

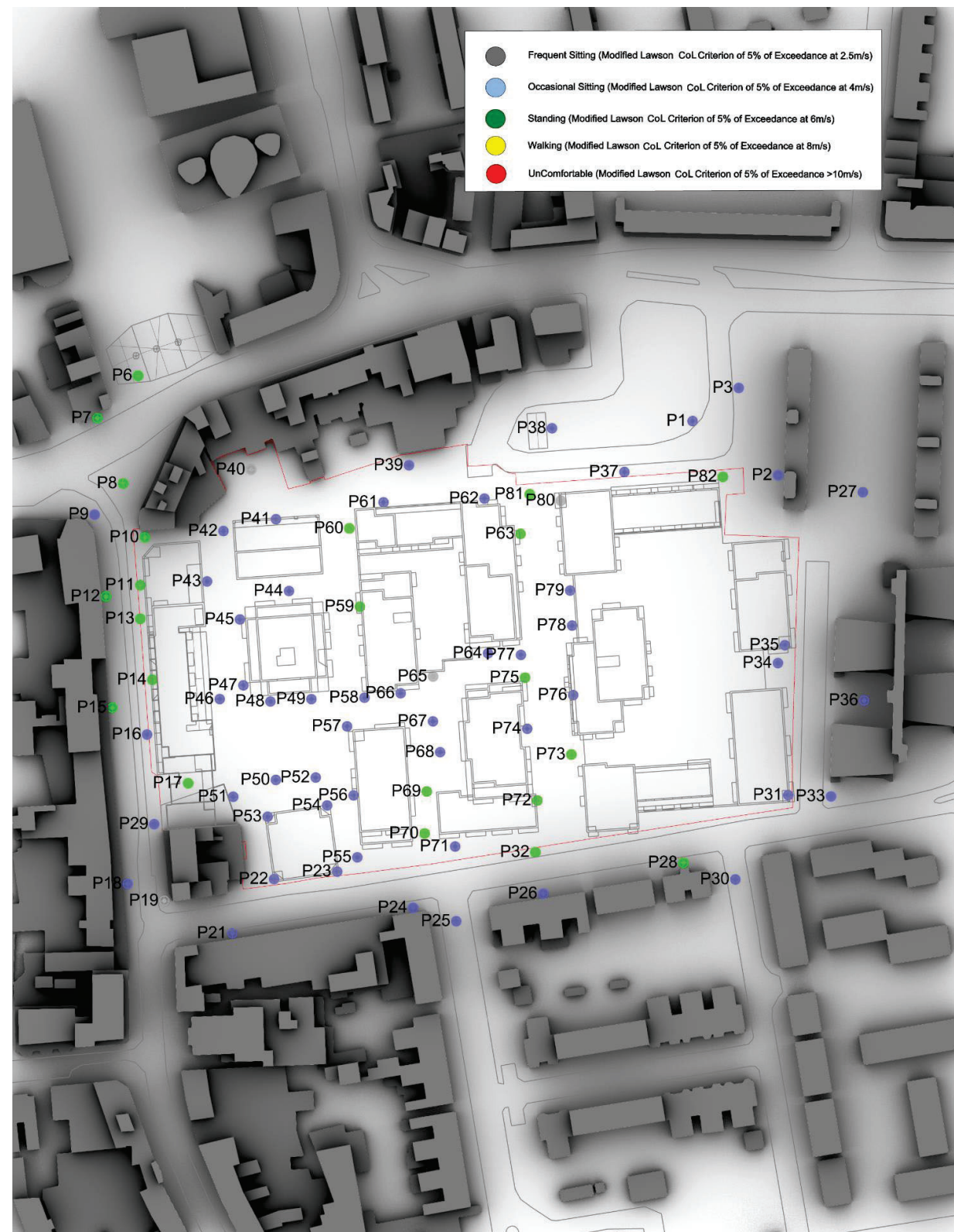


Figure 6aa: Wind Tunnel Results - Completed Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Ground

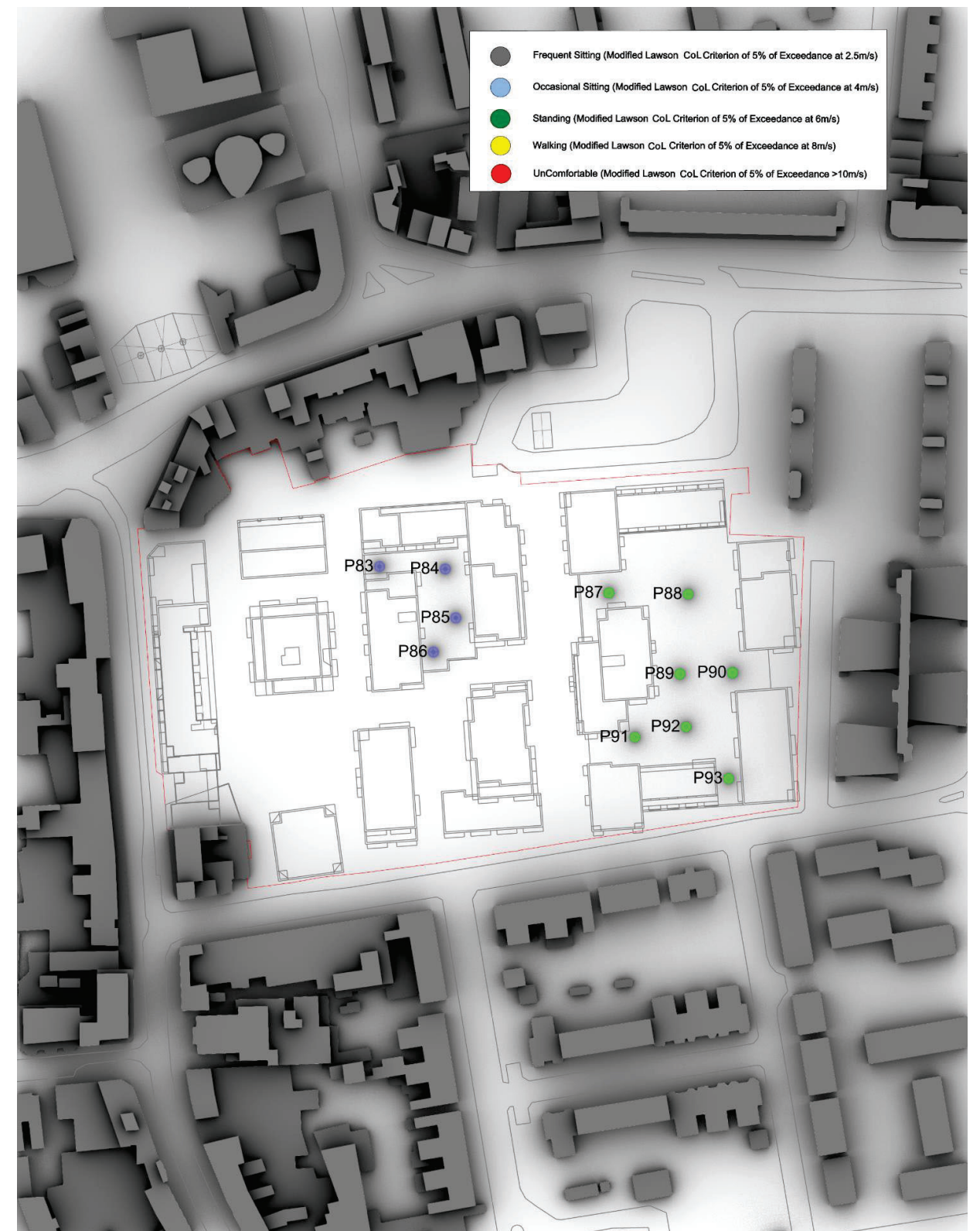


Figure 6bb: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Amenity

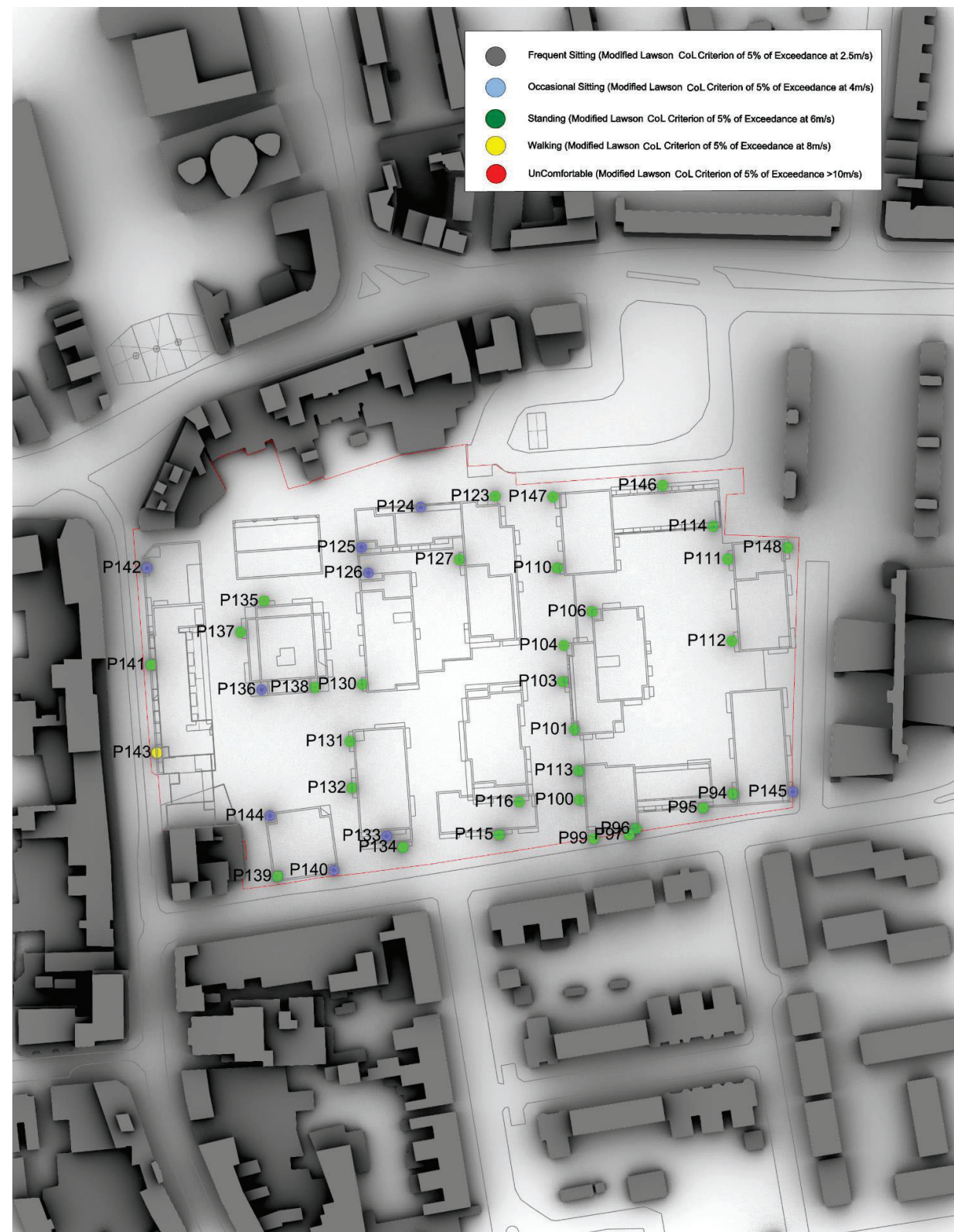


Figure 6cc: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Balcony Low

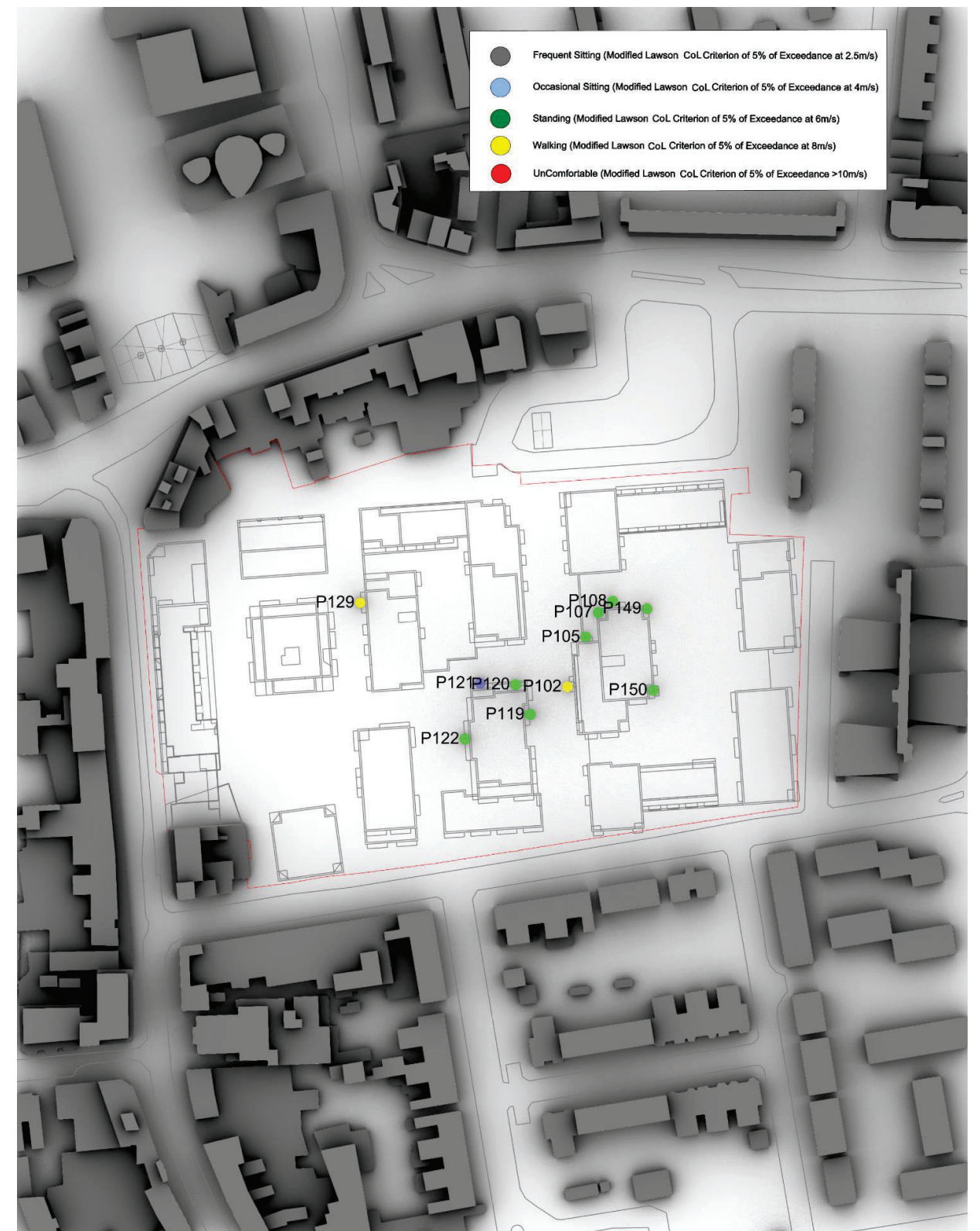


Figure 6dd: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Balcony Top

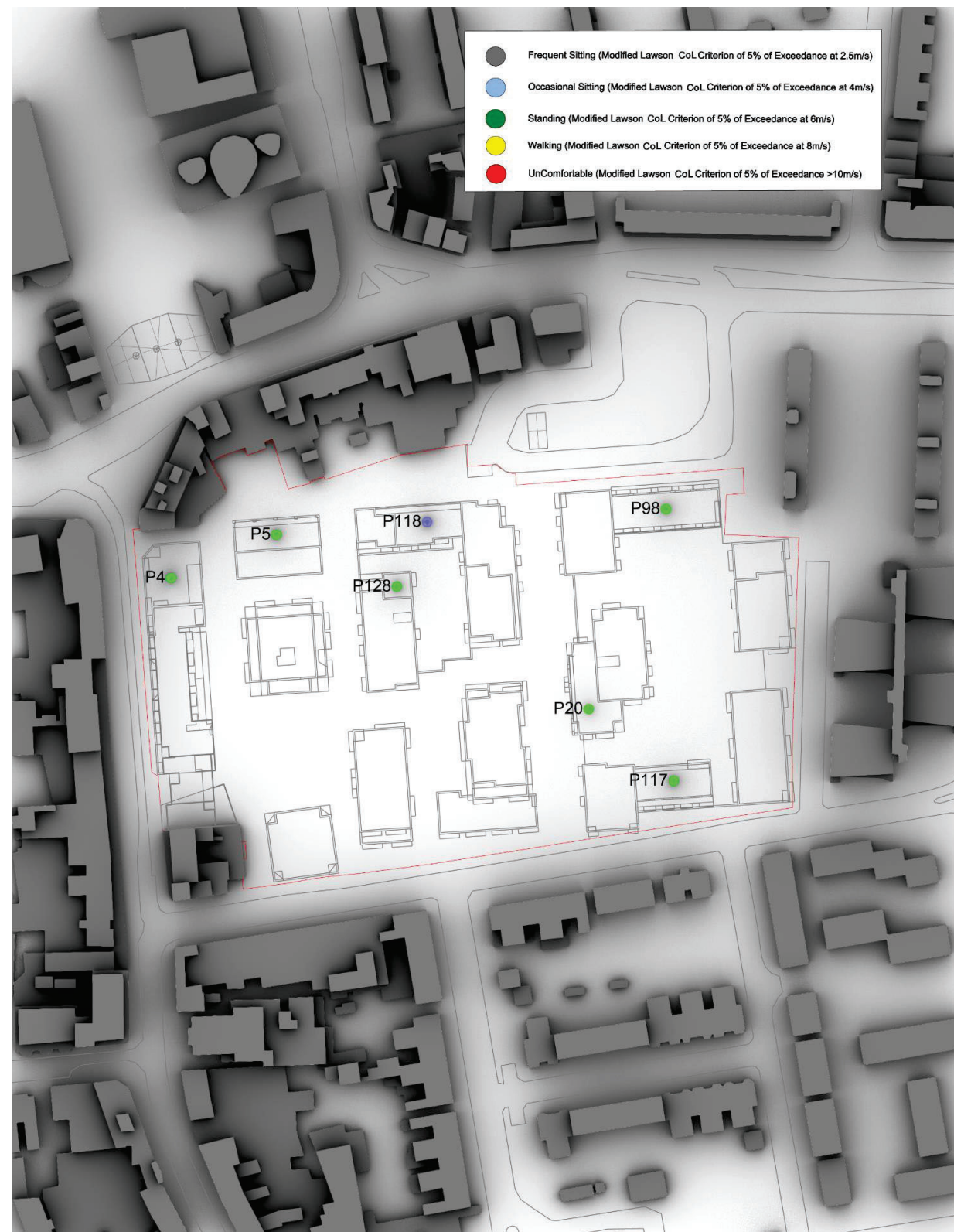


Figure 6ee: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Terraces Top

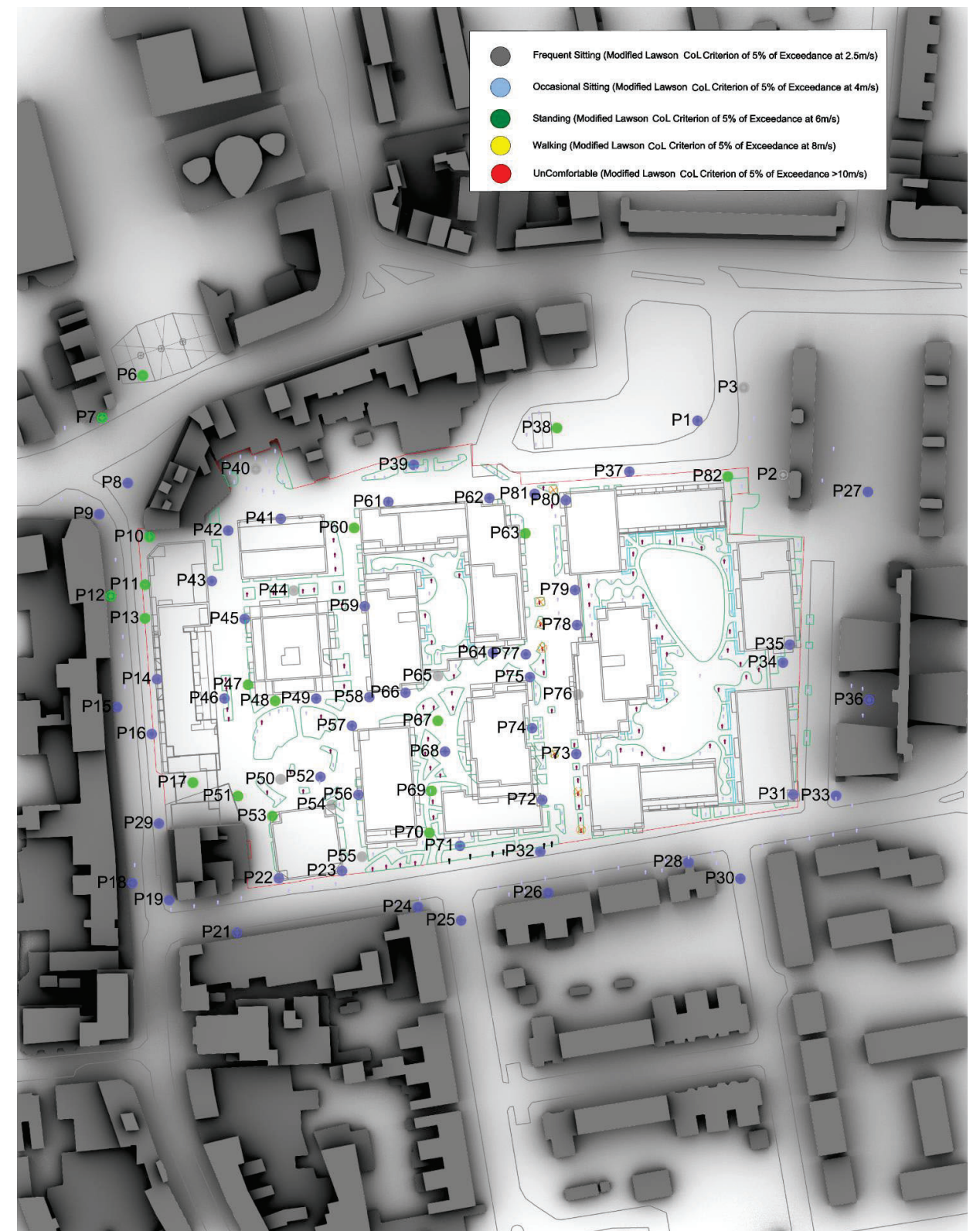


Figure 6ff: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Comfort Results, Summer Season, Ground

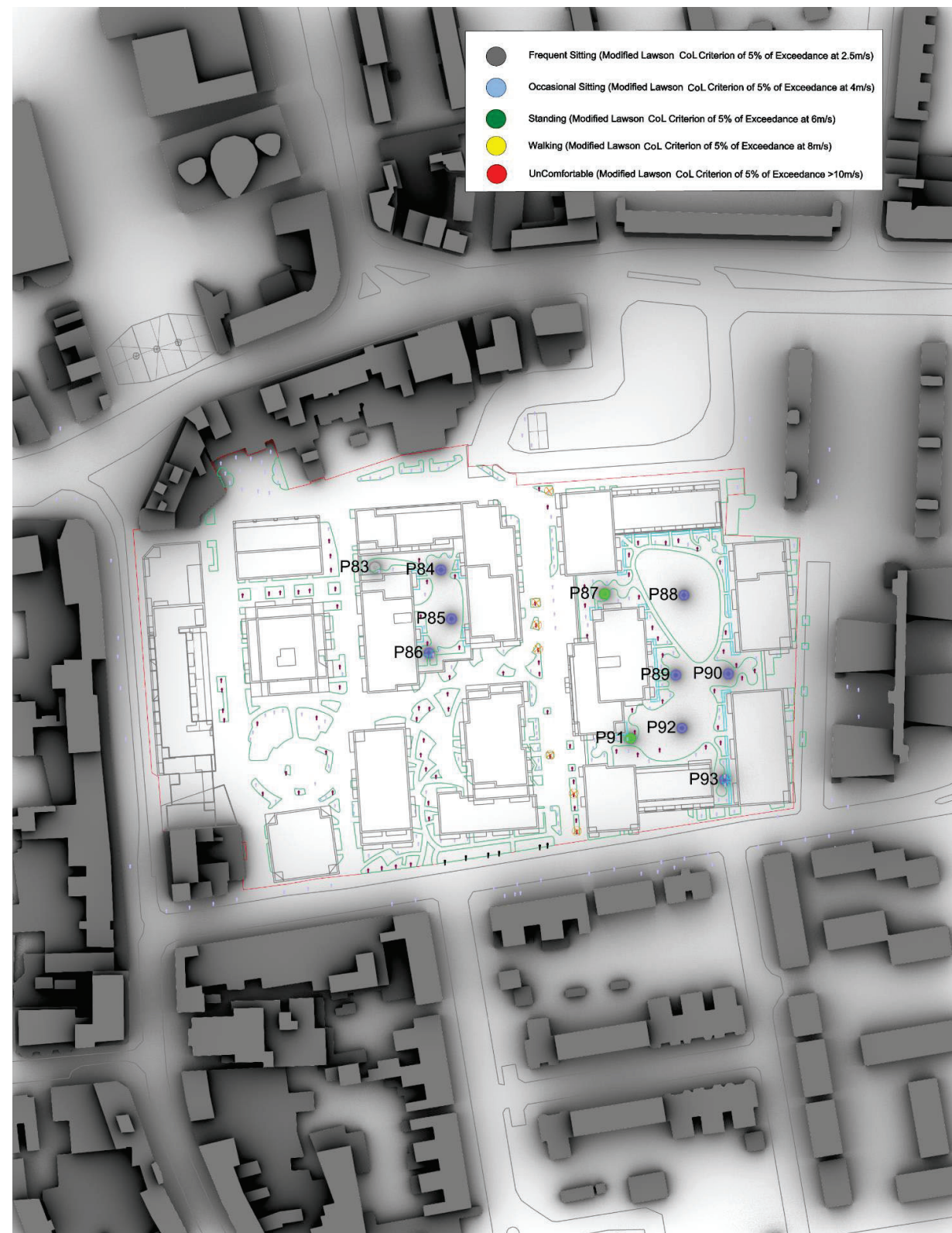


Figure 6gg: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Comfort Results, Summer Season, Elevated Amenity

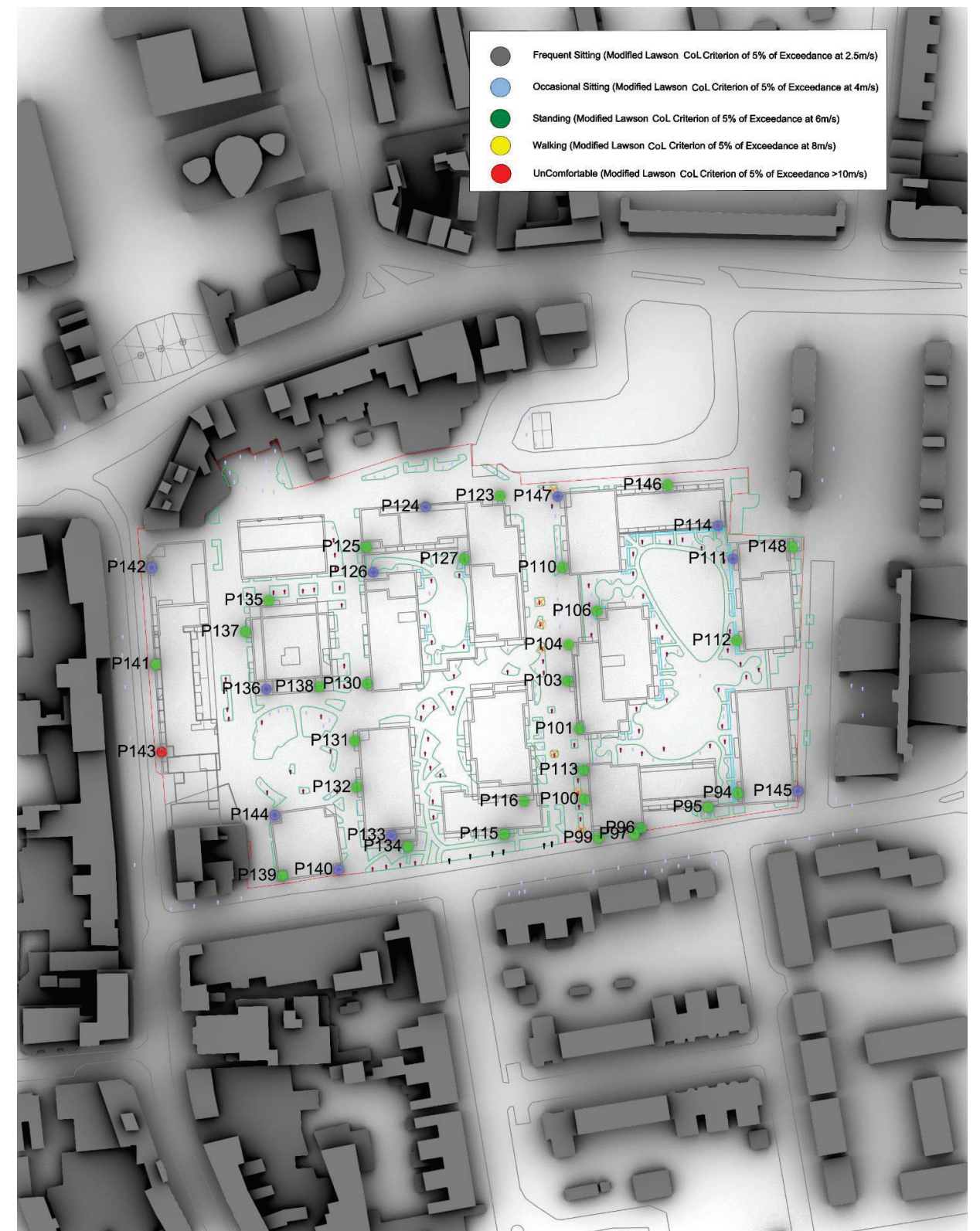


Figure 6hh: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Comfort Results, Summer Season, Elevated Balcony Low

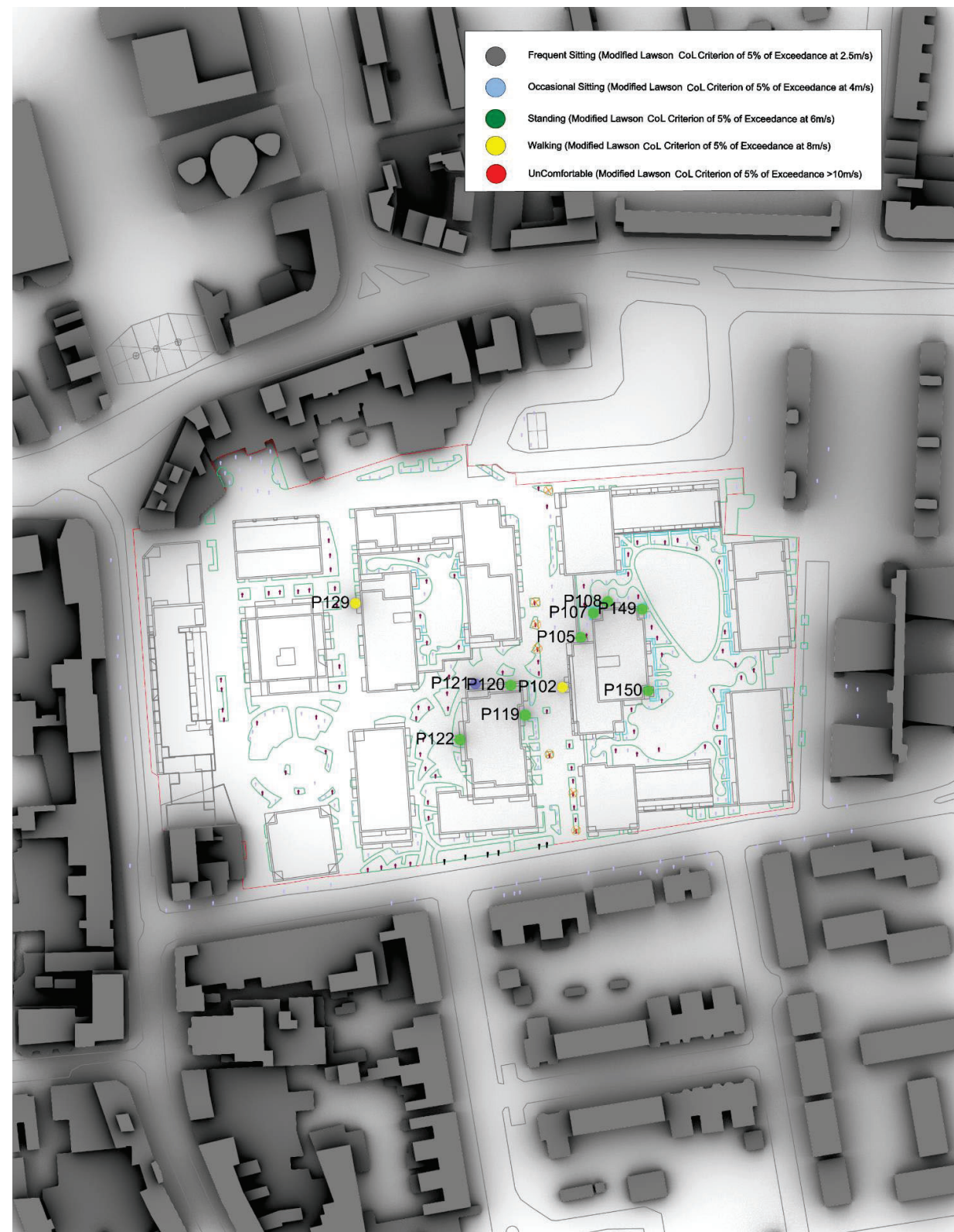


Figure 6ii: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Comfort Results, Summer Season, Elevated Balcony Top

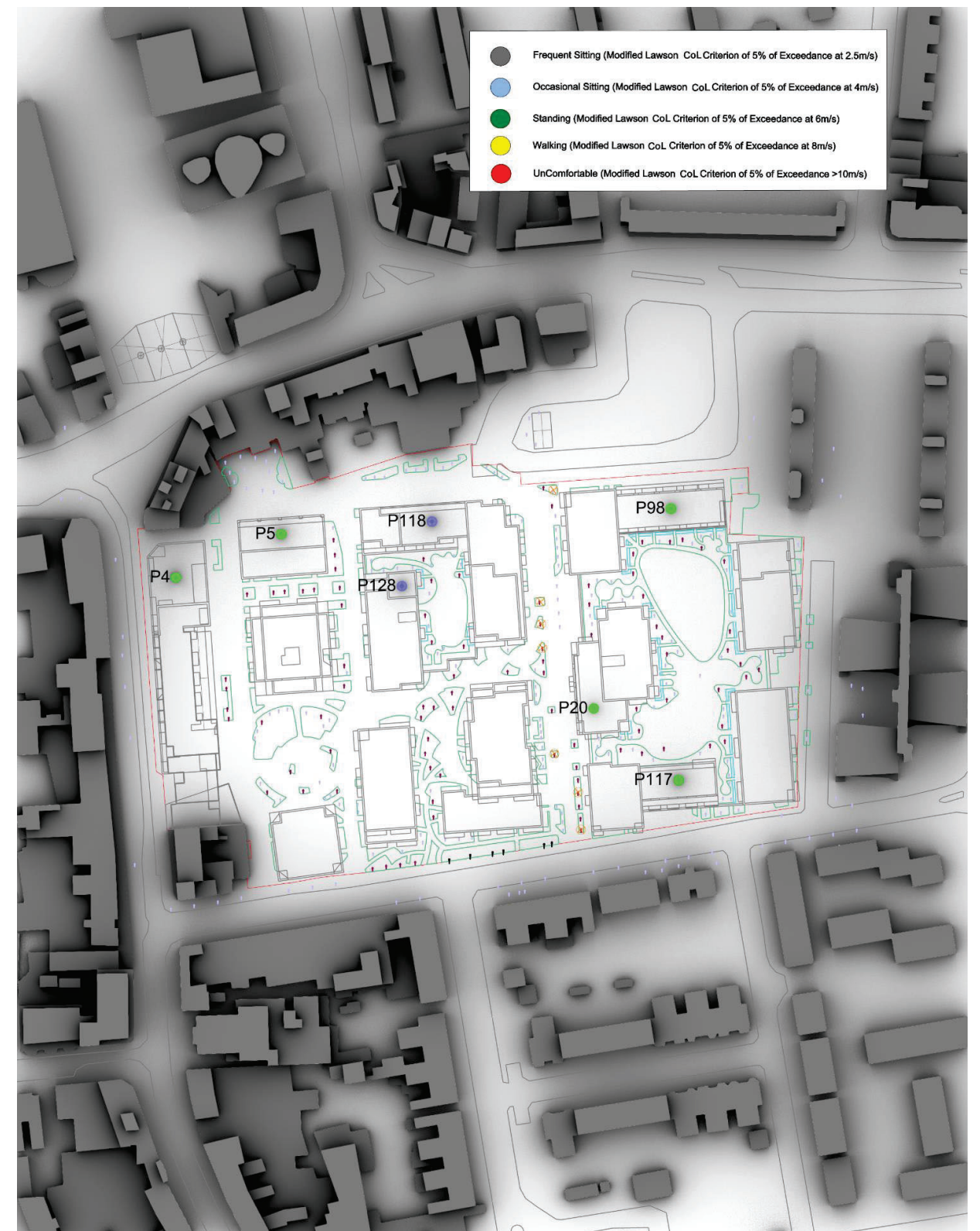


Figure 6jj: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Comfort Results, Summer Season, Elevated Terraces Top

6.8 Proposed Additional Mitigation Measures

Based on the currently tested configurations and mitigation measures included, there remain some areas of adverse wind safety and comfort conditions on-site. As such, additional onsite mitigation measures have been coordinated with the design team to provide suitable design where wind conditions in the remaining locations which are unsuitable for the intended use.

