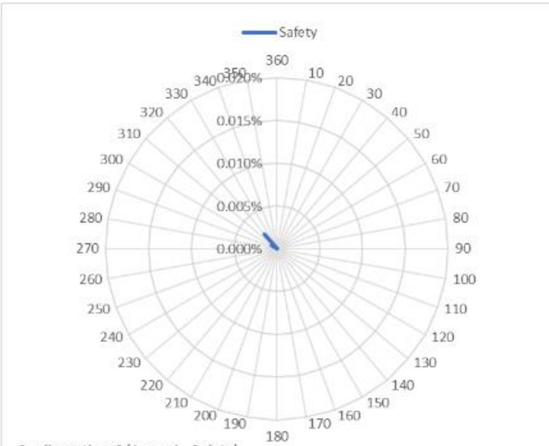
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

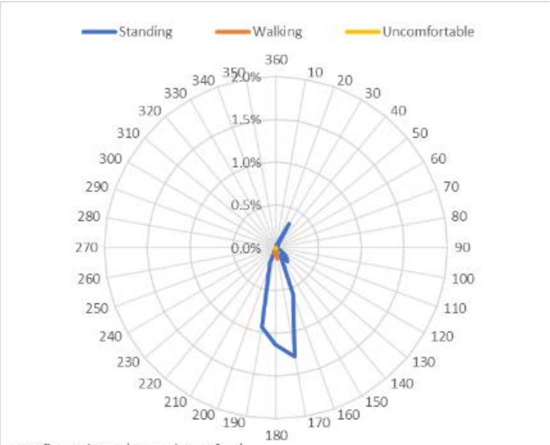


Configuration C (Annual-Comfort)

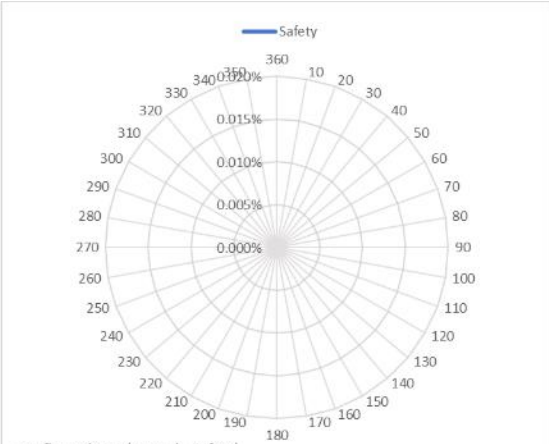


Configuration C (Annual - Safety)

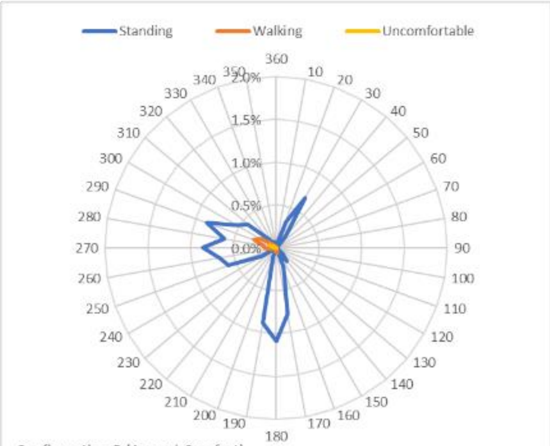
Measurement Location: 43



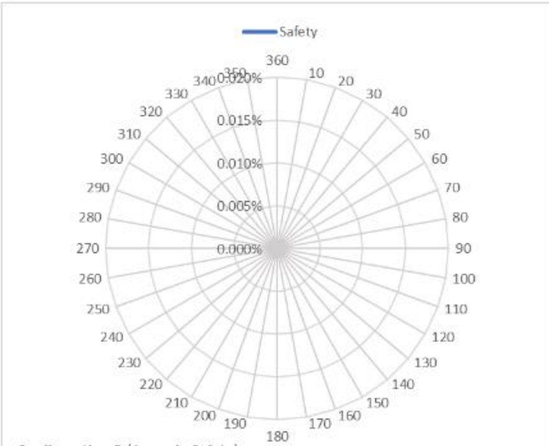
Configuration A (Annual-Comfort)



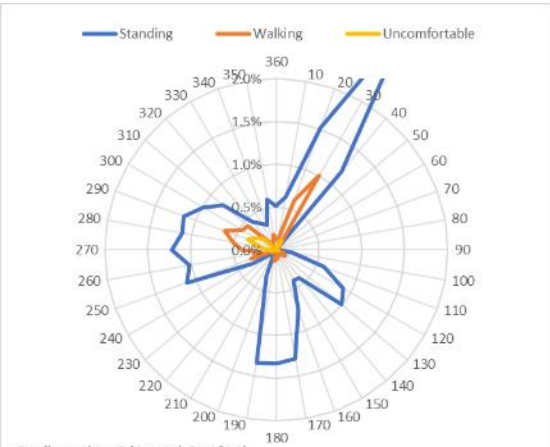
Configuration A (Annual - Safety)



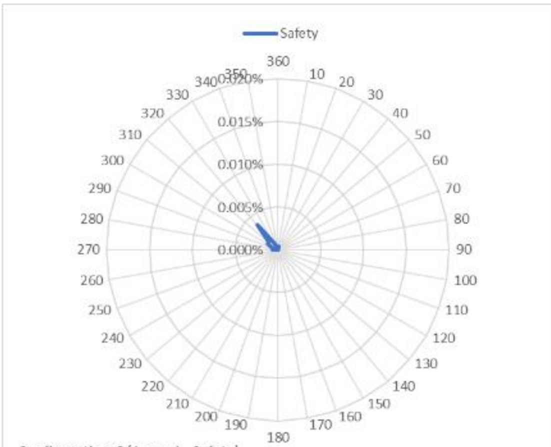
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

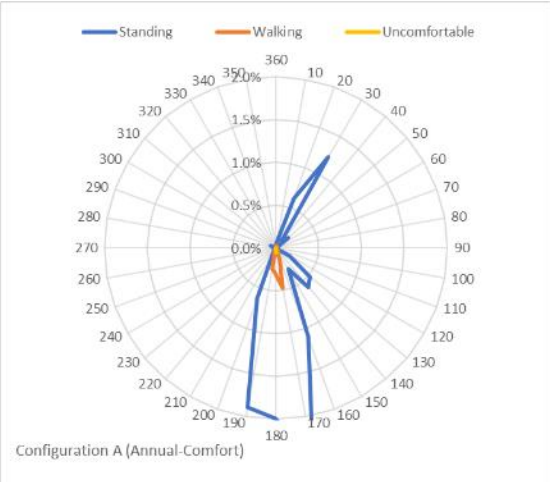


Configuration C (Annual-Comfort)

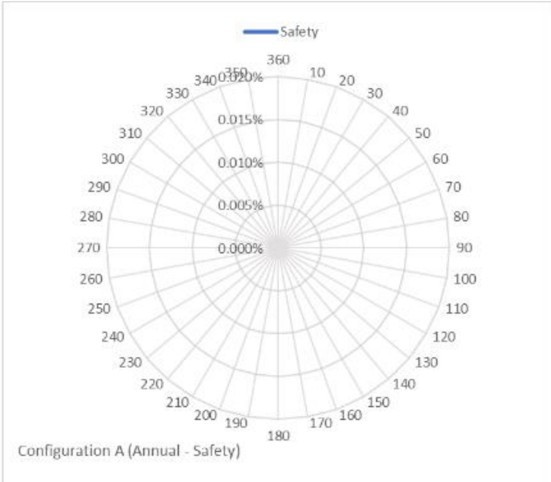


Configuration C (Annual - Safety)

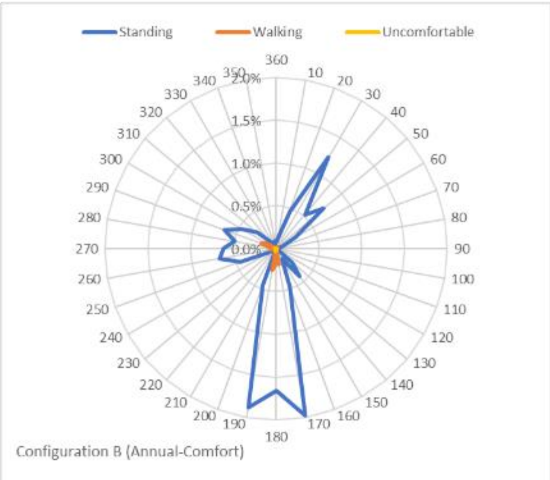
Measurement Location: 44



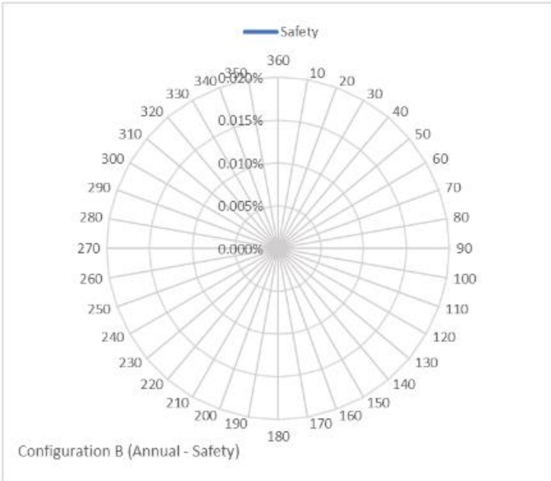
Configuration A (Annual-Comfort)



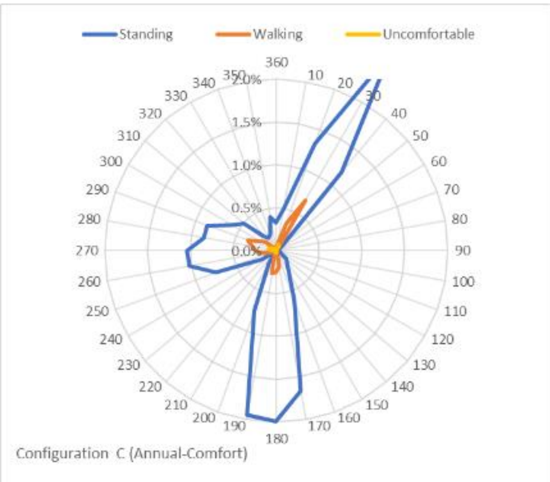
Configuration A (Annual - Safety)



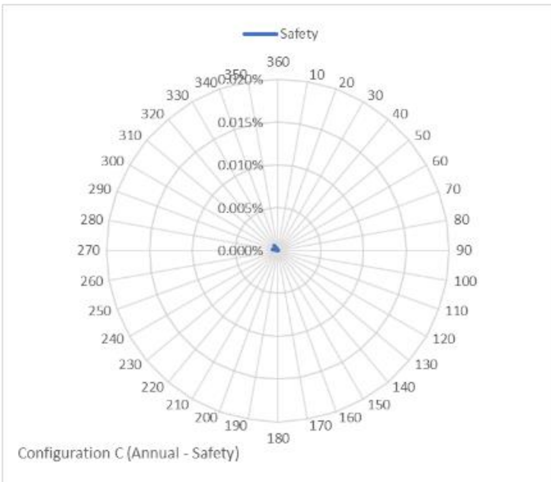
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

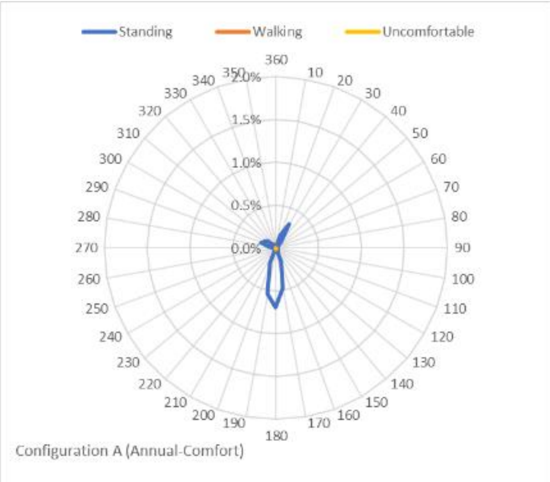


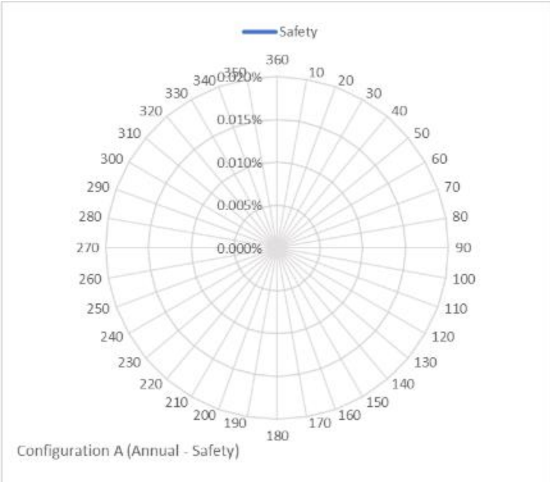
Configuration C (Annual-Comfort)

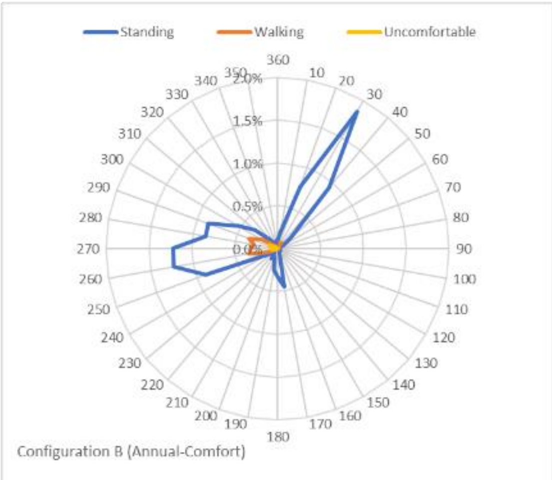


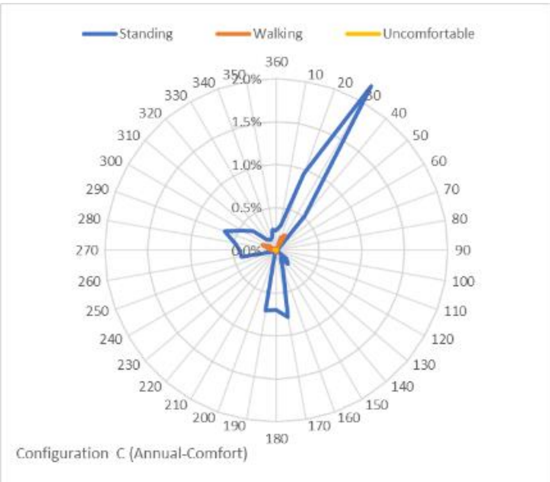
Configuration C (Annual - Safety)

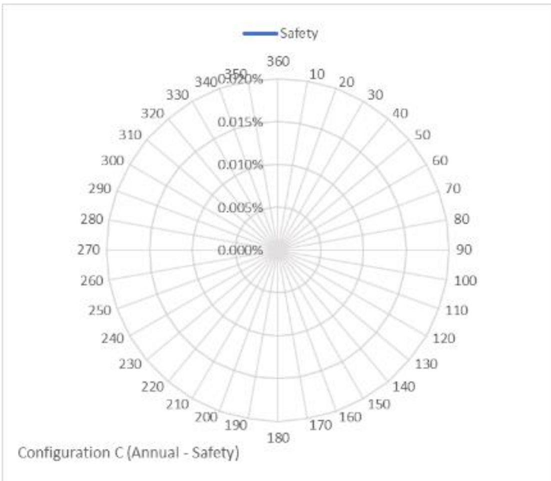
Measurement Location: 45



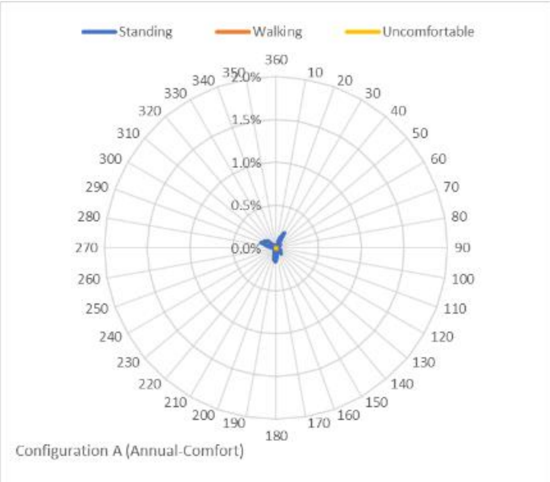




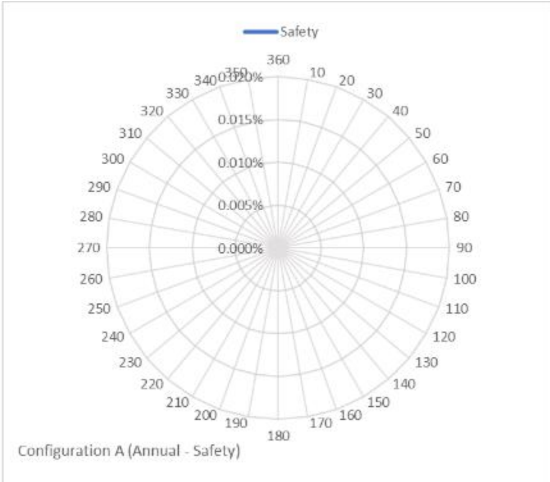




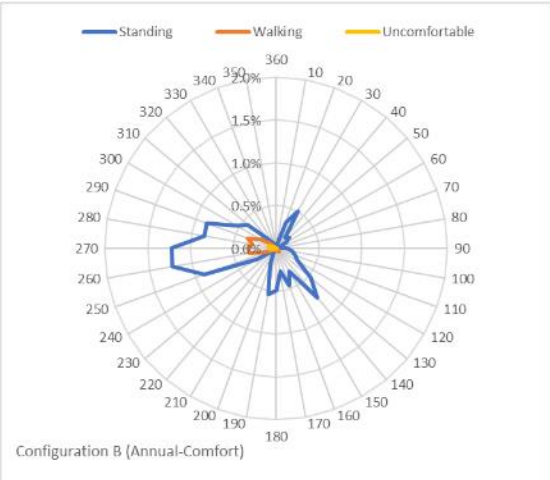
Measurement Location: 46



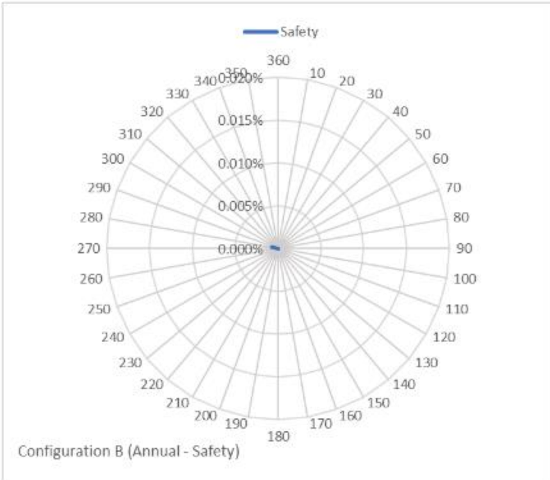
Configuration A (Annual-Comfort)



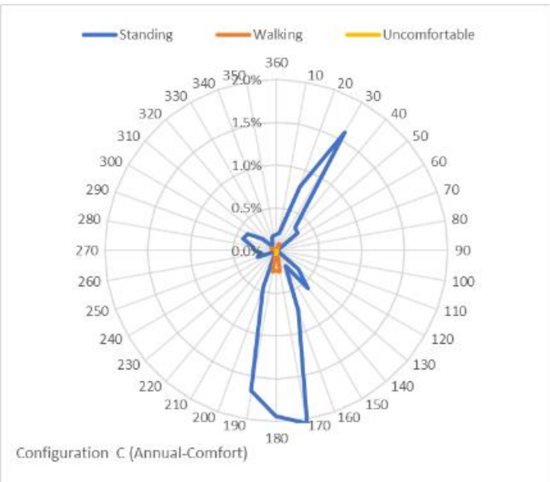
Configuration A (Annual - Safety)



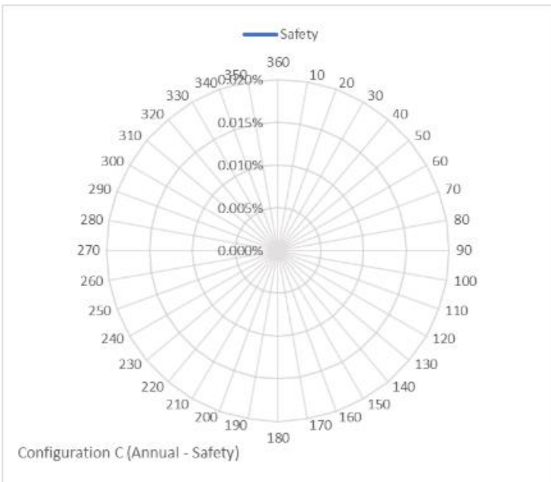
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

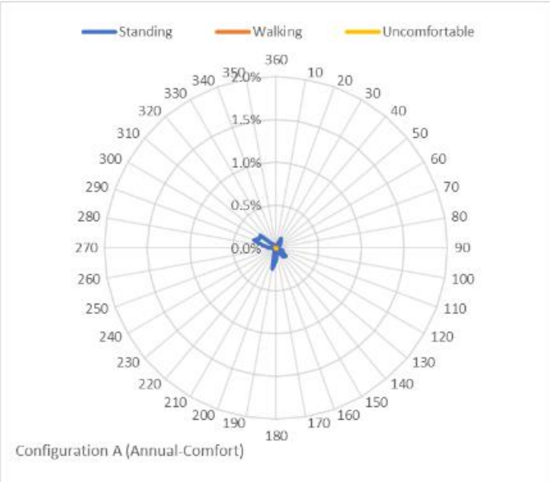


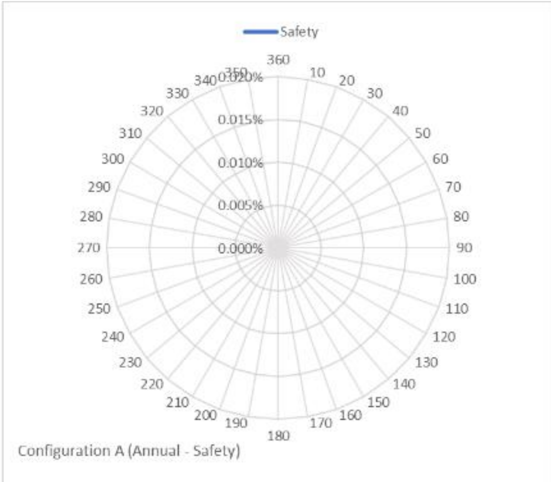
Configuration C (Annual-Comfort)