It is anticipated by the inclusion of these additional mitigation measures into the final design, all areas of the development will be safe and fit for intended usage.

It is recommended the efficacy of these measures is test prior to occupation with further CFD testing.

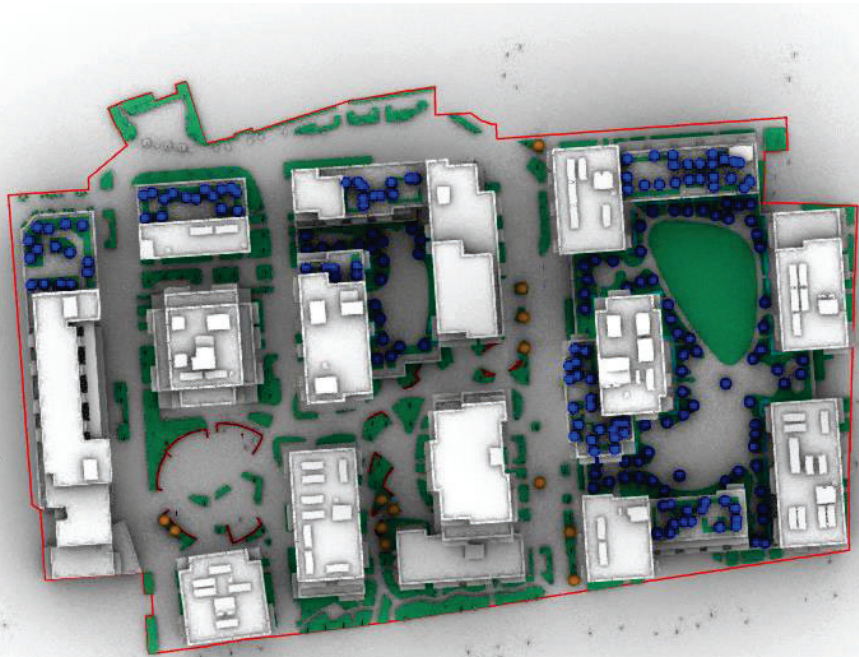
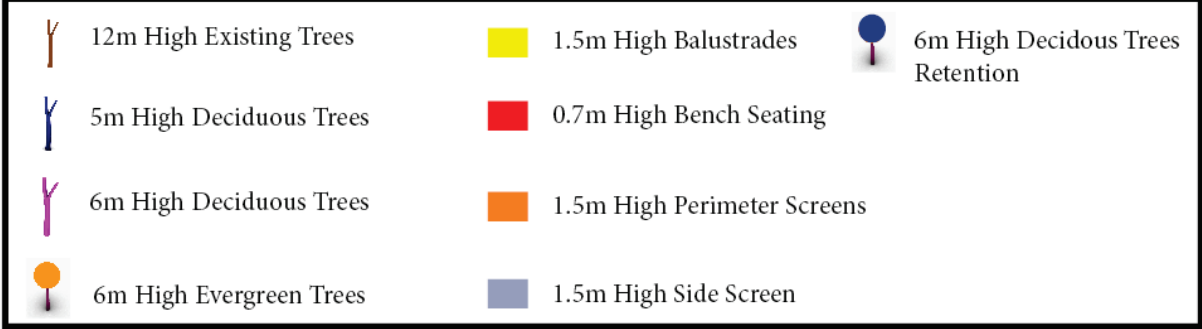


Figure 6kk: Additional Mitigation – Completed Proposed Development with Existing Surrounds and Proposed Landscaping - Plan View

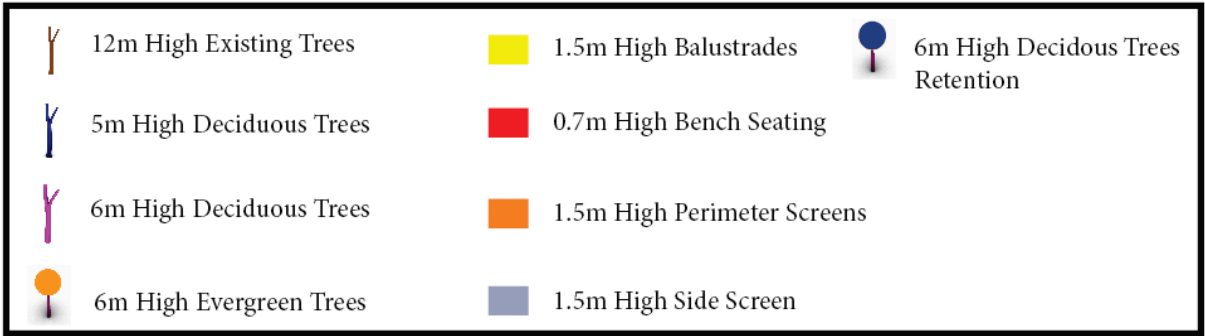


Figure 6ll: Additional Mitigation – Completed Proposed Development with Existing Surrounds and Proposed Landscaping – 3D East Aspect

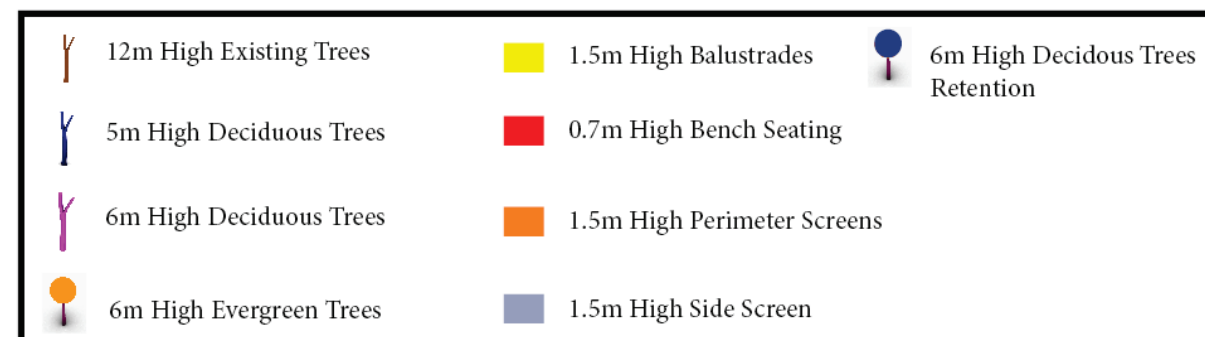


Figure 6mm: Additional Mitigation – Completed Proposed Development with Existing Surrounds and Proposed Landscaping – 3D West Aspect

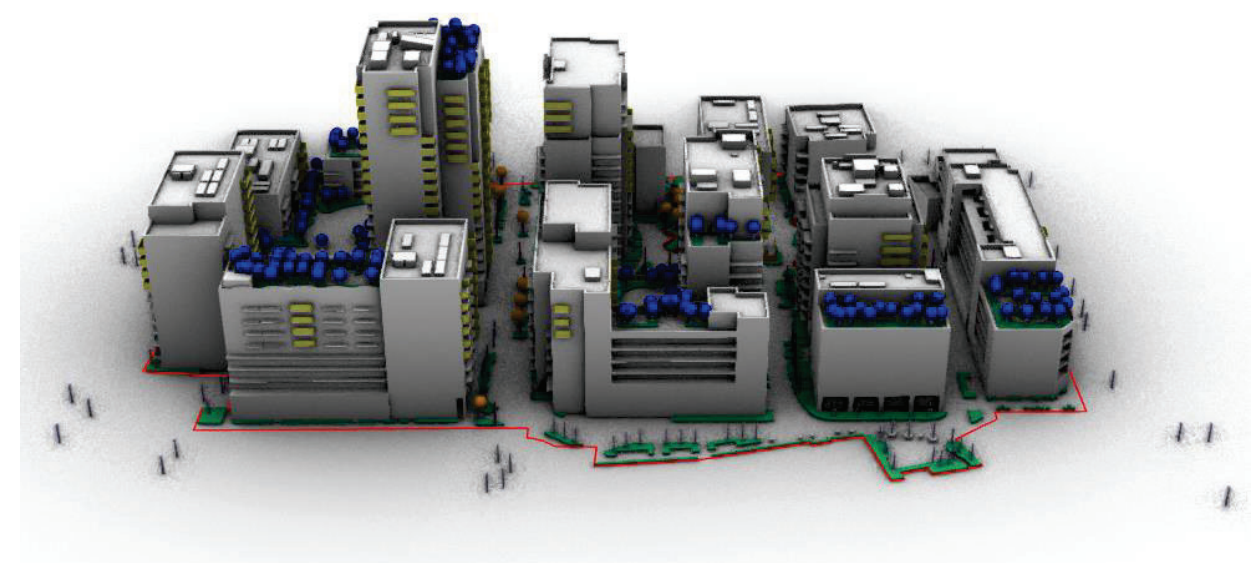
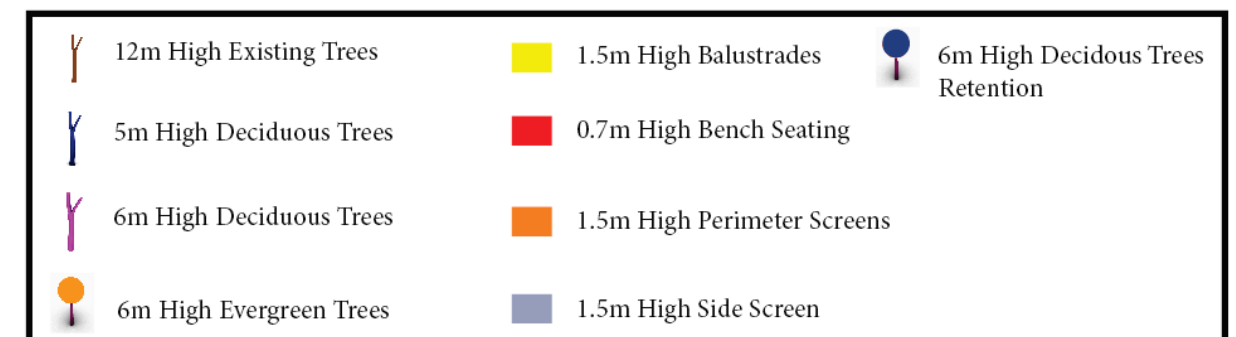


Figure 6nn: Additional Mitigation – Completed Proposed Development with Existing Surrounds and Proposed Landscaping – 3D North Aspect

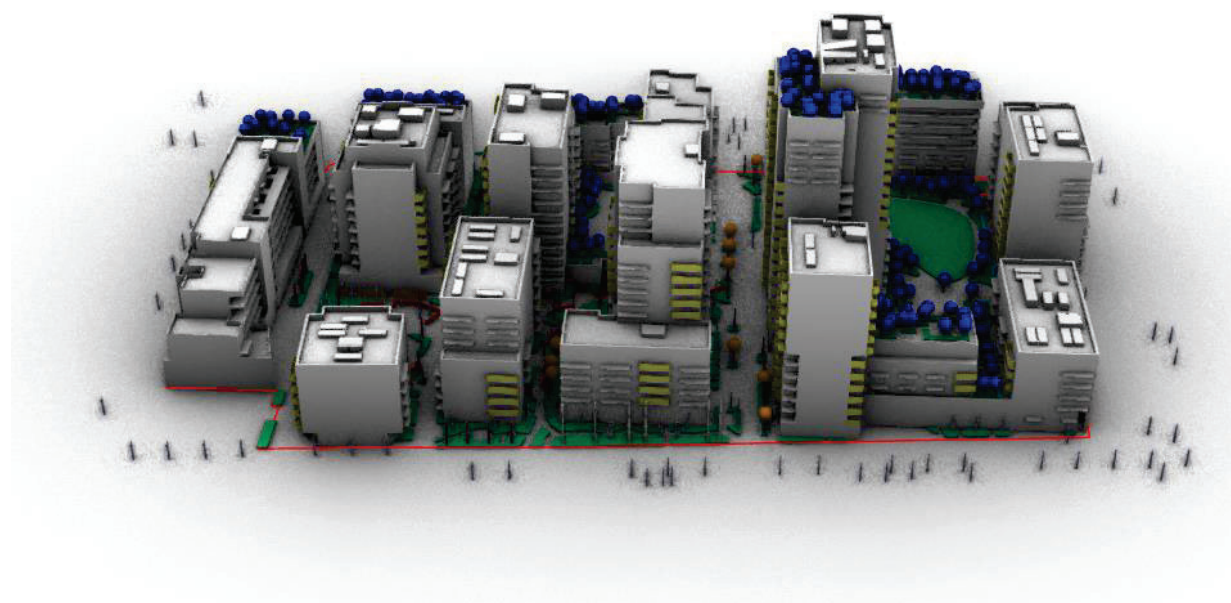
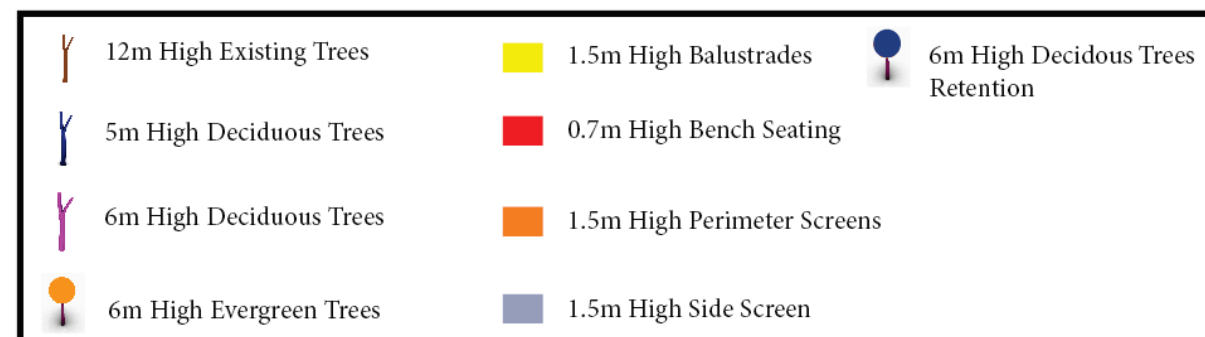


Figure 600: Additional Mitigation – Completed Proposed Development with Existing Surrounds and Proposed Landscaping – 3D South Aspect

7

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Deaves, D.M. and Harris, R.I., 1978, "A mathematical model of the structure of strong winds." Construction Industry and Research Association (U.K), Report 76.

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APPENDIX A PUBLISHED ENVIRONMENTAL CRITERIA

A.1 Wind Effects on People

The acceptability of wind in an area is dependent upon the use of the area. For example, people walking or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant. Quantifying wind comfort has been the subject of much research and many researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, and A.D. Penwarden, have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities. This section discusses and compares the various published criteria.

A.2 A.D. Penwarden (1973) Criteria for Mean Wind Speeds

A.D. Penwarden (1973) developed a modified version of the Beaufort scale which describes the effects of various wind intensities on people. Table A.1 presents the modified Beaufort scale. Note that the effects listed in this table refers to wind conditions occurring frequently over the averaging time (a probability of occurrence exceeding 5%). Higher ranges of wind speeds can be tolerated for rarer events.

Table A.1: Summary of Wind Effects on People (A.D. Penwarden, 1973)

Type of Winds	Beaufort Number	Hourly Mean Wind Speed (m/s)	Effects
Calm	0	0 - 0.3	None
Calm, light air	1	0.3 - 1.6	No noticeable wind
Light breeze	2	1.6 - 3.4	Wind felt on face
Gentle breeze	3	3.4 - 5.5	Hair is disturbed, clothing flaps, newspapers difficult to read
Moderate breeze	4	5.5 – 8.0	Raises dust, dry soil and loose paper, hair disarranged
Fresh breeze	5	8.0 – 10.8	Force of wind felt on body, danger of stumbling
Strong breeze	6	10.8 – 13.9	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, wind noise on ears unpleasant
Near gale	7	13.9 – 17.2	Inconvenience felt when walking
Gale	8	17.2 - 20.8	Generally impedes progress, difficulty balancing in gusts
Strong gale	9	20.8 – 24.5	People blown over

A.3 A.G. Davenport (1972) Criteria for Mean Wind Speeds

A.G. Davenport (1972) also determined a set of criteria in terms of the Beaufort scale and for various return periods. Table A.2 presents a summary of the criteria based on a probability of exceedance of 5%.

Table A.2: Criteria by A.G. Davenport (1972)

Classification	Activities	5% exceedance Mean Wind Speed (m/s)
Walking Fast	Acceptable for walking, main public accessways.	7.5 - 10.0
Strolling, Skating	Slow walking, etc.	5.5 - 7.5
Short Exposure Activities	Generally acceptable for walking & short duration stationary activities such as window-shopping, standing or sitting in plazas.	3.5 - 5.5
Long Exposure Activities	Generally acceptable for long duration stationary activities such as in outdoor restaurants & theatres and in parks.	0 - 3.5

A.4 T.V. Lawson (1975) Criteria for Mean Wind Speeds

In 1973, T.V. Lawson, while referring to the Beaufort wind speeds of A.D. Penwarden (1973) (as listed in Table A.1), quoted that a Beaufort 4 wind speed would be acceptable if it is not exceeded for more than 4% of the time, and that a Beaufort 6 wind speed would be unacceptable if it is exceeded more than 2% of the time. Later, in 1975, T.V. Lawson presented a set of criteria very similar to those presented in A.G. Davenport (1972) (as listed in Table A.2). These criteria are presented in Table A.3 and Table A.4 for safety and comfort respectively.

Table A.3: Safety Criteria by T.V. Lawson (1975)

Classification	Activities	Annual Mean Wind Speed (m/s)
Safety (all weather areas)	Accessible by the general public.	0 – 15
Safety (fair weather areas)	Private areas, balconies/terraces, etc.	0 – 20

Table A.4: Comfort Criteria by T.V. Lawson (1975)

Classification	Activities	5% exceedance Mean Wind Speed (m/s)
Business Walking	Objective walking from A to B.	8 - 10
Pedestrian Walking	Slow walking, etc.	6 - 8
Short Exposure Activities	Pedestrian standing or sitting for short times.	4 – 6
Long Exposure Activities	Pedestrian sitting for a long duration.	0 - 4

A.5 W.H. Melbourne (1978) Criteria for Gust Wind Speeds

W.H. Melbourne (1978) introduced a set of criteria for the assessment of environmental wind conditions that were developed for a temperature range of 10°C to 30°C and for people suitably dressed for outdoor conditions. These criteria are presented in Table A.5 and are based on maximum gust wind speeds with a probability of exceedance of once per year.

Table A.5: Criteria by W.H. Melbourne (1978)

Classification	Activities	Annual Gust Wind Speed (m/s)
Limit for Safety	Completely unacceptable: people likely to get blown over.	23
Marginal	Unacceptable as main public accessways.	16 - 23
Comfortable Walking	Acceptable for walking, main public accessways	13 - 16
Short Exposure Activities	Generally acceptable for walking & short duration stationary activities such as window-shopping, standing or sitting in plazas.	10 - 13
Long Exposure Activities	Generally acceptable for long duration stationary activities such as in outdoor restaurants & theatres and in parks.	0 - 10

A.6 Lawson Criteria (2001) for Mean Wind Speeds

In 2001 the T.V. Lawson criteria described in Section A.4 was revised by T.V. Lawson. Details of the comfort criteria are presented in the table below and are based on the exceedance of the threshold wind speeds, occurring less than 5% of the time. This criterion defines a reasonable allowance for extreme and relatively infrequent winds that are tolerable within each category.

Table A.6: Pedestrian Comfort Criteria (T.V. Lawson, 2001)

Classification	Activities	5% exceedance Mean Wind Speed (m/s)
Uncomfortable	Winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.	>10
Business Walking	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering.	8-10
Strolling	Moderate breezes that would be appropriate for strolling along a city/town street, plaza, or park.	6-8
Standing	Gentle breezes acceptable for main building entrances, pick-up/drop-off points and bus stops	4-6
Sitting	Light breezes desired for outdoor restaurants and seating areas where one can read a paper or comfortably sit for long periods	0-4

Details of the safety criteria are presented in the table below and are based on exceedance of 0.023% of the threshold wind speeds, occurring annually.

Table A.7: Pedestrian Safety Criteria (T.V. Lawson, 2001)

Classification	Activities	Threshold Mean Wind Speed (m/s)
Unsafe for Frail	Frail members of the public and cyclists will find the conditions challenging and will be at risk of being blown over.	15
Unsafe for All	All members of the public and cyclists will find the conditions challenging and will be at risk of being blown over.	20

A.7 Comparison of the Published Wind Speed Criteria

W.H. Melbourne (1978) presented a comparison of the criteria of various researchers on a probabilistic basis. Figure A.1 presents the results of this comparison and indicates that the criteria of W.H. Melbourne (1978) are comparatively quite conservative. This conclusion was also observed by A.W. Rofail (2007) when undertaking on-site remedial studies. The results of A.W. Rofail (2007) concluded that the criteria by W.H. Melbourne (1978) generally overstates the wind effects in a typical urban setting due to the assumption of a fixed 15% turbulence intensity for all areas. It was observed in A.W. Rofail (2007) that the 15% turbulence intensity assumption is not real and that the turbulence intensities at 1.5m above ground is at least 20% and in a suburban or urban setting is generally in the range of 30% to 60%.

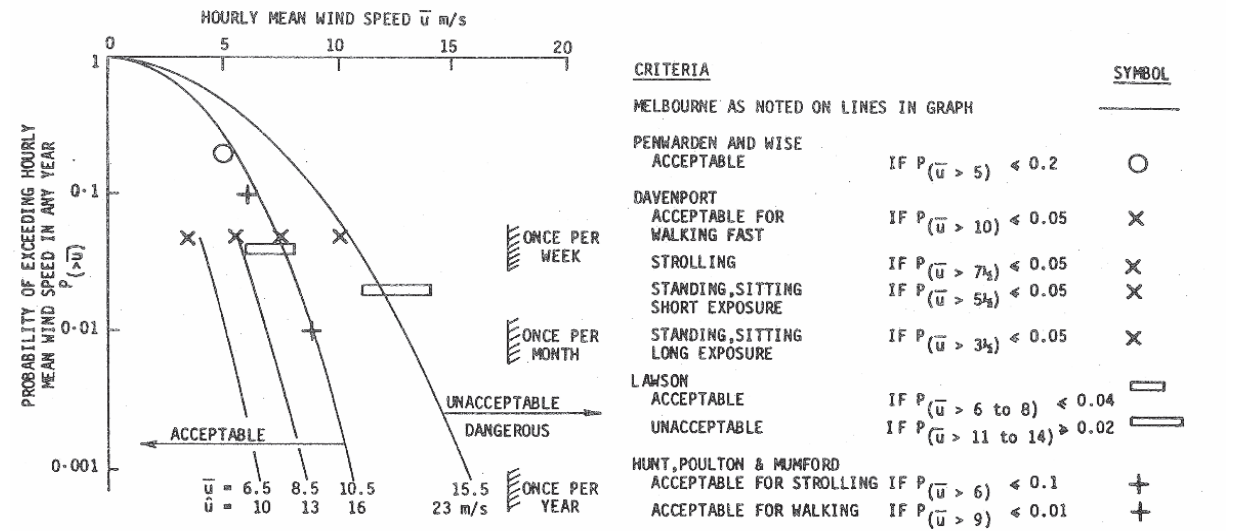


Figure A.1: Comparison of Various Mean and Gust Wind Environment Criteria, assuming 15% turbulence and a Gust Factor of 1.5 (W.H. Melbourne, 1978)

A.8 References relating to Pedestrian Comfort Criteria

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APPENDIX B DATA ACQUISITION

The wind tunnel testing procedures utilised for this study were based on the Wind Microclimate Guidelines for developments in the City of London and the guidelines set out in the Australasian Wind Engineering Society Quality Assurance Manual (AWES-QAM-1-2019), ASCE 7-16 (Chapter C31), and CTBUH (2013). The wind speed measurements for the wind tunnel study are determined as coefficients using data acquired by either Dantec hot-wire probe anemometers or pressure-based wind speed sensors and converted to full-scale wind speeds using details of the regional wind climate obtained from an analysis of directional wind speed recordings from the local meteorological recording station(s).

B.1 Measurement of the Velocity Coefficients

The study model and proximity model were setup within the wind tunnel which was configured to the appropriate boundary layer profile, and the wind velocity measurements are monitored using either Dantec hot-wire probe anemometers or pressure-based wind speed sensors at selected critical outdoor locations. The wind velocity results presented in this study for each study point are representative of wind at a full-scale height of approximately 1.5m above ground/slab level. In the case of the Dantec hot-wire probe anemometers, the support of the probe is mounted such that the probe wire is vertical as much as possible to ensure that the measured wind speeds are independent of wind direction along the horizontal plane. In addition, care was taken in the alignment of the hot-wire probe wire and in avoiding wall-heating effects.

Wind speed measurements were made in the wind tunnel for the wind directions described within this report. Data was acquired for each wind direction using a sample rate of 1024Hz. The sample length was determined to produce a full-scale sample time that is sufficient for this type of study. In the case of the pressure-based wind speed sensors, the phase lag between the various channels where data is acquired simultaneously is within 10% of a typical pressure cycle, and the signal is low-pass filtered at 500Hz and then digital filtering is applied over this range to provide an unbiased response from the pressure measurement system (A.W. Rofail, 2004).

The mean, gust and standard deviation velocity coefficients were determined from the data acquired in the wind tunnel. The gust velocity coefficients were also derived for each wind direction from by the following relation:

$$\hat{C}_V = \bar{C}_V + g \cdot \sigma_{C_V}$$

B.1

where:

- $\hat{C}_V$ is the gust velocity coefficient.
- $\bar{C}_V$ is the mean velocity coefficient.
- g is the peak factor, taken as 3.0 for a 3-sec gust and 3.4 for a 0.5-sec gust.
- σ_{C_V} is the standard deviation of the velocity coefficient measurement.

In the case of a Dantec hot-wire probe anemometer, the velocity coefficient is obtained as follows:

$$C_V = \frac{C_{V,study}}{C_{V,200m}} \quad \text{B.2}$$

where:

$C_{V,study}$ is the velocity coefficient measurement obtained from the Dantec hot-wire probe anemometer at the study point location.

$C_{V,200m}$ is the velocity coefficient measurement obtained from the Dantec hot-wire probe anemometer at the free-stream reference location at 200m height upwind of the model in the wind tunnel.

However, in the case of the pressure-based wind speed sensors, these are determined from the measured differential mean, standard deviation and maximum pressure coefficients obtained from the wind speed sensor. For this analysis all calculations are performed on the square root of the differential pressure measurements. The velocity coefficient at the pressure-based wind speed sensor location is then calculated as follows:

$$C_V = \frac{\alpha + \beta\sqrt{\Delta p}}{V_{200m}} \quad \text{B.3}$$

where:

C_V is the velocity coefficient measurement at the study point location.

α is a calibration coefficient for the pressure-based wind speed sensor.

β is a calibration coefficient for the pressure-based wind speed sensor.

Δp is the differential pressure obtained from the pressure-based wind speed sensor at the study point location.

V_{200m} is the wind speed at the free-stream reference location of 200m height (full-scale) in the wind tunnel, which is determined directly in the wind tunnel using a pitot static probe.

B.2 Calculation of the Full-Scale Results

The full-scale results determine if the wind conditions at a study location satisfy the designated criteria of that location. More specifically, the full-scale results need to determine the probability of exceedance of a given wind speed at a study location. To determine the probability of exceedance, the measured velocity coefficients were combined with a statistical model of the local wind climate that relates wind speed to a probability of exceedance. Details of the wind climate model are outlined in Section 4 of the main report.

The statistical model of the wind climate includes the impact of wind directionality as any local variations in wind speed or frequency with wind direction. This is important as the wind directions that produce the highest wind speed events for a region may not coincide with the most wind exposed direction at the site.

The methodology adopted for the derivation of the full-scale results for the maximum gust and the GEM wind speeds are outlined in the following sub-sections.

B.3 Maximum Gust Wind Speeds

The full-scale maximum gust wind speed at each study point location is derived from the velocity coefficient using the following relationship:

$$V_{study} = V_{ref,RH} \left(\frac{k_{200m,tr,T=1hr}}{k_{RH,tr,T=1hr}} \right) C_V \quad \text{B.4}$$

where:

V_{study} is the full-scale wind speed at the study point location.

$V_{ref,RH}$ is the full-scale reference wind speed at the study reference height. This value is determined by combining the directional wind speed data for the region (detailed in Section 4) and the upwind terrain and height multipliers for the site (detailed in Section 3).

$k_{200m,tr,T=1hr}$ is the hourly mean terrain and height multiplier at the free-stream reference location of 200m height.

$k_{RH,tr,T=1hr}$ is the hourly mean terrain and height multiplier at the study reference height (Section 4).

C_V is the velocity coefficient, obtained from either Equation B.2 (in the case of Dantec hot-wire probe anemometers) or Equation B.3 (in the case of pressure-based wind speed sensors).

The value of $V_{ref,RH}$ varies with each prevailing wind direction. Wind directions where there is a high probability that a strong wind will occur have a higher directional wind speed than other directions. To determine the directional wind speeds, a probability level must be assigned for each wind direction. These probability levels are set following the approach used in AS/NZS1170.2:2011, which assumes that the major contributions to the combined probability of exceedance of a typical load effect comes from only two 45-degree sectors.

B.4 Maximum Gust-Equivalent Mean Wind Speeds

The contribution to the probability of exceedance of a specified wind speed (i.e.: the desired wind speed for pedestrian comfort, as per the criteria) was calculated for each wind direction. These contributions are then combined over all wind directions to calculate the total probability of exceedance of the specified wind speed. To calculate the probability of exceedance for a specified wind speed a statistical wind climate model was used to describe the relationship between directional wind speeds and the probability of exceedance. A detailed description of the methodology is given by T.V. Lawson (1980).

The criteria used in this study is referenced to a probability of exceedance of 5% of a specified wind speed.

B.5 References relating to Data Acquisition

American Society of Civil Engineers (ASCE), ASCE-7-16, 2016, "Minimum Design Loads for Buildings and Other Structures".

Australasian Wind Engineering Society, QAM-1, 2019, "Quality Assurance Manual: Wind Engineering Studies of Buildings", edited by Rofail A.W., et al.

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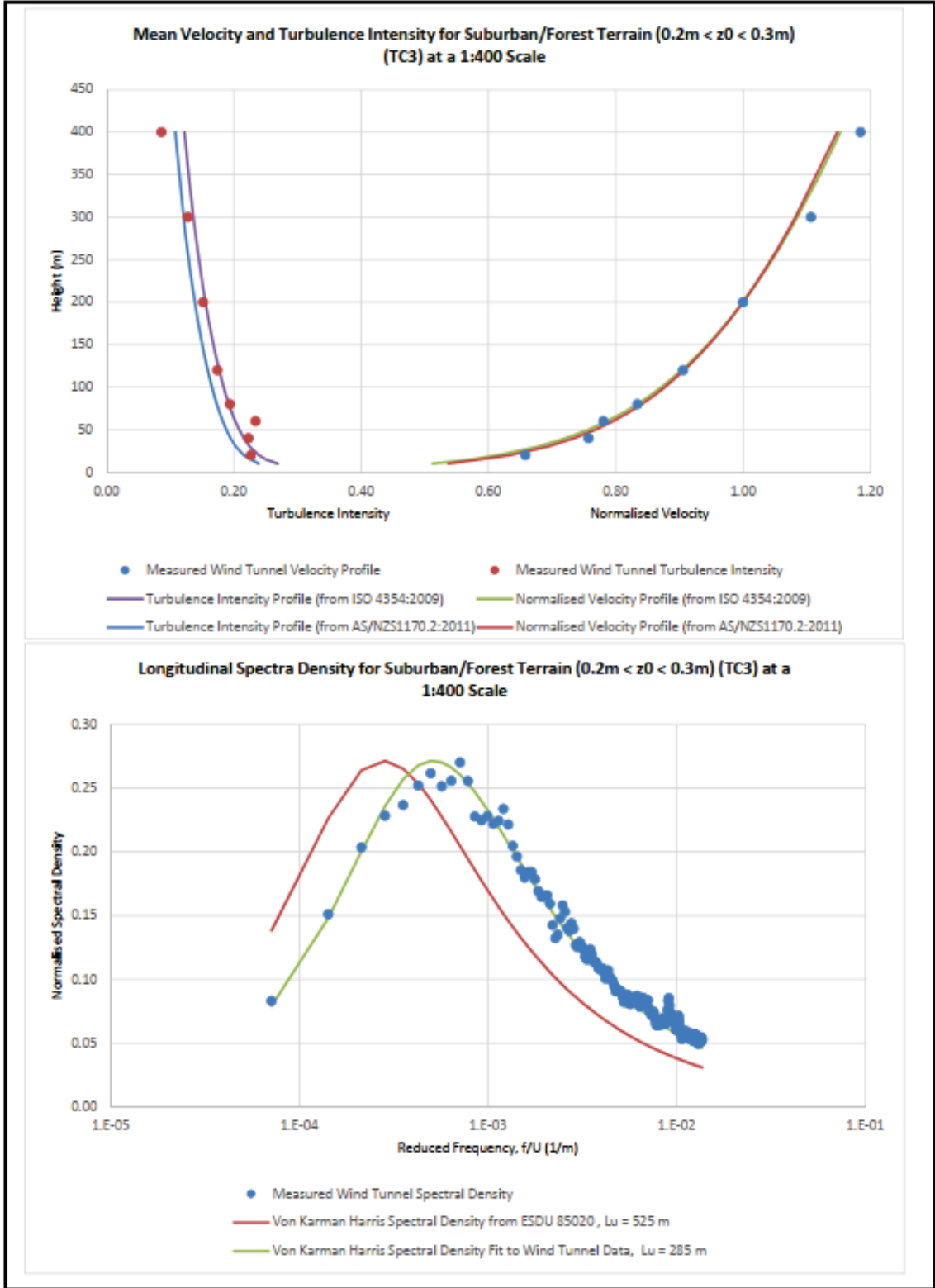
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APPENDIX C VELOCITY AND TURBULENCE INTENSITY PROFILES

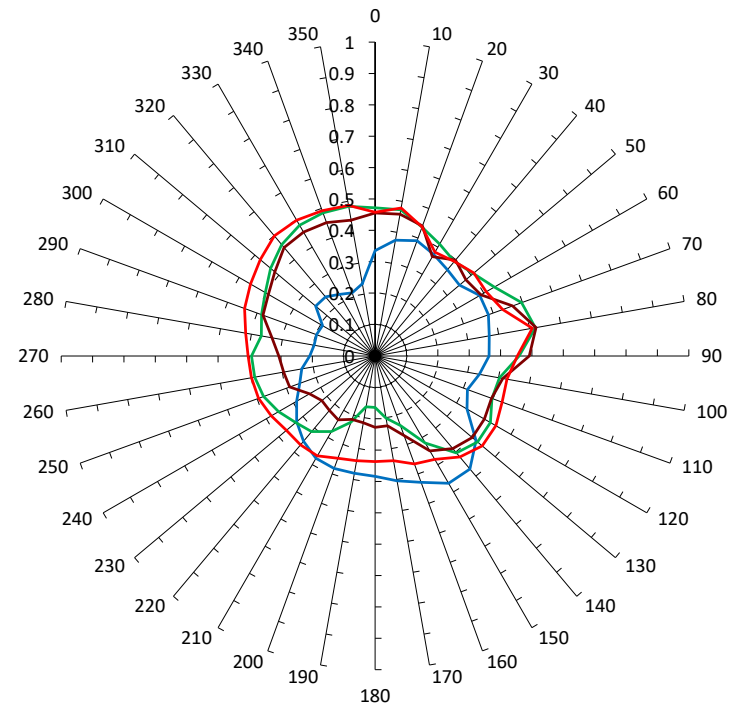




APPENDIX D MEASURED VELOCITY COEFFICIENTS

Results for P1

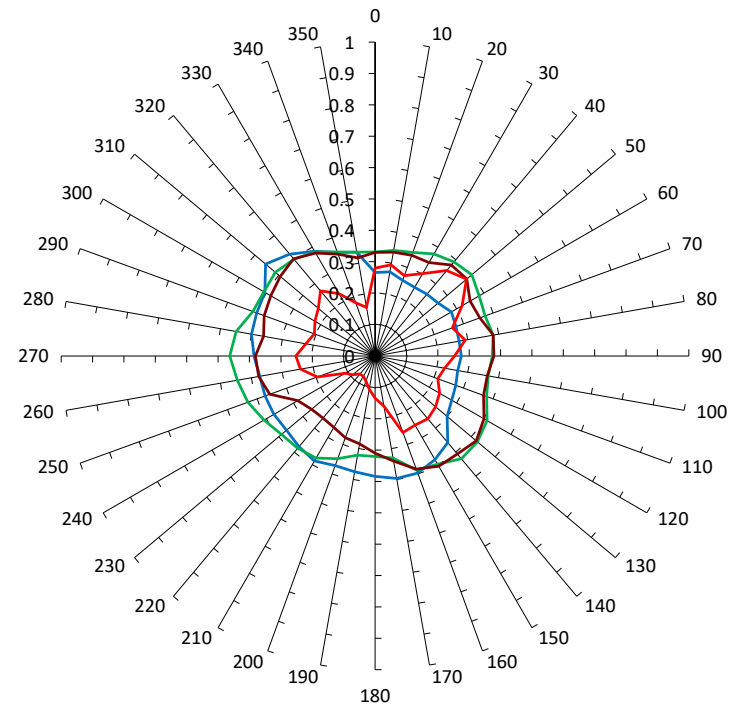
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.05%	3.40	0.61%	4.31	< 0.001%	8.10
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.12%	3.77	1.03%	4.62	< 0.001%	8.77
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.07%	3.51	0.57%	4.18	< 0.001%	8.19
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.18%	3.98	1.58%	4.97	< 0.001%	9.28

Results for P2

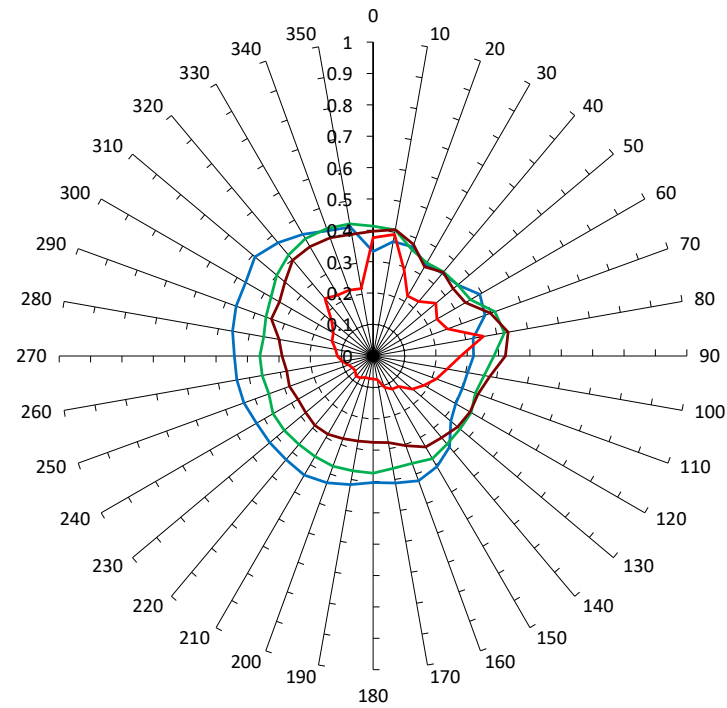
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.08%	3.65	1.06%	4.67	< 0.001%	8.75
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.16%	3.89	1.58%	4.94	< 0.001%	9.39
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.03%	3.33	0.49%	4.18	< 0.001%	7.93
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.32	0.02%	2.82	< 0.001%	5.66

Results for P3

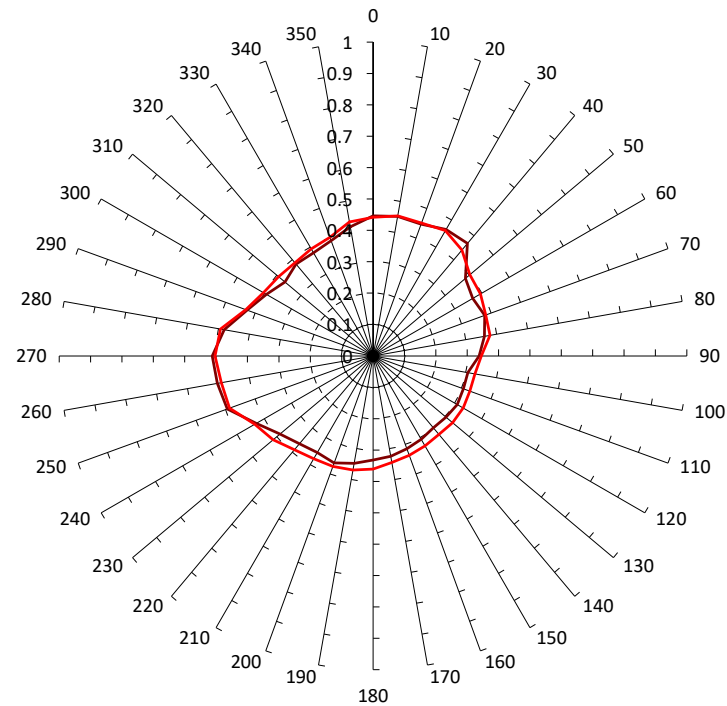
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.01%	4.18	0.33%	5.33	< 0.001%	9.99
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.65	0.08%	4.63	< 0.001%	8.48
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	3.20	0.02%	3.93	< 0.001%	7.32
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.12	< 0.01%	2.34	< 0.001%	5.54

Results for P4

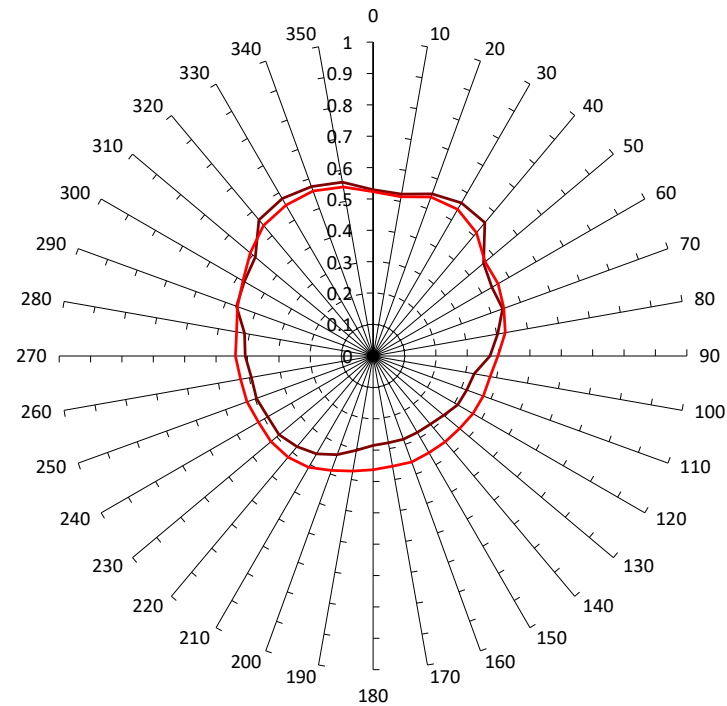
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	5.82%	4.10	2.25%	5.18	< 0.001%	10.22
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	6.32%	4.16	2.42%	5.27	< 0.001%	10.19

Results for P5

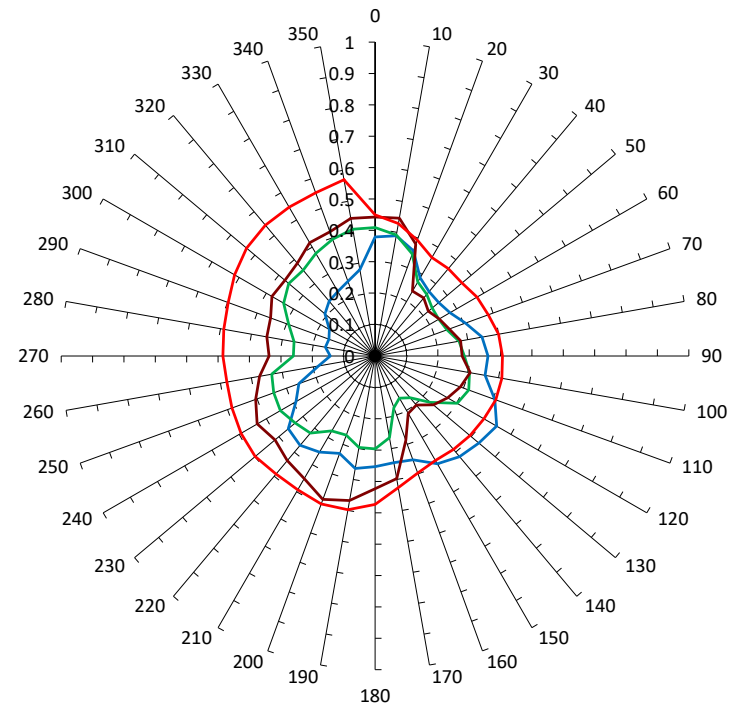
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	6.84%	4.21	0.28%	5.14	< 0.001%	10.02
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	8.33%	4.35	0.37%	5.41	< 0.001%	10.17

Results for P6

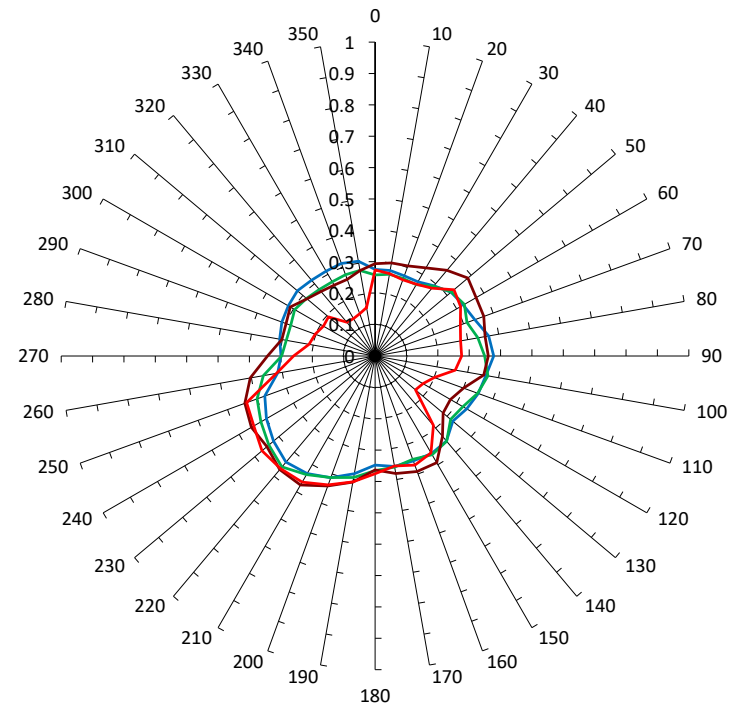
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	3.30	0.03%	4.12	< 0.001%	7.76
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.12	0.02%	3.91	< 0.001%	7.44
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.02%	4.05	0.27%	5.18	< 0.001%	9.77
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.06%	4.73	0.84%	6.03	< 0.001%	11.26

Results for P7

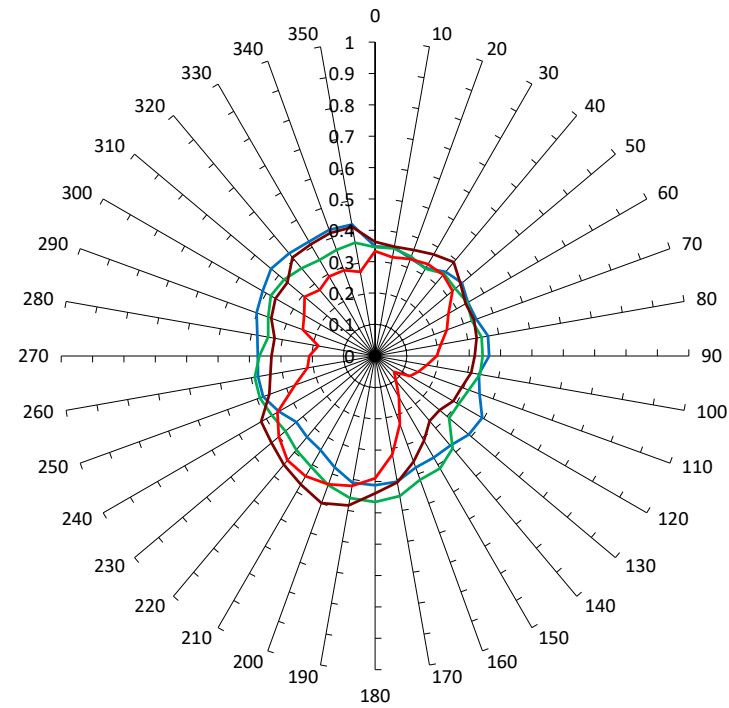
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.16%	3.79	1.29%	4.78	< 0.001%	9.12
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.21%	3.90	1.59%	4.92	< 0.001%	9.44
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.34%	4.13	2.27%	5.21	< 0.001%	9.98
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.31%	4.06	2.04%	5.10	< 0.001%	9.89

Results for P8

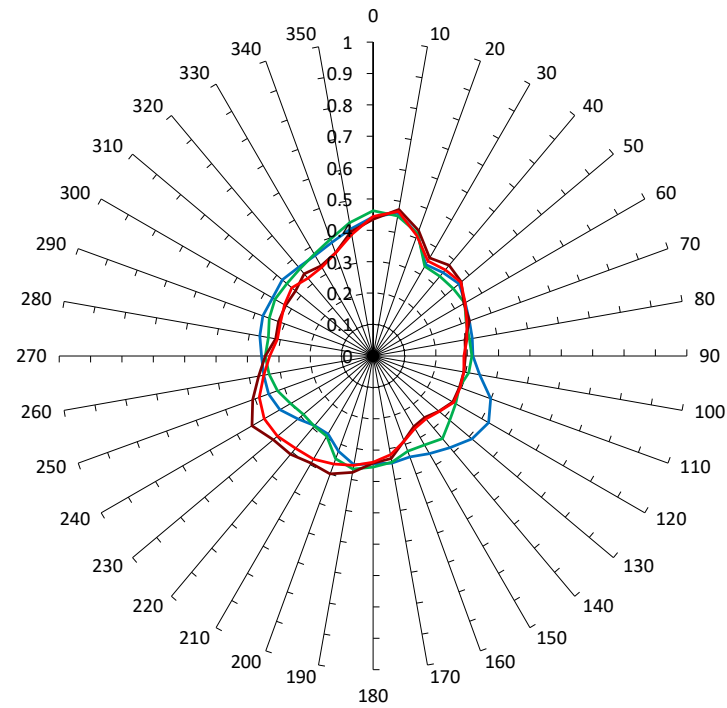
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.07%	3.63	1.00%	4.65	< 0.001%	8.65
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.15%	3.82	1.57%	4.95	< 0.001%	9.24
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.34%	4.12	2.33%	5.25	< 0.001%	9.97
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.15%	3.70	1.15%	4.65	< 0.001%	9.07

Results for P9

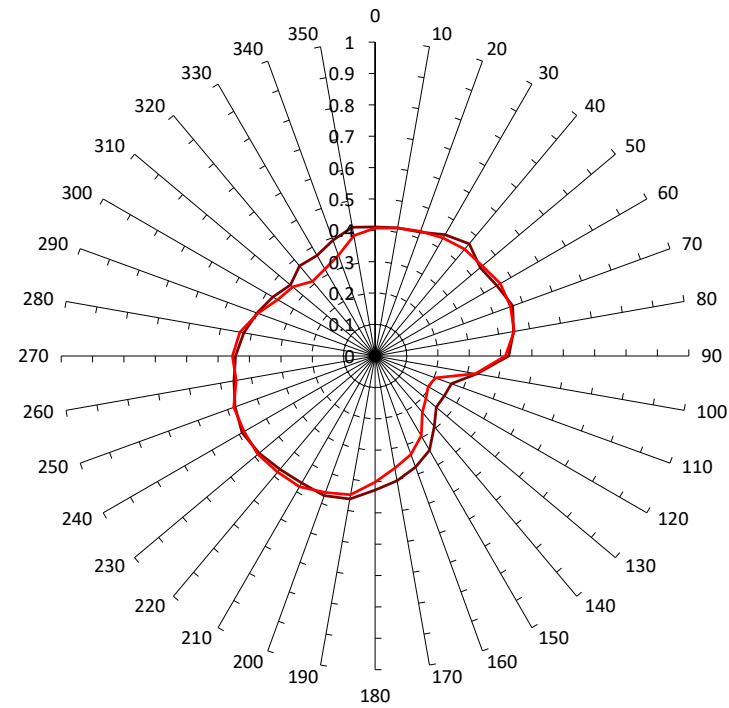
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	3.41	0.05%	4.29	< 0.001%	7.99
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.29	0.04%	4.17	< 0.001%	7.80
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	3.80	0.15%	4.80	< 0.001%	9.08
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.61	0.09%	4.55	< 0.001%	8.56

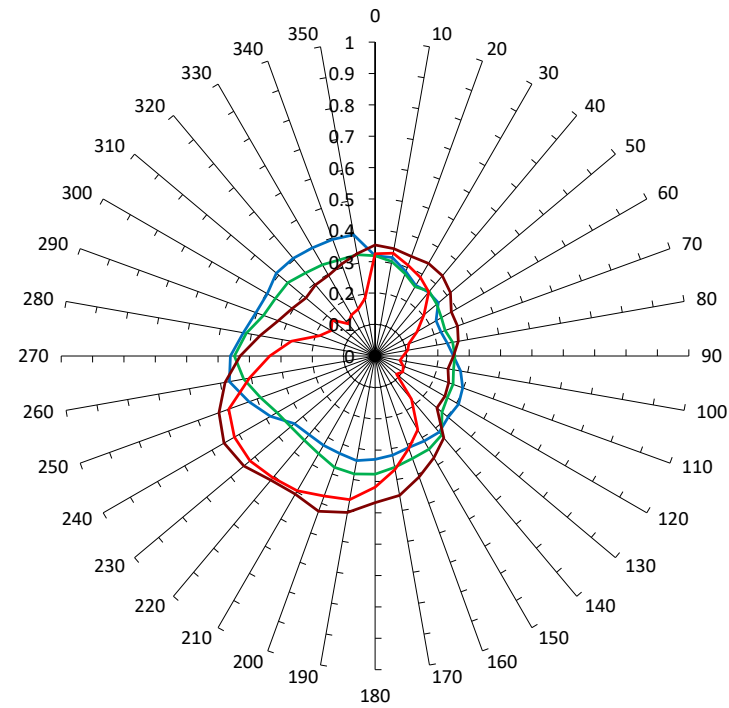
Results for P10

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.03%	4.45	0.52%	5.65	< 0.001%	10.55
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.04%	4.45	0.52%	5.64	< 0.001%	10.59

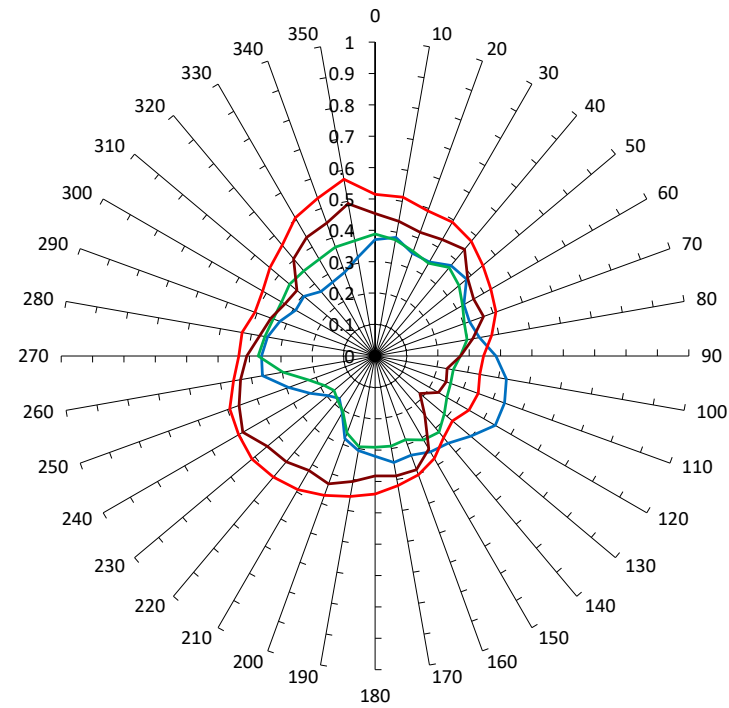
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.11%	3.67	1.21%	4.67	< 0.001%	9.25
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.08%	3.59	1.04%	4.62	< 0.001%	8.84
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	1.08%	4.78	5.29%	6.07	0.0012%	11.61
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.69%	4.49	3.63%	5.64	< 0.001%	10.94

Results for P12

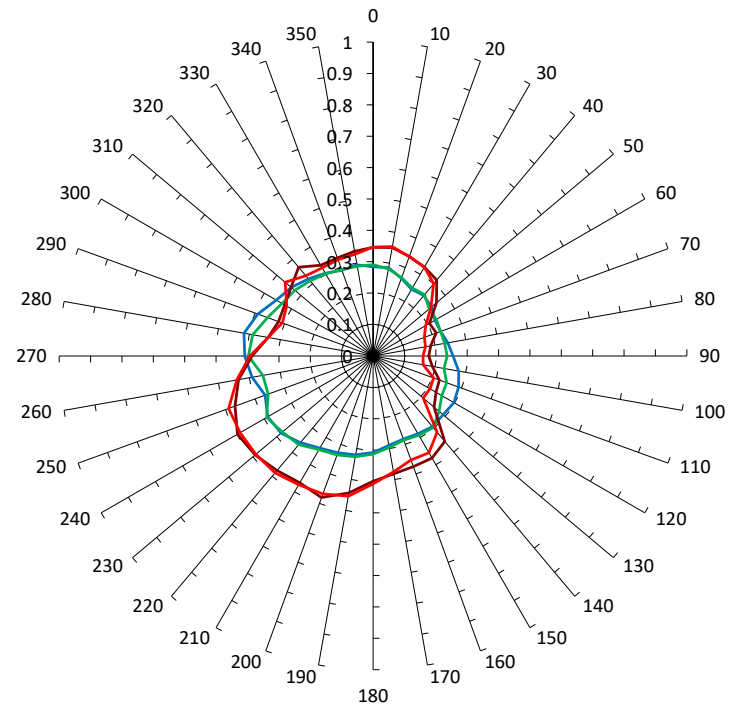
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.02%	3.16	0.30%	3.91	< 0.001%	7.42
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.01%	2.95	0.21%	3.67	< 0.001%	7.21
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.31%	4.17	2.43%	5.29	< 0.001%	9.97
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.80%	4.66	4.51%	5.89	< 0.001%	11.01

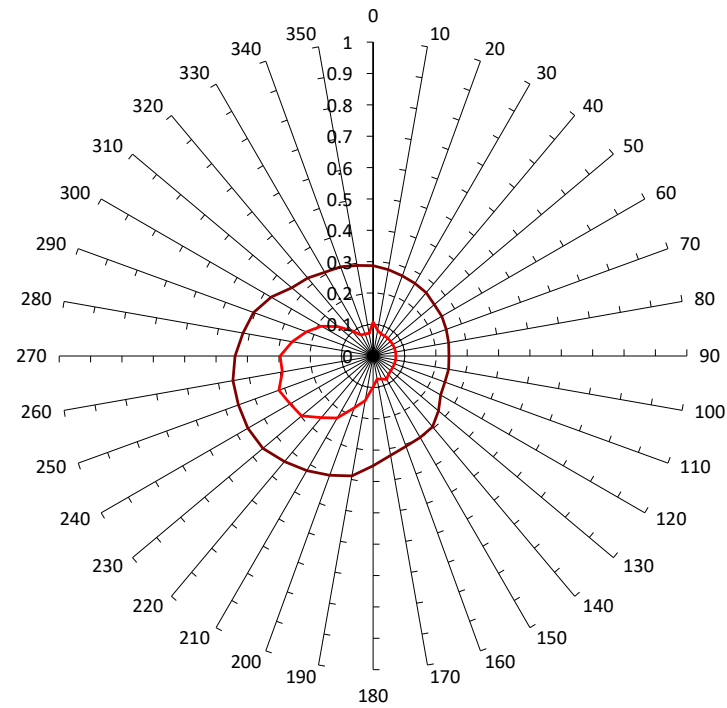
Results for P13

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.06%	3.48	0.79%	4.43	< 0.001%	8.52
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.05%	3.42	0.69%	4.36	< 0.001%	8.31
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.49%	4.32	3.06%	5.48	< 0.001%	10.48
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.51%	4.35	3.15%	5.51	< 0.001%	10.54

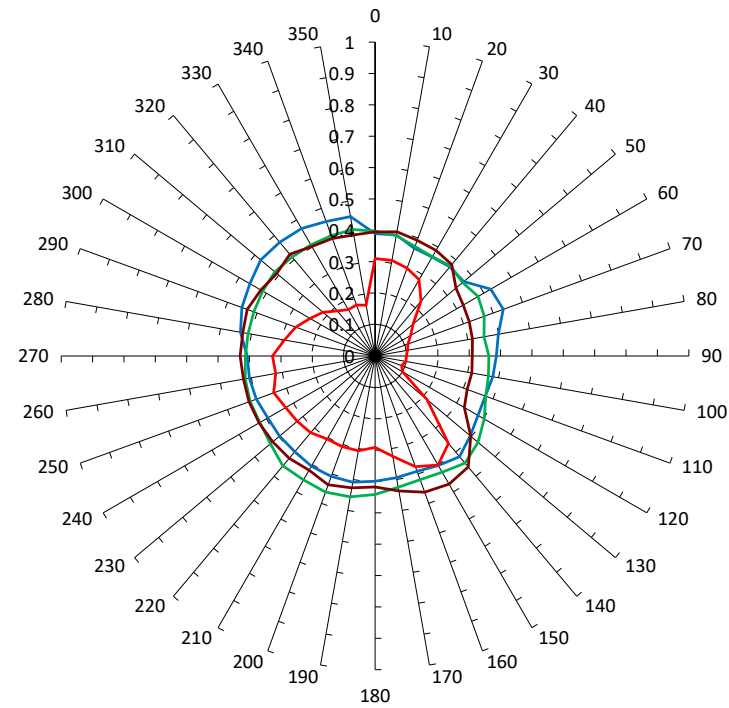
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.27%	4.07	2.17%	5.17	< 0.001%	9.91
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.55	0.08%	3.20	< 0.001%	6.41

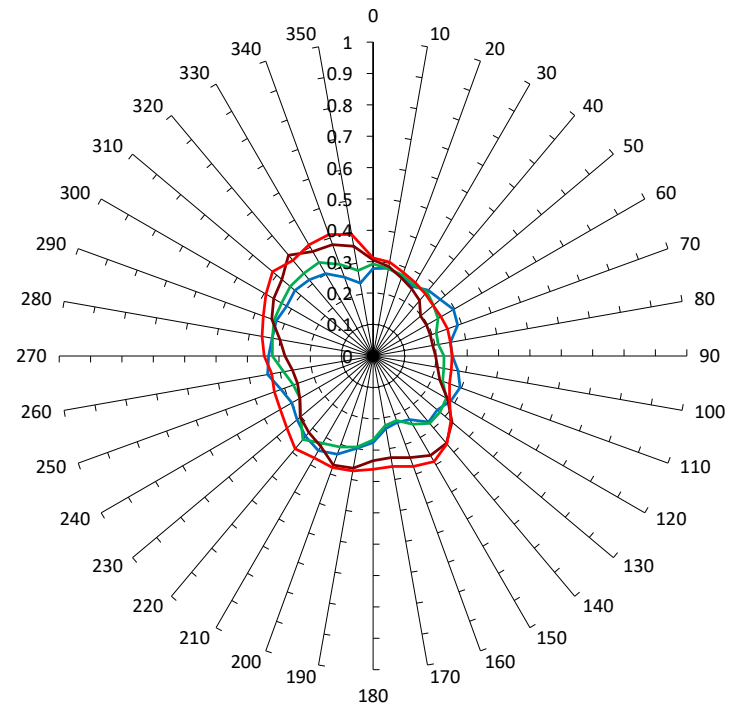
Results for P15

GEM Velocity Coefficients



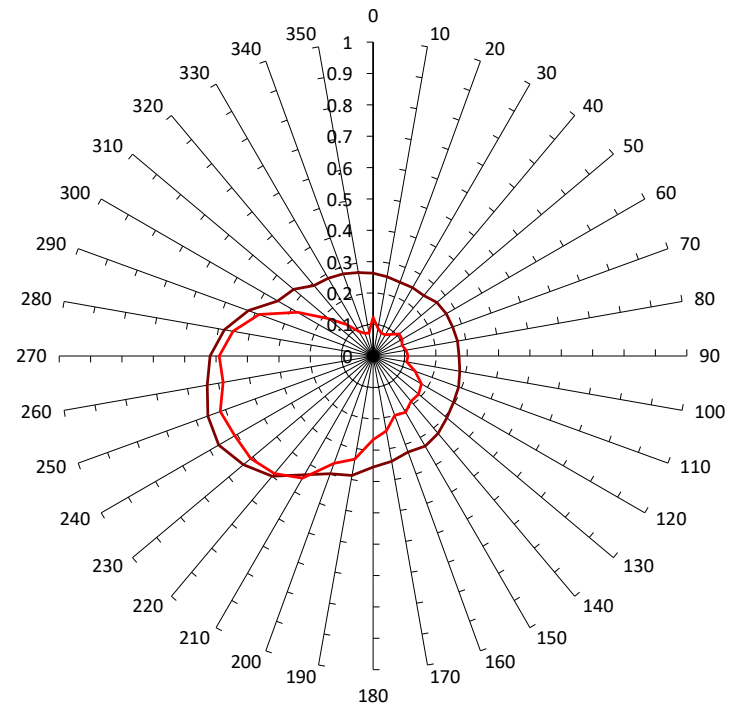
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.20%	4.01	1.87%	5.10	< 0.001%	9.46
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.33%	4.19	2.61%	5.37	< 0.001%	9.97
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.25%	4.09	2.29%	5.25	< 0.001%	9.74
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.01%	3.02	0.28%	3.87	< 0.001%	7.30

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.02%	3.10	0.29%	3.93	< 0.001%	7.43
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.01%	3.00	0.22%	3.78	< 0.001%	7.19
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.02%	3.15	0.34%	4.00	< 0.001%	7.58
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.06%	3.51	0.78%	4.49	< 0.001%	8.37

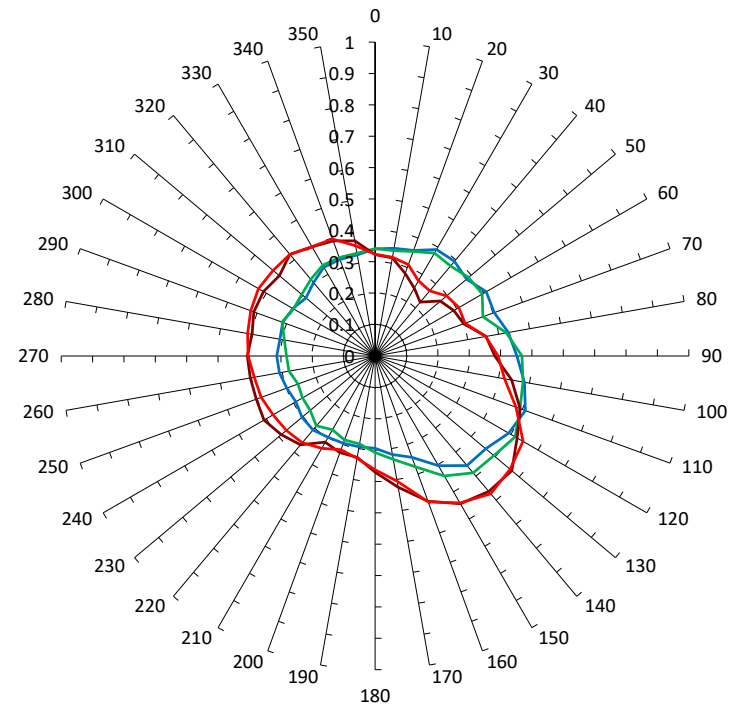
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.08%	4.70	0.89%	5.92	0.0014%	11.66
CONFIGURATION 4: Completed Proposed Development	0.04%	4.40	0.56%	5.54	< 0.001%	10.86