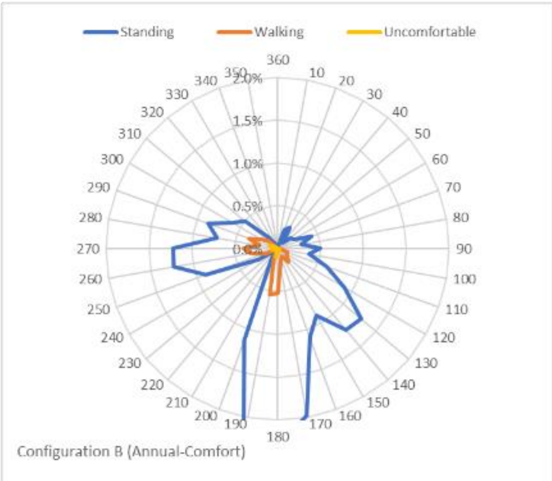


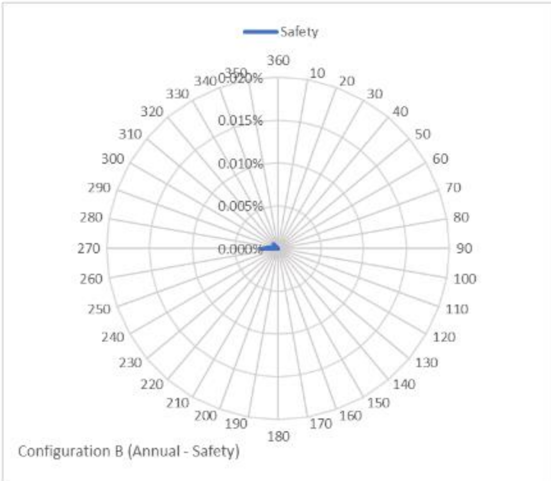
Configuration C (Annual - Safety)

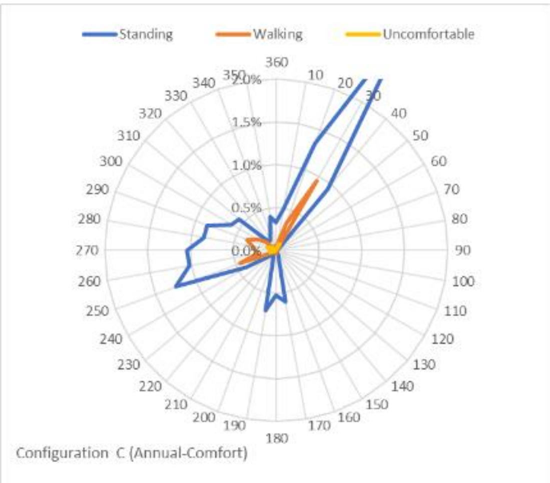
Measurement Location: 47

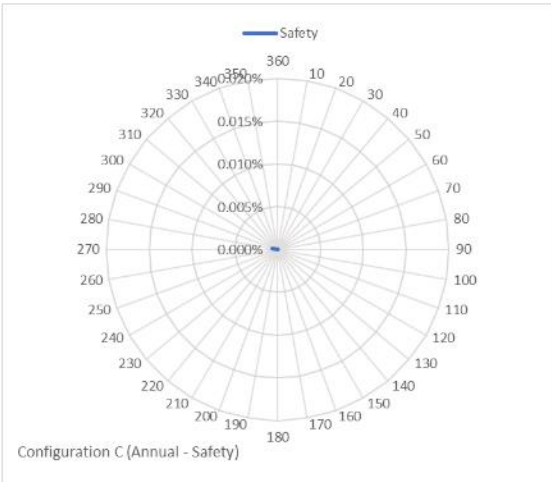




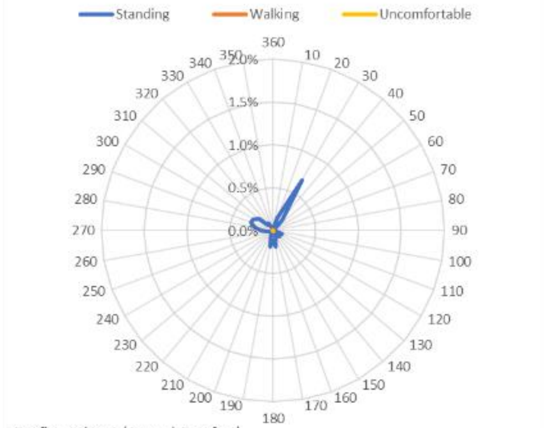




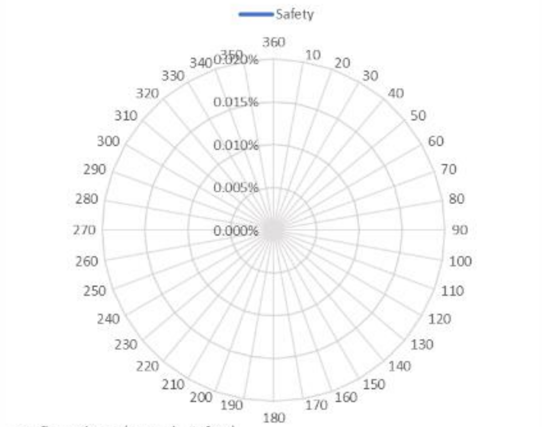




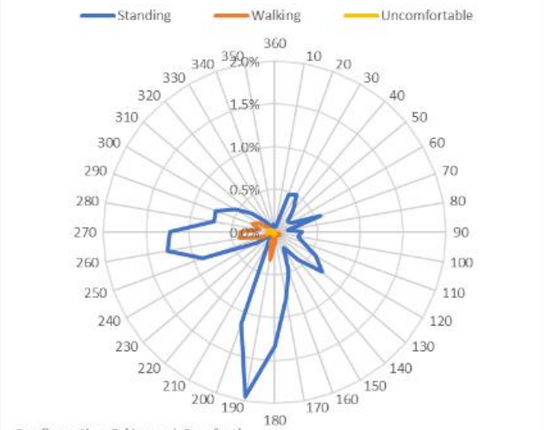
Measurement Location: 48



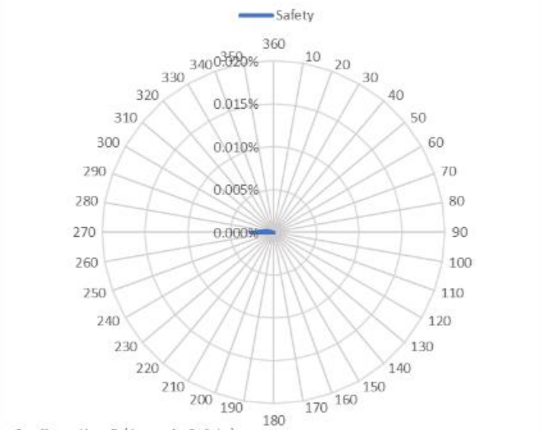
Configuration A (Annual-Comfort)



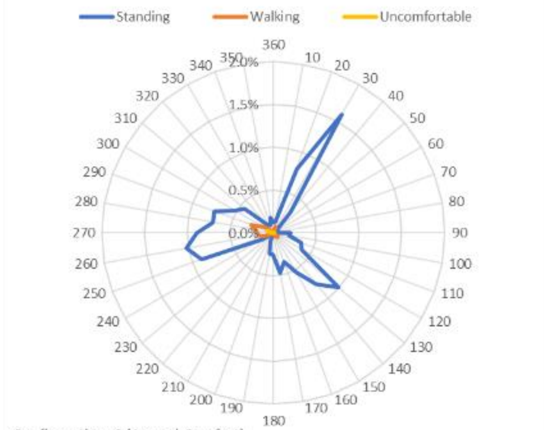
Configuration A (Annual - Safety)



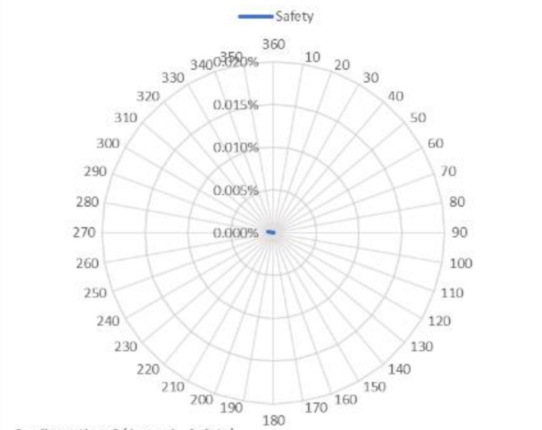
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

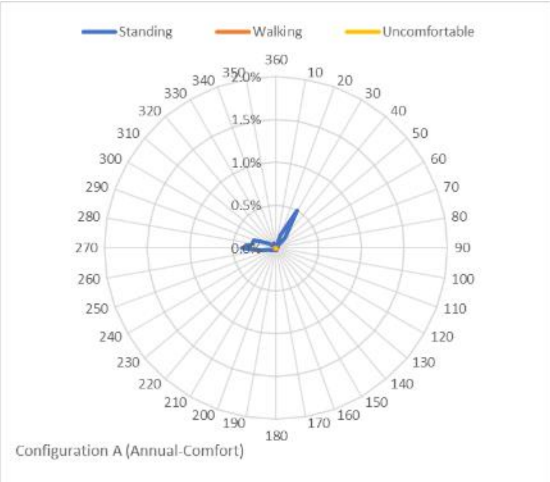


Configuration C (Annual-Comfort)

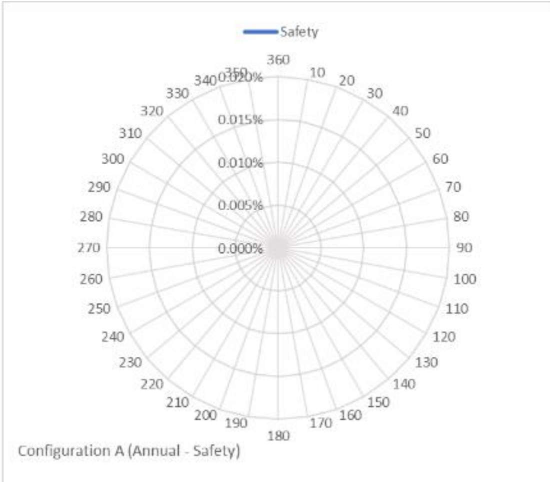


Configuration C (Annual - Safety)

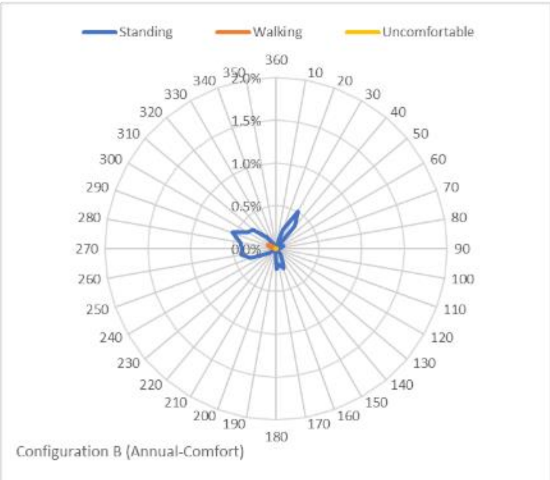
Measurement Location: 49



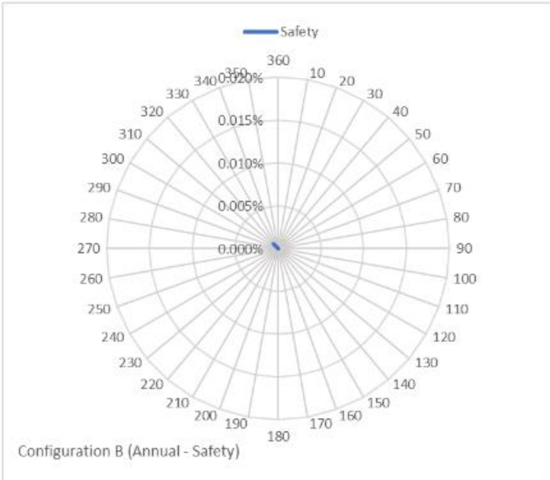
Configuration A (Annual-Comfort)



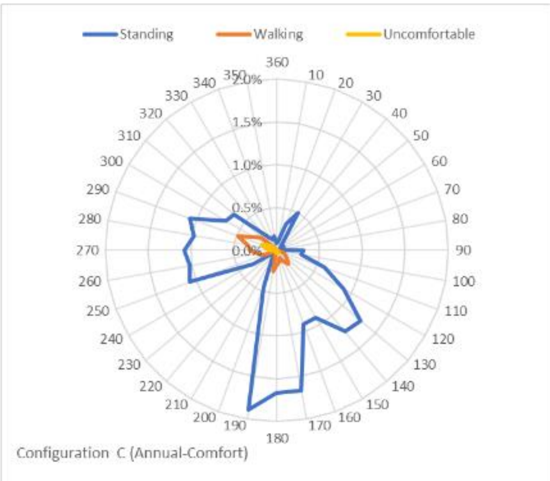
Configuration A (Annual - Safety)



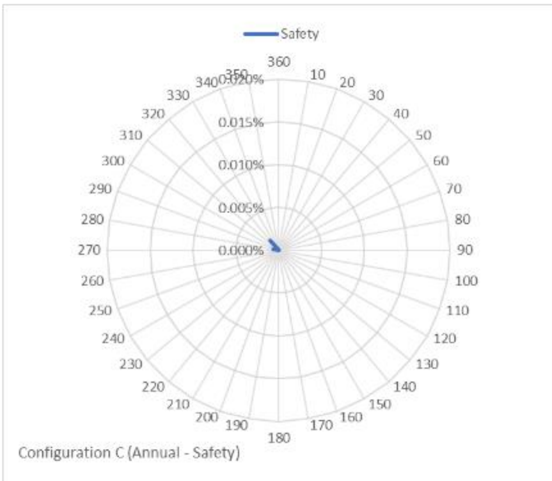
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

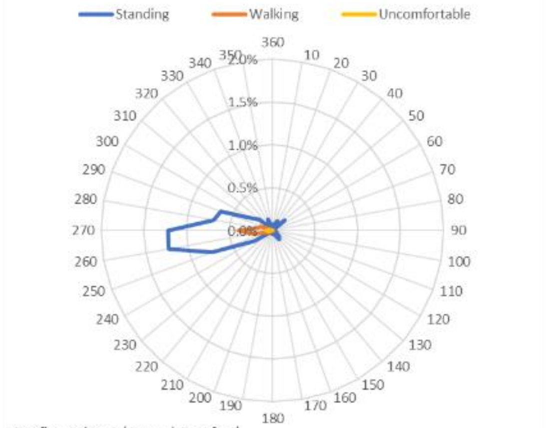


Configuration C (Annual-Comfort)

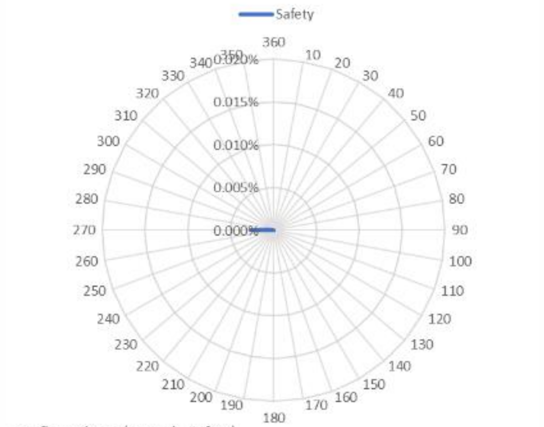


Configuration C (Annual - Safety)

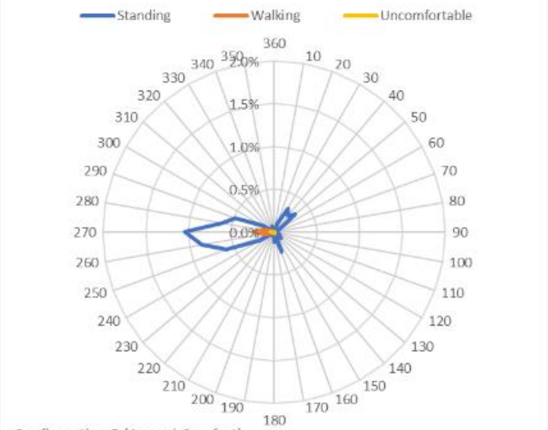
Measurement Location: 50



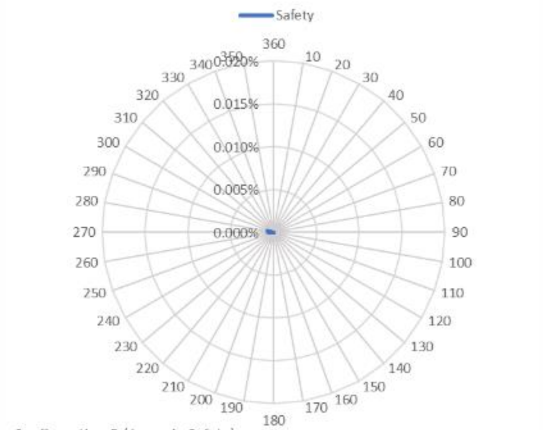
Configuration A (Annual-Comfort)



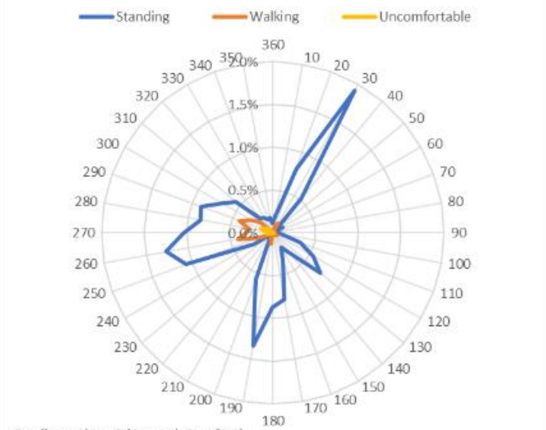
Configuration A (Annual - Safety)



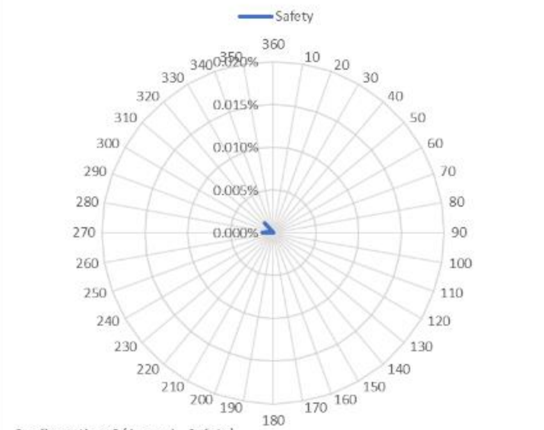
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

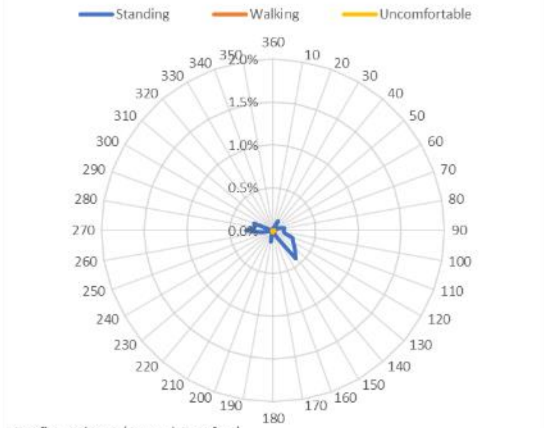


Configuration C (Annual-Comfort)

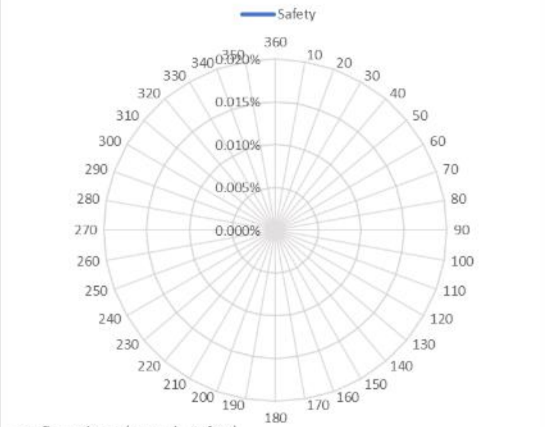


Configuration C (Annual - Safety)

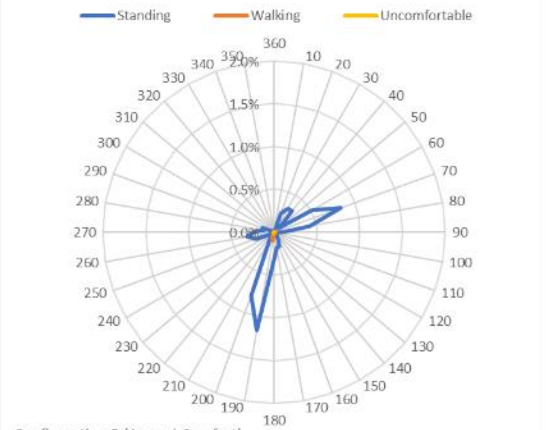
Measurement Location: 51



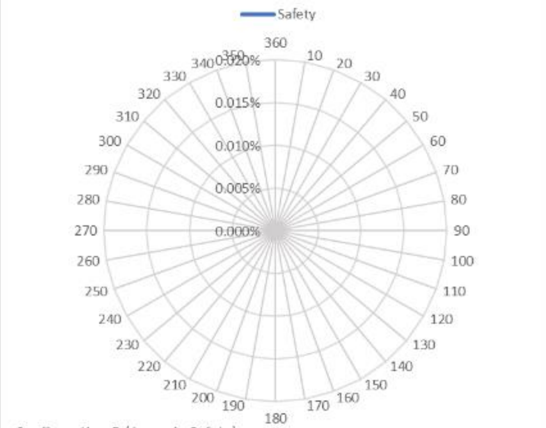
Configuration A (Annual-Comfort)



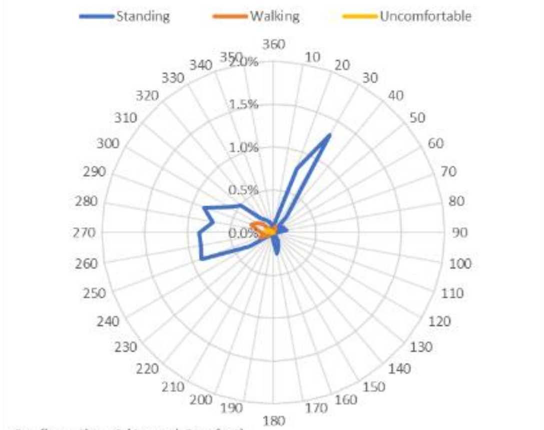
Configuration A (Annual - Safety)