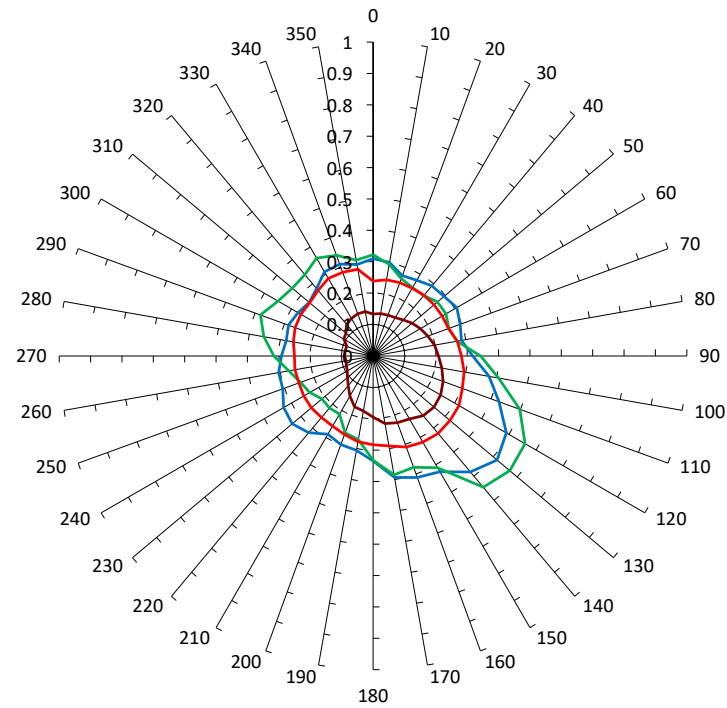
Results for P18

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	3.43	0.03%	4.17	< 0.001%	7.67
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.38	0.03%	4.08	< 0.001%	7.66
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	3.87	0.18%	4.90	< 0.001%	9.23
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.84	0.16%	4.84	< 0.001%	9.14

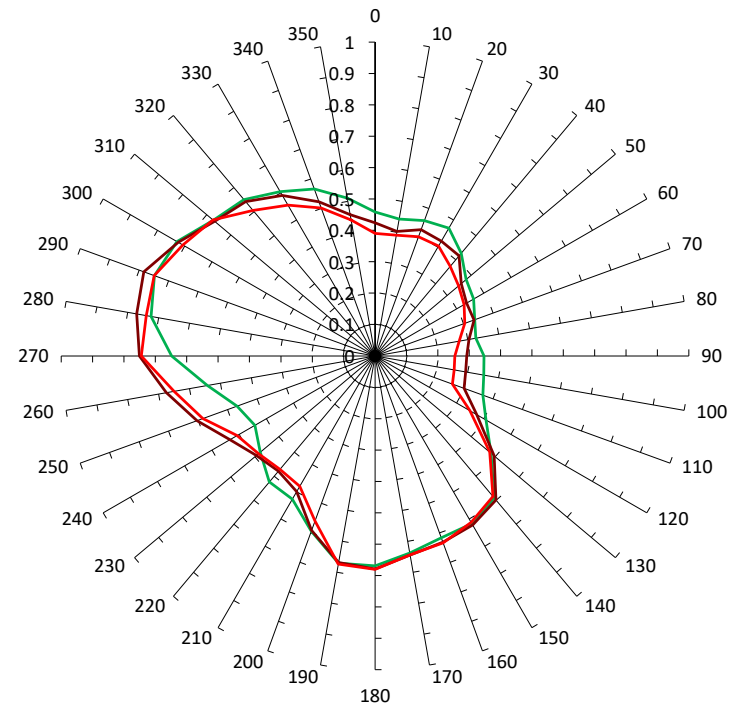
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.03%	3.25	0.40%	4.07	< 0.001%	7.66
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.06%	3.21	0.43%	3.97	< 0.001%	8.01
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	1.65	< 0.01%	2.03	< 0.001%	3.98
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.60	0.05%	3.31	< 0.001%	6.04

Results for P20

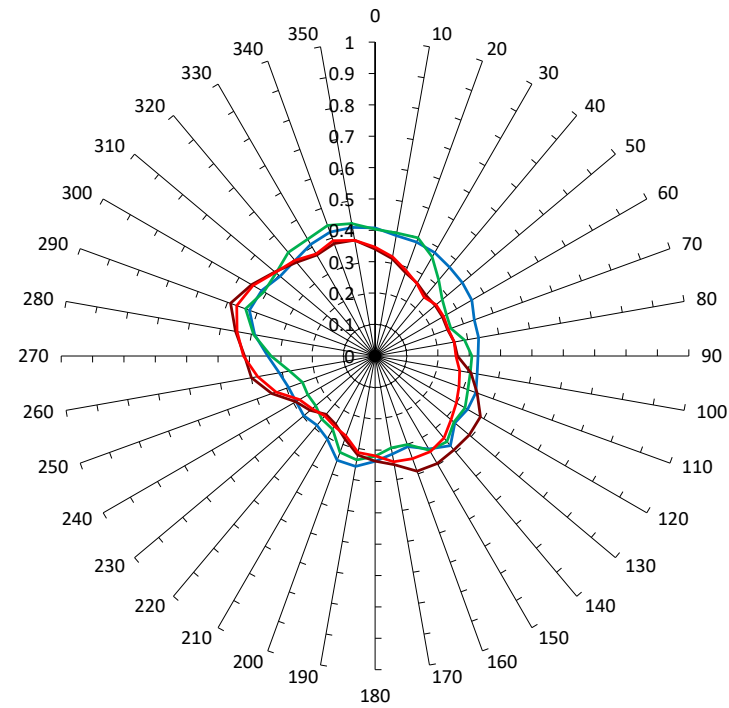
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	23.35%	5.65	2.95%	7.26	0.0128%	14.20
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	25.13%	5.93	3.92%	7.63	0.0233%	15.09
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	23.49%	5.77	3.46%	7.45	0.0184%	14.72

Results for P21

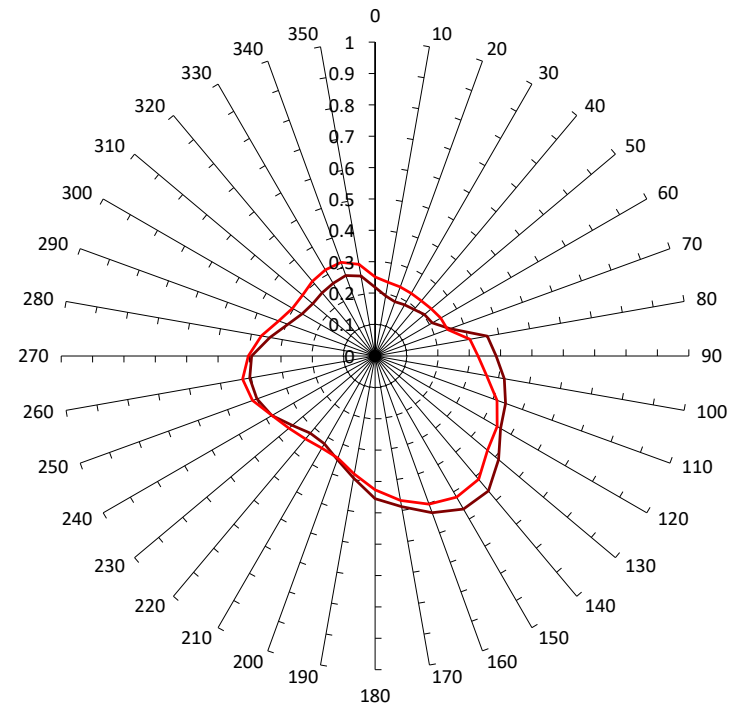
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.04%	3.38	0.52%	4.24	< 0.001%	8.05
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.03%	3.27	0.44%	4.06	< 0.001%	8.04
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.07%	3.46	0.82%	4.37	< 0.001%	8.88
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.06%	3.37	0.69%	4.25	< 0.001%	8.68

Results for P22

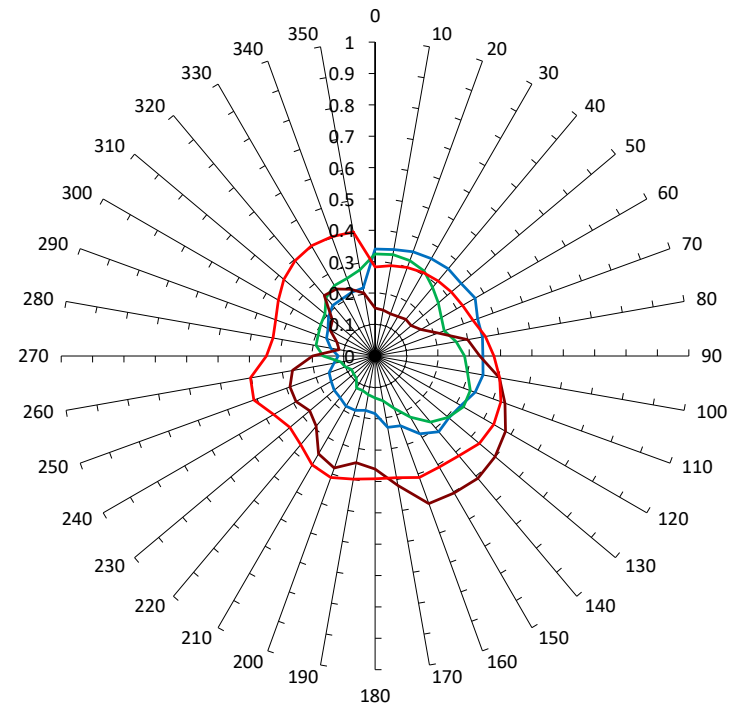
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.13%	3.70	1.36%	4.78	< 0.001%	9.22
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.11%	3.68	1.29%	4.76	< 0.001%	9.08

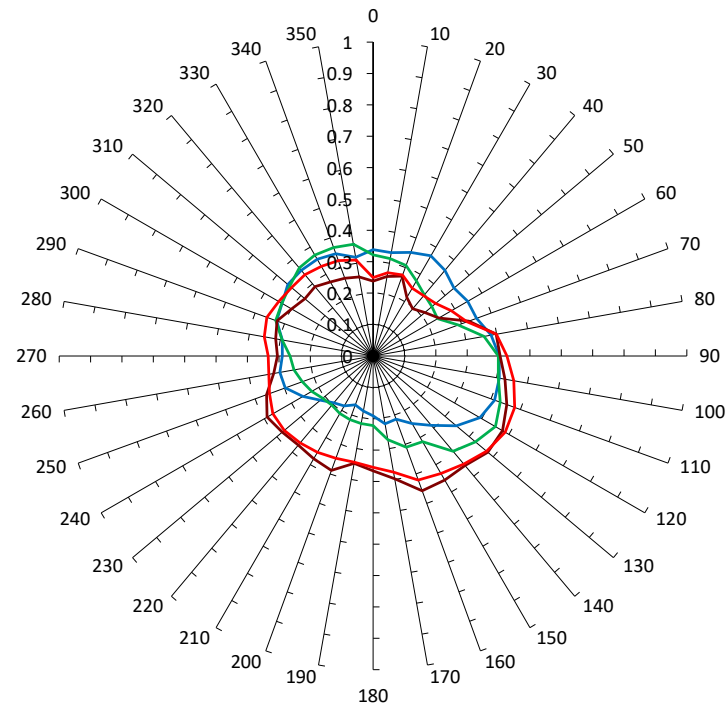
Results for P23

GEM Velocity Coefficients



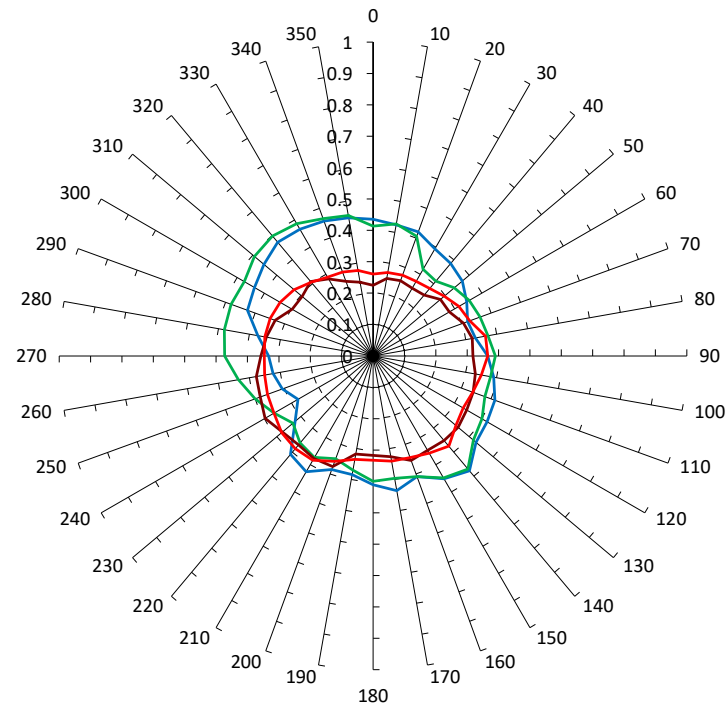
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	2.61	0.05%	3.03	< 0.001%	6.05
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	2.26	0.01%	2.57	< 0.001%	5.27
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.06%	3.32	0.58%	4.18	< 0.001%	8.20
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.10%	3.73	1.19%	4.76	< 0.001%	8.83

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.01%	3.00	0.16%	3.61	< 0.001%	6.89
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.01%	2.94	0.14%	3.53	< 0.001%	6.83
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.08%	3.61	0.92%	4.58	< 0.001%	8.49
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.06%	3.58	0.79%	4.50	< 0.001%	8.27

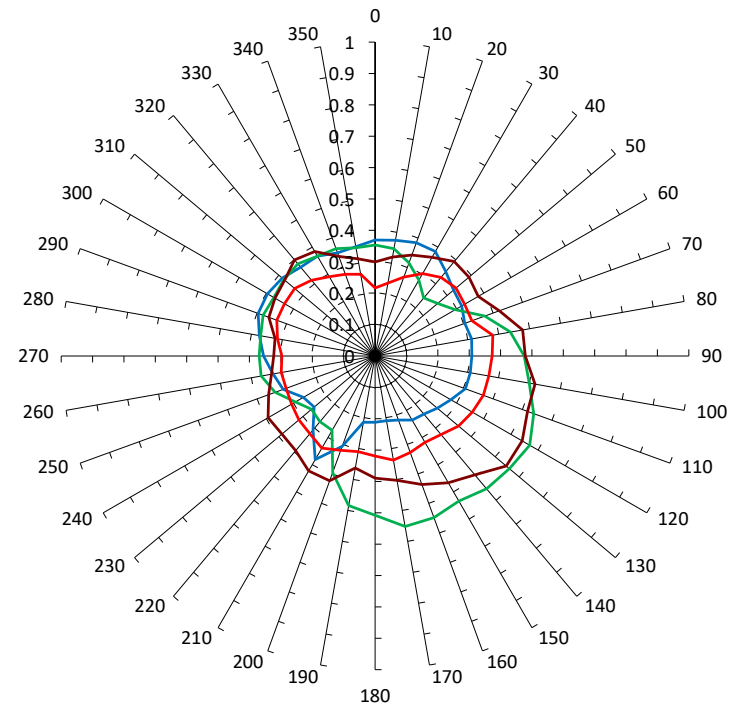
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	3.84	0.14%	4.84	< 0.001%	9.09
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.98	0.23%	5.05	< 0.001%	9.71
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	3.50	0.07%	4.45	< 0.001%	8.42
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.49	0.06%	4.44	< 0.001%	8.30

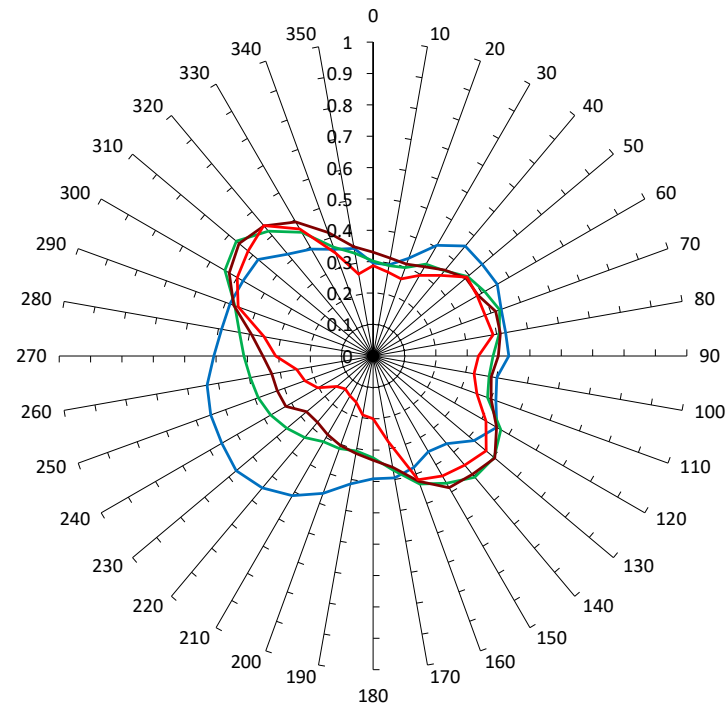
Results for P26

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.03%	3.27	0.42%	4.07	< 0.001%	7.89
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.24%	3.91	1.83%	5.00	< 0.001%	9.74
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.19%	3.97	1.53%	4.95	< 0.001%	9.08
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	3.16	0.29%	3.99	< 0.001%	7.32

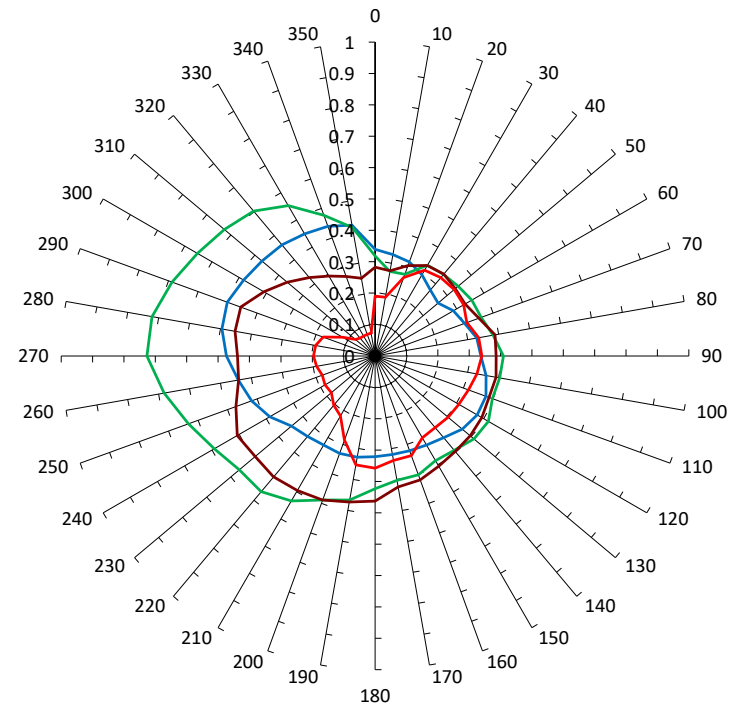
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	1.39%	4.97	1.18%	6.27	0.0018%	12.00
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.22%	3.95	0.20%	4.91	< 0.001%	9.71
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.17%	3.79	0.15%	4.63	< 0.001%	9.43
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.11%	3.50	0.09%	4.15	< 0.001%	8.96

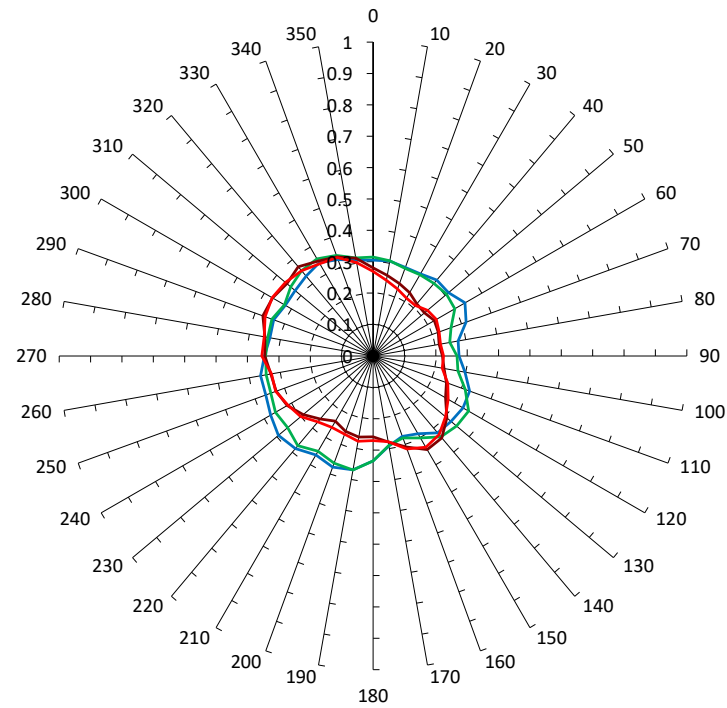
Results for P28

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.18%	3.87	1.59%	4.88	< 0.001%	9.72
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	3.69%	5.71	11.73%	7.24	0.0145%	14.37
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.69%	4.54	4.08%	5.78	< 0.001%	10.91
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.64	0.10%	3.35	< 0.001%	6.53

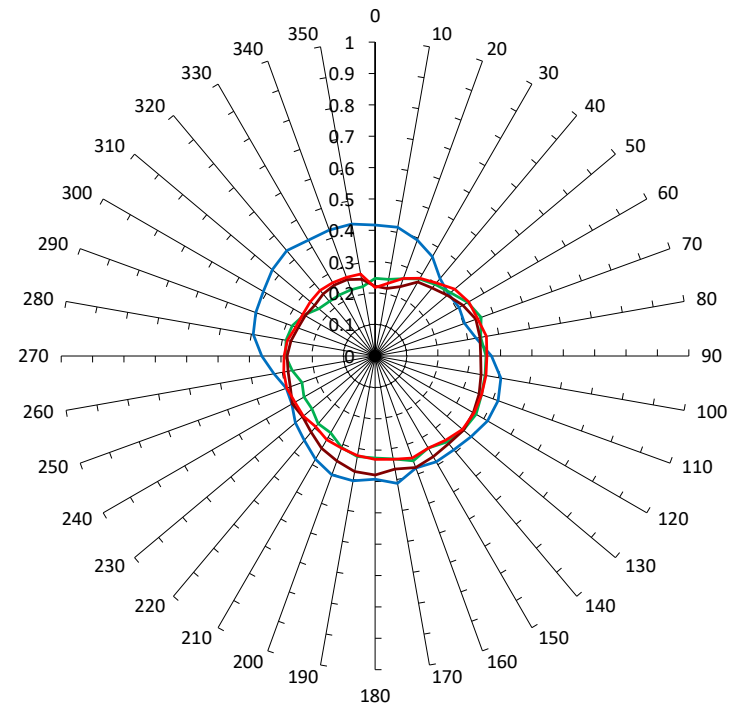
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.06%	3.51	0.77%	4.46	< 0.001%	8.37
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.04%	3.39	0.59%	4.32	< 0.001%	8.05
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	2.97	0.24%	3.77	< 0.001%	7.34
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.00	0.26%	3.81	< 0.001%	7.36

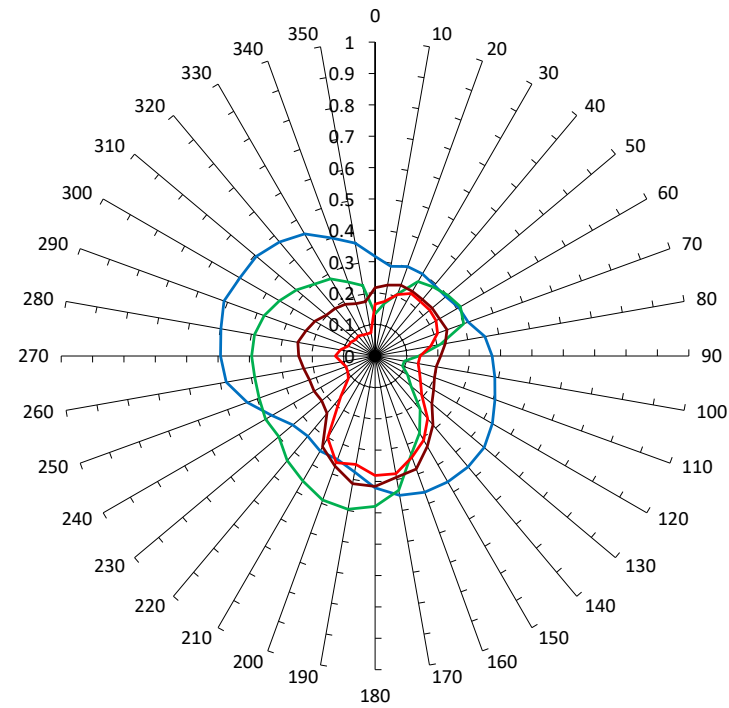
Results for P30

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	3.65	0.09%	4.64	< 0.001%	8.62
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	2.91	< 0.01%	3.68	< 0.001%	6.73
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	3.13	0.02%	4.02	< 0.001%	7.48
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.02	0.01%	3.83	< 0.001%	6.97

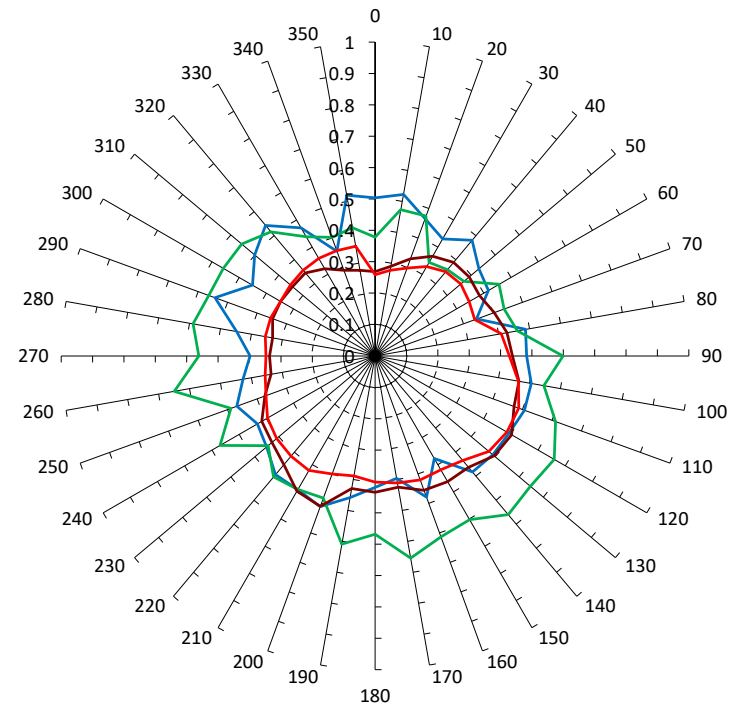
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.27%	4.06	2.20%	5.18	< 0.001%	10.14
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.30%	4.05	2.26%	5.22	< 0.001%	9.91
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.03%	2.92	0.35%	3.85	< 0.001%	7.71
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.01%	2.65	0.18%	3.46	< 0.001%	7.08

Results for P32

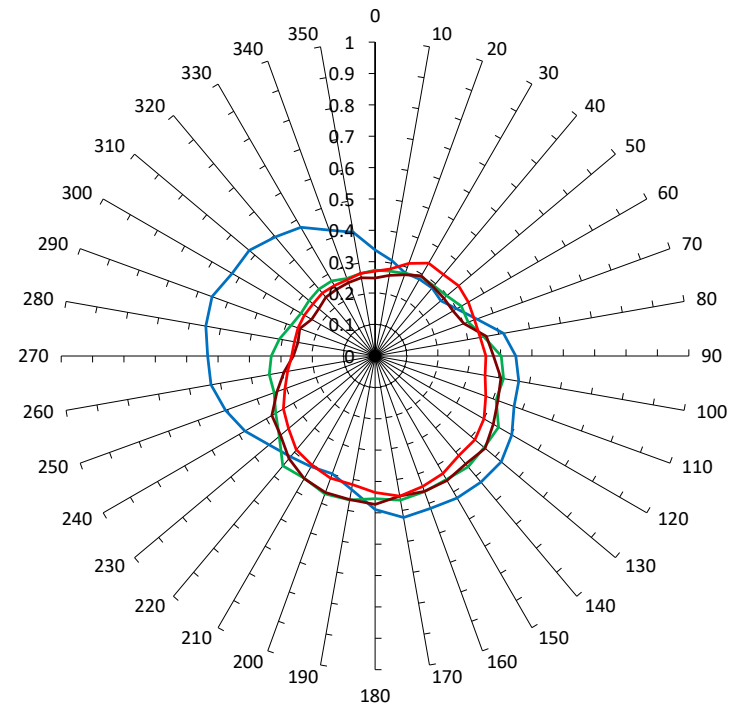
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.73%	4.62	0.63%	5.83	< 0.001%	10.86
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	2.17%	5.30	1.96%	6.80	0.0044%	12.90
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.41%	4.23	0.35%	5.35	< 0.001%	10.12
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.16%	3.88	0.15%	4.90	< 0.001%	9.04

Results for P33

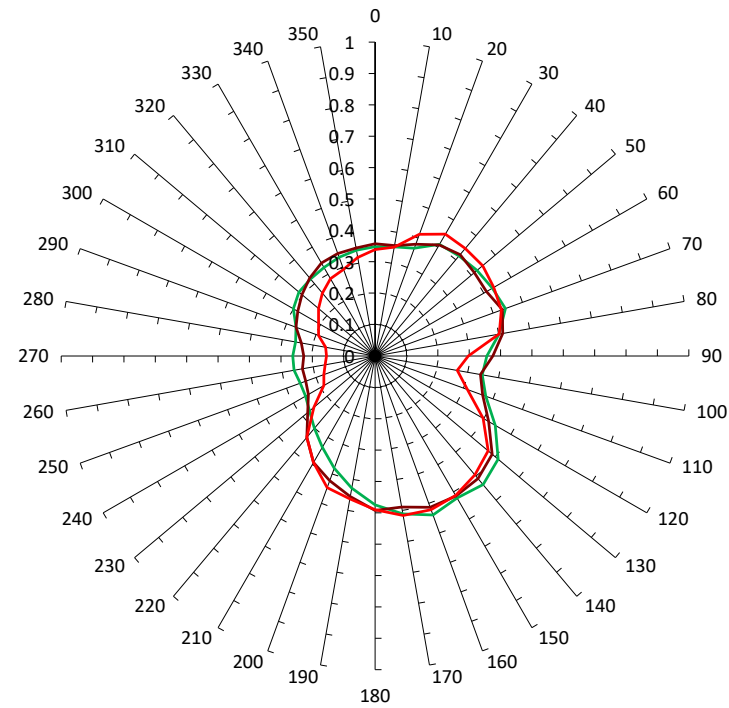
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.05%	4.60	0.76%	5.89	< 0.001%	11.28
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.01%	3.99	0.25%	5.10	< 0.001%	9.68
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.01%	3.91	0.22%	5.01	< 0.001%	9.54
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.59	0.10%	4.60	< 0.001%	8.71

Results for P34

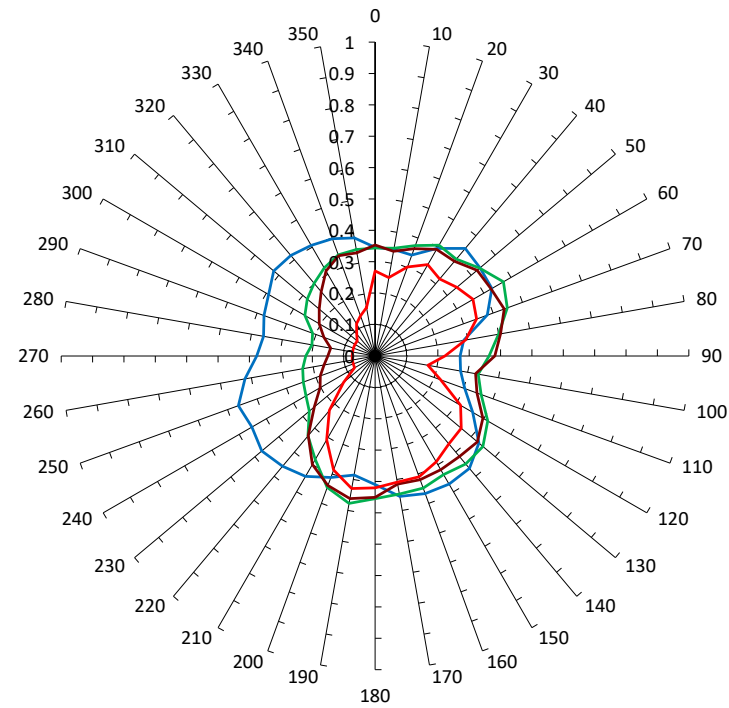
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.13%	3.62	1.12%	4.63	< 0.001%	9.08
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.15%	3.71	1.30%	4.75	< 0.001%	9.19
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.19%	3.76	1.45%	4.81	< 0.001%	9.39

Results for P35

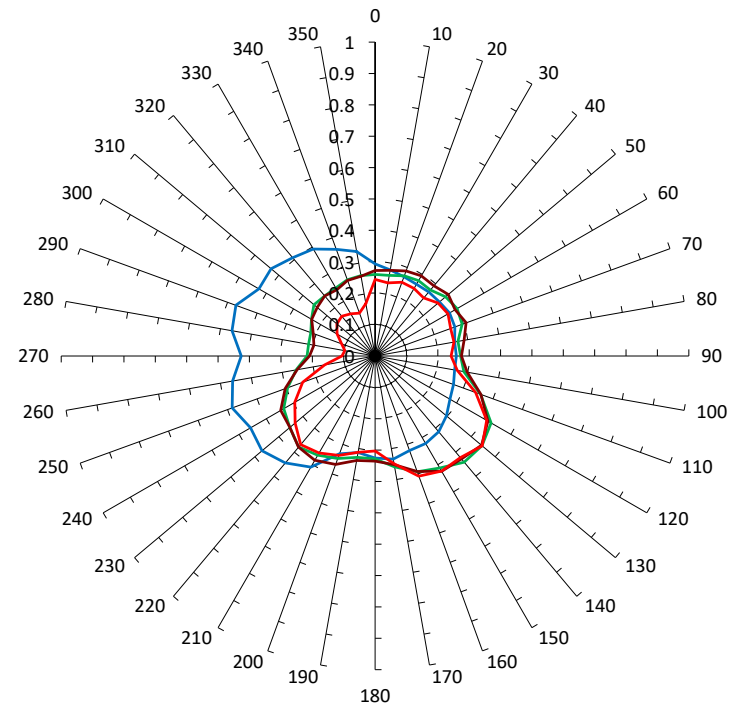
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.35%	4.22	2.59%	5.35	< 0.001%	10.03
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.14%	3.67	1.14%	4.67	< 0.001%	8.96
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.12%	3.60	0.98%	4.56	< 0.001%	8.78
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.04%	3.05	0.43%	3.95	< 0.001%	7.92

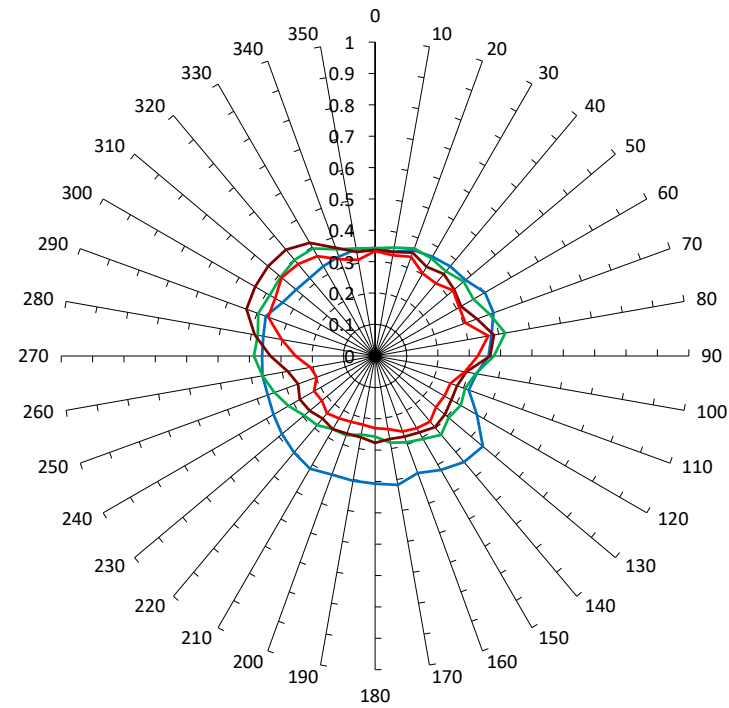
Results for P36

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.32%	4.14	2.37%	5.23	< 0.001%	10.14
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.04%	3.30	0.47%	4.15	< 0.001%	7.86
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.05%	3.36	0.55%	4.23	< 0.001%	8.02
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.03%	3.15	0.35%	3.95	< 0.001%	7.60

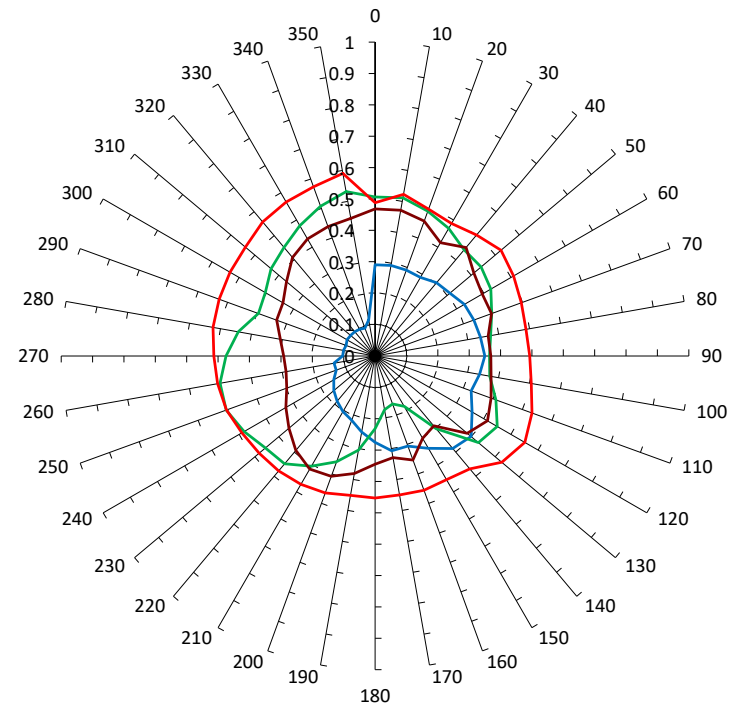
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.12%	3.77	1.26%	4.81	< 0.001%	8.87
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.03%	3.32	0.47%	4.15	< 0.001%	7.93
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.03%	3.23	0.39%	3.97	< 0.001%	8.05
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.81	0.11%	3.41	< 0.001%	6.81

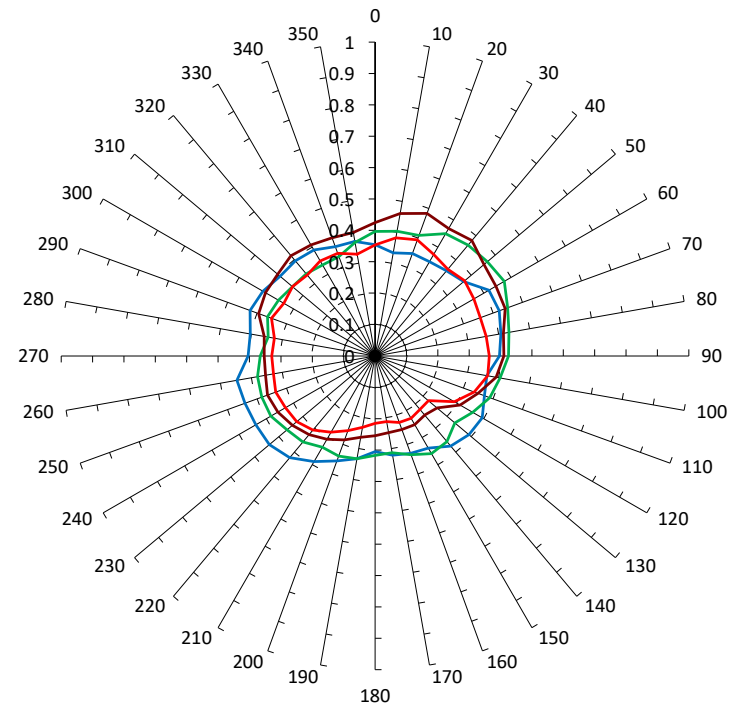
Results for P38

GEM Velocity Coefficients



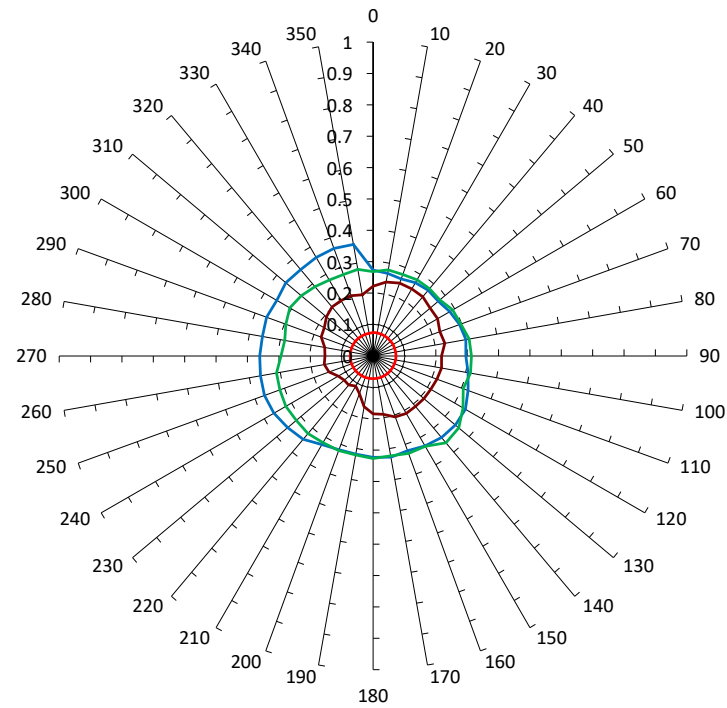
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	2.56	0.05%	3.08	< 0.001%	5.94
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.46%	4.37	3.05%	5.48	< 0.001%	10.50
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.11%	3.74	1.00%	4.65	< 0.001%	8.67
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	1.08%	4.87	5.72%	6.15	< 0.001%	11.39

GEM Velocity Coefficients



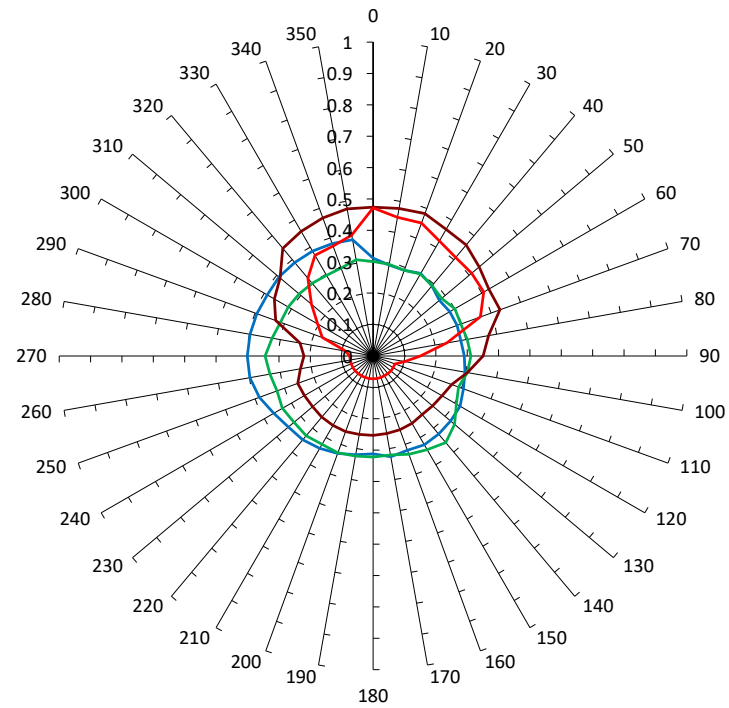
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.20%	3.98	1.78%	5.03	< 0.001%	9.53
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.10%	3.70	0.93%	4.62	< 0.001%	8.50
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.09%	3.65	0.80%	4.48	< 0.001%	8.45
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	3.19	0.31%	3.96	< 0.001%	7.41

GEM Velocity Coefficients



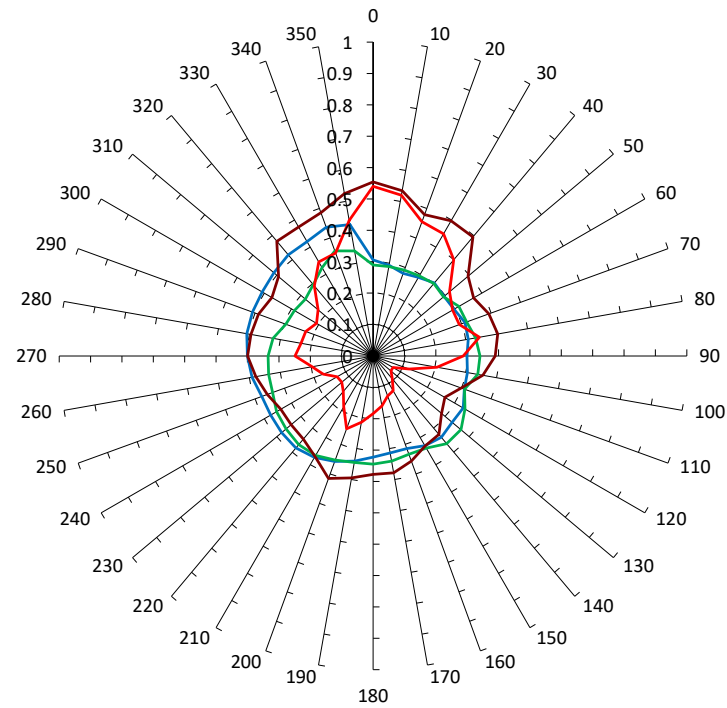
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	1.42%	3.35	0.55%	4.27	< 0.001%	8.01
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.69%	3.06	0.25%	3.91	< 0.001%	7.20
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	1.82	< 0.01%	2.21	< 0.001%	4.21
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	0.71	< 0.01%	0.91	< 0.001%	1.67

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.05%	3.49	0.77%	4.44	< 0.001%	8.45
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.02%	3.16	0.34%	4.05	< 0.001%	7.49
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.07%	3.40	0.45%	4.00	< 0.001%	8.13
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	2.93	0.17%	3.26	< 0.001%	7.22

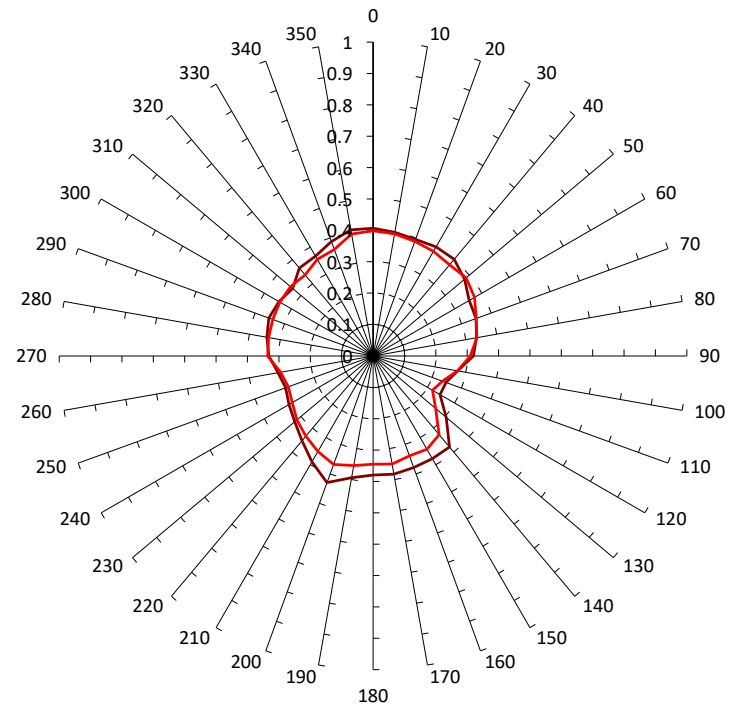
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	3.65	0.10%	4.64	< 0.001%	8.75
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.37	0.04%	4.29	< 0.001%	7.97
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	3.90	0.16%	4.86	< 0.001%	9.18
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.01	0.03%	3.32	< 0.001%	7.73

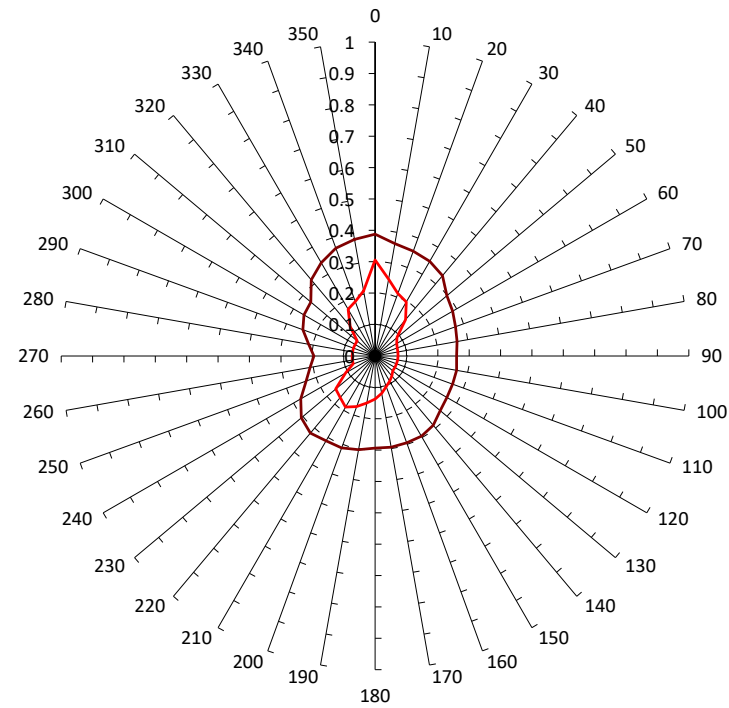
Results for P43

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.07%	3.54	0.81%	4.51	< 0.001%	8.41
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.03%	3.33	0.46%	4.22	< 0.001%	7.76

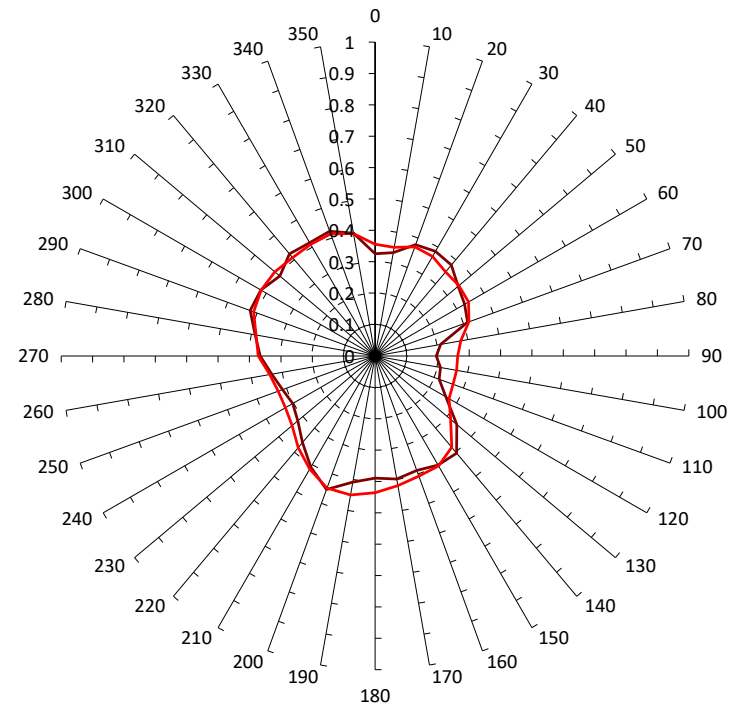
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.52%	2.94	0.16%	3.67	< 0.001%	6.88
CONFIGURATION 4: Completed Proposed Development	< 0.01%	1.65	< 0.01%	1.96	< 0.001%	4.13

Results for P45

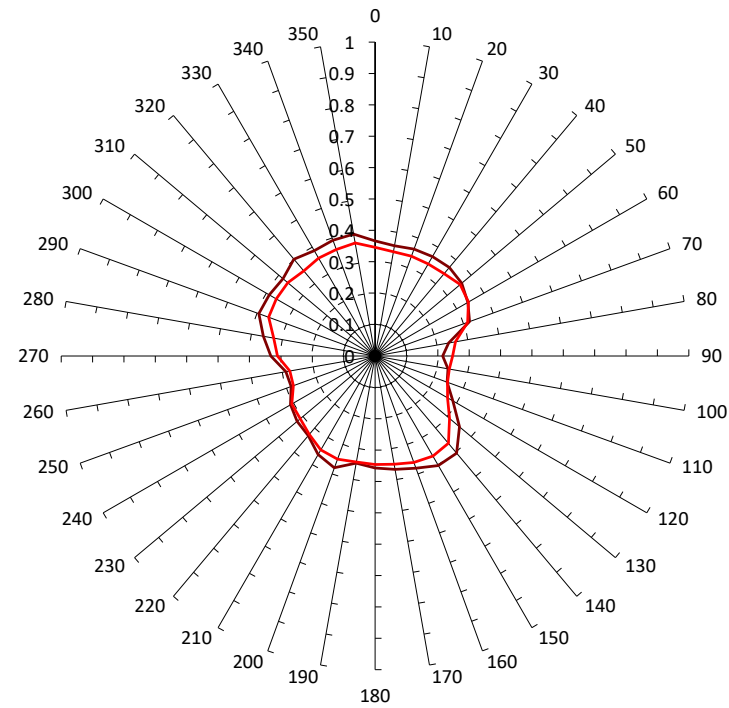
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.11%	3.70	1.14%	4.72	< 0.001%	8.91
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.14%	3.78	1.39%	4.86	< 0.001%	9.12

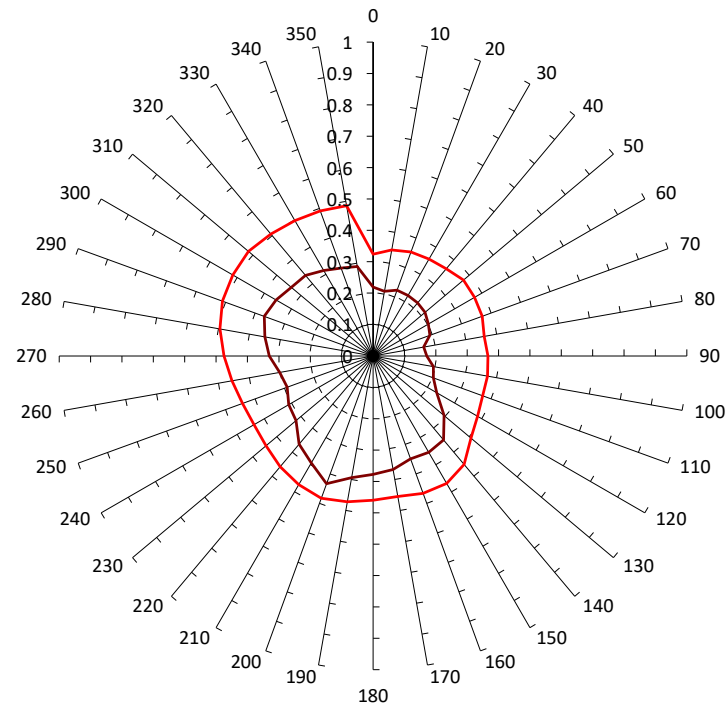
Results for P46

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.04%	3.41	0.59%	4.33	< 0.001%	8.06
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	3.23	0.38%	4.11	< 0.001%	7.60

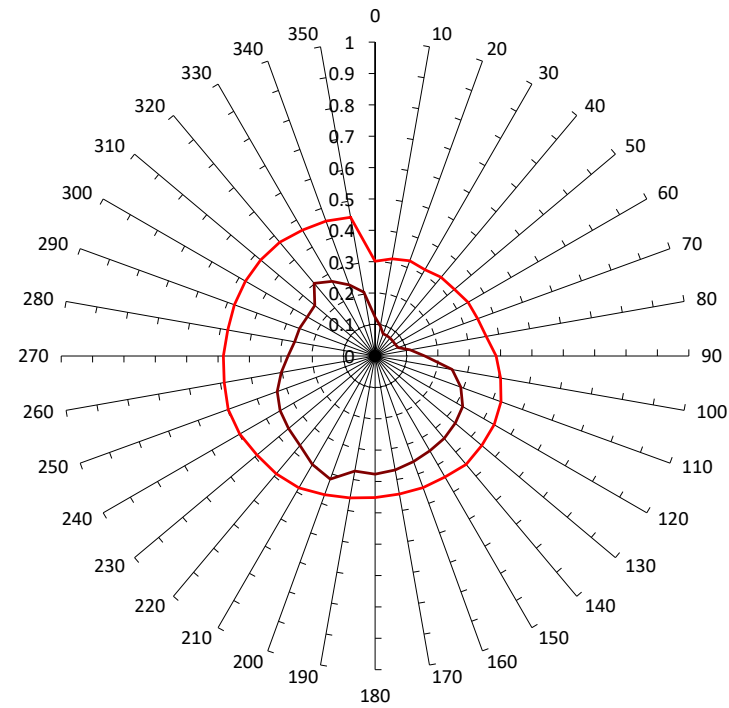
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.07%	3.43	0.73%	4.40	< 0.001%	8.39
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.58%	4.48	3.89%	5.74	< 0.001%	10.72

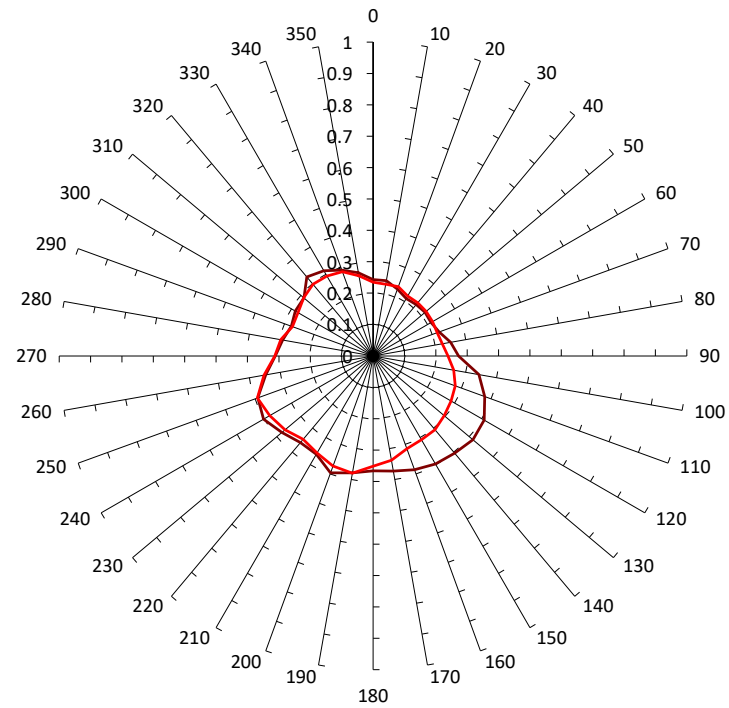
Results for P48

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	18.97%	3.41	0.69%	4.36	< 0.001%	8.32
CONFIGURATION 4: Completed Proposed Development	37.68%	4.60	4.47%	5.88	< 0.001%	11.02

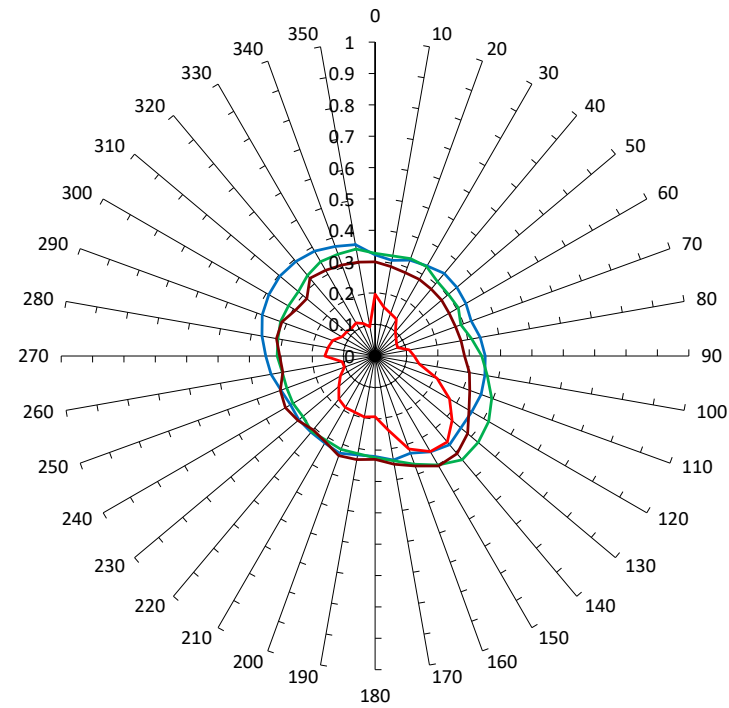
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	23.81%	3.52	0.83%	4.49	< 0.001%	8.44
CONFIGURATION 4: Completed Proposed Development	20.89%	3.37	0.63%	4.31	< 0.001%	8.17

Results for P50

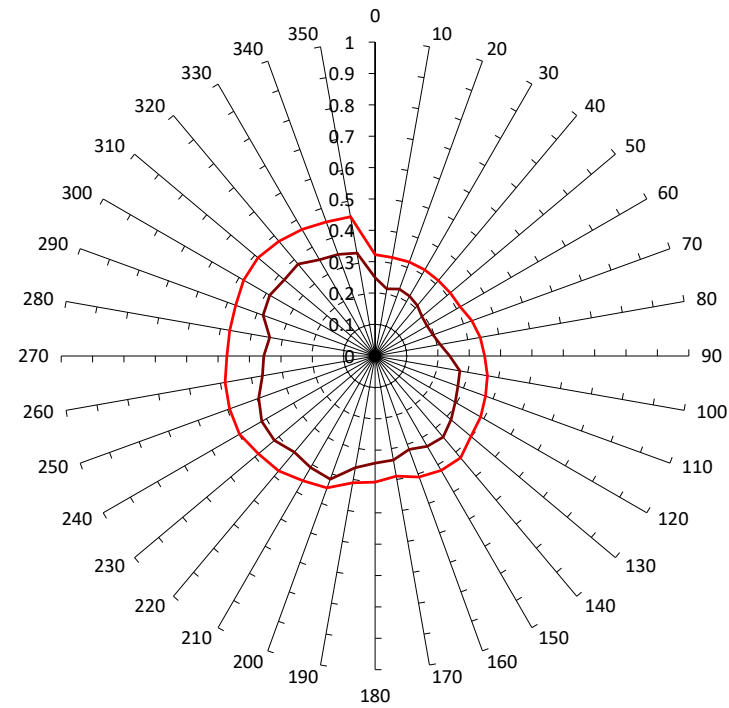
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	1.27%	3.31	0.44%	4.19	< 0.001%	7.78
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.88%	3.17	0.30%	4.00	< 0.001%	7.30
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.80%	3.12	0.31%	4.00	< 0.001%	7.38
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.03%	1.86	0.01%	2.40	< 0.001%	5.15

Results for P51

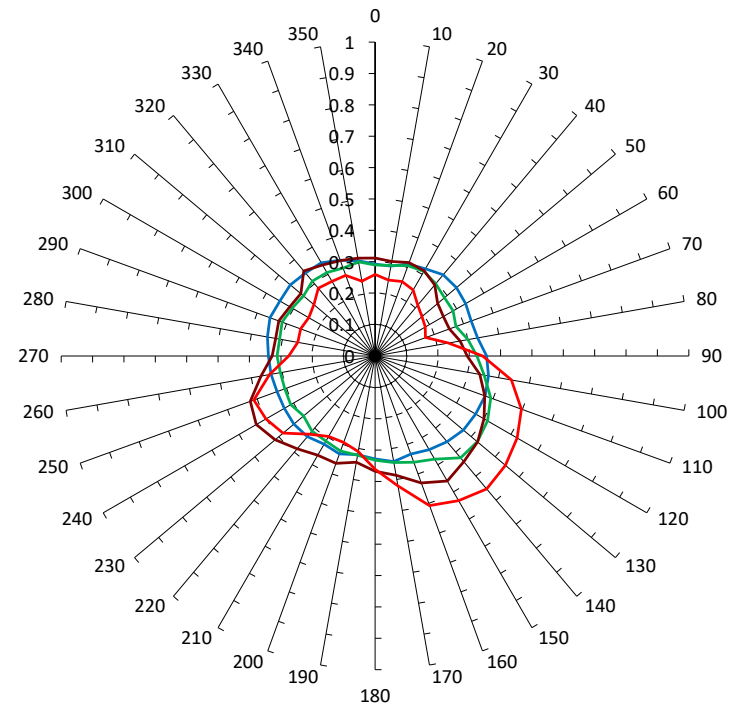
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.12%	3.74	1.24%	4.75	< 0.001%	9.00
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.60%	4.49	3.82%	5.71	< 0.001%	10.80

Results for P52

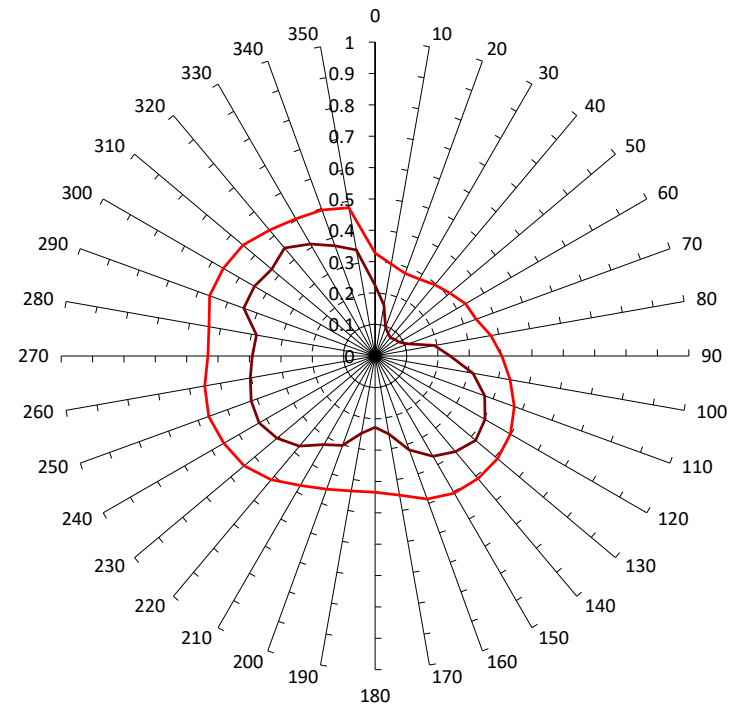
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	1.22%	3.29	0.43%	4.18	< 0.001%	7.69
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.81%	3.13	0.28%	3.97	< 0.001%	7.27
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.01%	3.70	1.17%	4.71	< 0.001%	8.92
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	2.64%	3.61	0.98%	4.51	< 0.001%	8.80

Results for P53

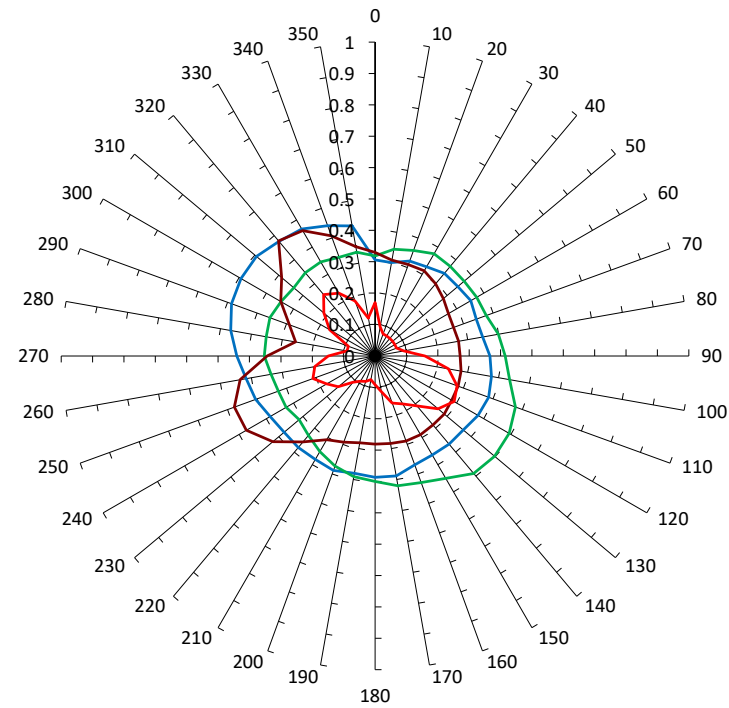
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.11%	3.72	1.18%	4.68	< 0.001%	9.08
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	1.38%	4.99	6.61%	6.34	0.0019%	12.08

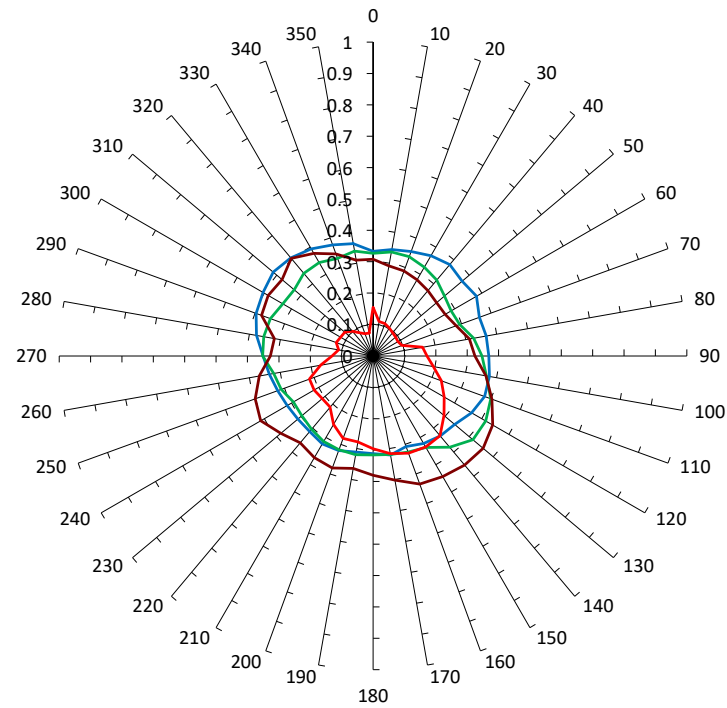
Results for P54

GEM Velocity Coefficients



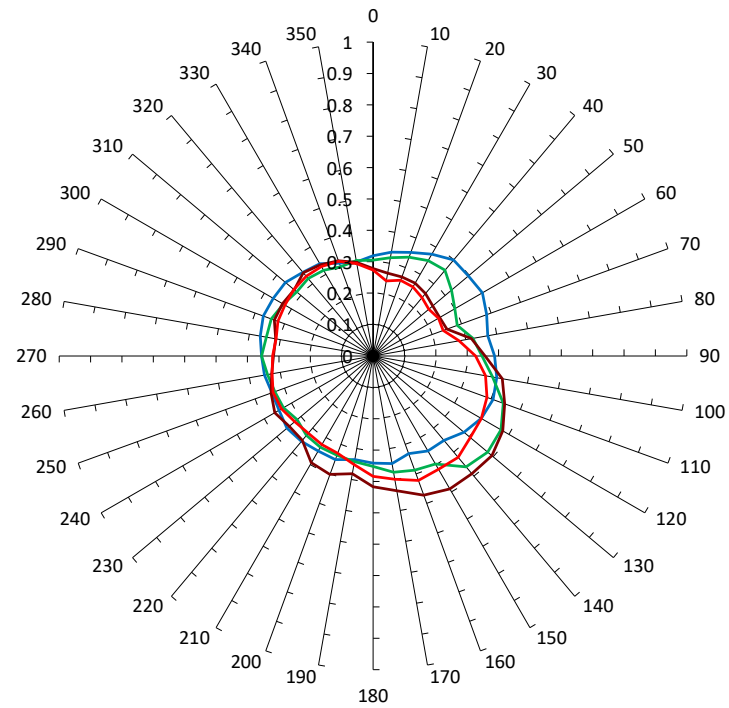
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.19%	3.96	1.76%	5.03	< 0.001%	9.60
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.07%	3.60	0.84%	4.55	< 0.001%	8.33
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.16%	3.79	1.37%	4.72	< 0.001%	9.49
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	1.78	< 0.01%	2.12	< 0.001%	4.32