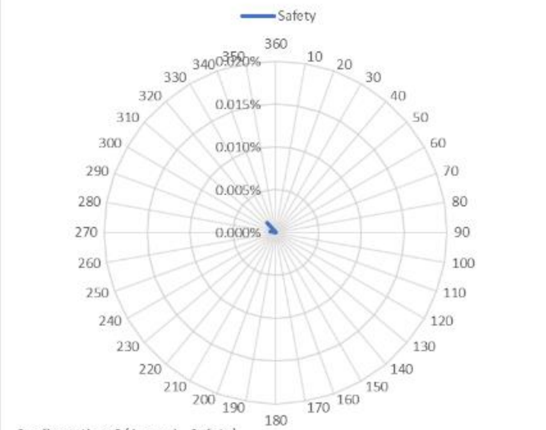
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

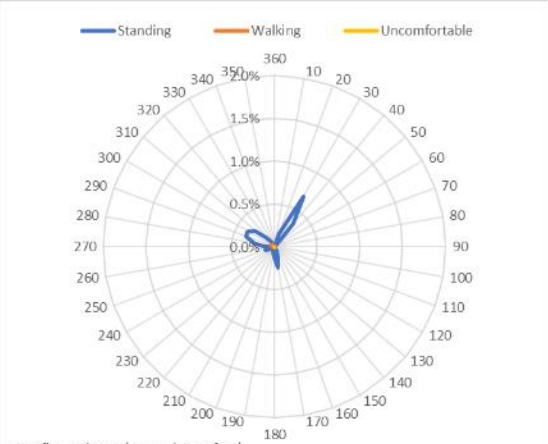


Configuration C (Annual-Comfort)

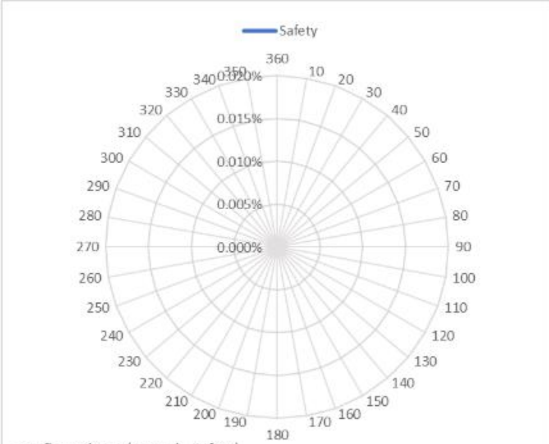


Configuration C (Annual - Safety)

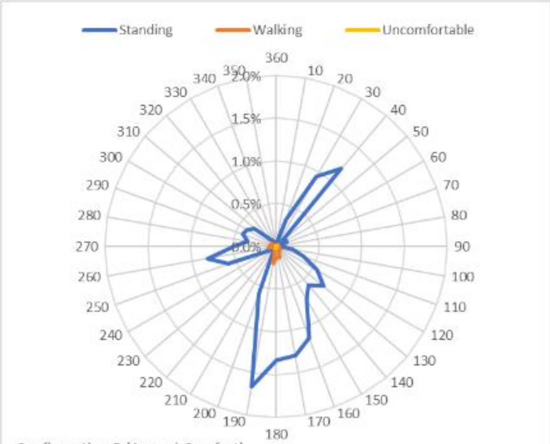
Measurement Location: 52



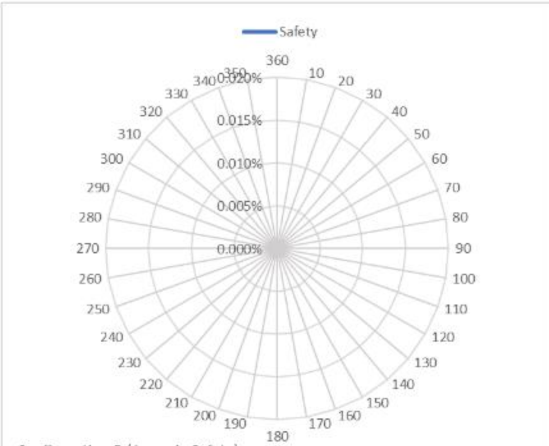
Configuration A (Annual-Comfort)



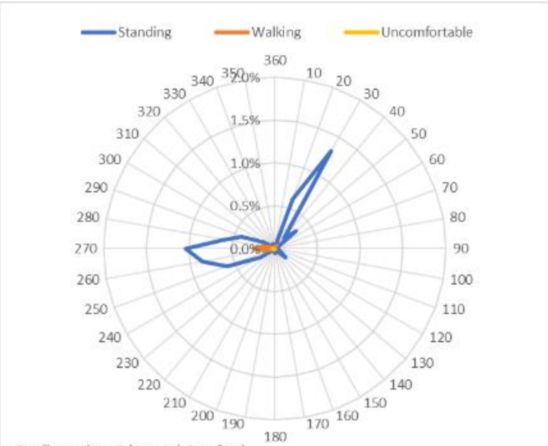
Configuration A (Annual - Safety)



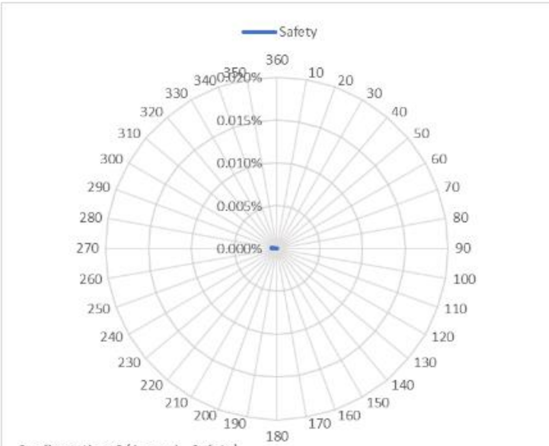
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

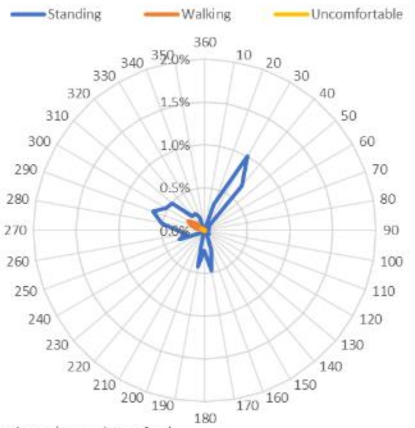


Configuration C (Annual-Comfort)

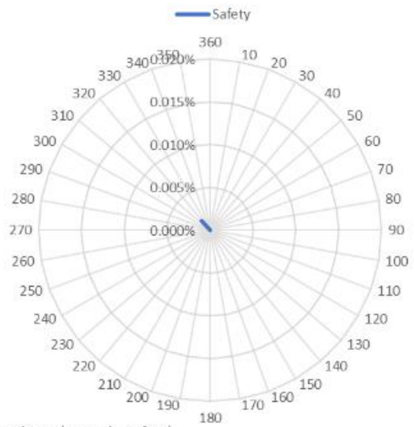


Configuration C (Annual - Safety)

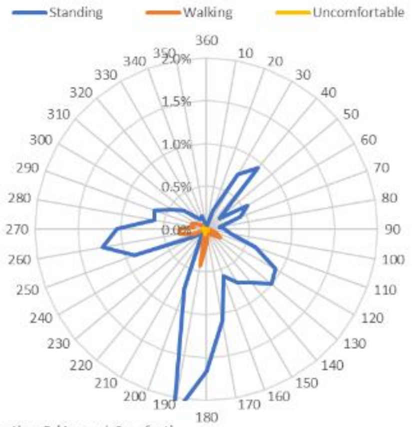
Measurement Location: 53



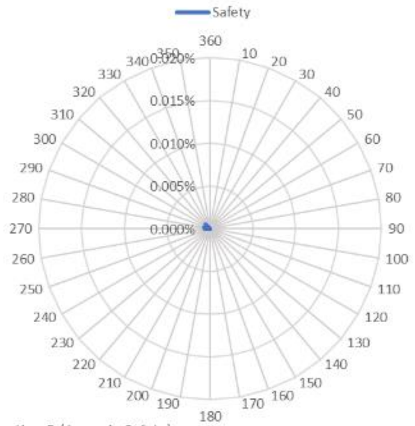
Configuration A (Annual-Comfort)



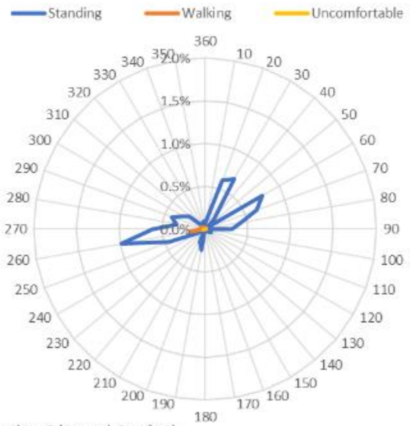
Configuration A (Annual - Safety)



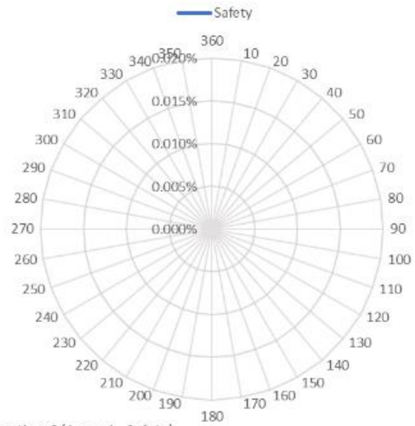
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

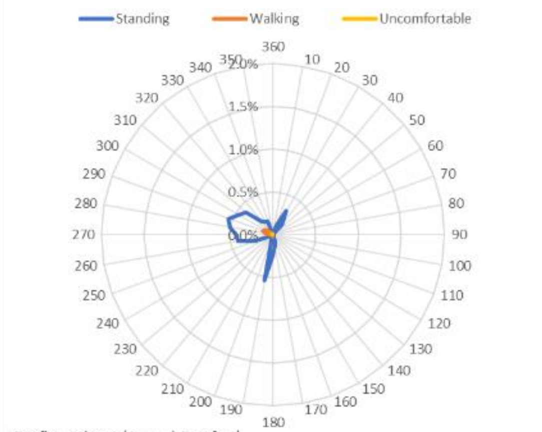


Configuration C (Annual-Comfort)

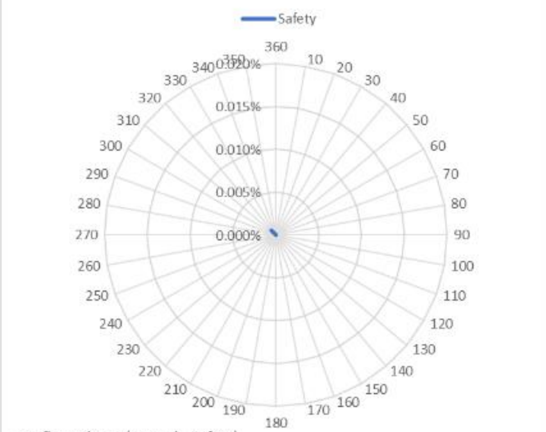


Configuration C (Annual - Safety)

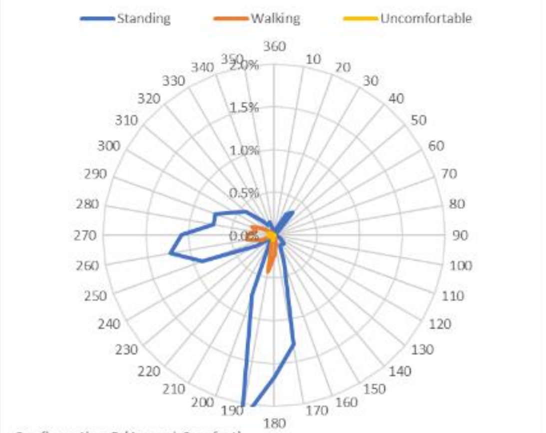
Measurement Location: 54



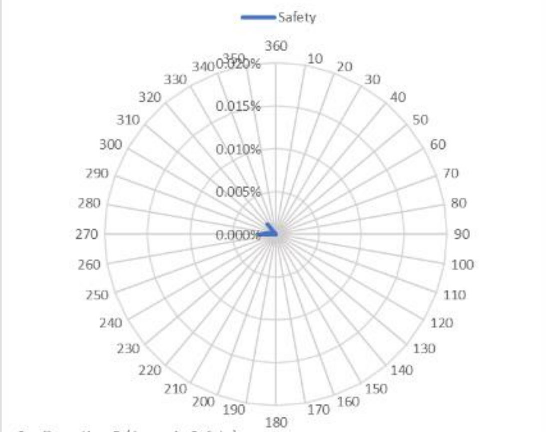
Configuration A (Annual-Comfort)



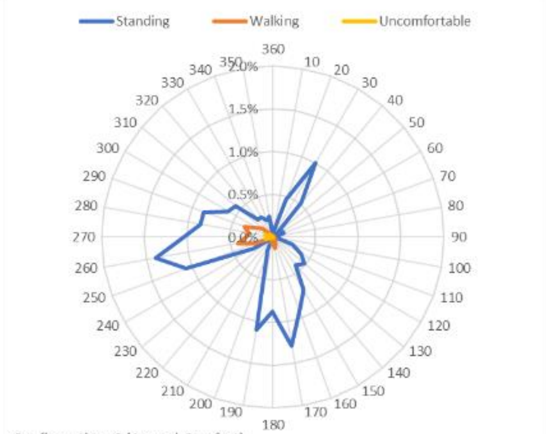
Configuration A (Annual - Safety)



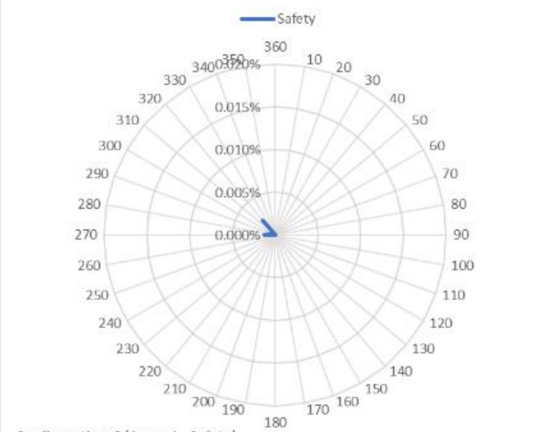
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

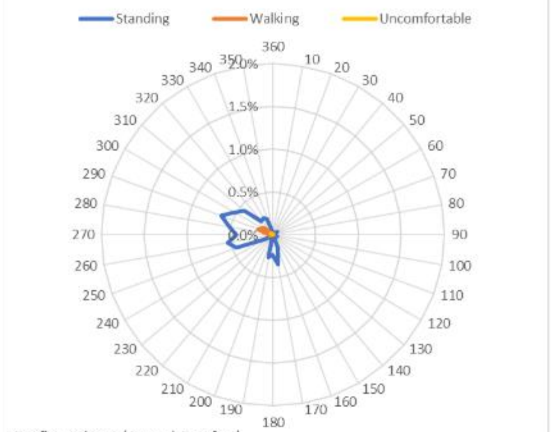


Configuration C (Annual-Comfort)

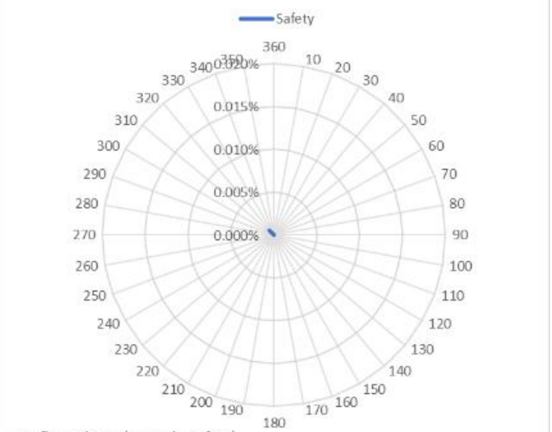


Configuration C (Annual - Safety)

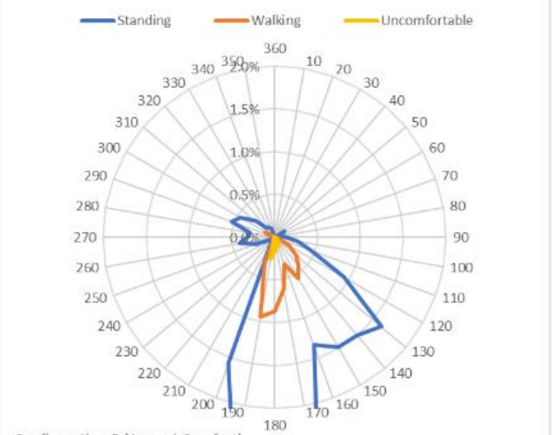
Measurement Location: 55



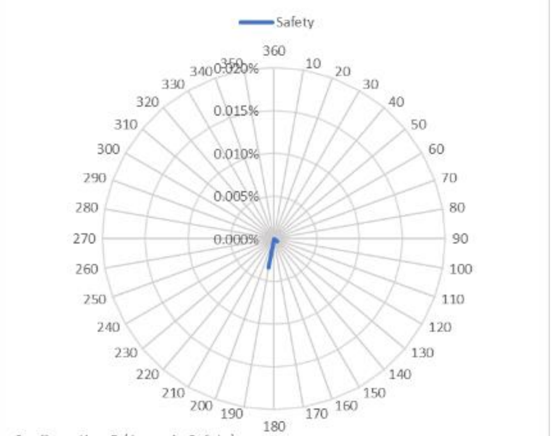
Configuration A (Annual-Comfort)



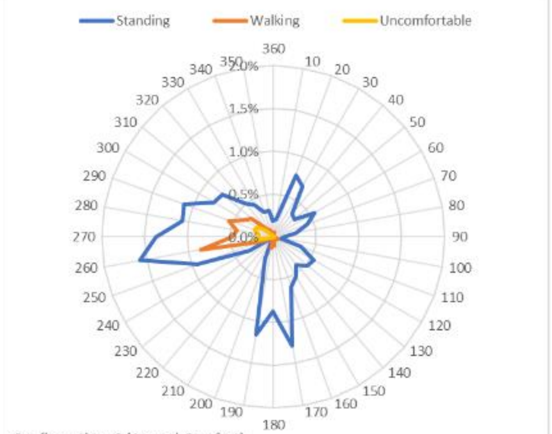
Configuration A (Annual - Safety)



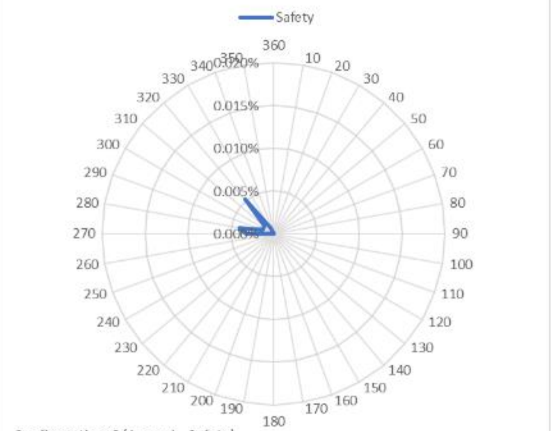
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

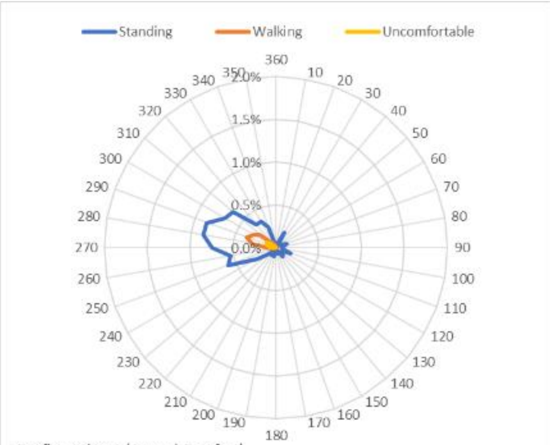


Configuration C (Annual-Comfort)

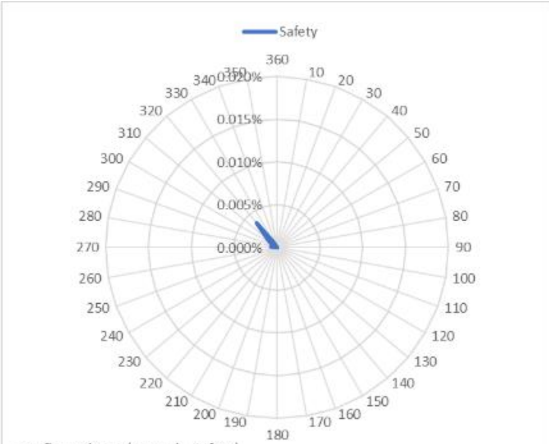


Configuration C (Annual - Safety)

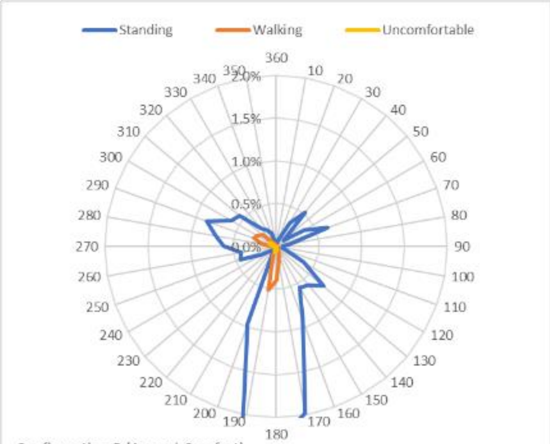
Measurement Location: 56



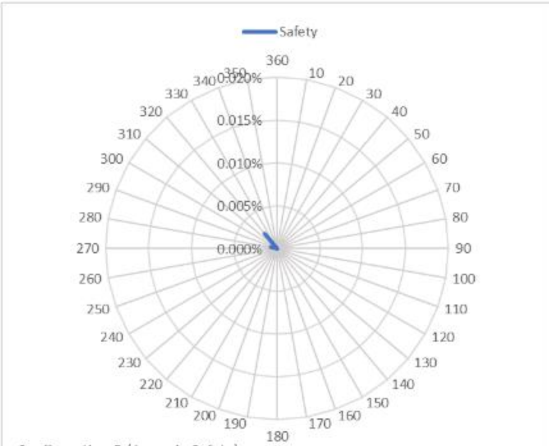
Configuration A (Annual-Comfort)



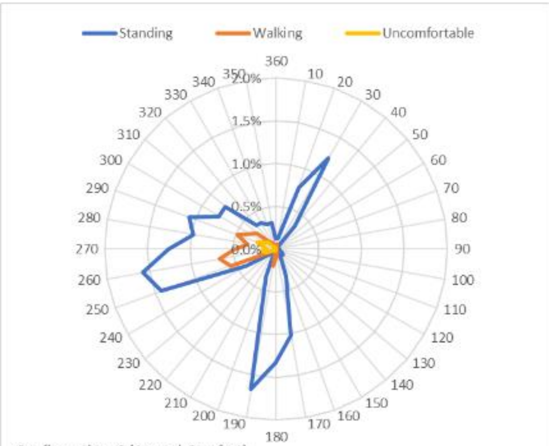
Configuration A (Annual - Safety)



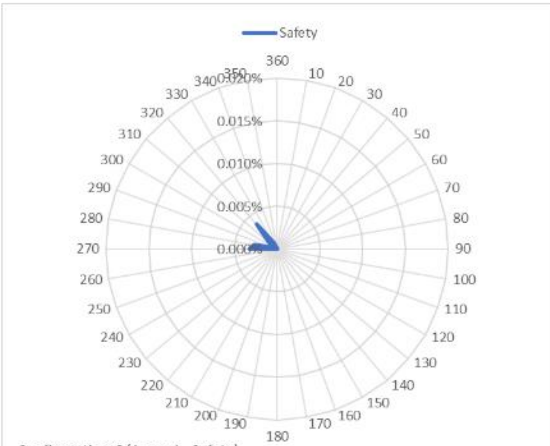
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

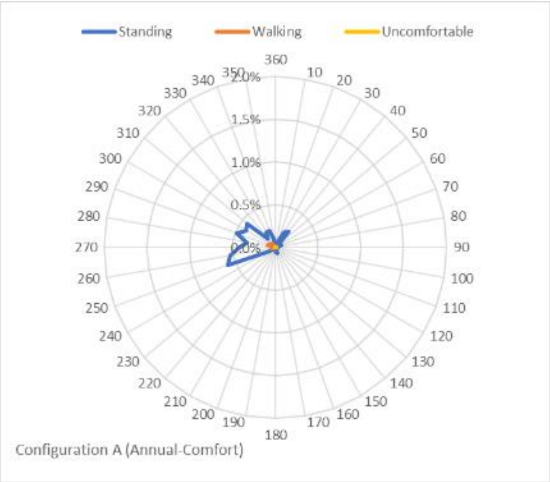


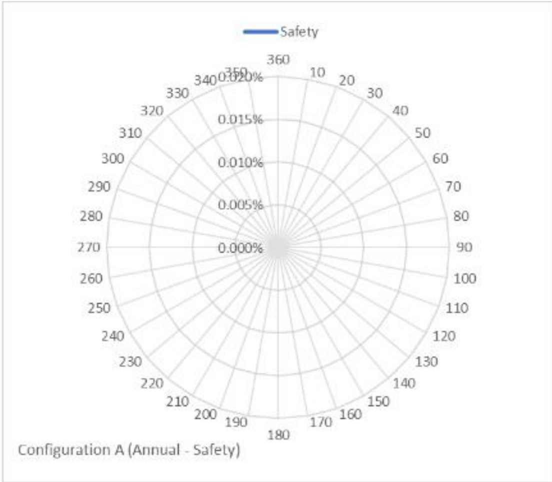
Configuration C (Annual-Comfort)

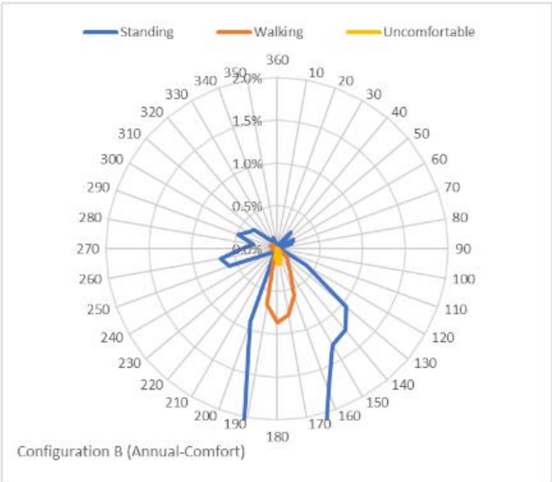


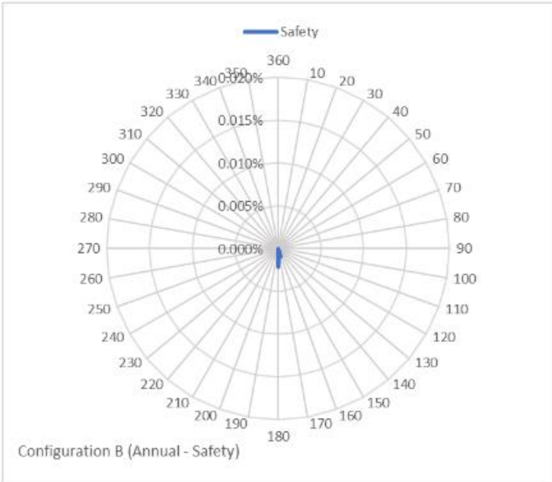
Configuration C (Annual - Safety)

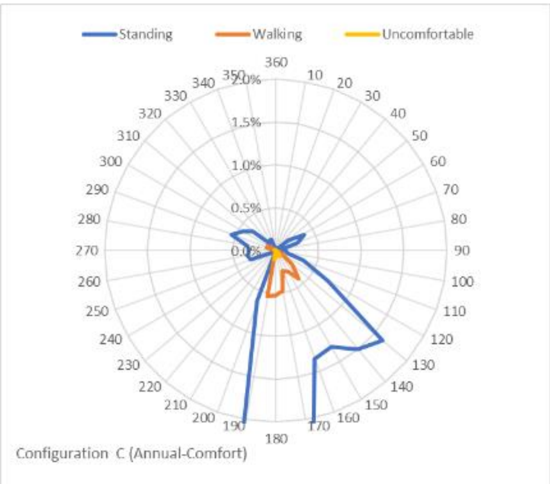
Measurement Location: 57

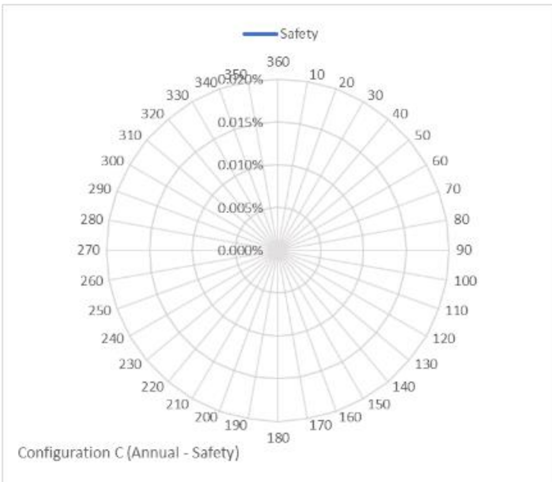




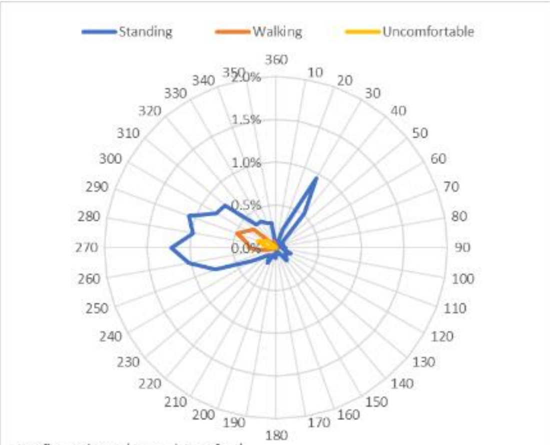




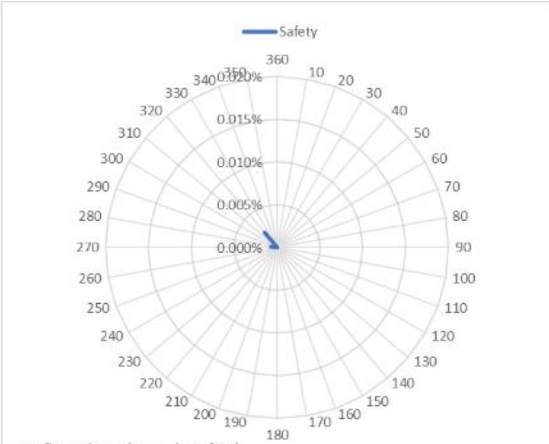




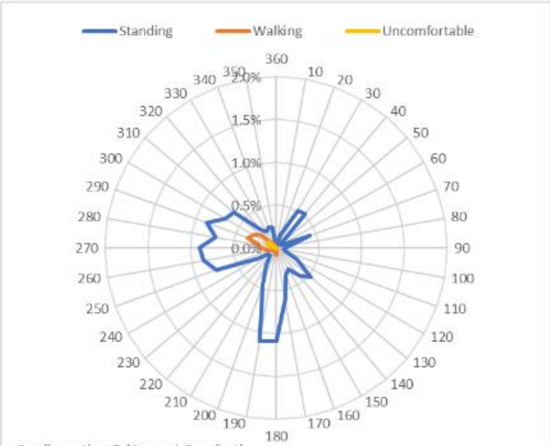
Measurement Location: 58



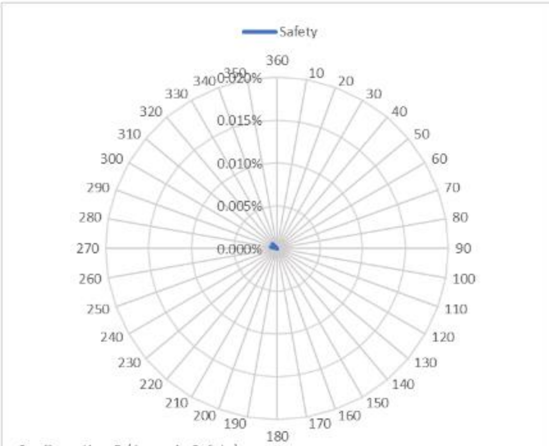
Configuration A (Annual-Comfort)



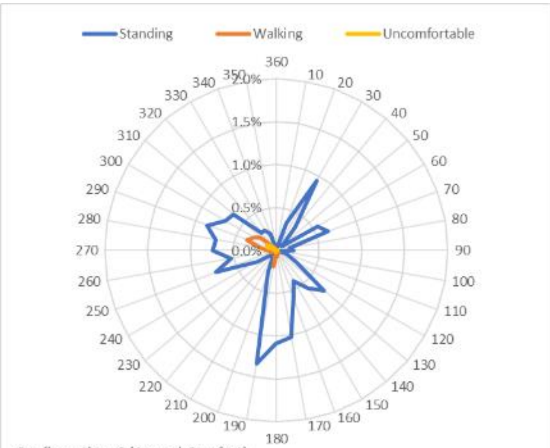
Configuration A (Annual - Safety)



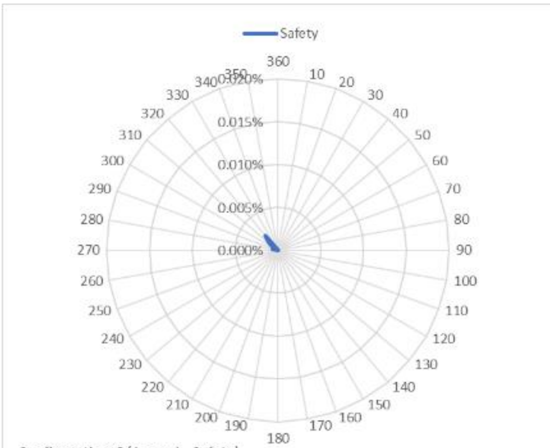
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

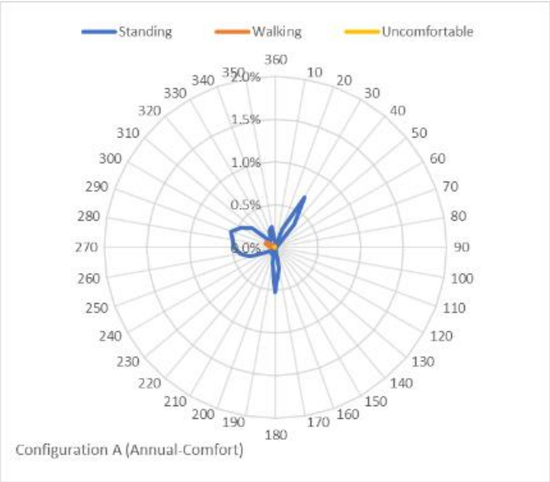


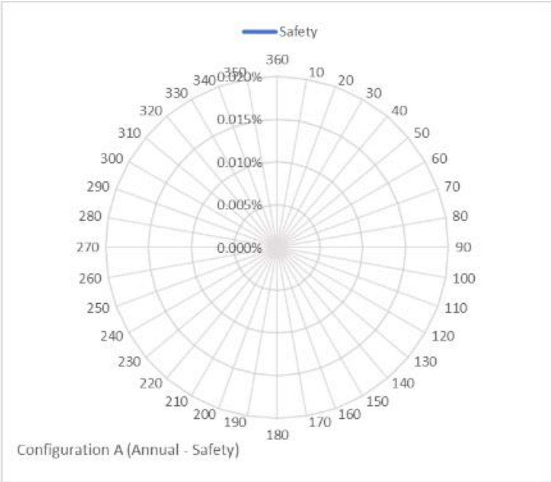
Configuration C (Annual-Comfort)

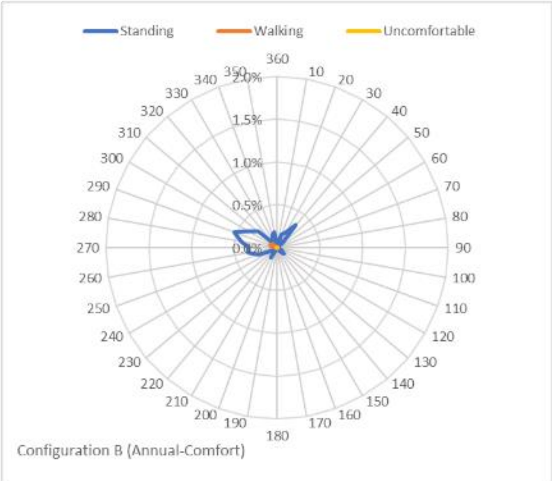


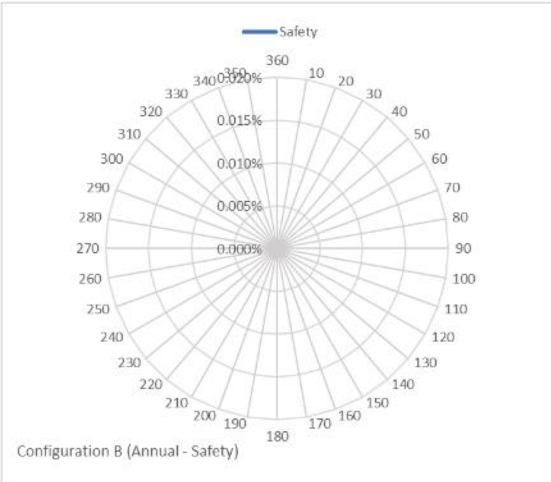
Configuration C (Annual - Safety)

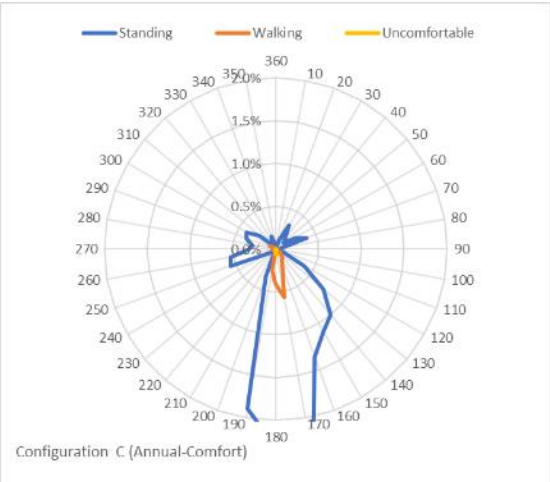
Measurement Location: 59

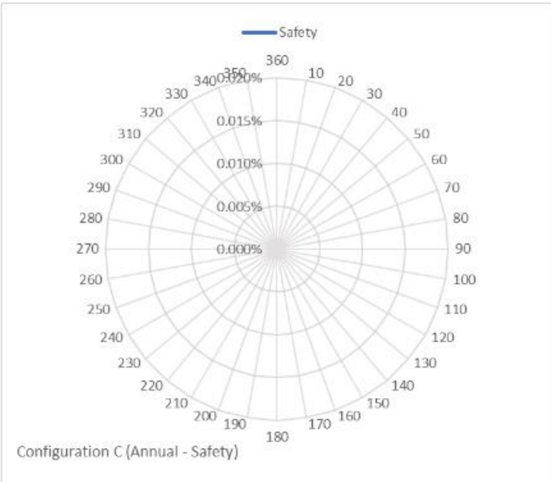




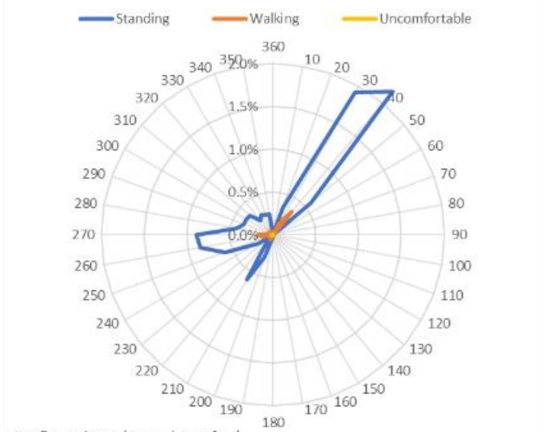




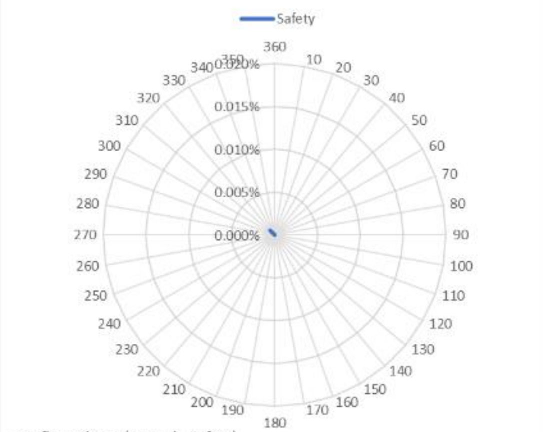




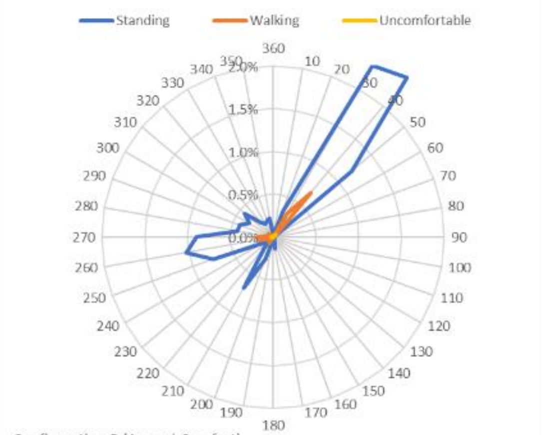
Measurement Location: 60



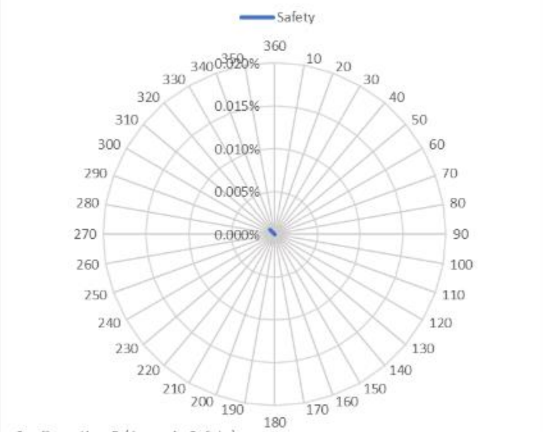
Configuration A (Annual-Comfort)



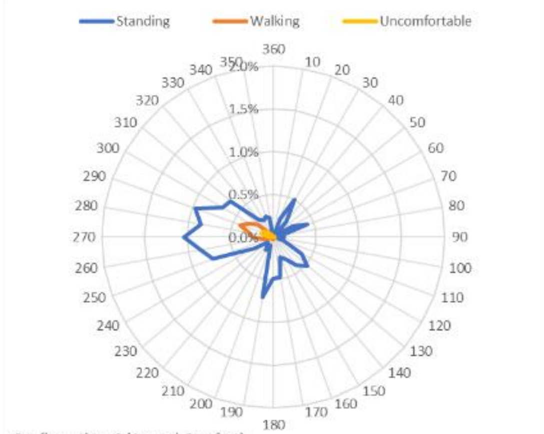
Configuration A (Annual - Safety)



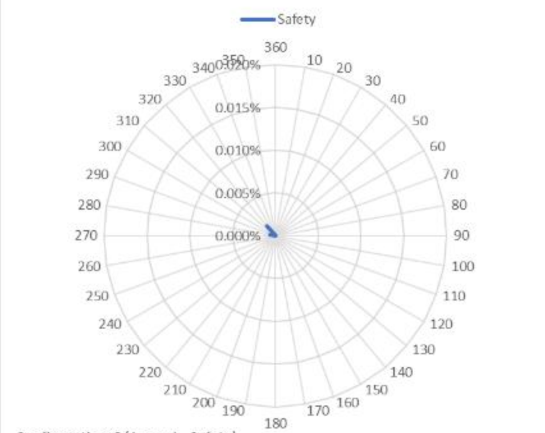
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

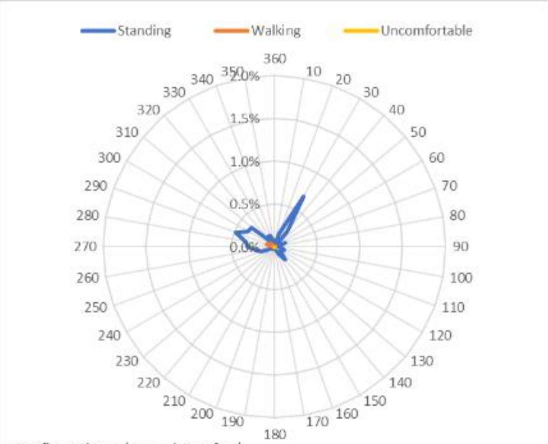


Configuration C (Annual-Comfort)

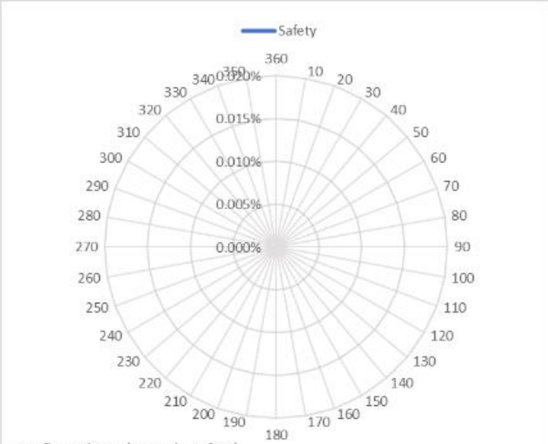


Configuration C (Annual - Safety)