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.03%	3.39	0.50%	4.24	< 0.001%	7.92
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.01%	3.19	0.32%	4.03	< 0.001%	7.41
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.09%	3.67	1.08%	4.68	< 0.001%	8.72
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.30	0.04%	2.99	< 0.001%	5.83

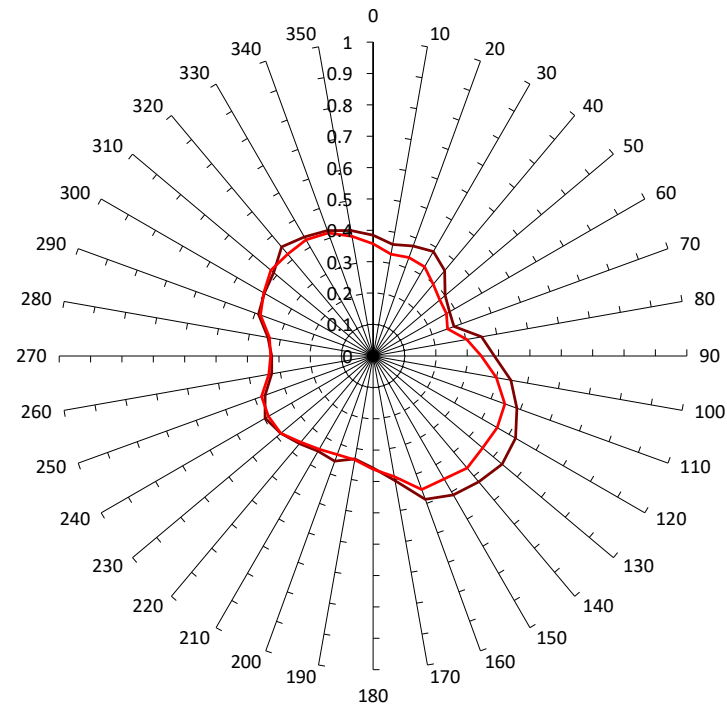
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.05%	3.51	0.66%	4.43	< 0.001%	8.10
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.04%	3.39	0.54%	4.29	< 0.001%	7.87
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.09%	3.62	1.00%	4.63	< 0.001%	8.63
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.03%	3.26	0.48%	4.20	< 0.001%	7.79

Results for P57

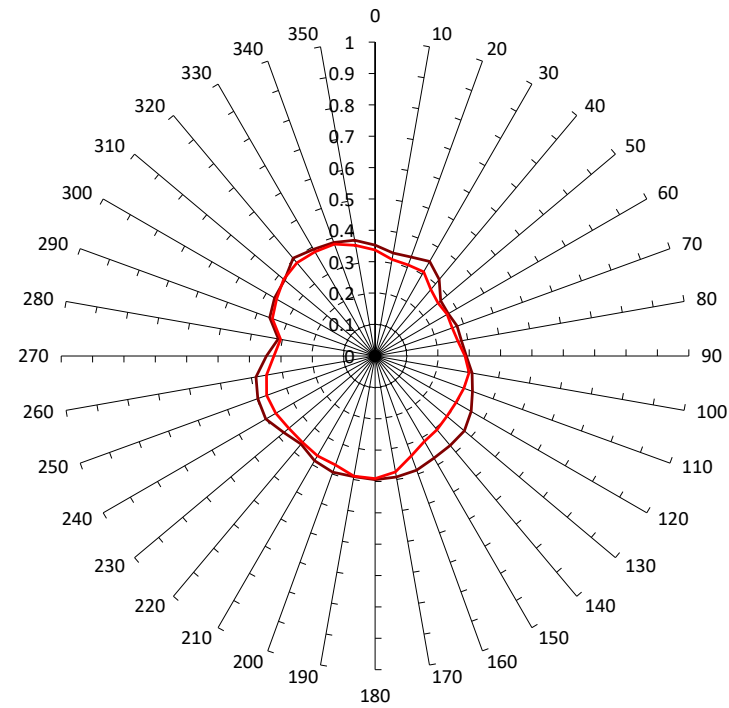
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	32.28%	3.79	1.20%	4.76	< 0.001%	8.84
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	29.80%	3.63	0.94%	4.59	< 0.001%	8.54

Results for P58

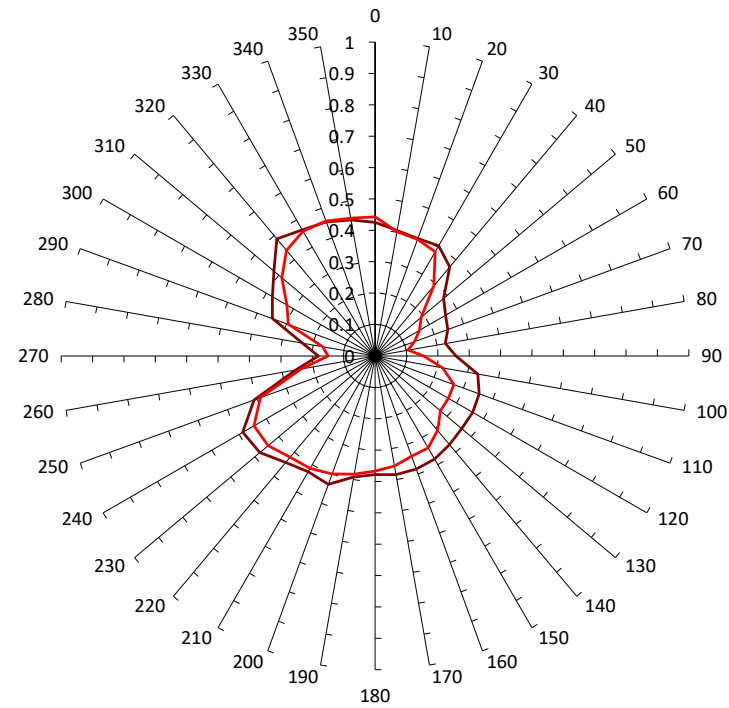
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	28.86%	3.66	1.08%	4.69	< 0.001%	8.73
CONFIGURATION 4: Completed Proposed Development	25.57%	3.46	0.73%	4.44	< 0.001%	8.27

Results for P59

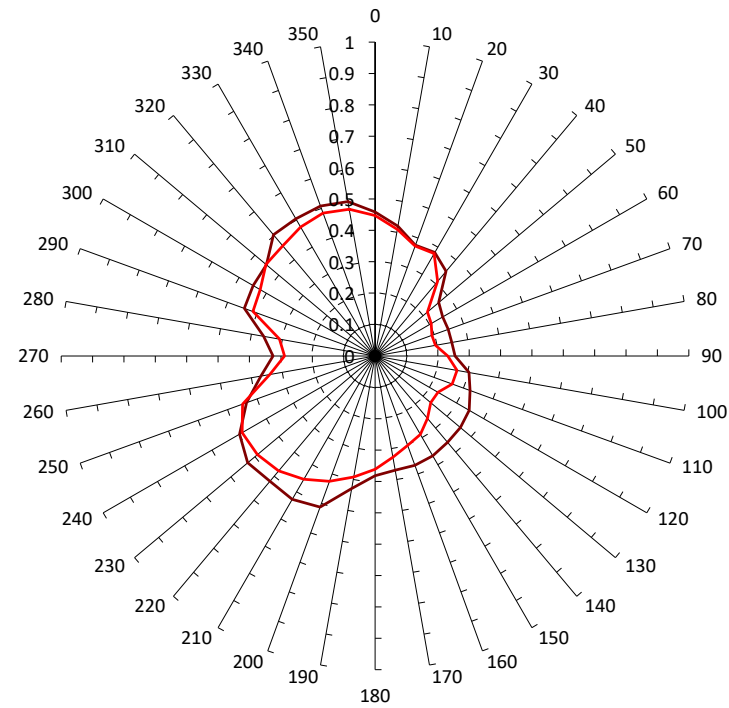
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.31%	4.12	2.16%	5.17	< 0.001%	9.89
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.17%	3.87	1.46%	4.85	< 0.001%	9.27

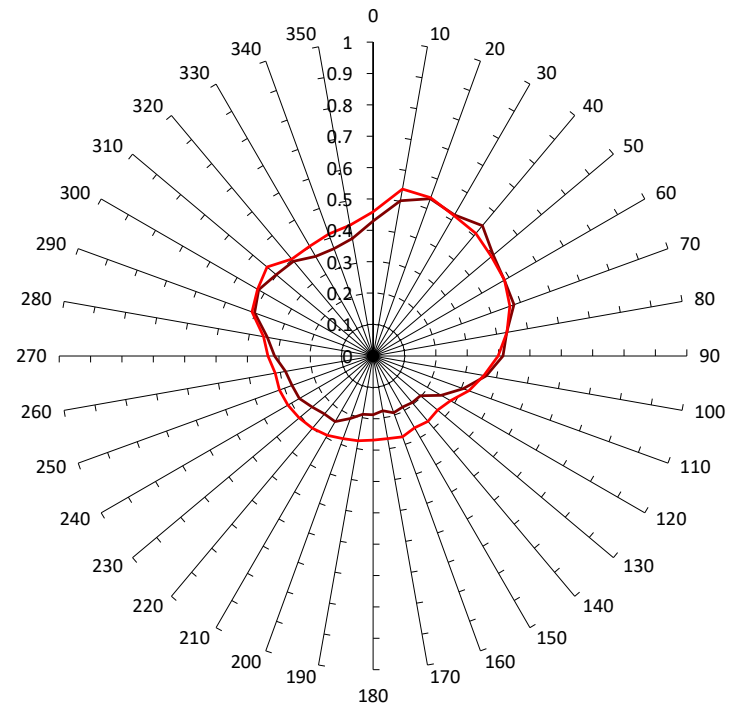
Results for P60

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.84%	4.63	4.22%	5.81	< 0.001%	11.15
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.41%	4.25	2.62%	5.33	< 0.001%	10.25

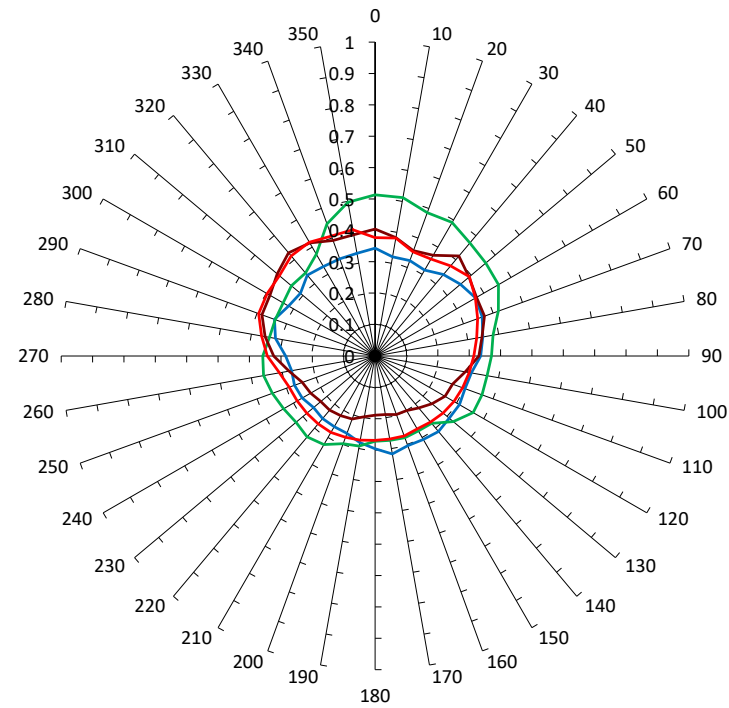
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.01%	3.63	0.08%	4.29	< 0.001%	8.73
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.73	0.10%	4.48	< 0.001%	8.82

Results for P62

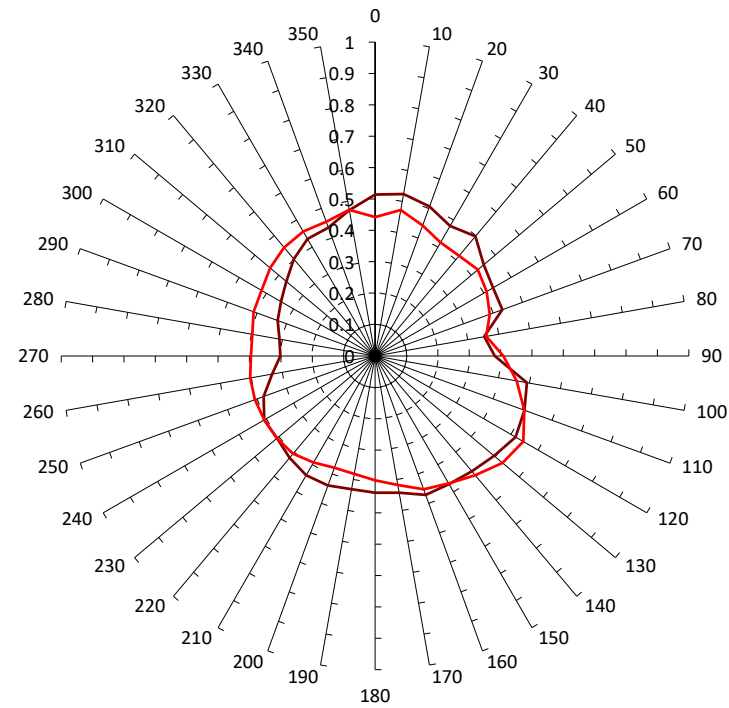
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	2.91	0.14%	3.66	< 0.001%	6.74
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.10%	3.64	0.78%	4.45	< 0.001%	8.51
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.02%	3.13	0.27%	3.77	< 0.001%	7.55
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	3.22	0.34%	3.99	< 0.001%	7.69

Results for P63

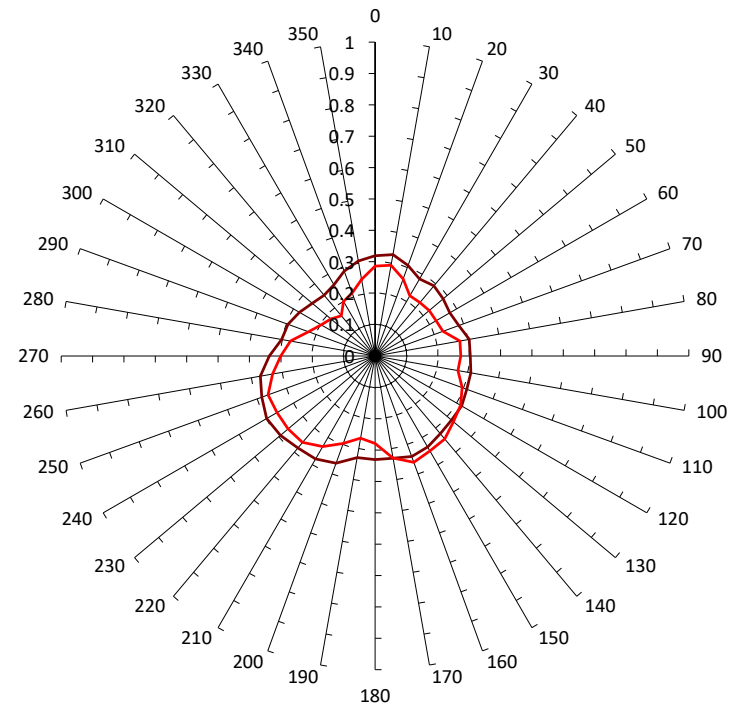
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.31%	4.18	2.20%	5.23	< 0.001%	9.61
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.22%	4.09	1.95%	5.14	< 0.001%	9.39

Results for P64

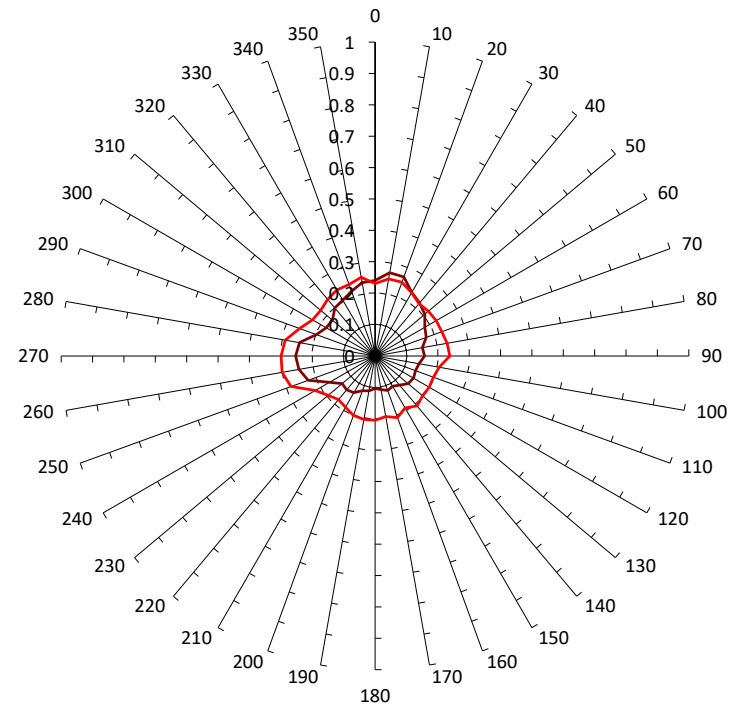
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.06%	3.51	0.79%	4.45	< 0.001%	8.45
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	3.18	0.40%	4.03	< 0.001%	7.72

Results for P65

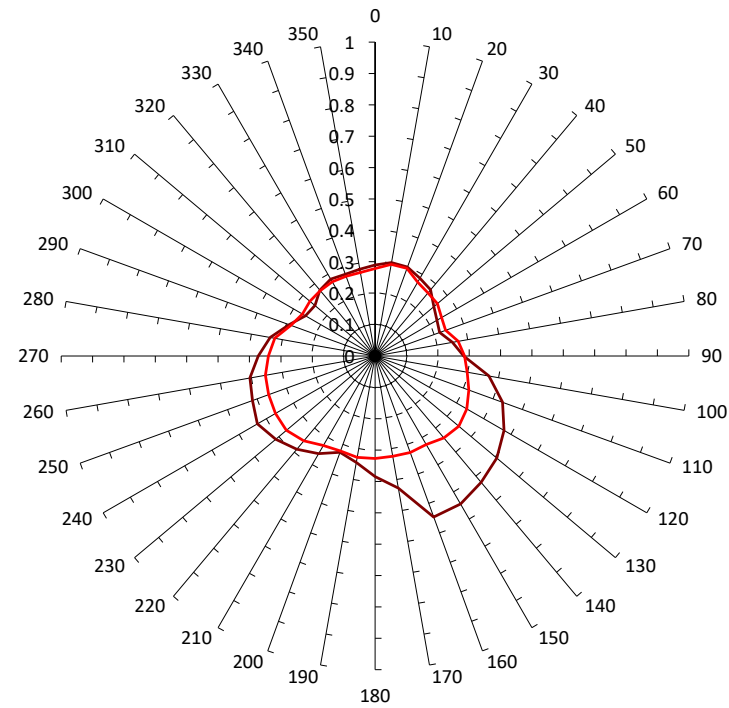
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	1.96	< 0.01%	2.42	< 0.001%	4.96
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.34	0.04%	2.96	< 0.001%	5.96

Results for P66

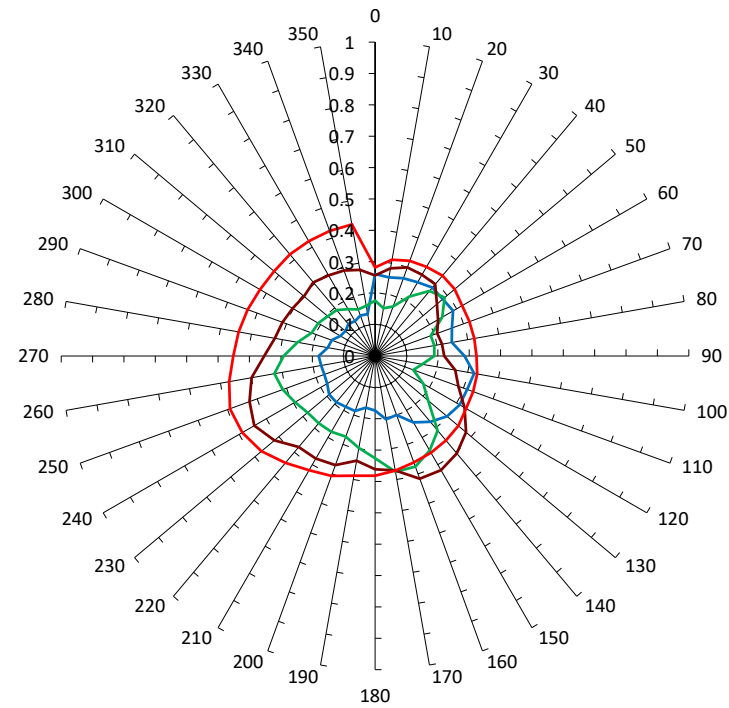
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	26.12%	3.80	1.47%	4.85	< 0.001%	9.29
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	20.31%	3.28	0.49%	4.18	< 0.001%	7.88

Results for P67

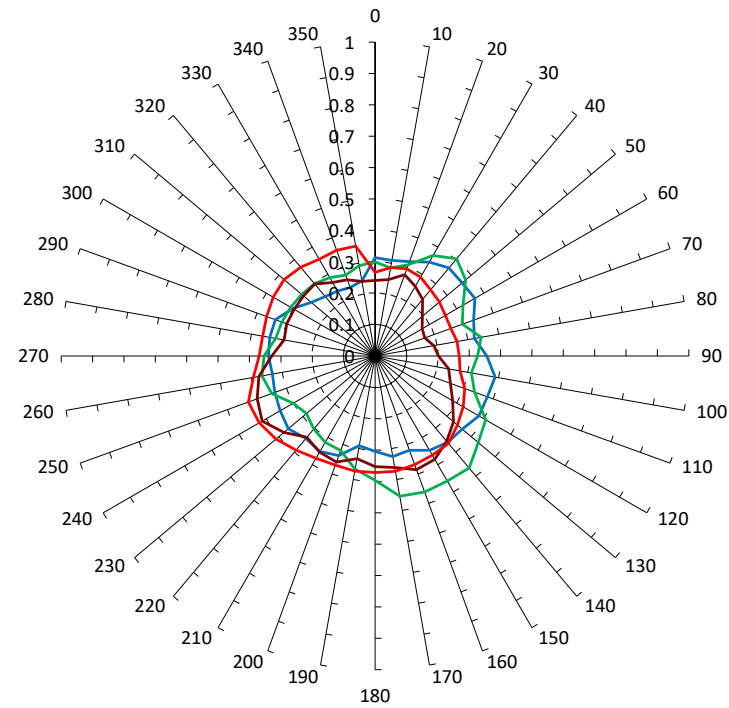
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.04%	2.19	< 0.01%	2.61	< 0.001%	4.92
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.36%	2.78	0.16%	3.61	< 0.001%	6.90
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.05%	3.70	1.21%	4.71	< 0.001%	9.01
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	7.27%	4.26	2.82%	5.41	< 0.001%	10.33

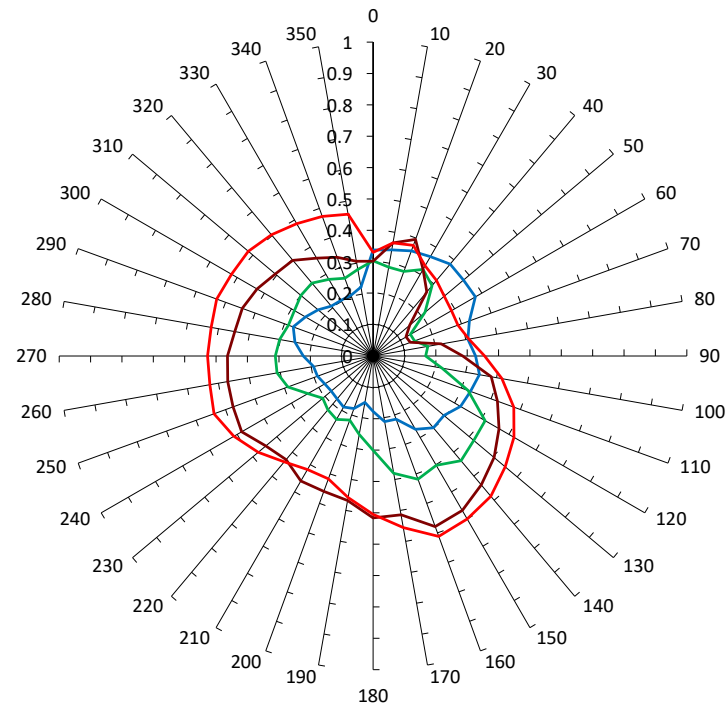
Results for P68

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	1.41%	3.34	0.47%	4.21	< 0.001%	7.79
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	1.51%	3.35	0.63%	4.32	< 0.001%	8.18
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	1.84%	3.44	0.75%	4.40	< 0.001%	8.40
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.18%	3.73	1.25%	4.76	< 0.001%	9.00

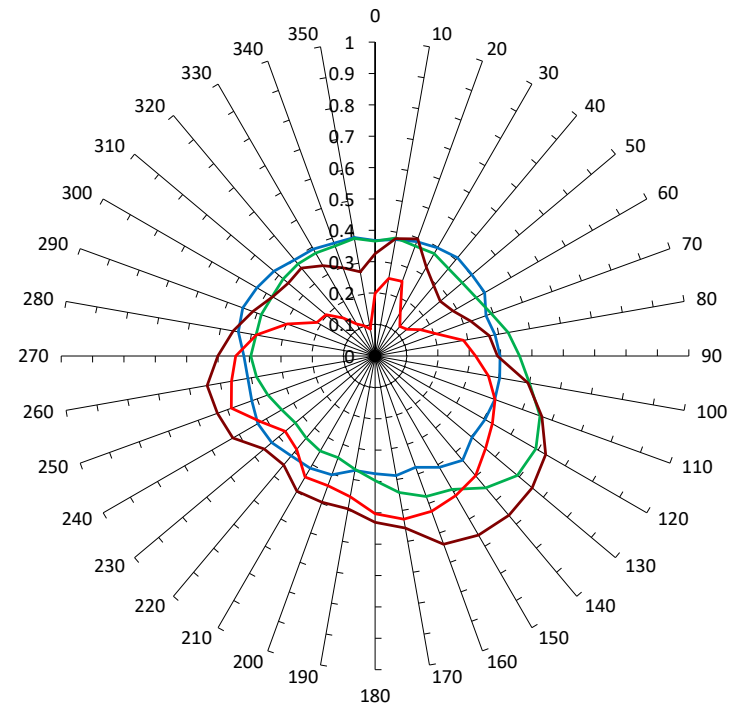
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.30%	2.63	0.05%	3.11	< 0.001%	6.16
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.42%	2.82	0.18%	3.59	< 0.001%	7.00
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	8.90%	4.41	3.83%	5.71	< 0.001%	10.70
CONFIGURATION 4: Completed Proposed Development	13.08%	4.73	5.42%	6.09	0.0011%	11.56

Results for P70

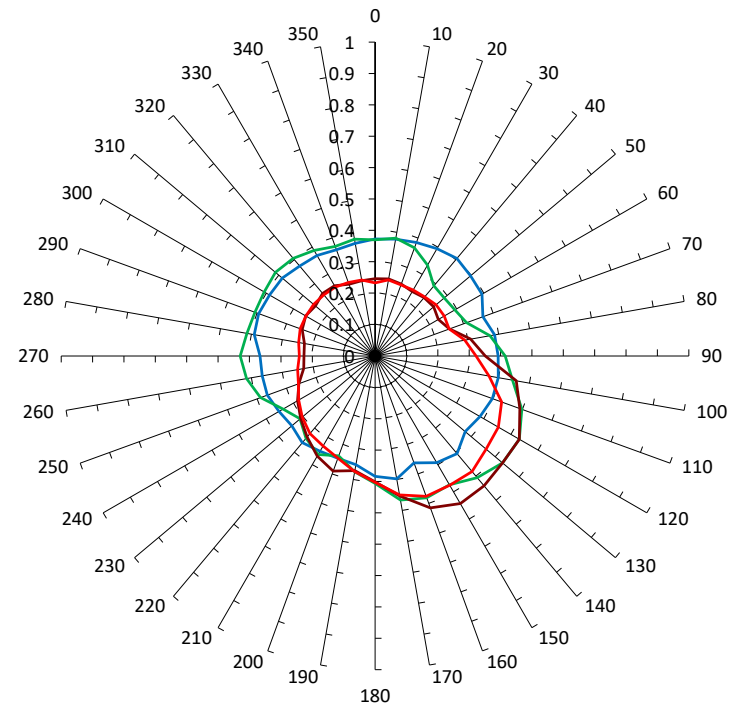
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	4.04	0.23%	5.13	< 0.001%	9.55
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.89	0.15%	4.84	< 0.001%	9.00
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.09%	4.84	1.09%	6.21	0.0013%	11.71
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	4.12	0.39%	5.35	< 0.001%	10.21

Results for P71

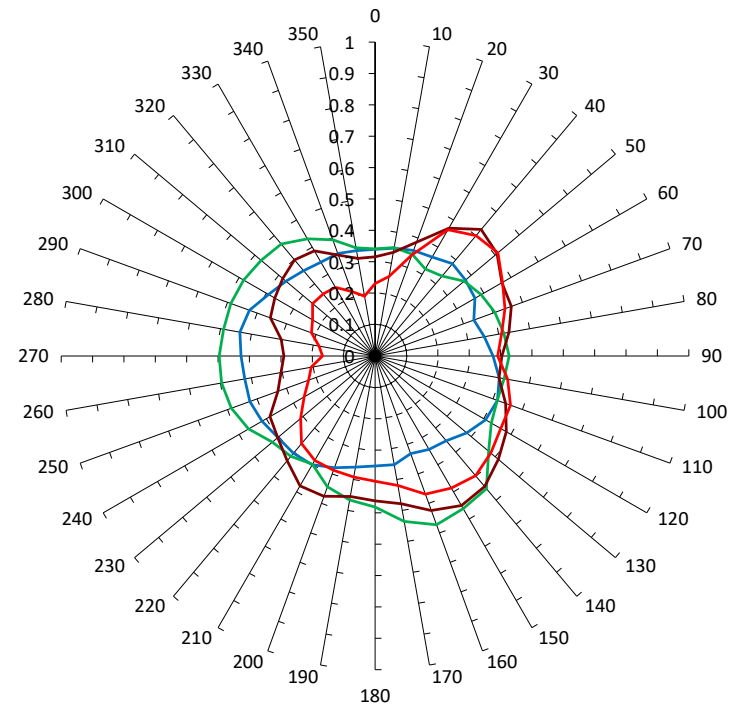
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	2.47%	3.61	0.87%	4.58	< 0.001%	8.40
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	3.67%	3.81	1.39%	4.85	< 0.001%	9.10
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	2.40%	3.54	0.87%	4.44	< 0.001%	8.69
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	1.32%	3.25	0.54%	4.16	< 0.001%	8.07

Results for P72

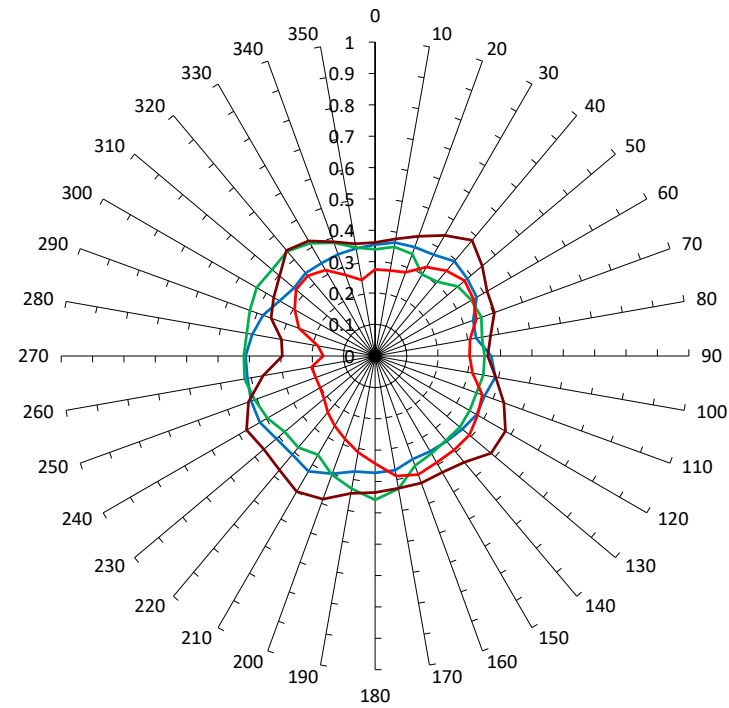
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.15%	3.89	1.56%	4.94	< 0.001%	9.29
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.53%	4.44	3.89%	5.73	< 0.001%	10.80
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.41%	4.25	2.59%	5.36	< 0.001%	10.00
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.15%	3.72	0.97%	4.60	< 0.001%	8.66

Results for P73

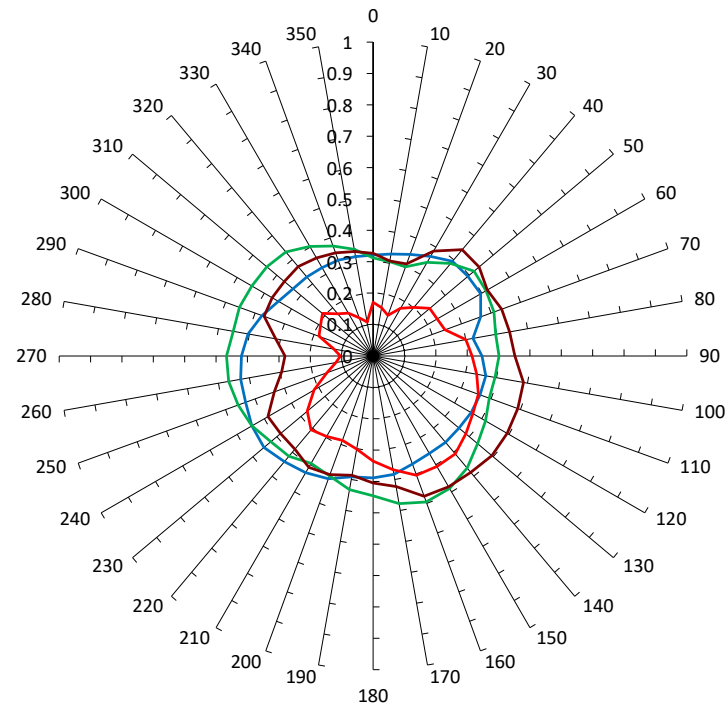
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.16%	3.90	1.59%	4.96	< 0.001%	9.28
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.14%	3.86	1.61%	4.97	< 0.001%	9.30
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.51%	4.37	3.10%	5.52	< 0.001%	10.37
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.01%	2.88	0.17%	3.61	< 0.001%	6.91