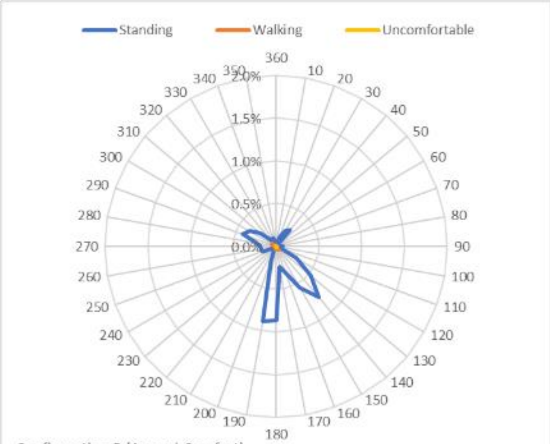
Measurement Location: 61



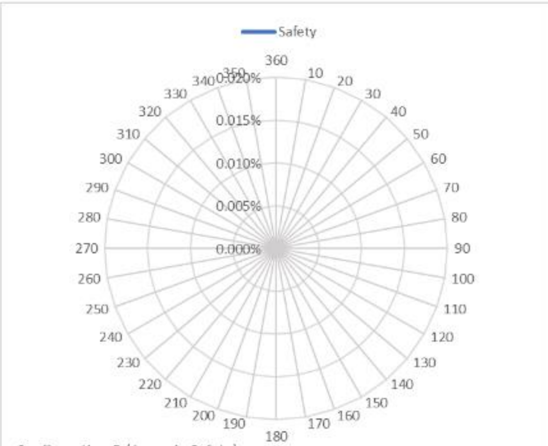
Configuration A (Annual-Comfort)



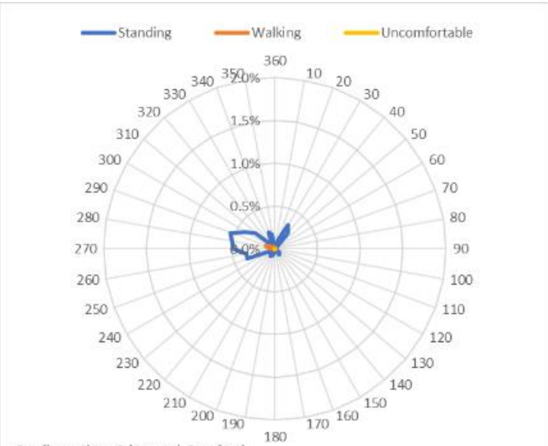
Configuration A (Annual - Safety)



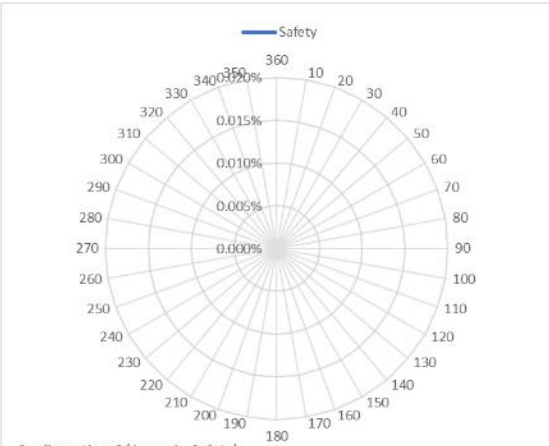
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

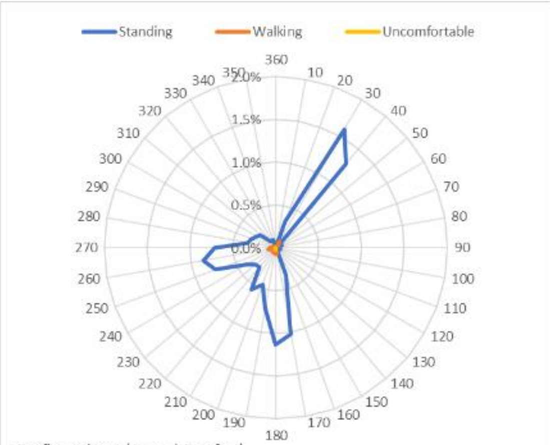


Configuration C (Annual-Comfort)

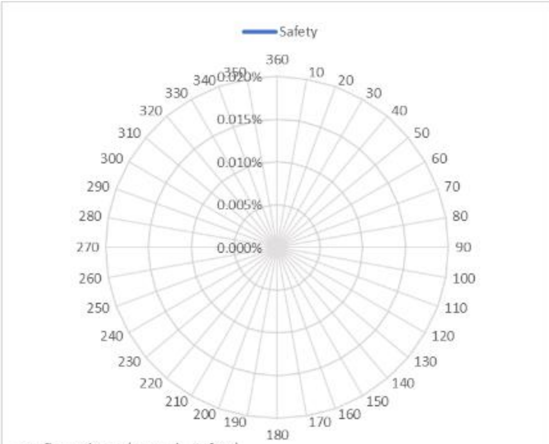


Configuration C (Annual - Safety)

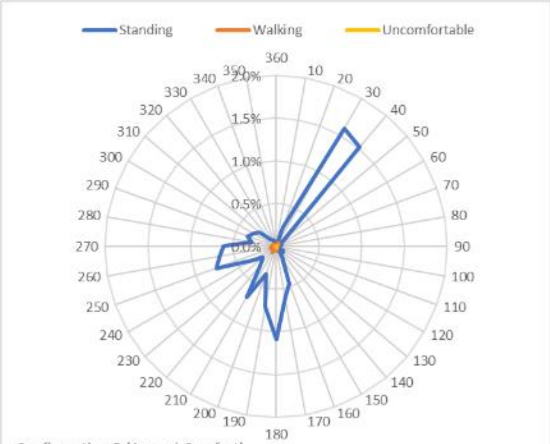
Measurement Location: 62



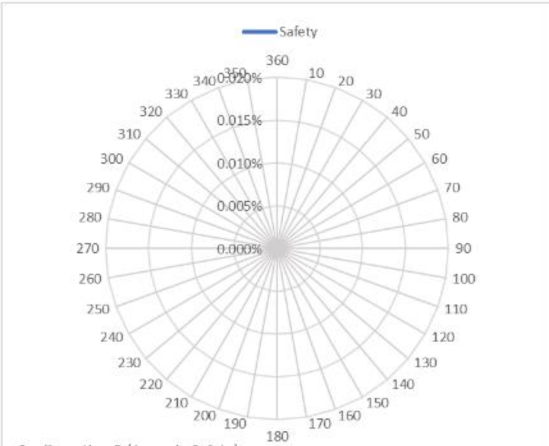
Configuration A (Annual-Comfort)



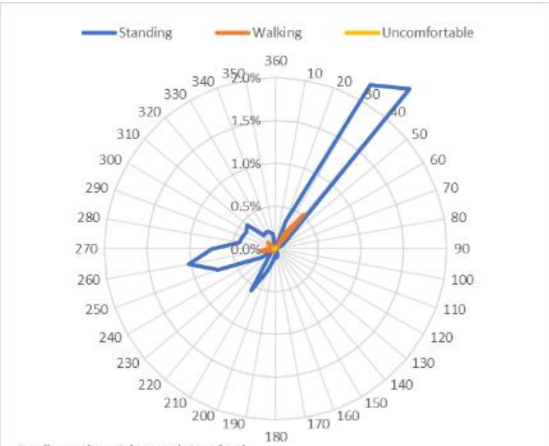
Configuration A (Annual - Safety)



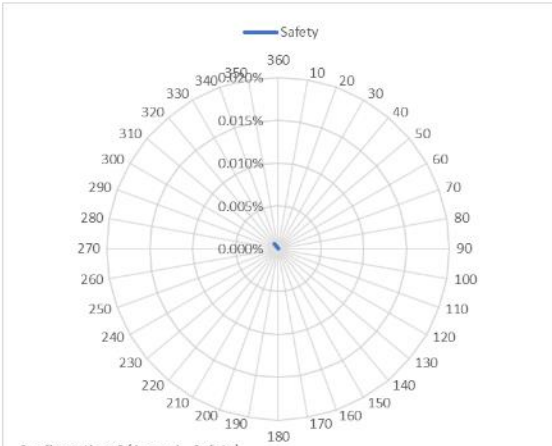
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

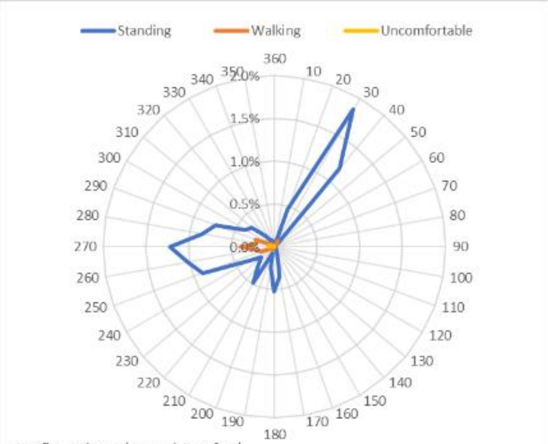


Configuration C (Annual-Comfort)

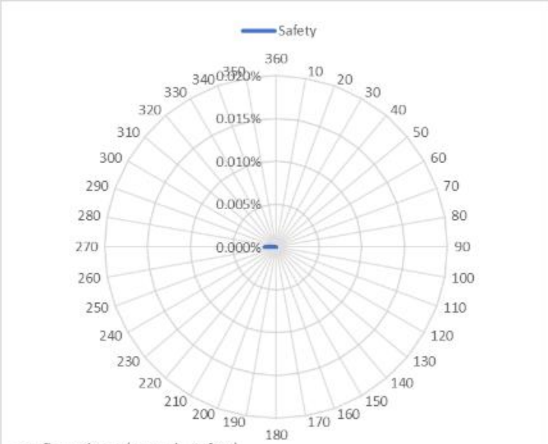


Configuration C (Annual - Safety)

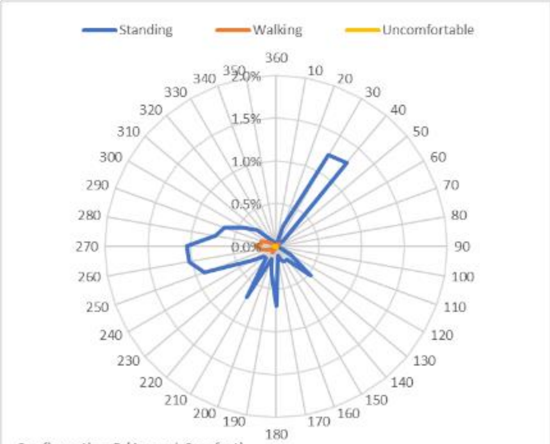
Measurement Location: 63



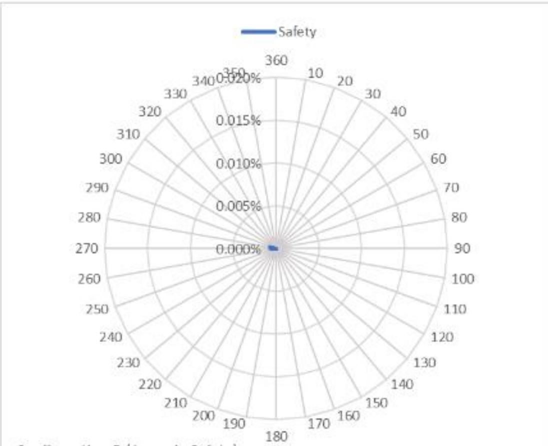
Configuration A (Annual-Comfort)



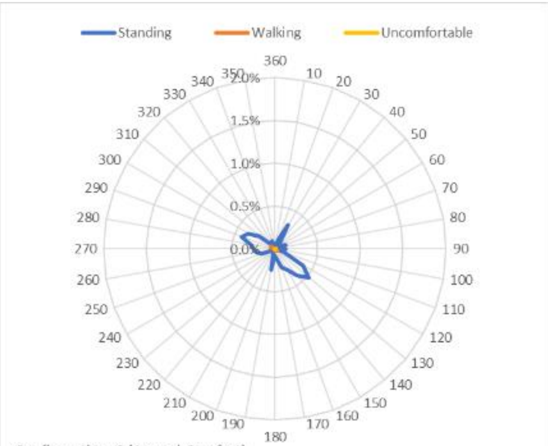
Configuration A (Annual - Safety)



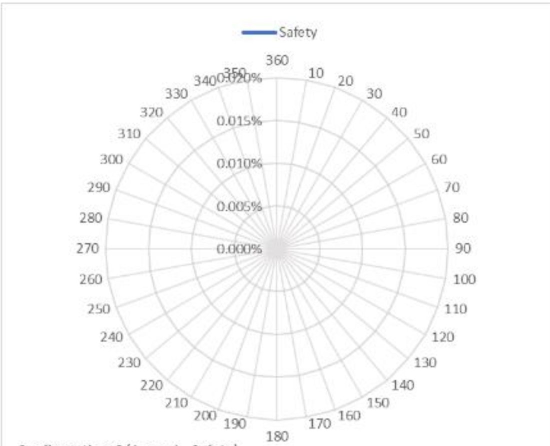
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

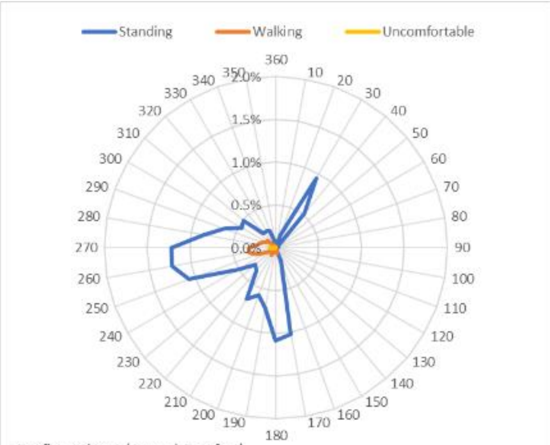


Configuration C (Annual-Comfort)

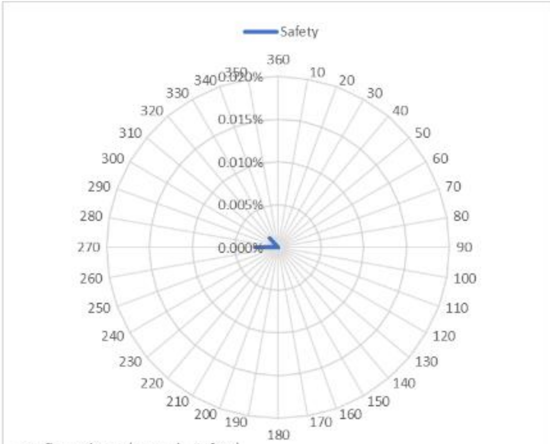


Configuration C (Annual - Safety)

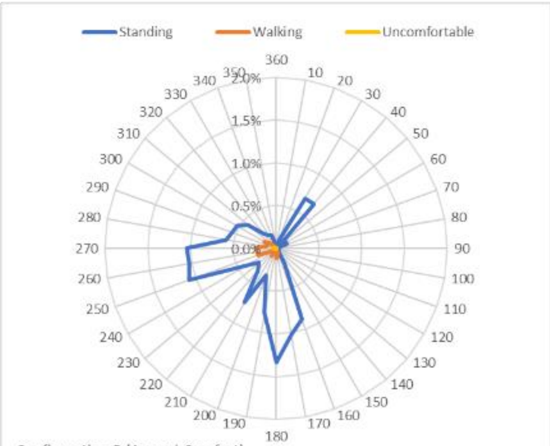
Measurement Location: 64



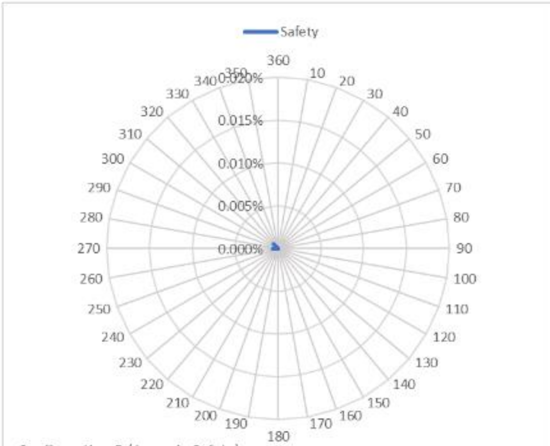
Configuration A (Annual-Comfort)



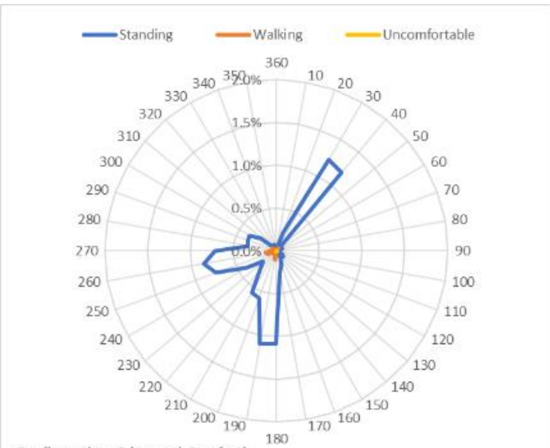
Configuration A (Annual - Safety)



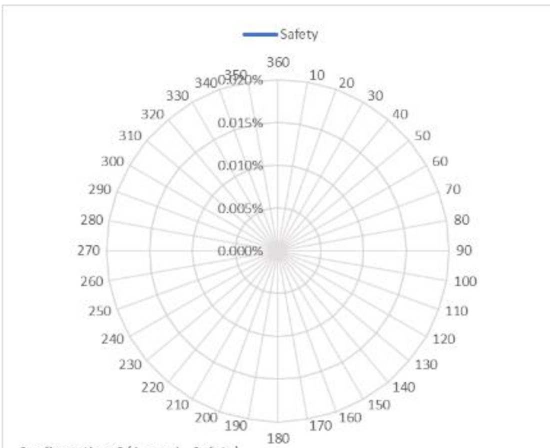
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

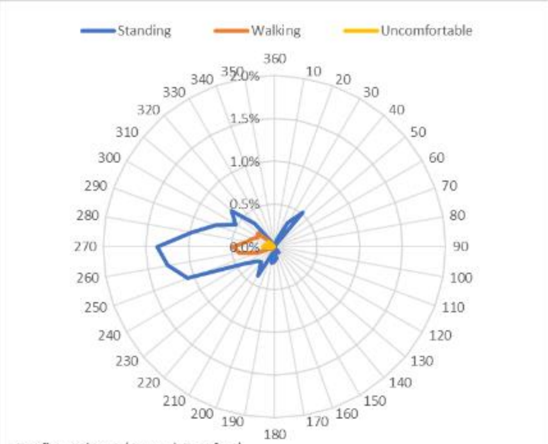


Configuration C (Annual-Comfort)

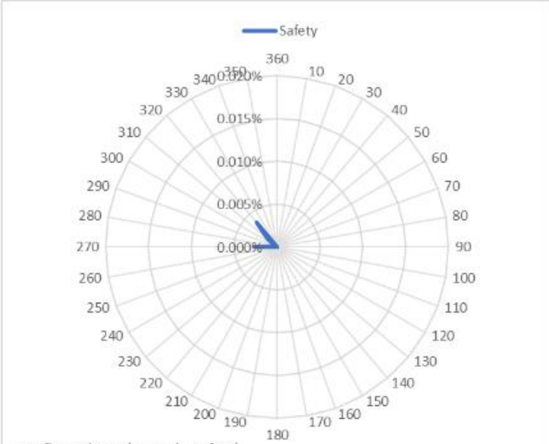


Configuration C (Annual - Safety)

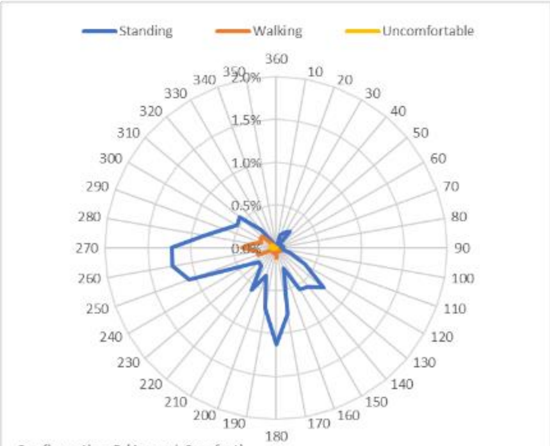
Measurement Location: 65



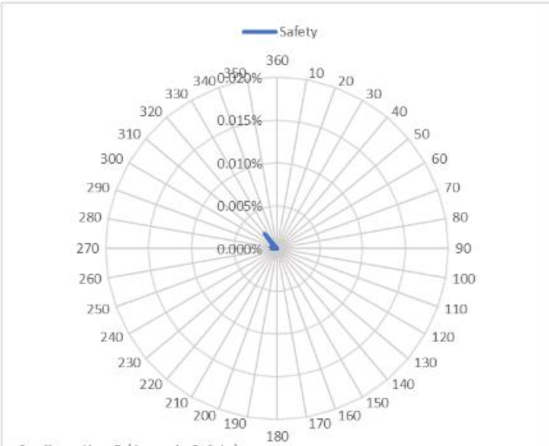
Configuration A (Annual-Comfort)



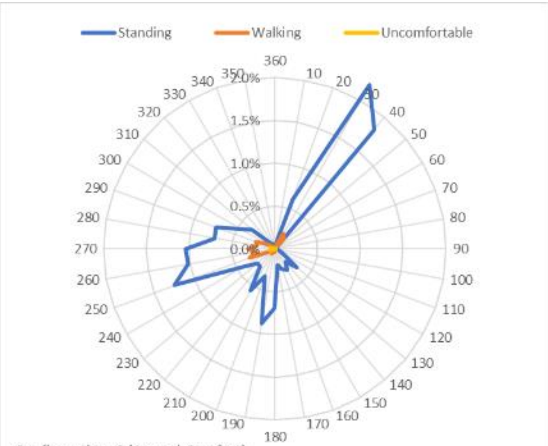
Configuration A (Annual - Safety)



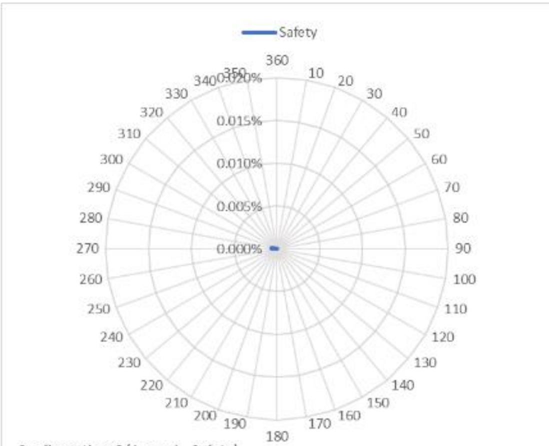
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

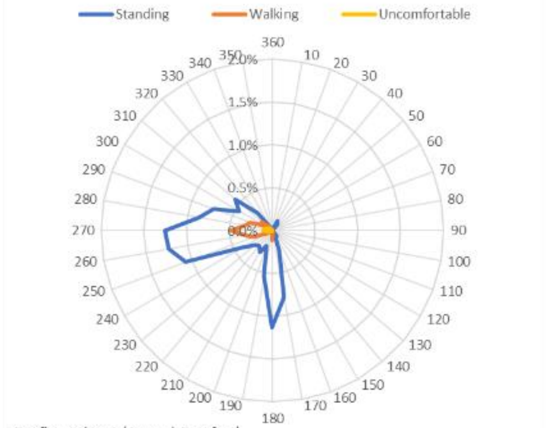


Configuration C (Annual-Comfort)

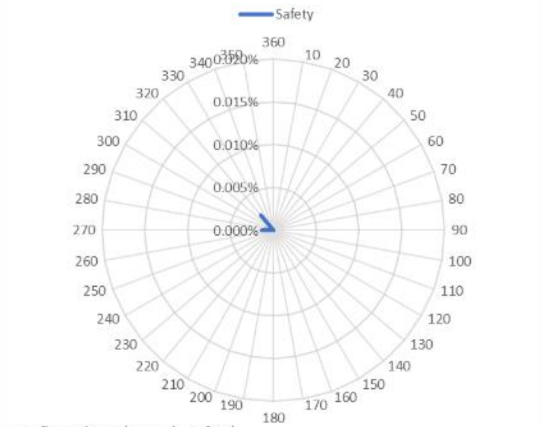


Configuration C (Annual - Safety)

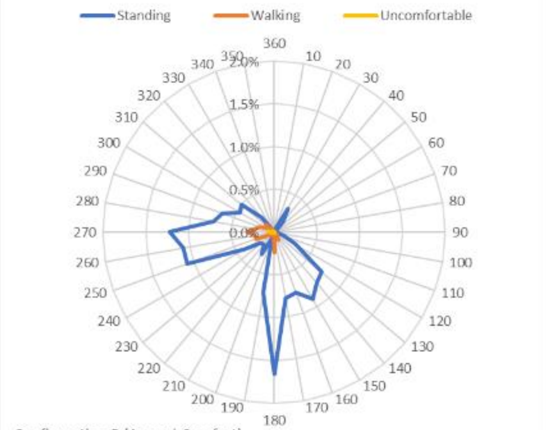
Measurement Location: 66



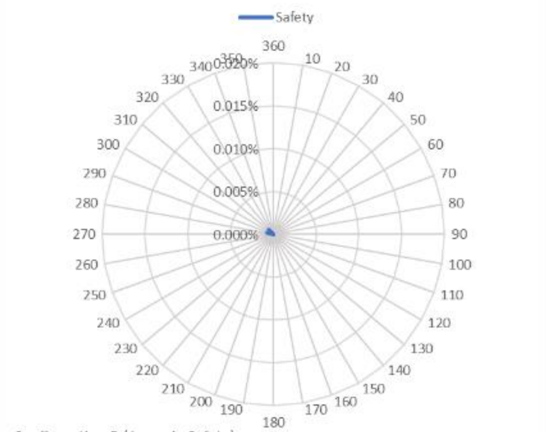
Configuration A (Annual-Comfort)



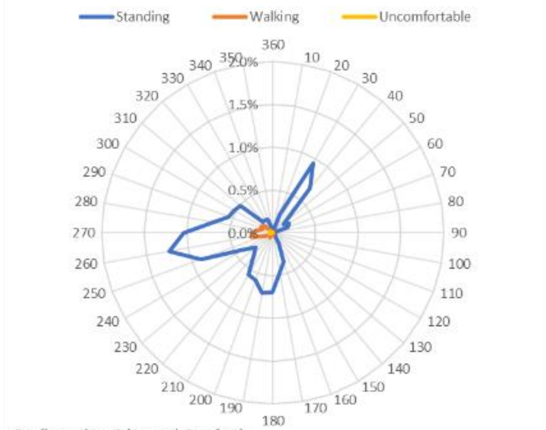
Configuration A (Annual - Safety)



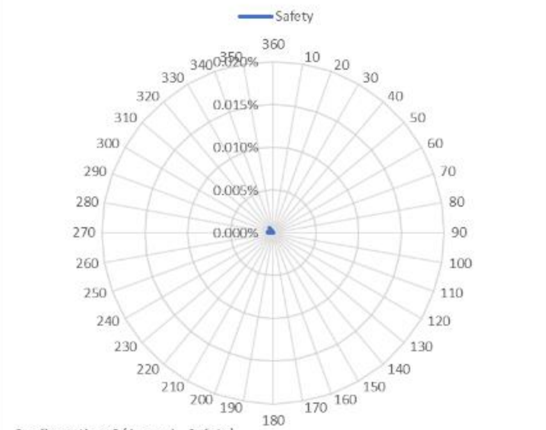
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

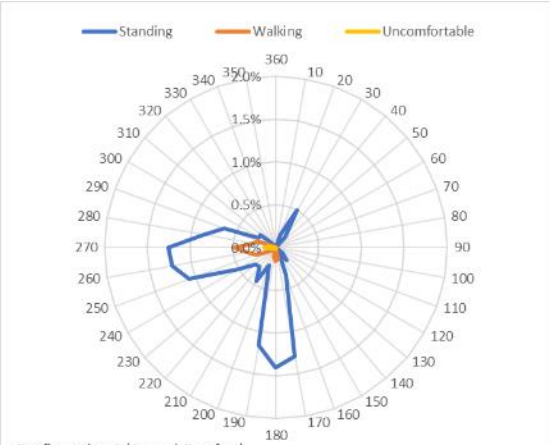


Configuration C (Annual-Comfort)

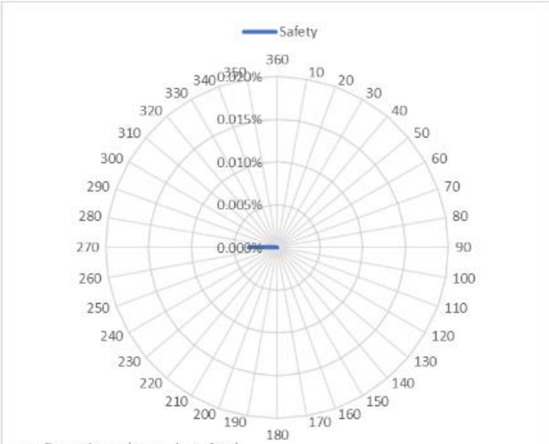


Configuration C (Annual - Safety)

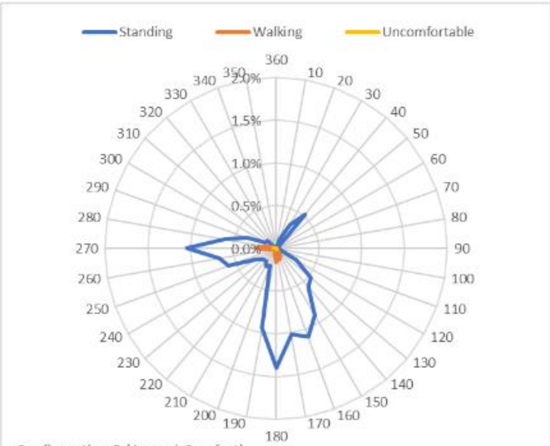
Measurement Location: 67



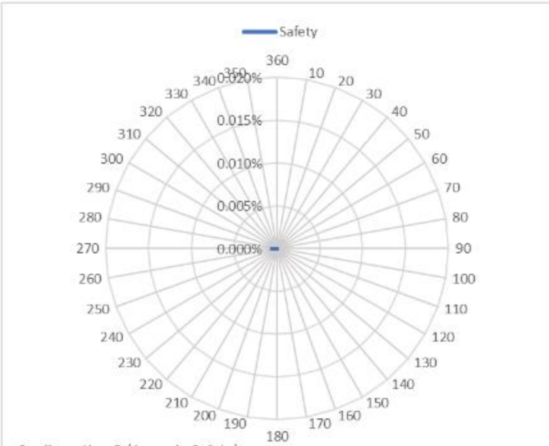
Configuration A (Annual-Comfort)



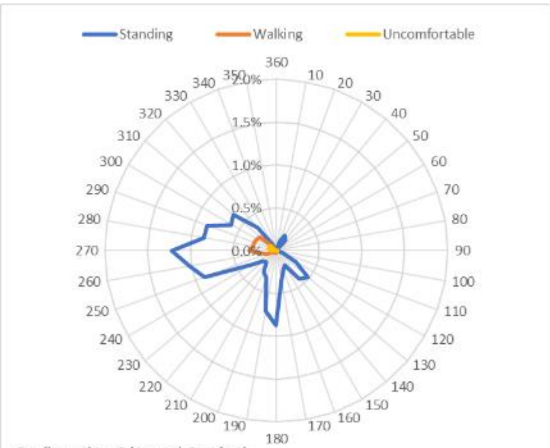
Configuration A (Annual - Safety)



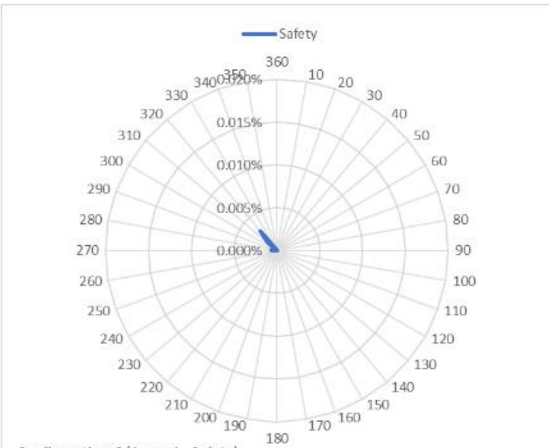
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

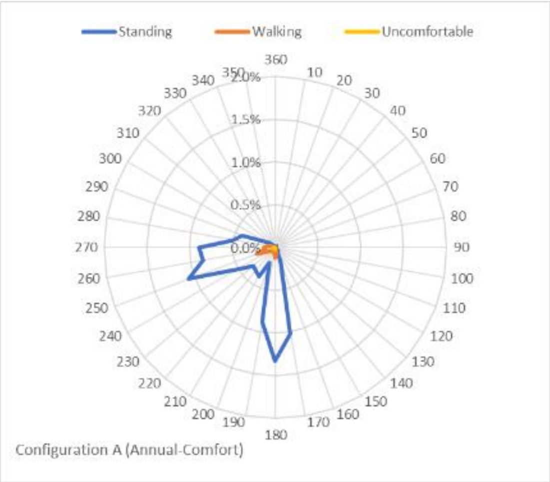


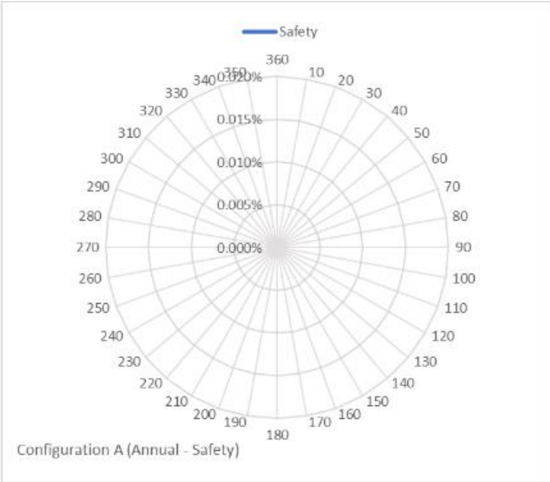
Configuration C (Annual-Comfort)

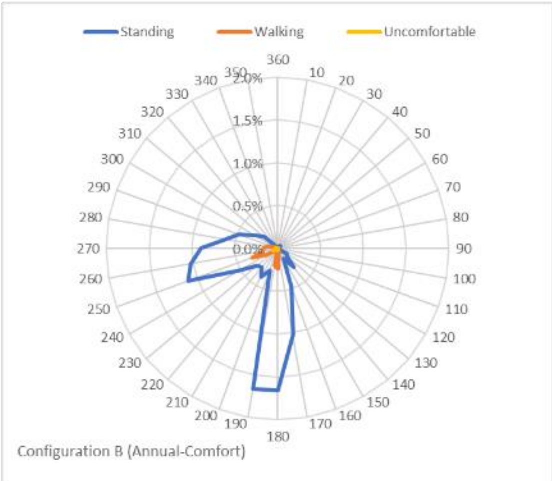


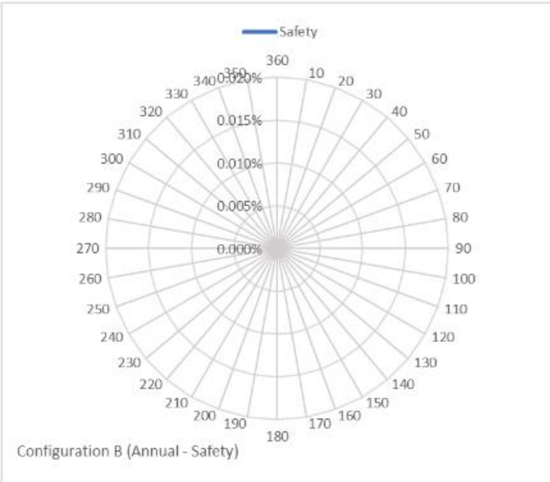
Configuration C (Annual - Safety)

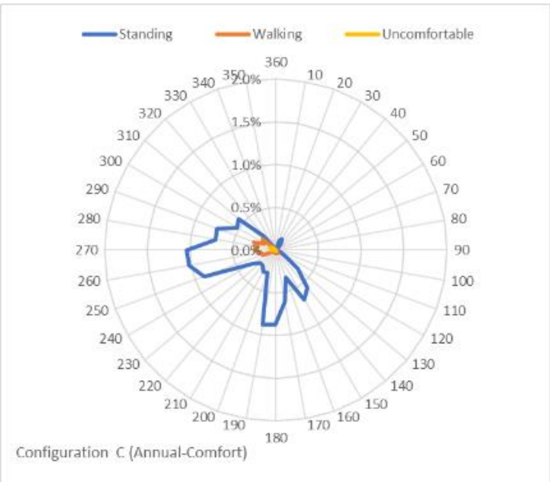
Measurement Location: 68

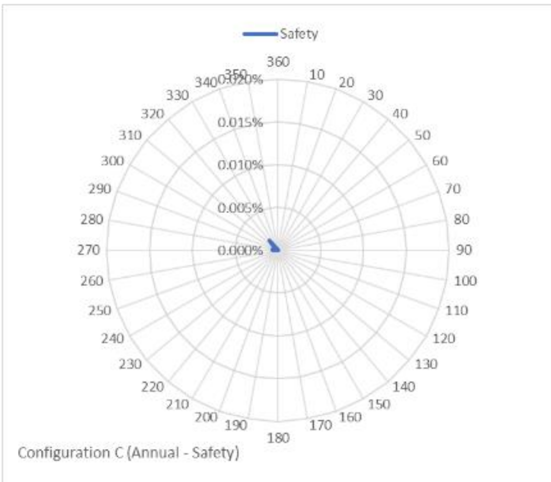




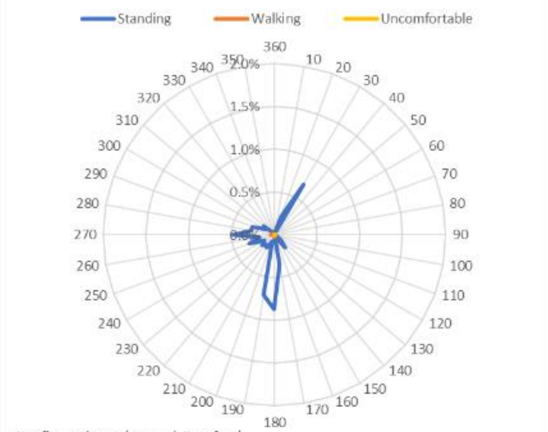




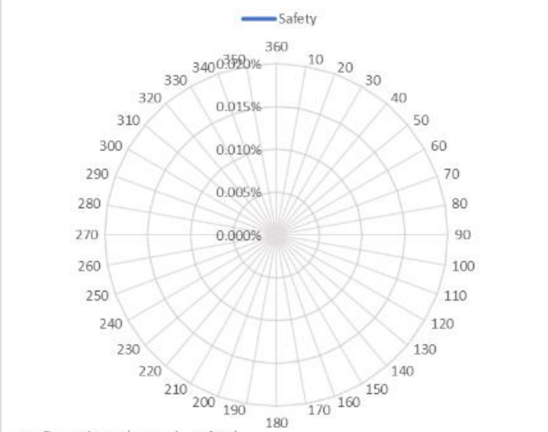




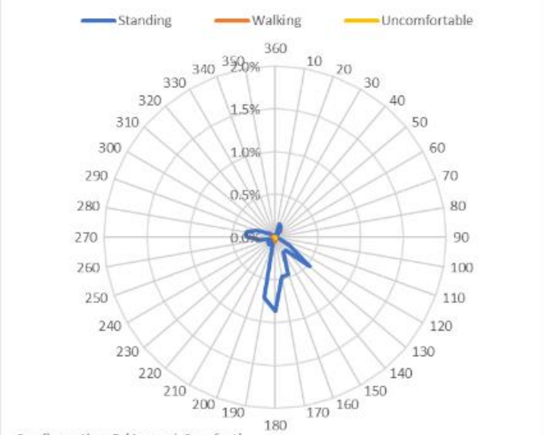
Measurement Location: 69



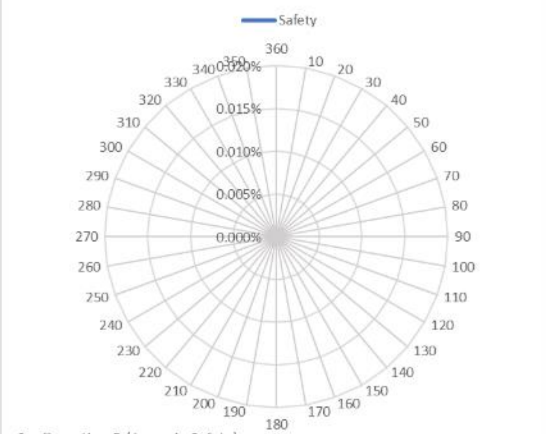
Configuration A (Annual-Comfort)



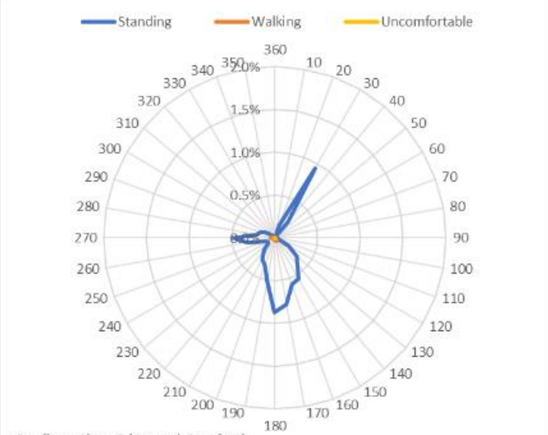
Configuration A (Annual - Safety)



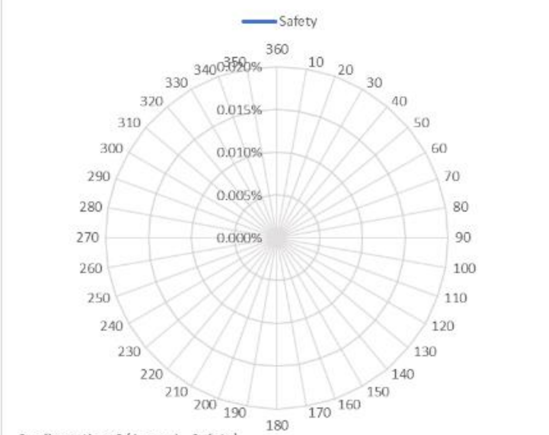
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

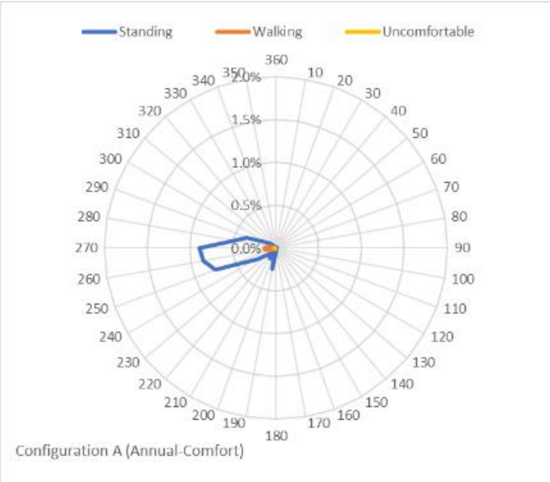


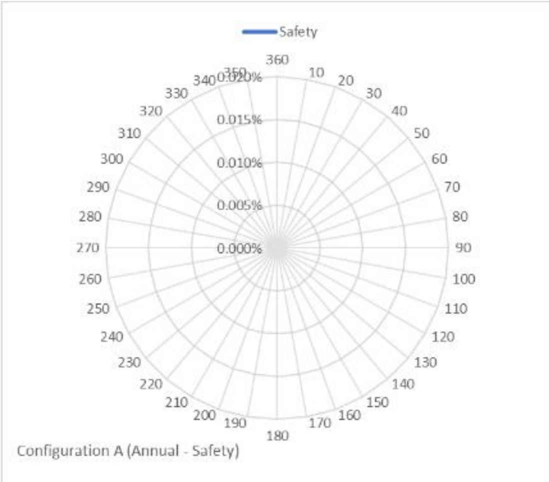
Configuration C (Annual-Comfort)

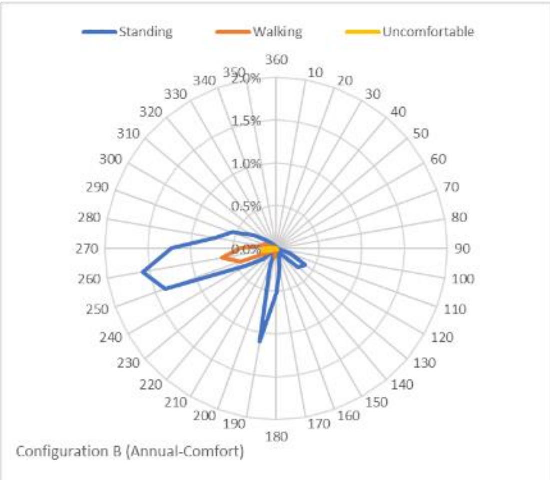


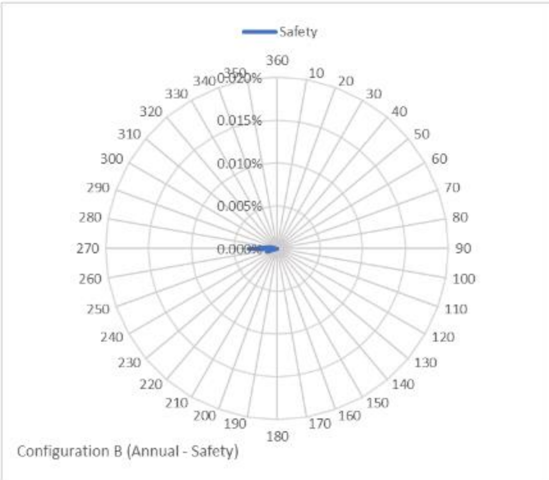
Configuration C (Annual - Safety)