Results for P74

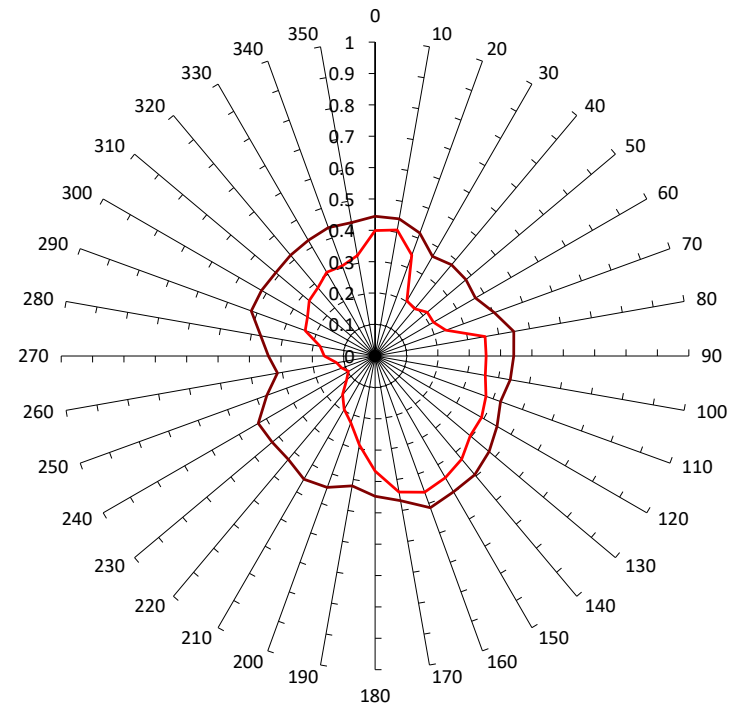
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.25%	4.06	2.07%	5.16	< 0.001%	9.71
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.32%	4.21	2.73%	5.40	< 0.001%	10.09
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.16%	3.89	1.37%	4.88	< 0.001%	8.93
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.81	0.16%	3.55	< 0.001%	6.87

Results for P75

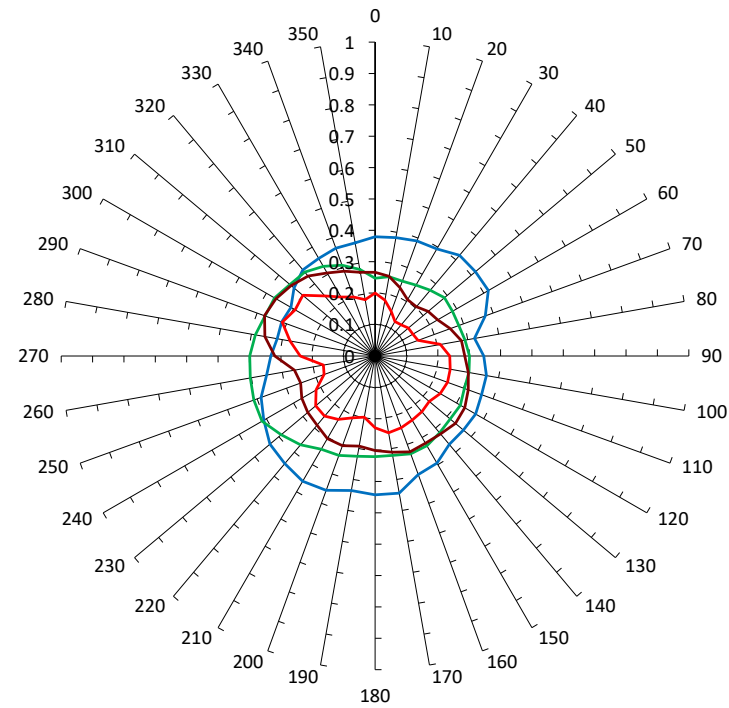
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.01%	4.15	0.29%	5.28	< 0.001%	9.76
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.87	0.03%	3.60	< 0.001%	7.51

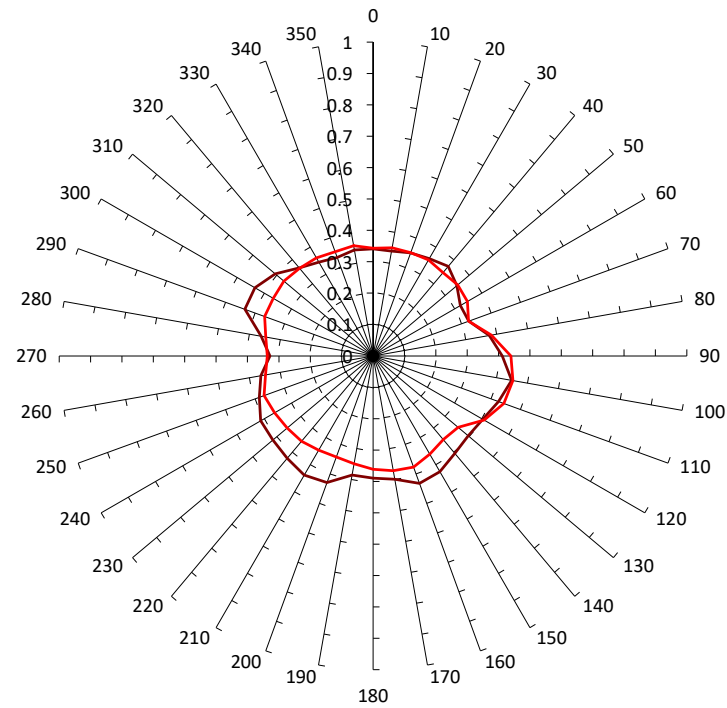
Results for P76

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.01%	4.06	0.25%	5.15	< 0.001%	9.68
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	< 0.01%	3.59	0.10%	4.56	< 0.001%	8.73
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	2.94	0.01%	3.74	< 0.001%	7.12
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.33	< 0.01%	2.93	< 0.001%	5.73

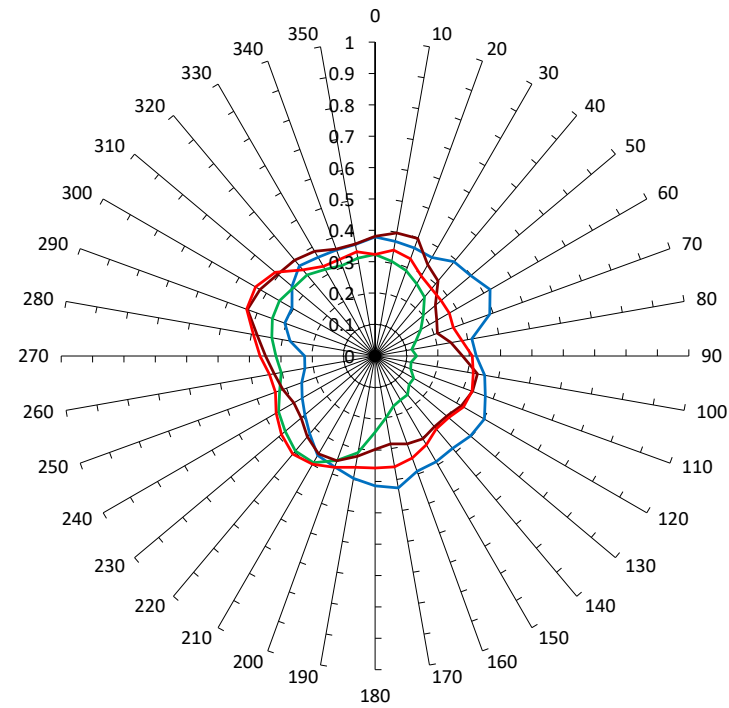
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	3.96	0.19%	5.02	< 0.001%	9.37
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	3.54	0.06%	4.47	< 0.001%	8.18

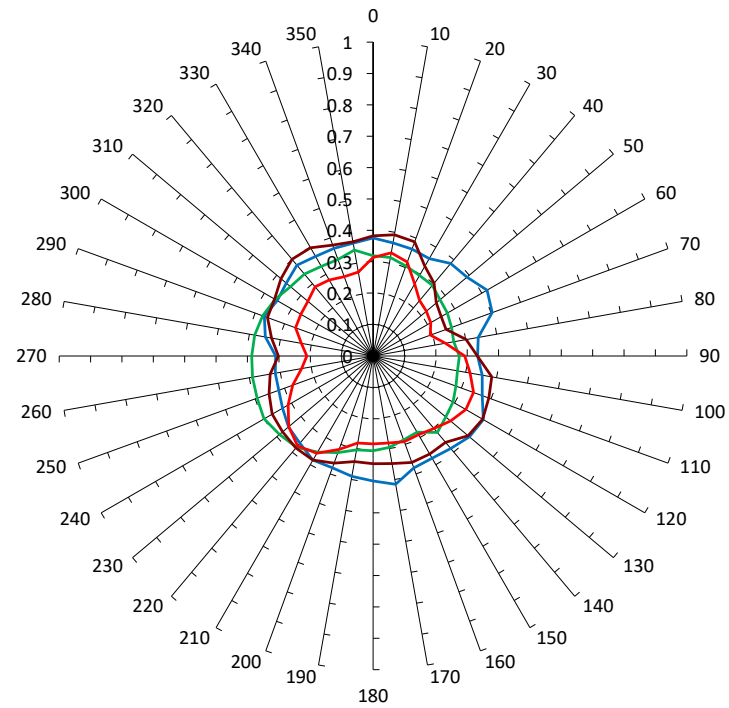
Results for P78

GEM Velocity Coefficients



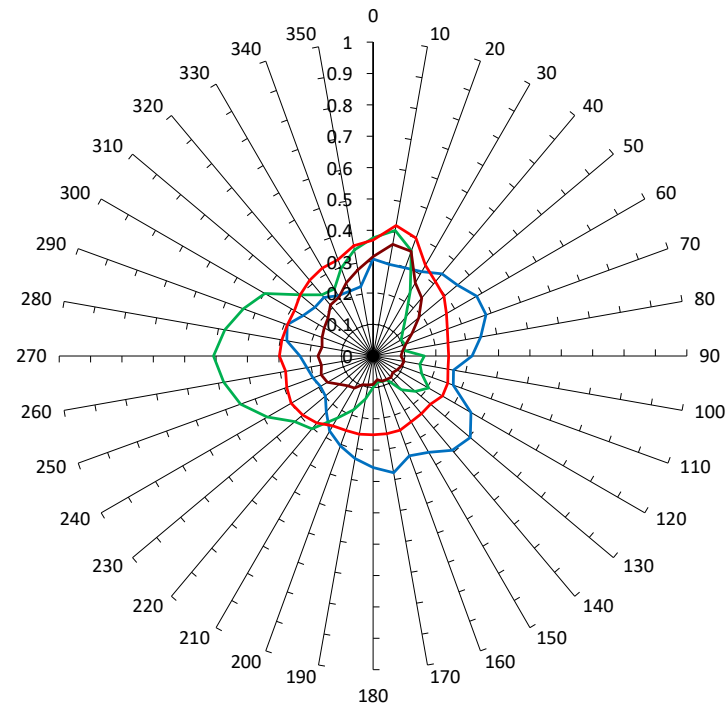
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.05%	3.40	0.58%	4.31	< 0.001%	8.05
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.05%	3.39	0.60%	4.27	< 0.001%	8.19
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.04%	3.38	0.56%	4.26	< 0.001%	8.15
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.10%	3.66	1.04%	4.65	< 0.001%	8.81

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.07%	3.57	0.81%	4.54	< 0.001%	8.32
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.06%	3.54	0.86%	4.49	< 0.001%	8.57
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.06%	3.56	0.78%	4.49	< 0.001%	8.34
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.02%	3.11	0.30%	3.89	< 0.001%	7.50

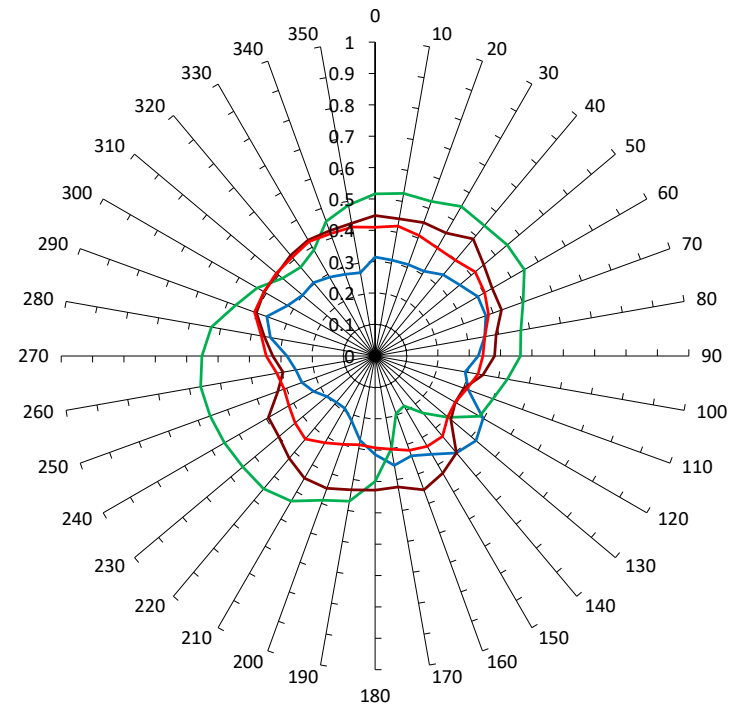
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	0.01%	2.87	0.16%	3.63	< 0.001%	6.85
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.17%	3.71	1.41%	4.67	< 0.001%	9.77
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	< 0.01%	1.94	0.01%	2.23	< 0.001%	5.23
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	< 0.01%	2.87	0.14%	3.57	< 0.001%	6.78

Results for P81

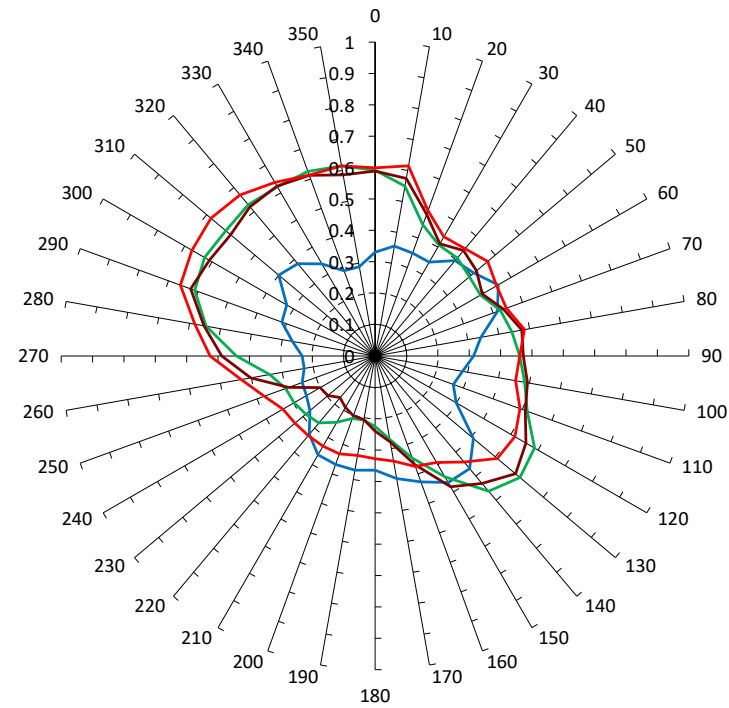
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	2.91	0.16%	3.62	< 0.001%	6.91
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	1.71%	5.13	7.32%	6.46	0.0022%	12.23
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.25%	4.05	1.93%	5.13	< 0.001%	9.49
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.05%	3.46	0.57%	4.30	< 0.001%	8.08

Results for P82

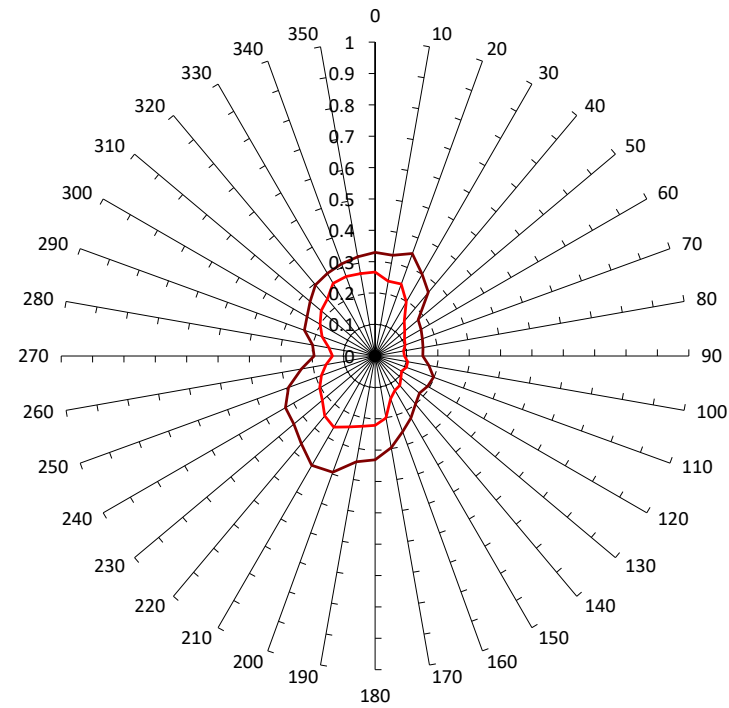
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)	< 0.01%	3.38	0.05%	4.25	< 0.001%	7.98
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	0.07%	4.56	0.58%	5.42	0.0013%	11.46
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	0.06%	4.57	0.60%	5.47	0.0013%	11.45
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.12%	4.83	0.89%	5.83	0.0030%	12.28

Results for P83

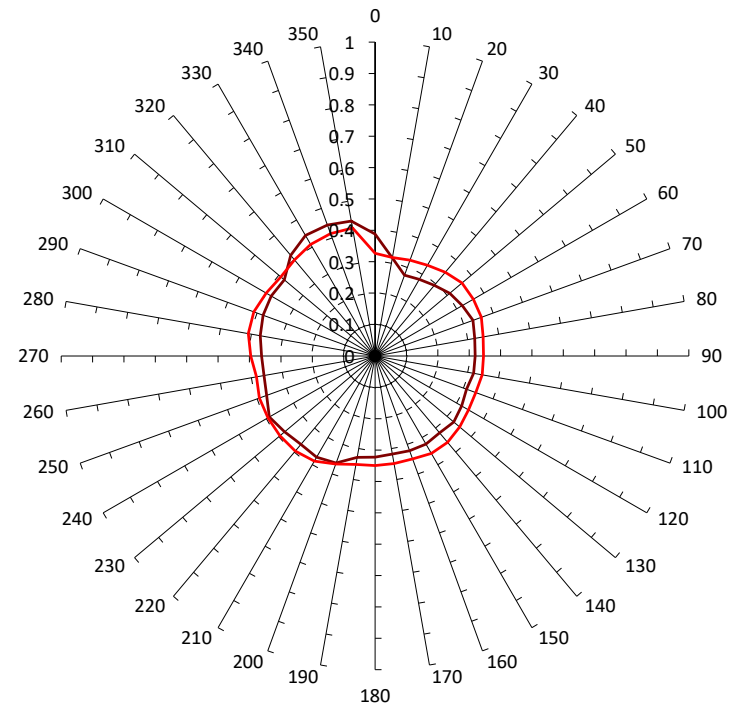
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	1.39%	3.27	0.04%	4.12	< 0.001%	8.00
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.04%	2.18	< 0.01%	2.74	< 0.001%	5.27

Results for P84

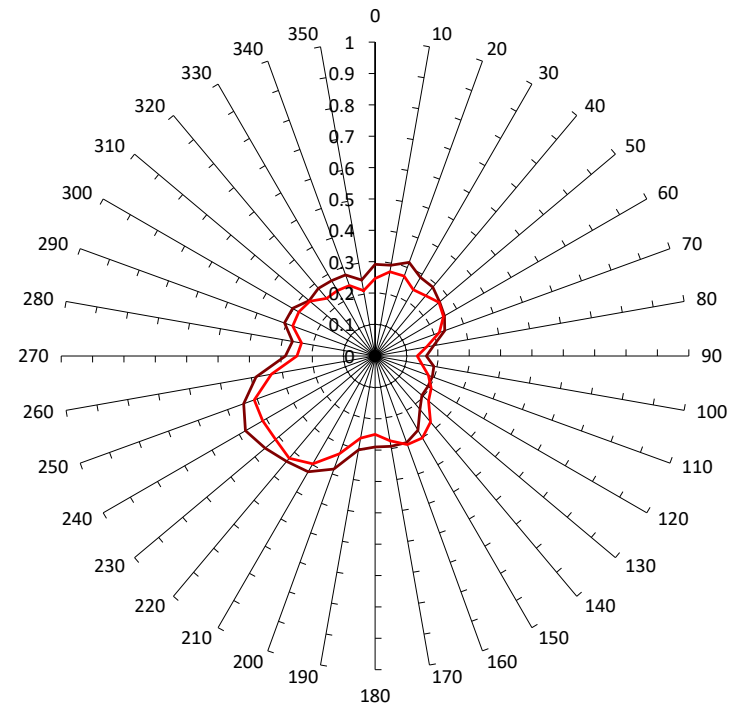
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	28.73%	3.58	0.08%	4.53	< 0.001%	8.49
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	31.93%	3.75	0.12%	4.76	< 0.001%	8.89

Results for P85

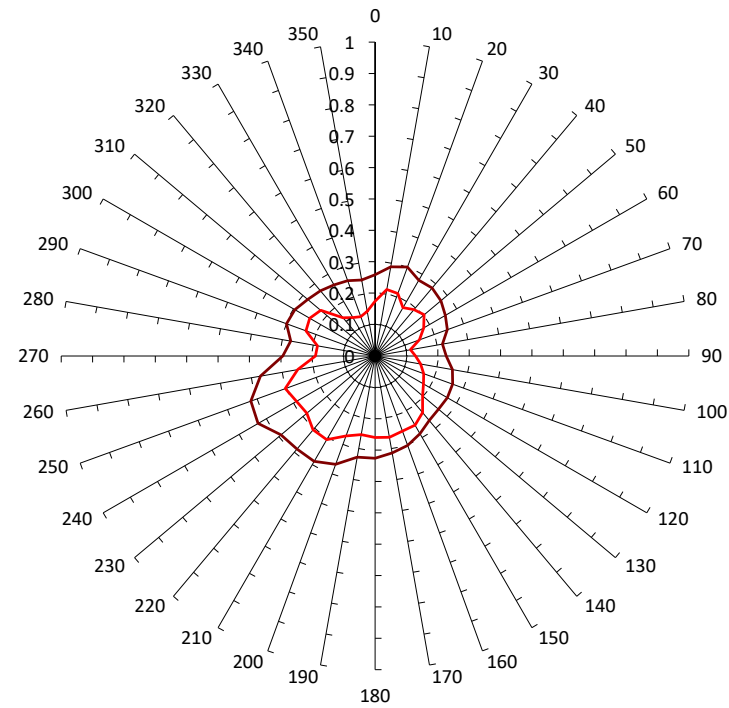
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	4.44%	3.92	0.23%	4.90	< 0.001%	9.64
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	2.57%	3.59	0.11%	4.47	< 0.001%	8.82

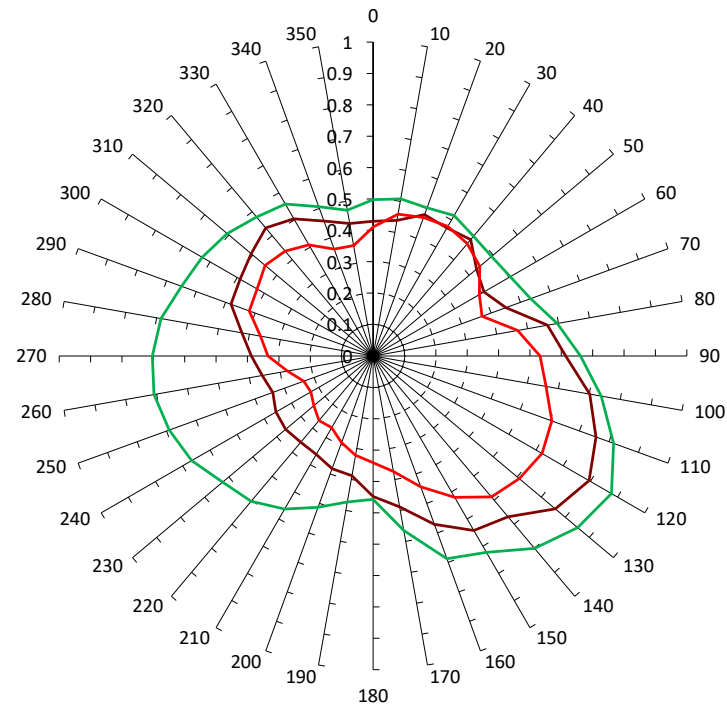
Results for P86

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	21.13%	3.57	0.10%	4.51	< 0.001%	8.73
CONFIGURATION 4: Completed Proposed Development	7.06%	2.66	< 0.01%	3.36	< 0.001%	6.47

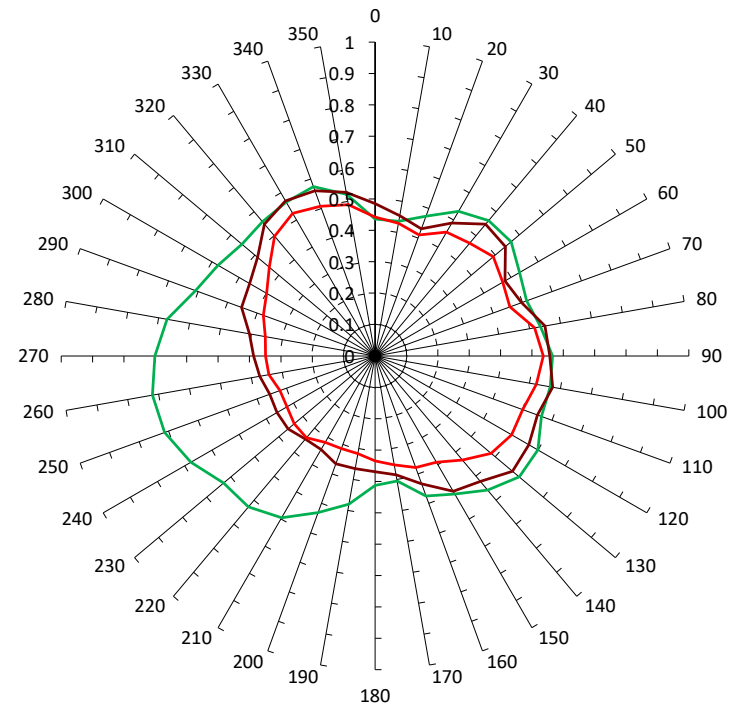
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	45.54%	6.26	4.55%	7.86	0.0206%	14.90
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	39.23%	4.75	0.66%	5.71	< 0.001%	11.17
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	25.42%	4.00	0.16%	4.73	< 0.001%	9.22

Results for P88

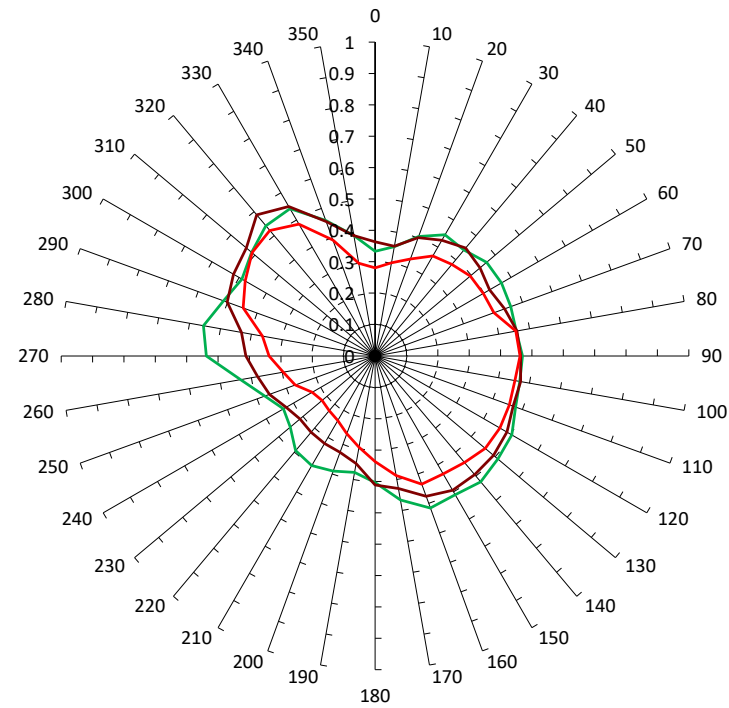
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	28.27%	6.07	4.02%	7.68	0.0202%	14.87
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	8.20%	4.34	0.30%	5.29	< 0.001%	9.89
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	4.61%	3.95	0.13%	4.79	< 0.001%	8.95

Results for P89

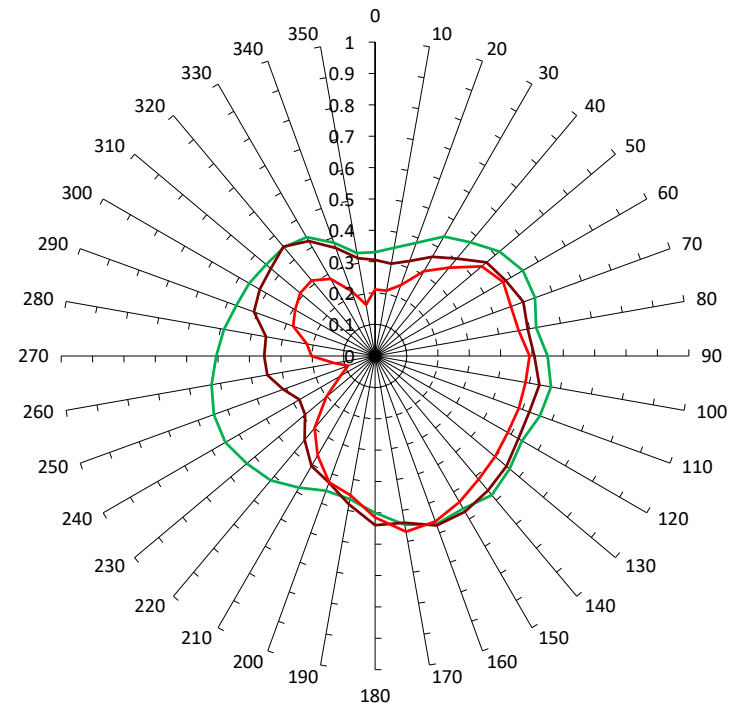
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	38.60%	4.36	0.45%	5.49	< 0.001%	10.60
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	34.55%	4.09	0.24%	5.05	< 0.001%	9.86
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	22.49%	3.66	0.09%	4.42	< 0.001%	8.87

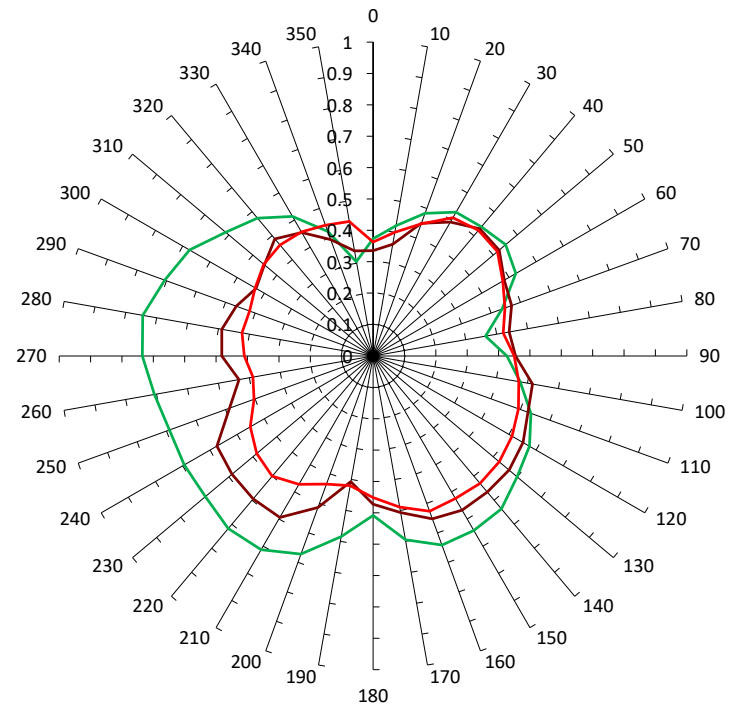
Results for P90

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	40.74%	5.01	1.21%	6.36	0.0014%	11.80
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	32.18%	4.17	0.35%	5.30	< 0.001%	10.08
CONFIGURATION 4: Completed Proposed Development	20.64%	3.86	0.24%	4.90	< 0.001%	9.74

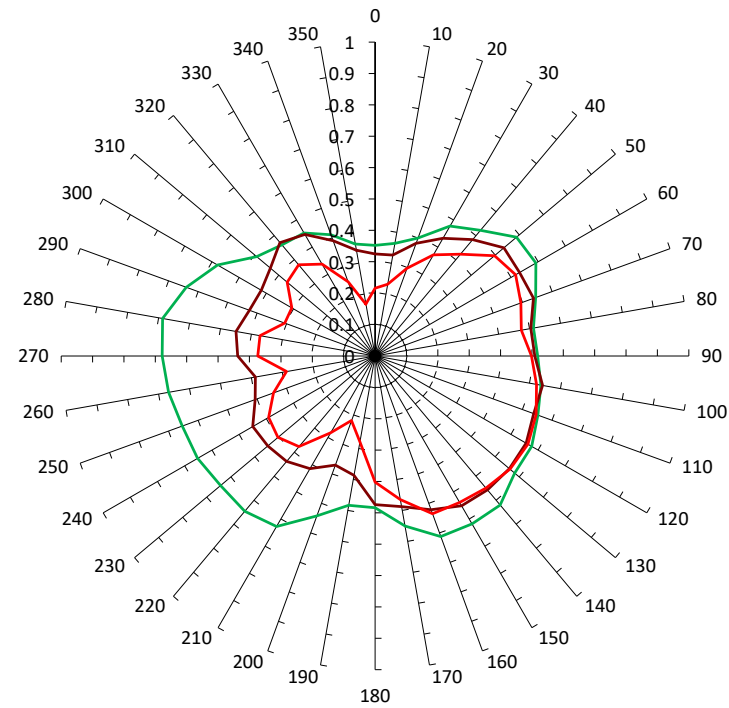
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	30.46%	6.57	6.27%	8.36	0.0388%	15.88
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	18.61%	5.23	1.57%	6.58	0.0029%	12.48
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	10.47%	4.53	0.53%	5.71	< 0.001%	10.53