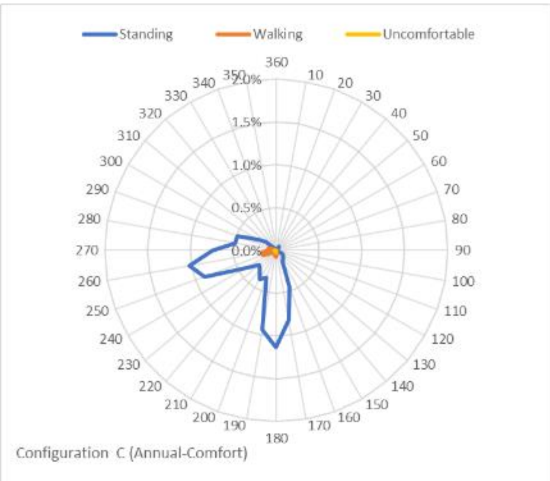
Measurement Location: 70

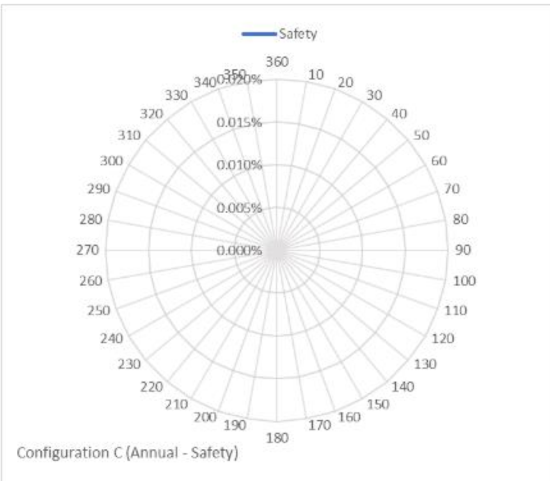




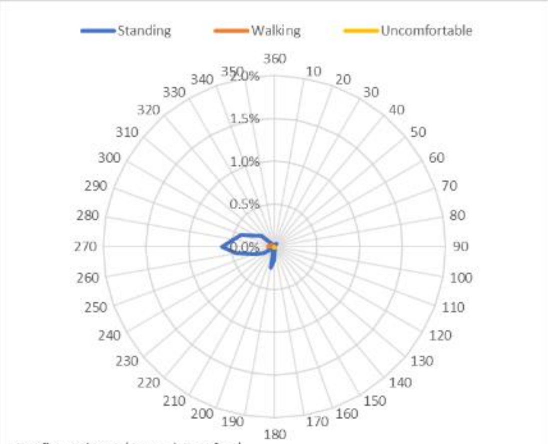




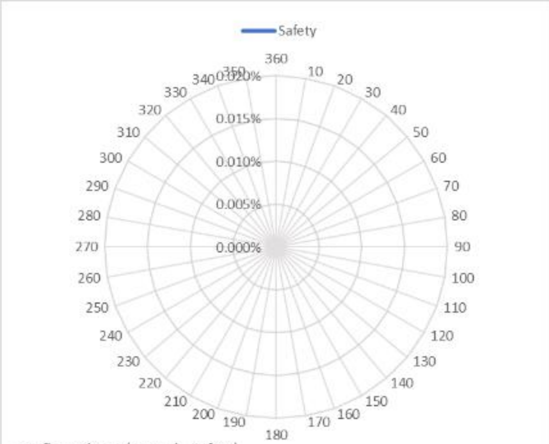




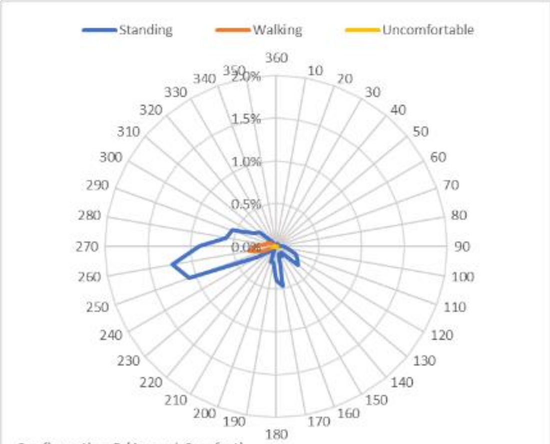
Measurement Location: 71



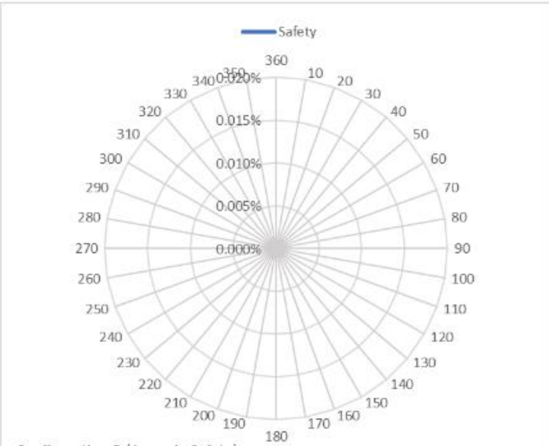
Configuration A (Annual-Comfort)



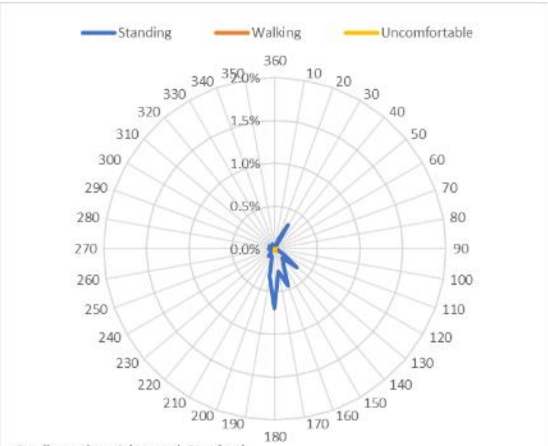
Configuration A (Annual - Safety)



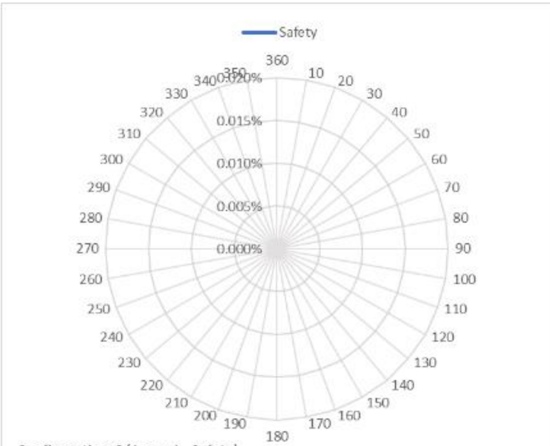
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

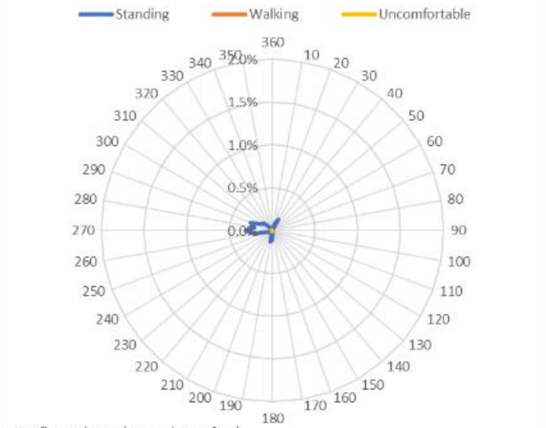


Configuration C (Annual-Comfort)

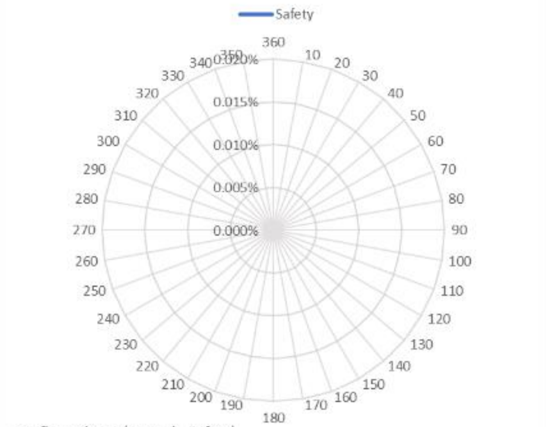


Configuration C (Annual - Safety)

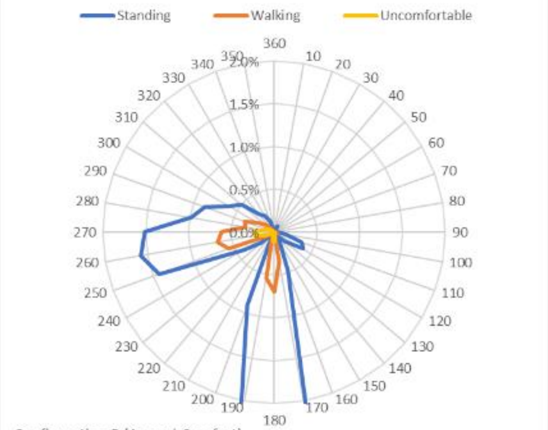
Measurement Location: 72



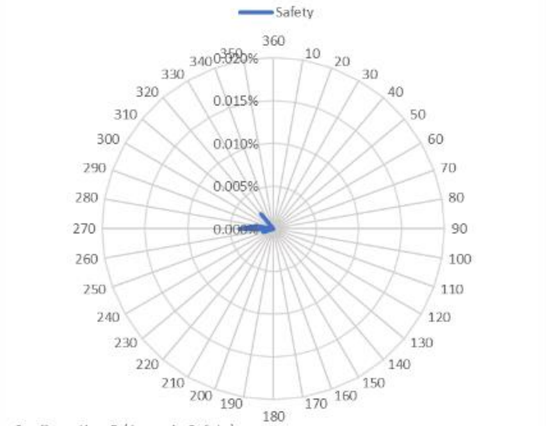
Configuration A (Annual-Comfort)



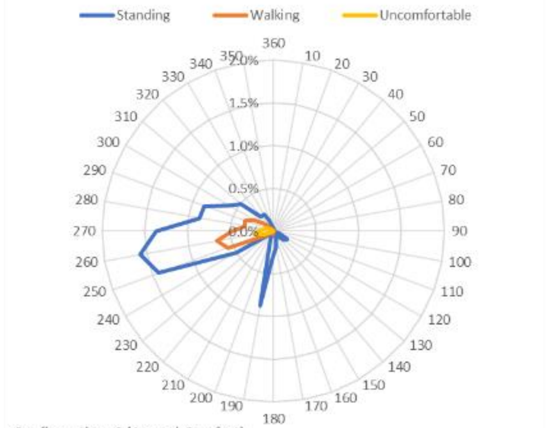
Configuration A (Annual - Safety)



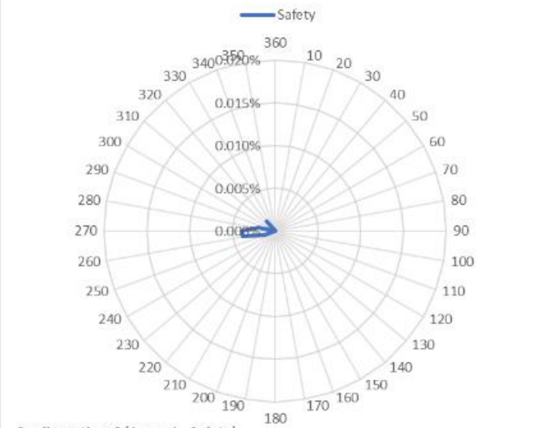
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

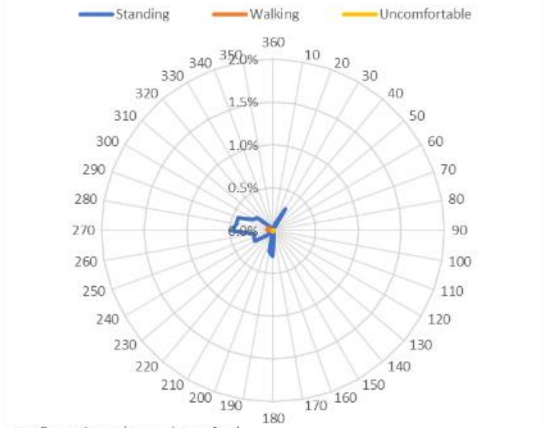


Configuration C (Annual-Comfort)

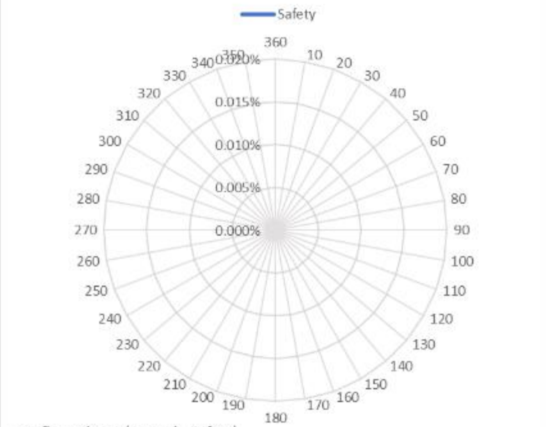


Configuration C (Annual - Safety)

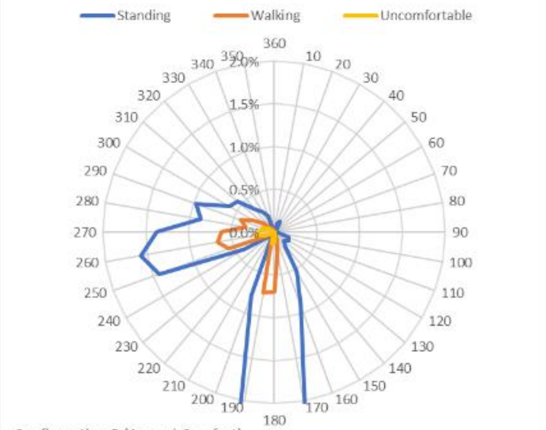
Measurement Location: 73



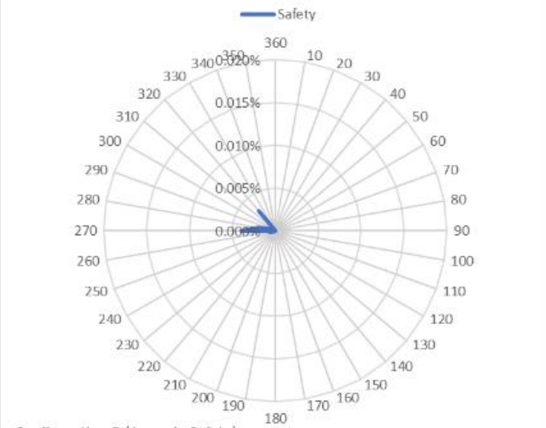
Configuration A (Annual-Comfort)



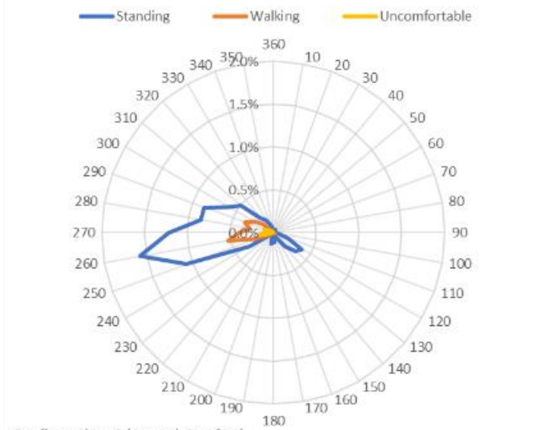
Configuration A (Annual - Safety)



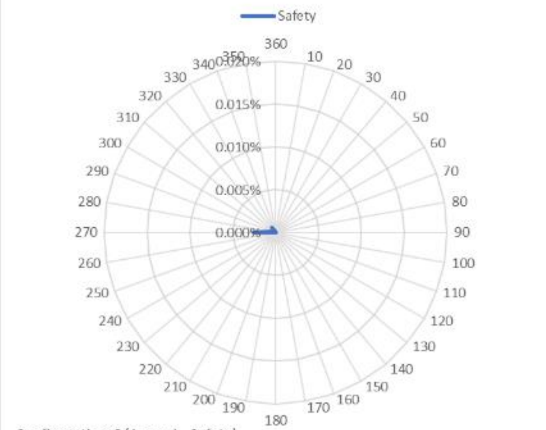
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)

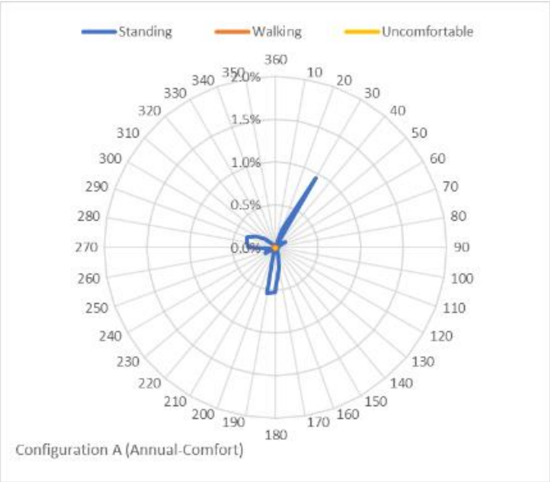


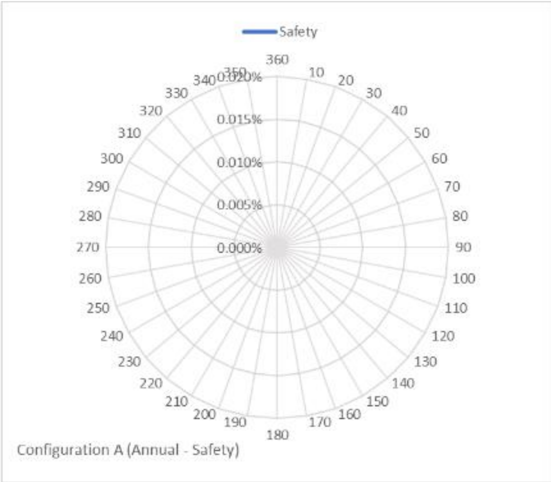
Configuration C (Annual-Comfort)

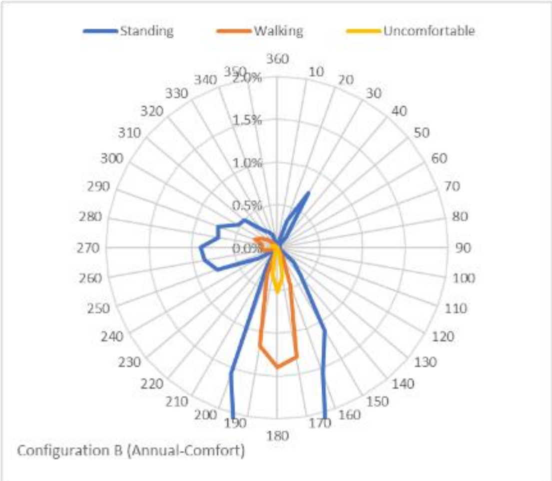


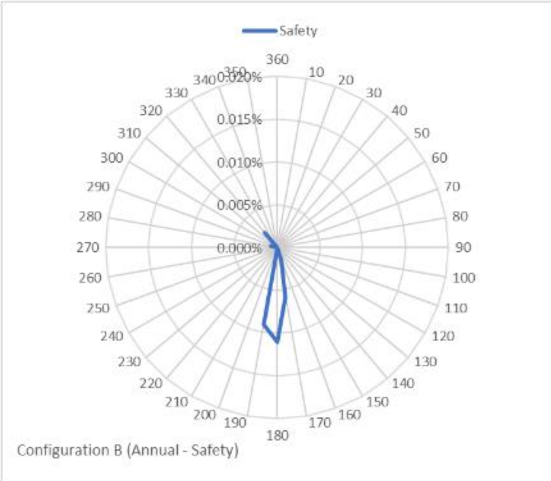
Configuration C (Annual - Safety)

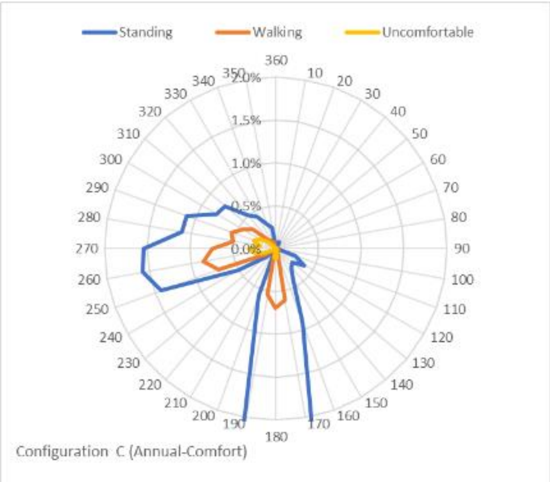
Measurement Location: 74

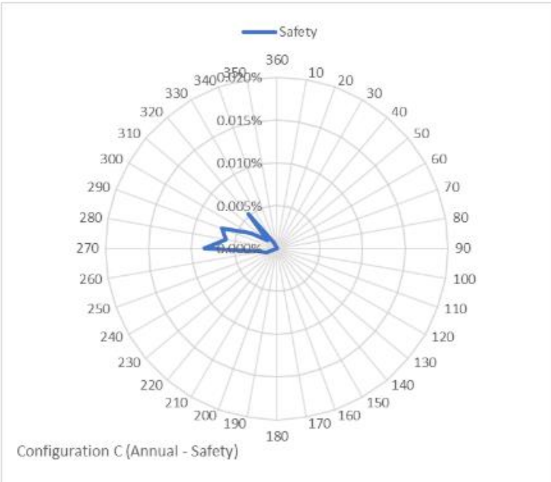




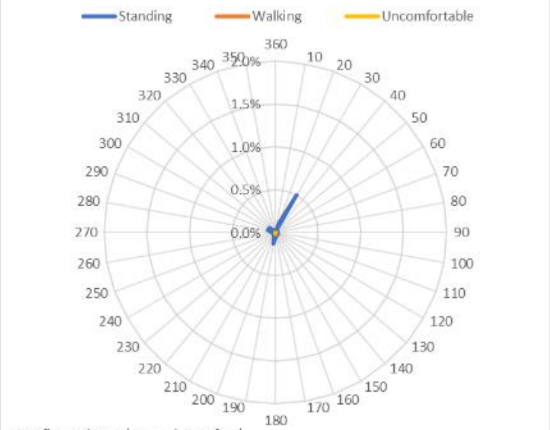




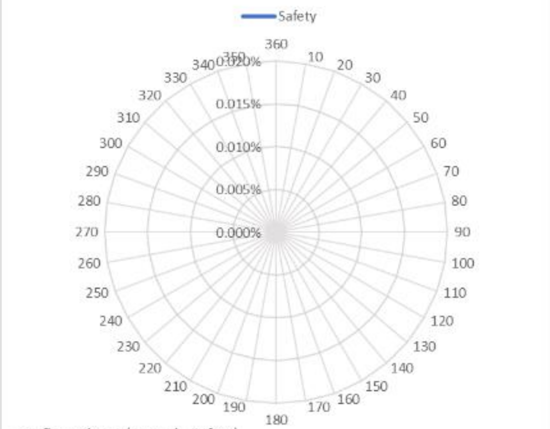




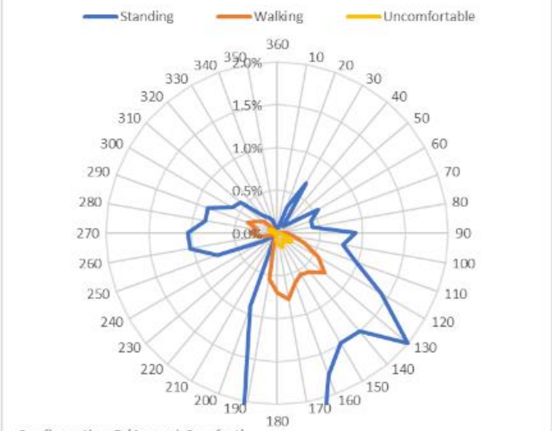
Measurement Location: 75



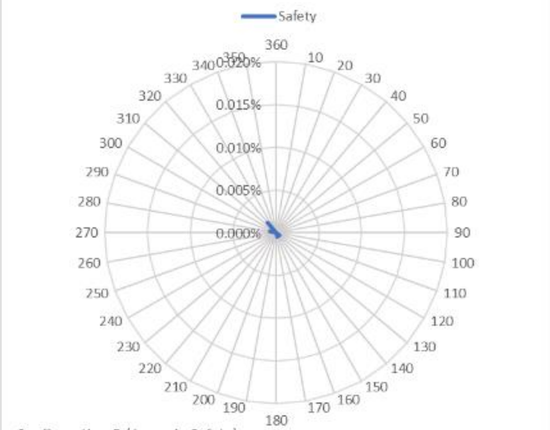
Configuration A (Annual-Comfort)



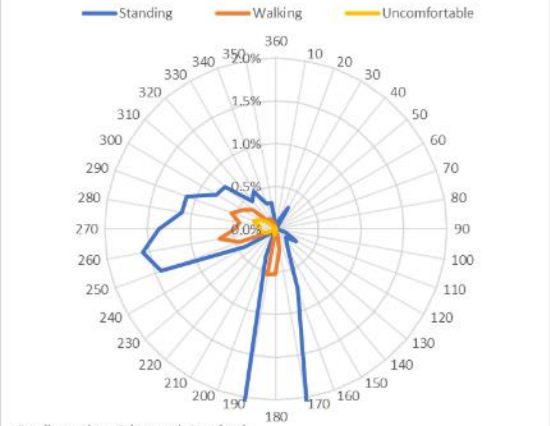
Configuration A (Annual - Safety)



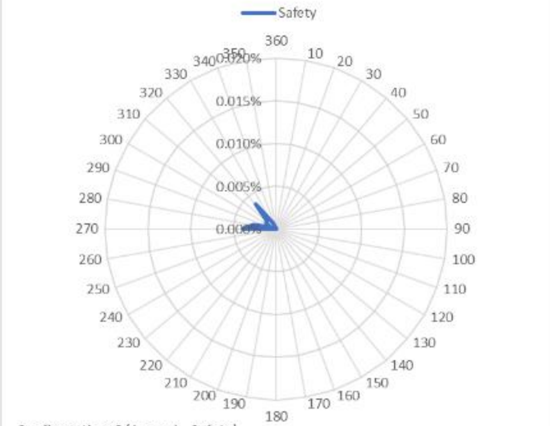
Configuration B (Annual-Comfort)



Configuration B (Annual - Safety)



Configuration C (Annual-Comfort)



Configuration C (Annual - Safety)

Your ref -
Our ref 270416
File ref -

ARUP

Barrack Place, Level 5, 151 Clarence Street
PO Box 76 Millers Point
Sydney NSW 2000
Australia

t +61 2 9320 9320
d +61 2 9320 9921
m +61 416 161 856
f +61 2 9320 9321

graeme-s.wood@arup.com
www.arup.com

Greaton Developments Pty. Ltd.
Mr. Peter Jones
Suite 3301, Level 33, 52 Martin Place
Sydney
NSW 2000

12 August 2020

187 Thomas Street – ground level wind conditions

Dear Mr. Jones,

Please find herein a brief report discussing the results of the indicative Computation Fluid Dynamics (CFD) study to show the benefits of potential design changes to the building on the wind conditions around the proposed development at 187 Thomas Street, Sydney. This report follows on from the meeting with the City of Sydney Council on 27 July 2020 where such a quantitative study was requested to illustrate the potential level of improvement such changes to the tower design would have on the local wind conditions prior to the design competition. Due to the relatively minor exceedances of the comfort and safety criteria measured in the wind-tunnel tests and the relative tight timeframes to conduct the analysis, it was agreed that a comparative numerical study would be appropriate to illustrate the impact of changes to the building massing on the local wind environment relative to the wind-tunnel testing.

Summary of previous results

Three configurations were previously wind-tunnel tested: existing, baseline, and proposed indicative scheme 5B. The results for the proposed indicative scheme are presented in Figure 1 showing exceedances of the safety criterion, and directional results: the contour plots show the comfort conditions with the contours at a 5% directional level, and the smaller polar plots indicate the wind directions contributing to the safety criterion. It is evident that the wind directions causing the safety exceedances are from the south and west-north-west. On the contour polar plots, wind speed measurements outside the yellow (walking) contour are the important results to mitigate.

CFD modelling

A 3d model of the site building and surrounding buildings in the near-field was prepared for the numerical study, Figure 2. Three site models were considered, Figure 3, based on the proposed potential mitigation techniques discussed in our previous report dated 12 June 2020. Configuration 5B was the proposed scheme from the previous wind-tunnel tests, Configuration 6A has an additional notch to the west, and Configuration 6B includes a more rounded south-west tower corner. All schemes have a 20:1 floor space ratio above ground with the amended geometry slightly increasing the height of the tower, but remaining inside the proposed DCP envelope. The site models did not include any awnings, which would locally improve the wind conditions.

The 3d numeric model was meshed with about 12 million cells. Each site model was modelled for the two significant incident wind directions: south and west-north-west. The

CFD analysis was conducted using a steady-state RANS simulation with an approach boundary layer profile suitable for the city environment. The volume refinement regions were introduced refining mesh to a radius of 100 m around the building to accurately capture flow features closer to the building and surrounding streets. The model was run for over 2000 iterations to allow model convergence. Monitor points on the surrounding streets and around building were implemented to ensure parameters convergence. The results show the mean wind speed and do not represent the magnitude of the gust, however the magnitude of the reduction would be expected to be similar.

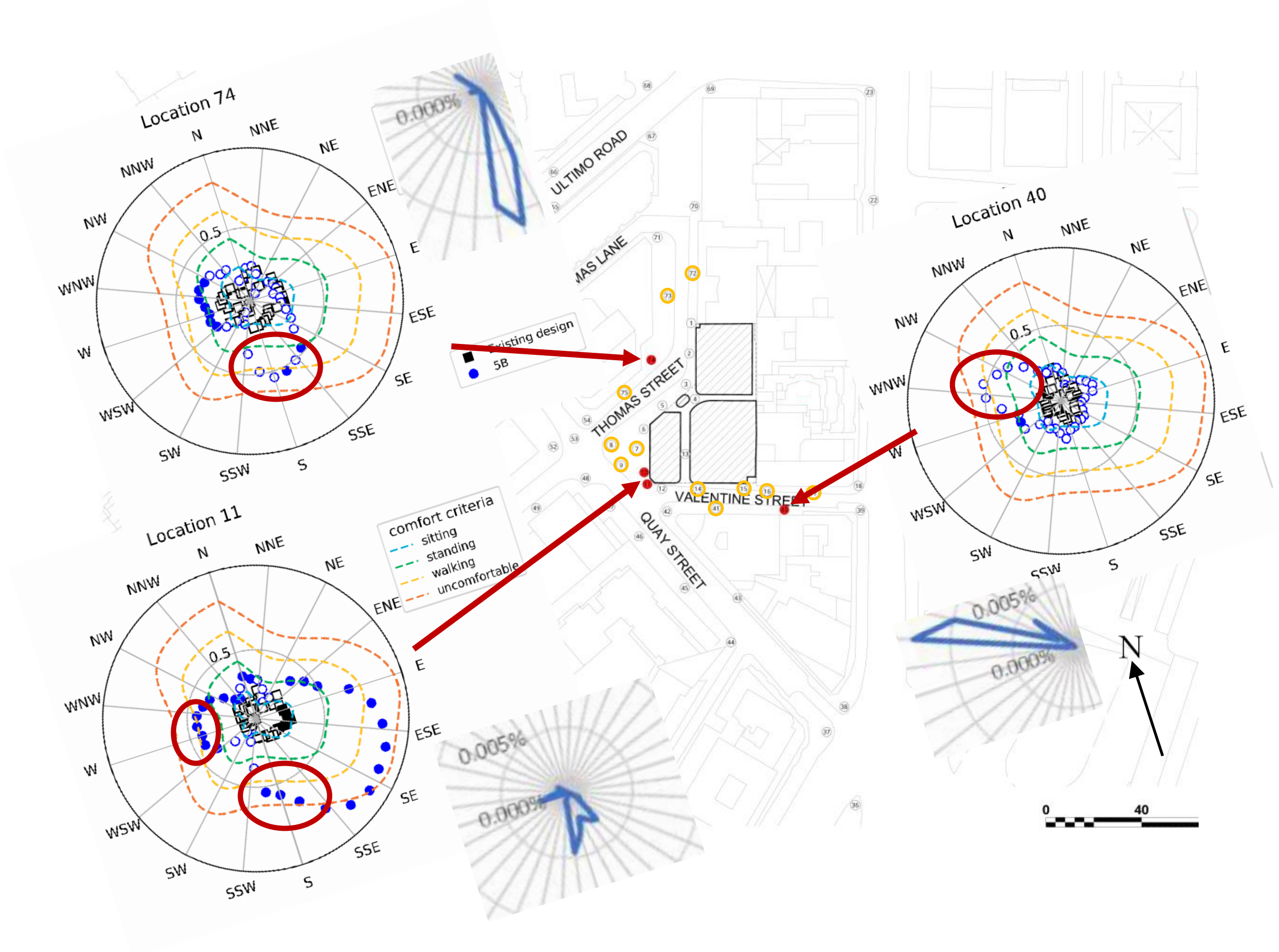


Figure 1: Proposed option 5B configuration safety wind rating and directional plots

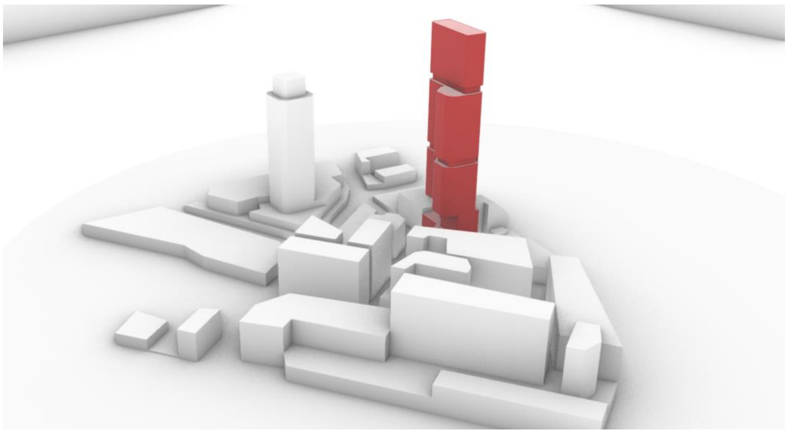


Figure 2: Extent of generic numeric model viewed from the south-west

Comparative results showing the wind speed ratio are presented in Figure 3. The wind speed ratio is the local mean wind speed at pedestrian height of 1.5 m divided by the mean wind speed at 10 m above ground level at the domain inlet. The relative wind speed ratios at the various points across the different wind directions are similar to those measured in the wind-tunnel tests, Figure 2, providing confidence in the results of the numerical modelling.

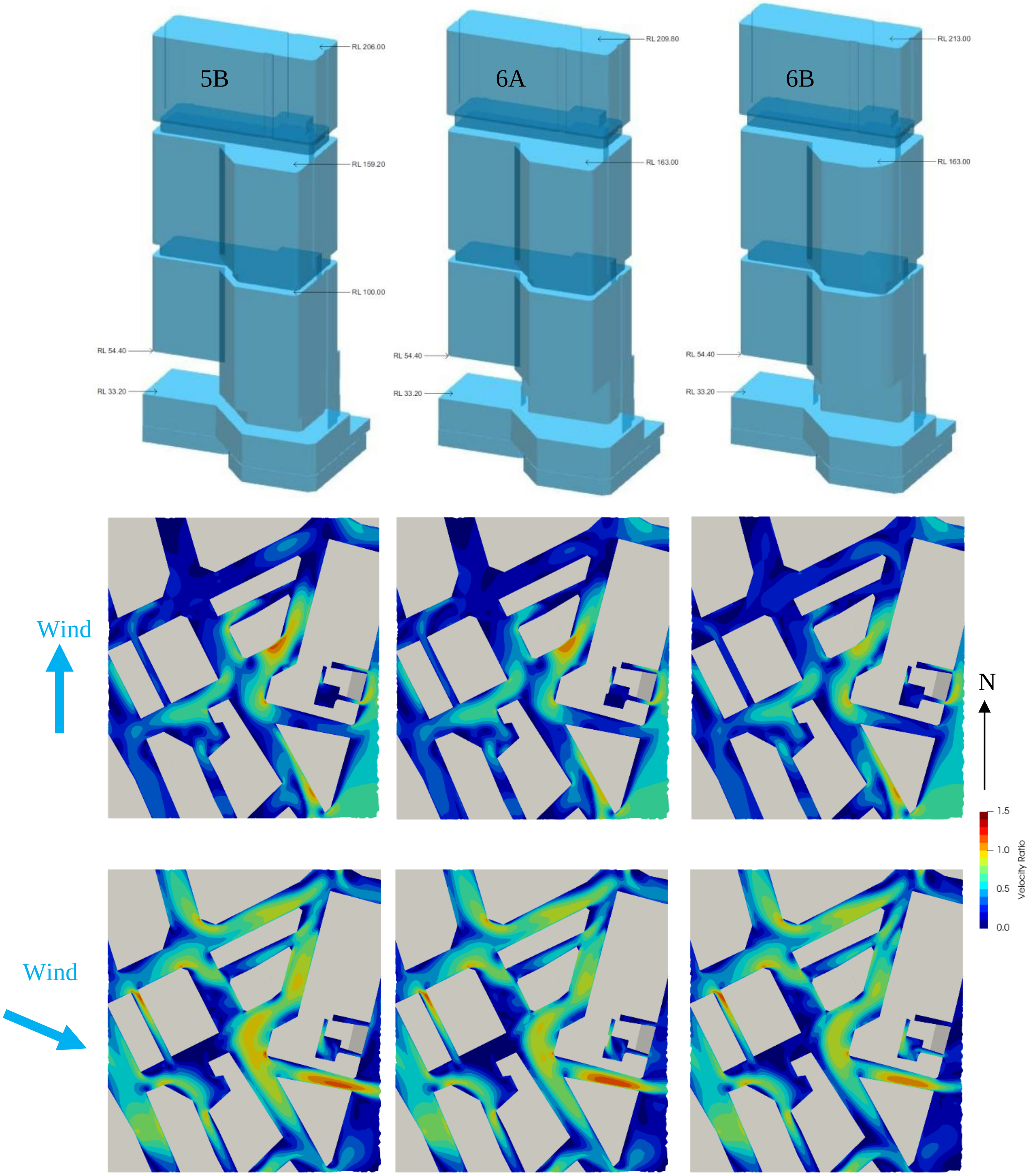


Figure 3: Tower forms viewed from the south-west, and comparative CFD results at 1.5 m above ground

For winds from the south, it is evident from Figure 3 that the inclusion of the western notch and rounded south-west tower corner, reduces the peak values along Thomas Street by about 10%, and reduces the extent of the affected area. The western notch allows a portion of the flow to be redirected to the east of the building on the east side of Thomas Street, and over the lower rise buildings to the north, Figure 4 thereby reducing the flow to the north-west along Quay Street. The curved south-west corner encourages more horizontal flow over the height of the tower reducing the amount of downwash. The wind conditions around the corner of Thomas and Valentine Streets are similar in all configurations, and would be better mitigated with local treatment such as an awning.

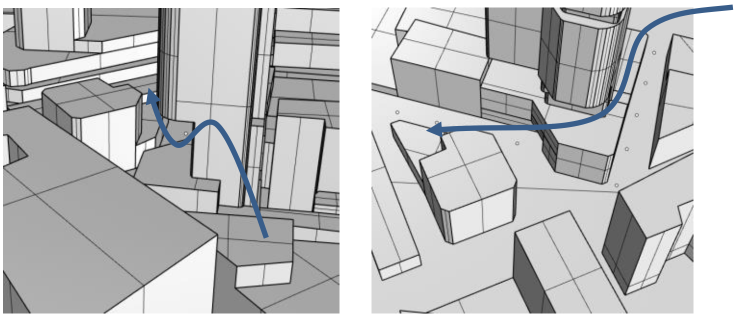


Figure 4: View from the south (L) and west (R) showing flow path

For winds from the west-north-west, the western notch shifts the peak affected zone along Valentine Street to the west further from George Street, but does not reduce the size or intensity of the wind speed. This is caused by the relative height of the notch to the buildings on the south side of Valentine Street. The inclusion of the rounded south-west corner encourages horizontal flow over the height of the tower, thereby reducing the amount of downwash improving the peak mean wind speed and the size of the affected zone along Valentine Street. This massing also improves the wind conditions along Thomas Street. In more detailed design, there would be the potential to investigate the relative height of the notch, to the roof heights on the buildings to the south of Valentine Street to further reduce the size and intensity of the wind conditions along Valentine Street.

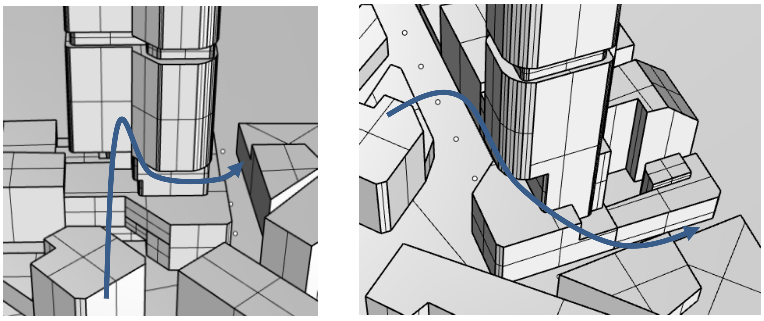


Figure 5: View from the west (L) and south-west (R) showing flow path

The directional wind tunnel test results for Configuration 5B at Locations 40 and 74 are presented in Figure 6. The CFD results for Configuration 6B were used to predict the comfort conditions at these locations. It is evident that these results lie inside the comfort walking contour for all directions, therefore the locations already meeting the walking comfort criterion would be improved.

From the wind tunnel testing on Configuration 5B, the safety criterion at Locations 40 and 74 were 25.4 and 25.7 m/s respectively, exceeding the 0.5 s gust wind speed in an hour limit of 24 m/s. As these peak values are associated with the downwash flow mechanism associated with strong mean flows, it would be expected that the safety result would decrease by a similar amount. Configuration 6B would therefore be expected to similarly meet the wind safety criterion.

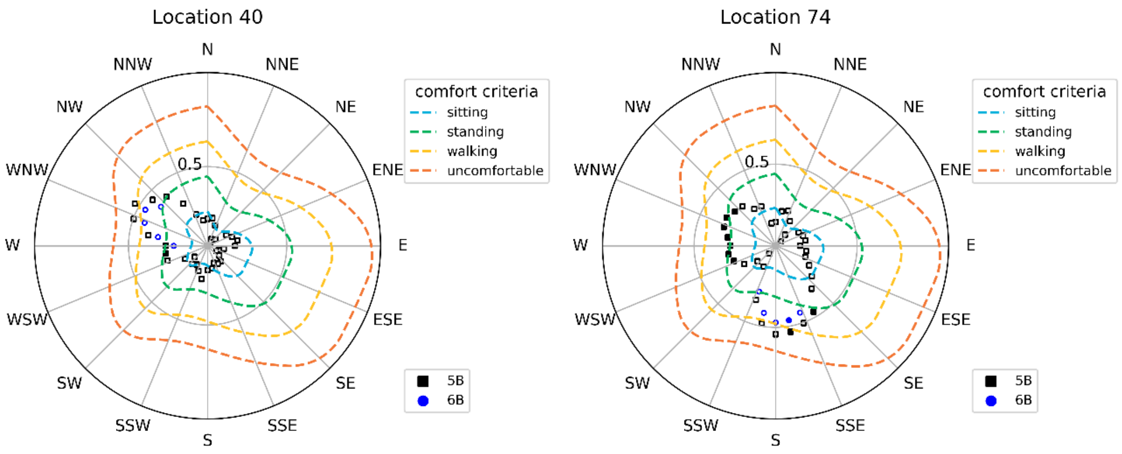


Figure 6: Directional results for Location 40 on Valentine Street, and 74 on Thomas Street

Summary

It has been shown that architectural changes to the proposed massing of the development at 187 Thomas Street reduces the maximum mean wind speeds along Valentine and Thomas Streets by over 10%, and the size of the affected zone of high wind speeds is reduced.

As wind is an important issue for this site, it is considered that a wind section should be included in the competition design brief to ensure that competitors understand the importance of the wind conditions around this isolated tower and describe potential architectural measures that could be adopted to mitigate the comfort and safety issues. Further, the inclusion of a wind expert on the technical committee for the design competition who can provide consistent information to the competitors would be recommended. The competition winning scheme would be wind-tunnel tested to ensure satisfactory wind conditions for comfort and safety are experienced around the site.

I hope this is of assistance, please do not hesitate to contact me on (02) 9320 9921, if you have any questions regarding any aspect of this report.

Yours sincerely,

Graeme Wood
Associate Principal