Results for P92

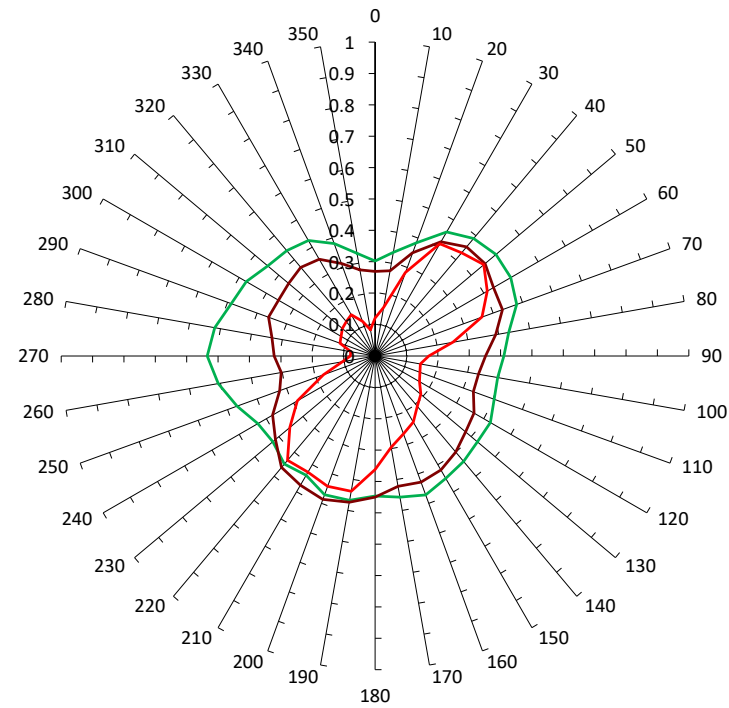
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	27.76%	6.01	3.87%	7.63	0.0160%	14.54
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	9.24%	4.43	0.42%	5.56	< 0.001%	10.15
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	5.00%	4.00	0.19%	4.93	< 0.001%	9.26

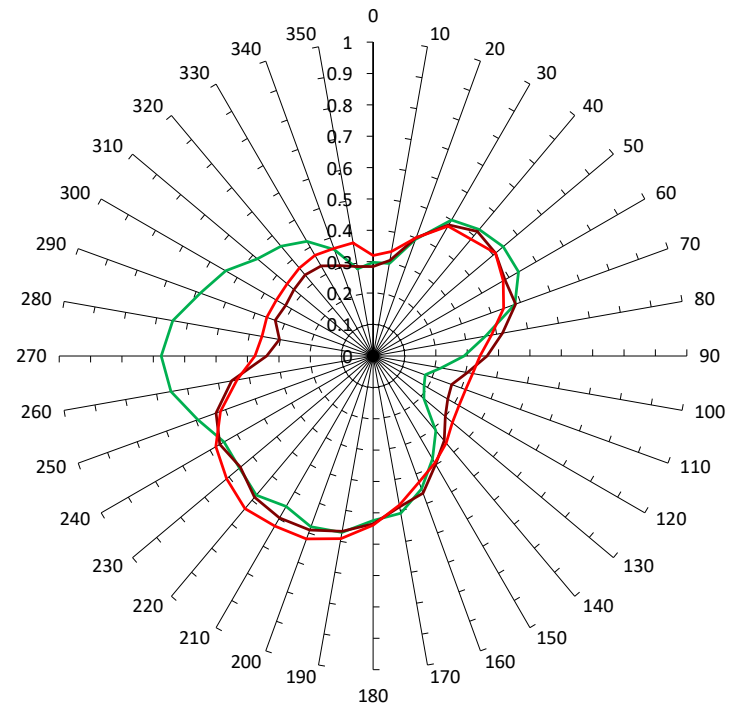
Results for P93

GEM Velocity Coefficients



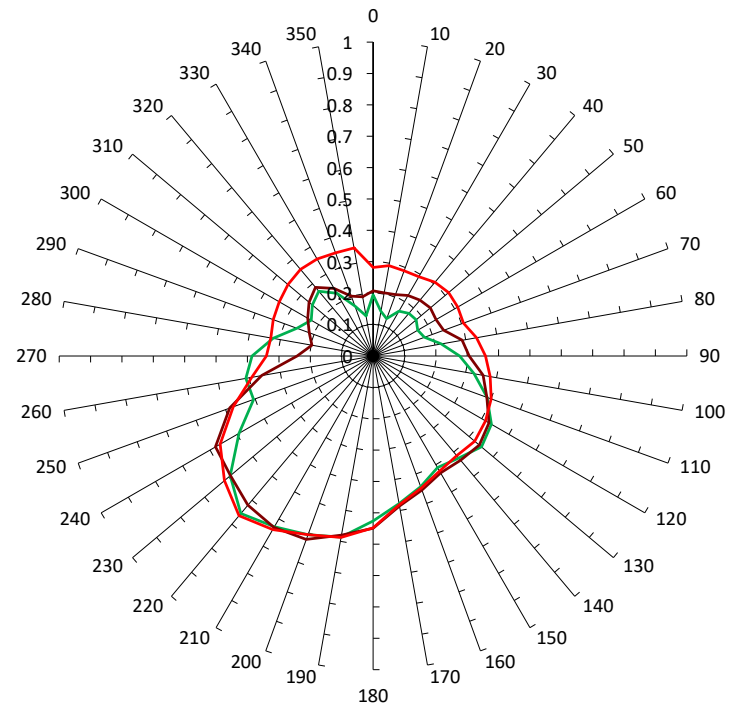
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	10.21%	4.51	0.60%	5.76	< 0.001%	10.82
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	6.03%	4.13	0.29%	5.23	< 0.001%	9.90
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.13%	3.69	0.12%	4.58	< 0.001%	8.96

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	23.85%	5.54	2.51%	7.07	0.0077%	13.56
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	17.21%	5.19	1.58%	6.56	0.0030%	12.53
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	17.84%	5.45	2.12%	6.86	0.0058%	13.22

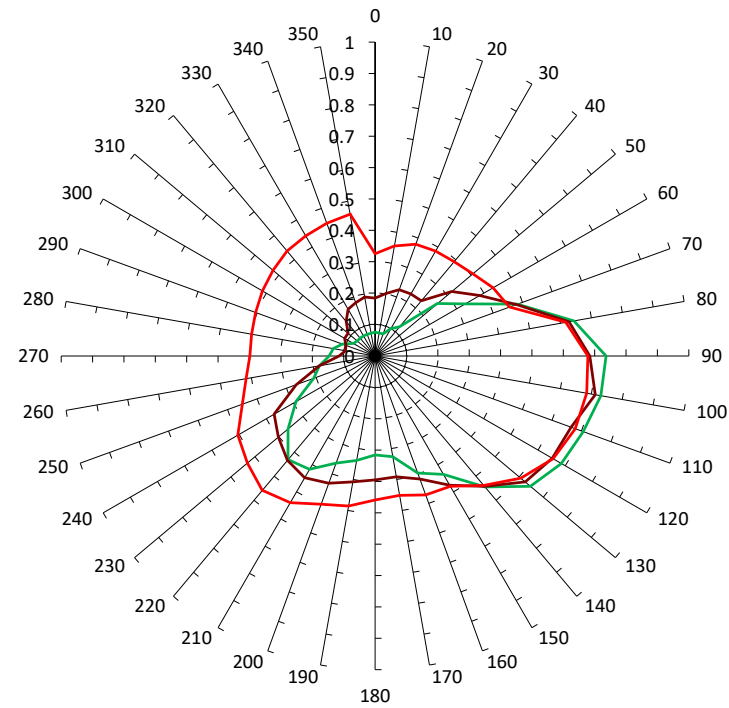
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	14.56%	5.33	1.86%	6.68	0.0055%	13.13
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	15.99%	5.35	1.95%	6.74	0.0052%	13.09
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	16.14%	5.47	2.18%	6.87	0.0069%	13.42

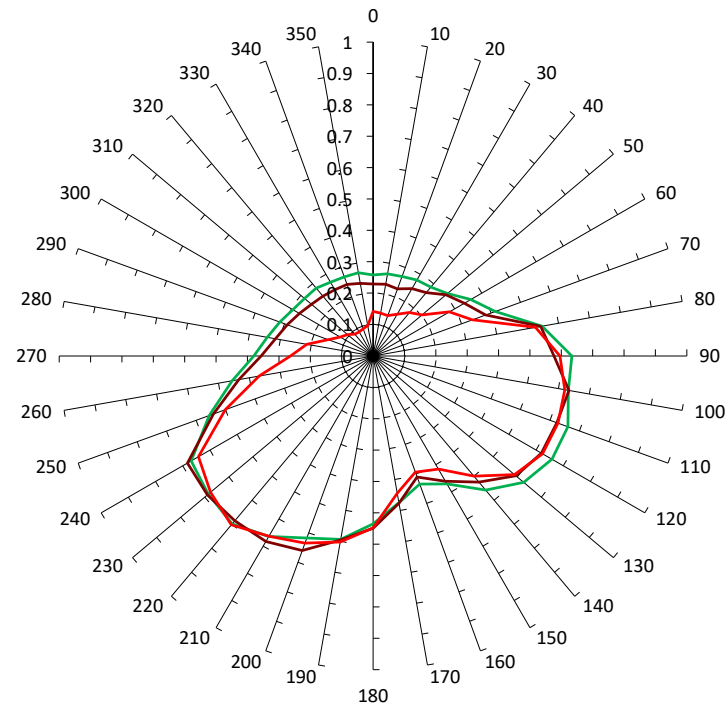
Results for P96

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	6.83%	4.41	0.42%	5.19	< 0.001%	10.60
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	7.88%	4.48	0.40%	5.33	< 0.001%	10.35
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	16.56%	5.06	1.10%	6.26	0.0012%	11.68

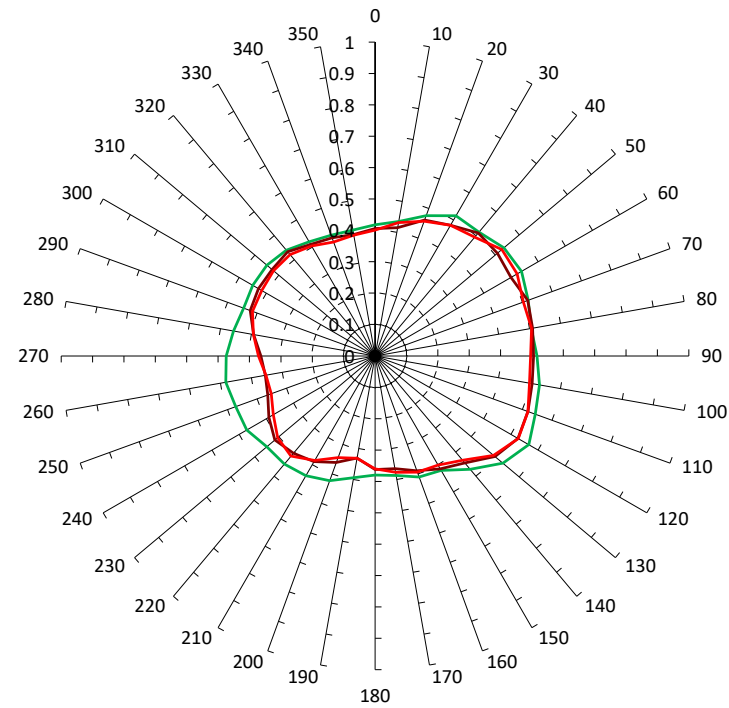
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	21.29%	5.95	3.36%	7.42	0.0144%	14.38
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	20.62%	5.99	3.50%	7.48	0.0158%	14.51
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	19.66%	5.88	3.14%	7.33	0.0134%	14.28

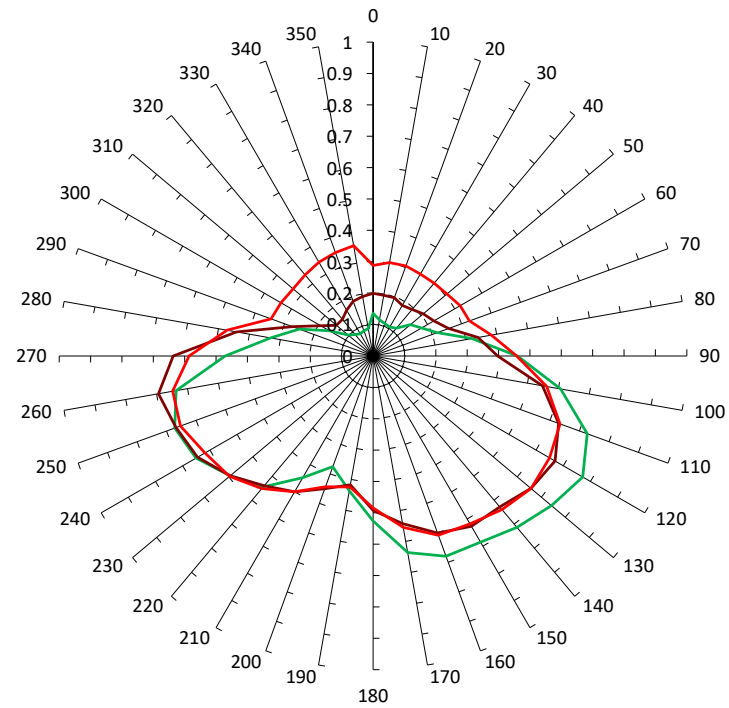
Results for P98

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	11.02%	4.56	0.52%	5.71	< 0.001%	10.49
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	6.22%	4.14	0.20%	5.11	< 0.001%	9.32
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	5.95%	4.11	0.18%	5.07	< 0.001%	9.26

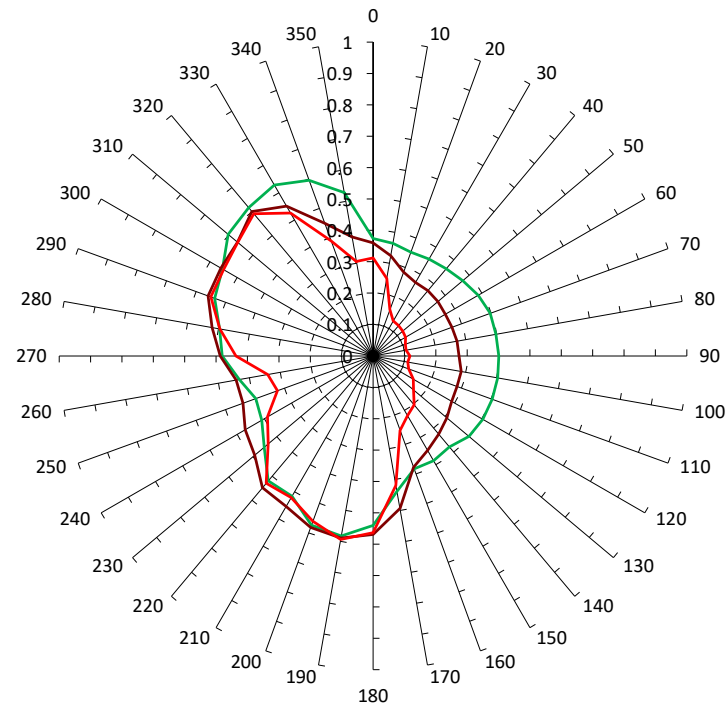
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	19.13%	5.54	2.35%	6.94	0.0079%	13.57
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	20.07%	5.54	2.45%	6.99	0.0096%	13.80
CONFIGURATION 4: Completed Proposed Development	20.22%	5.42	2.14%	6.85	0.0064%	13.31

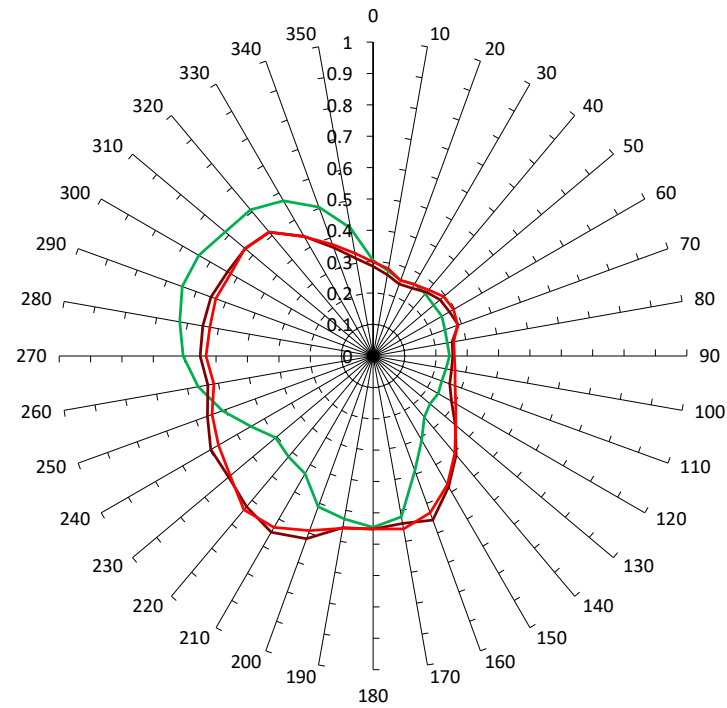
Results for P100

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	15.02%	4.90	1.09%	6.23	0.0014%	11.84
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	16.52%	5.02	1.33%	6.42	0.0020%	12.15
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	12.70%	4.77	0.96%	6.07	0.0013%	11.72

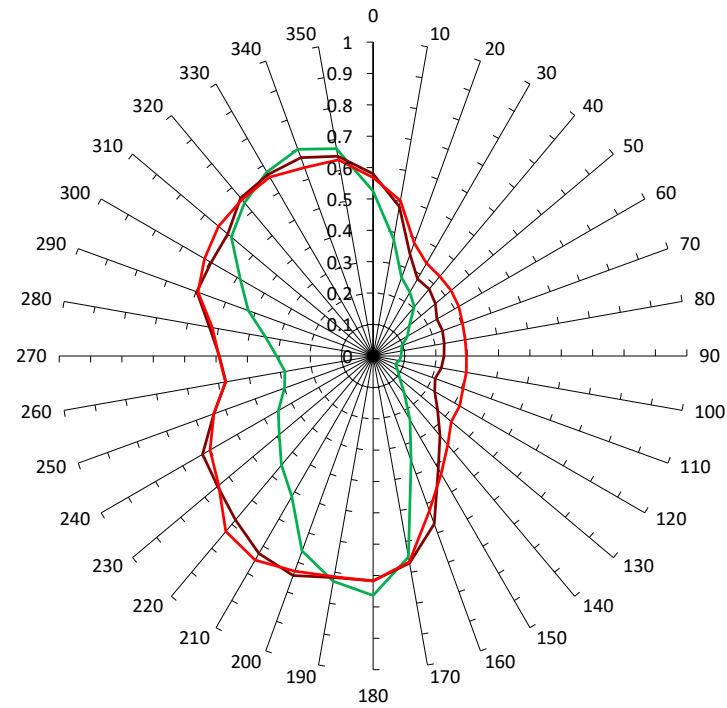
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	15.65%	4.98	1.34%	6.35	0.0034%	12.55
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	21.40%	5.60	2.61%	7.13	0.0071%	13.51
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	20.31%	5.51	2.35%	7.00	0.0060%	13.30

Results for P102

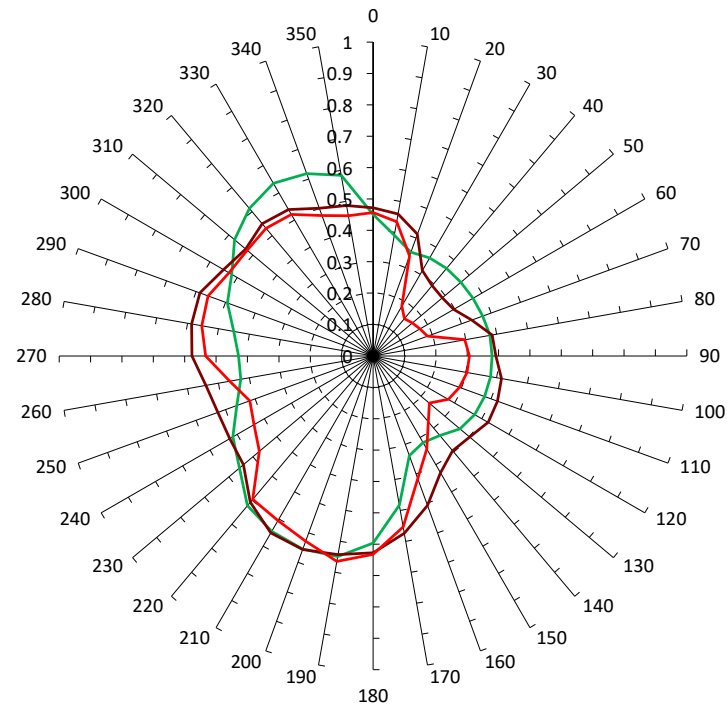
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	13.74%	5.20	2.07%	6.74	0.0089%	13.67
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	25.75%	6.24	4.91%	7.97	0.0246%	15.17
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	25.89%	6.32	5.15%	8.05	0.0287%	15.41

Results for P103

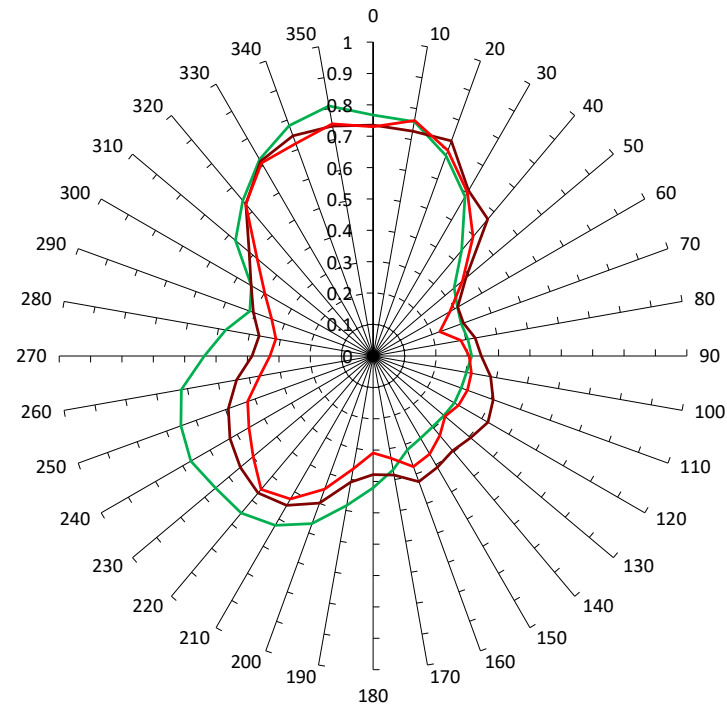
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	19.43%	5.51	2.34%	6.99	0.0066%	13.39
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	22.20%	5.60	2.74%	7.19	0.0077%	13.60
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	17.13%	5.29	1.99%	6.81	0.0048%	13.04

Results for P104

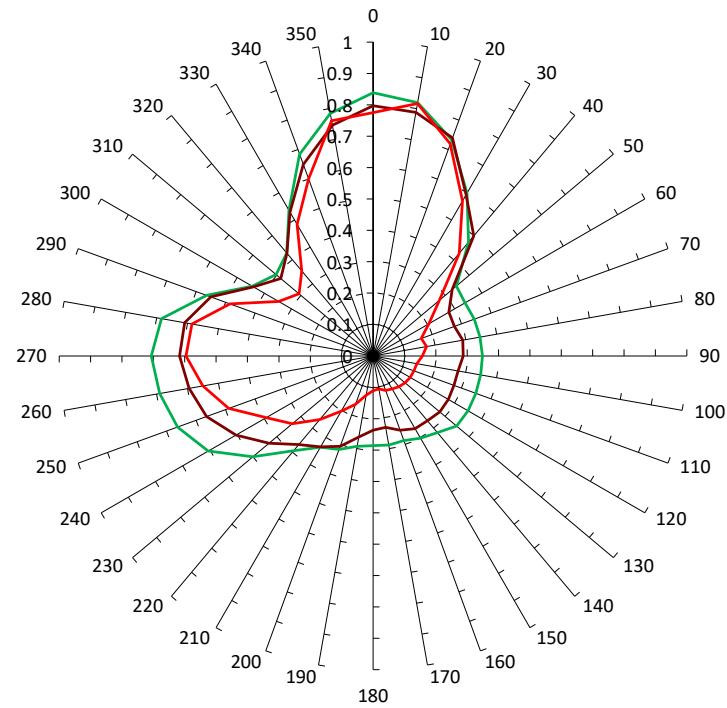
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	26.76%	6.01	3.55%	7.50	0.0144%	14.40
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	20.71%	5.32	1.53%	6.49	0.0034%	12.66
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	16.50%	5.09	1.10%	6.10	0.0025%	12.29

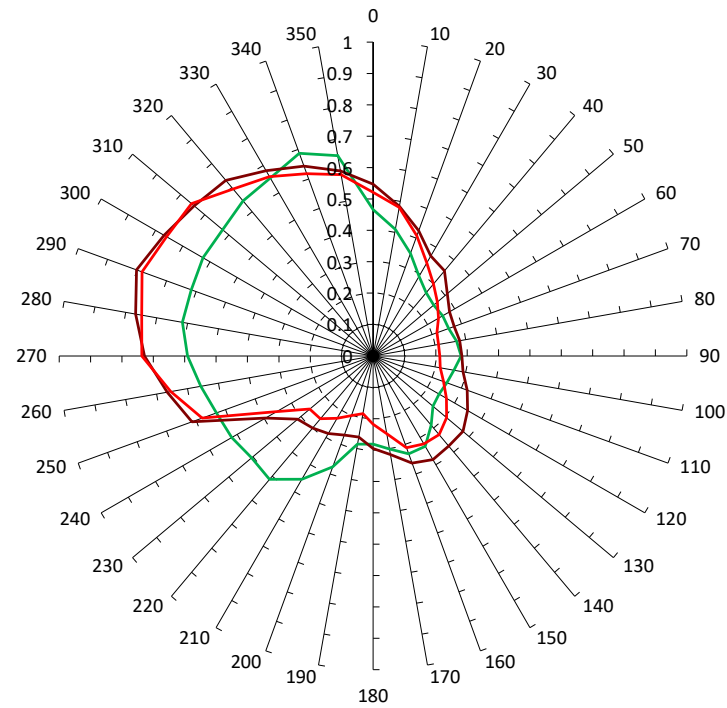
Results for P105

GEM Velocity Coefficients



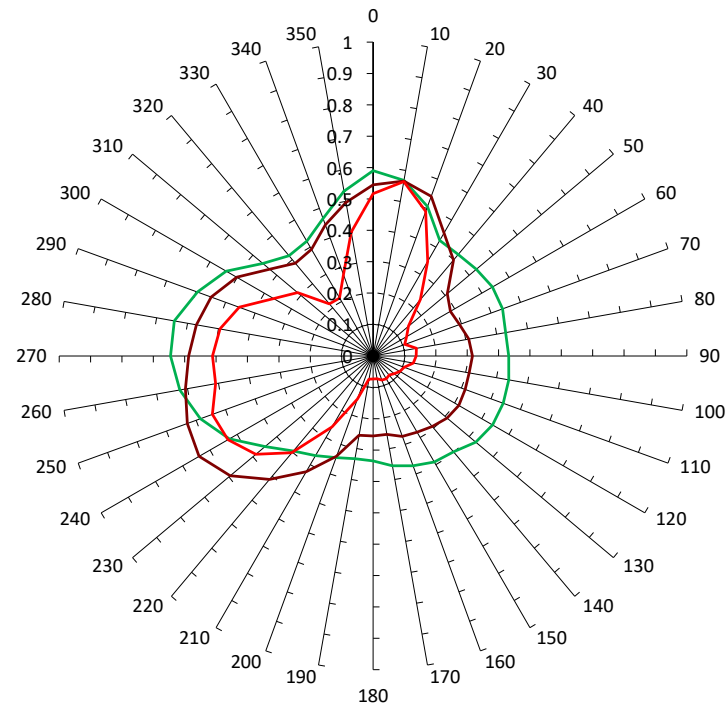
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	19.69%	5.65	2.59%	6.99	0.0139%	14.31
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	16.05%	5.14	1.40%	6.25	0.0045%	12.88
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	11.26%	4.86	0.97%	5.76	0.0032%	12.44

GEM Velocity Coefficients



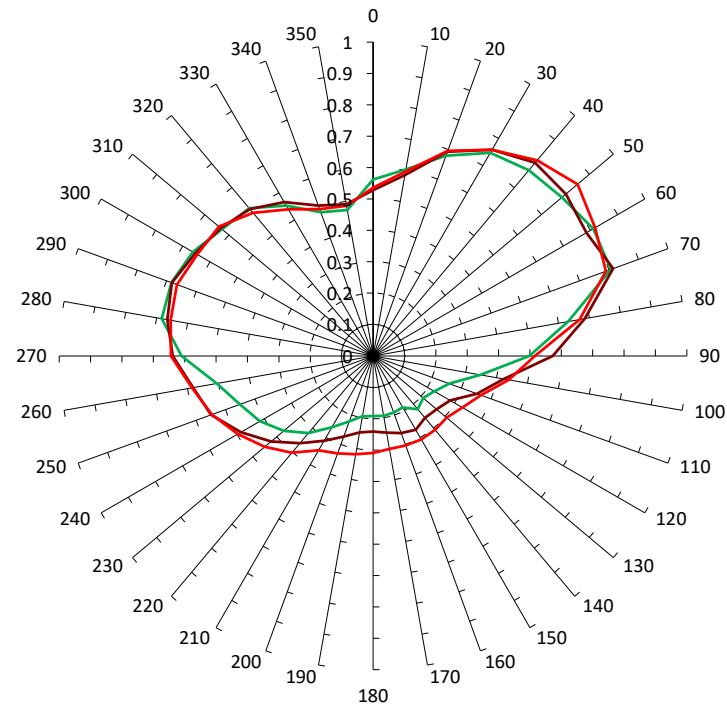
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	18.09%	5.10	1.42%	6.39	0.0033%	12.58
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	16.37%	5.70	2.75%	7.03	0.0220%	15.00
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	15.43%	5.60	2.51%	6.89	0.0193%	14.78

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	15.05%	4.97	1.36%	6.27	0.0044%	12.76
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	17.16%	5.23	1.76%	6.58	0.0052%	13.05
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	8.36%	4.39	0.60%	5.49	< 0.001%	11.04

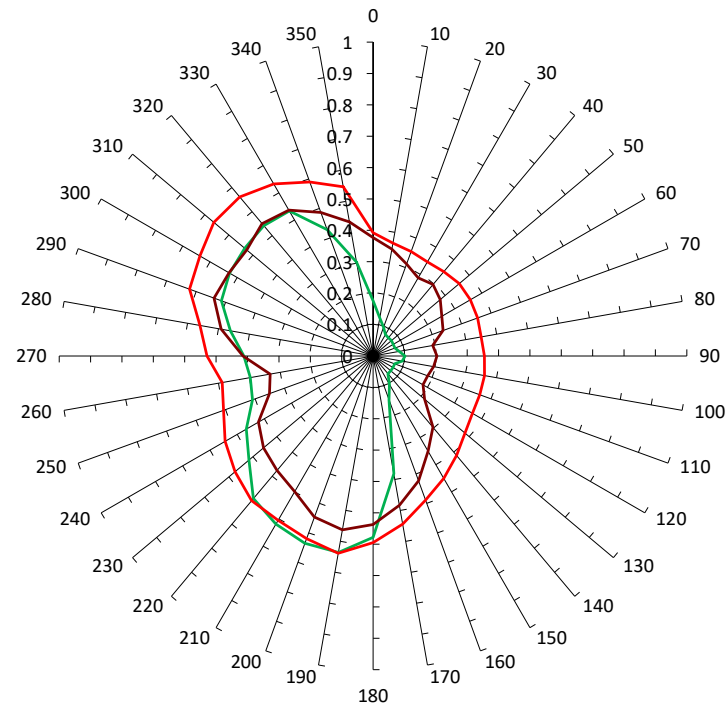
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	18.05%	5.59	2.04%	6.76	0.0078%	13.58
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	21.25%	5.73	2.44%	6.99	0.0091%	13.79
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	21.73%	5.76	2.52%	7.04	0.0095%	13.86

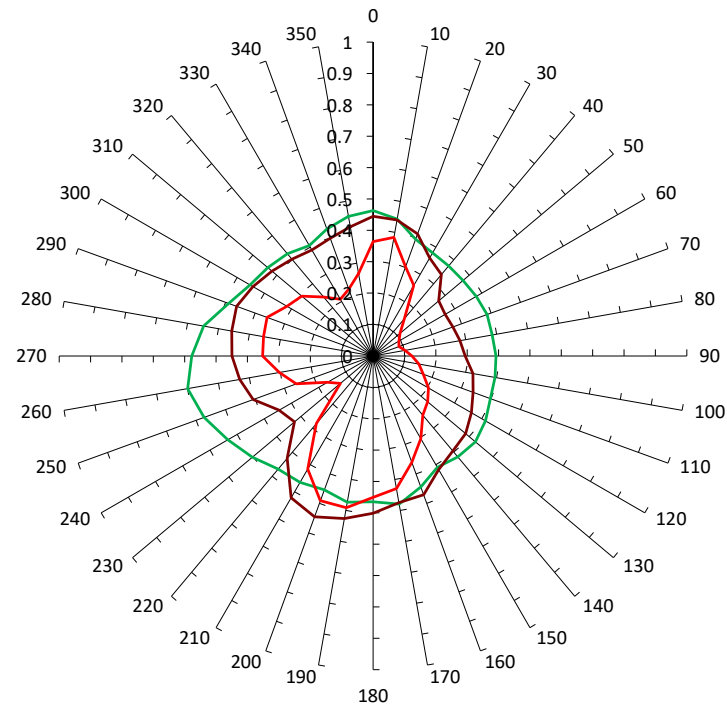
Results for P110

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	15.53%	5.22	1.72%	6.63	0.0041%	12.83
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	10.98%	4.61	0.75%	5.90	< 0.001%	11.24
CONFIGURATION 4: Completed Proposed Development	23.60%	5.57	2.53%	7.10	0.0063%	13.38

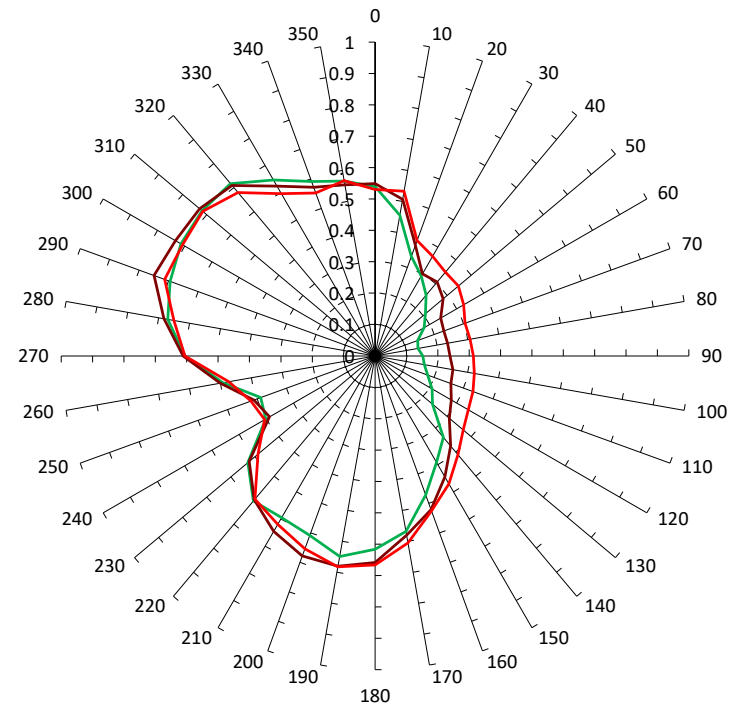
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	14.65%	4.86	1.14%	6.22	0.0021%	12.04
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	8.25%	4.37	0.55%	5.64	< 0.001%	10.80
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	2.74%	3.59	0.16%	4.65	< 0.001%	9.30

Results for P112

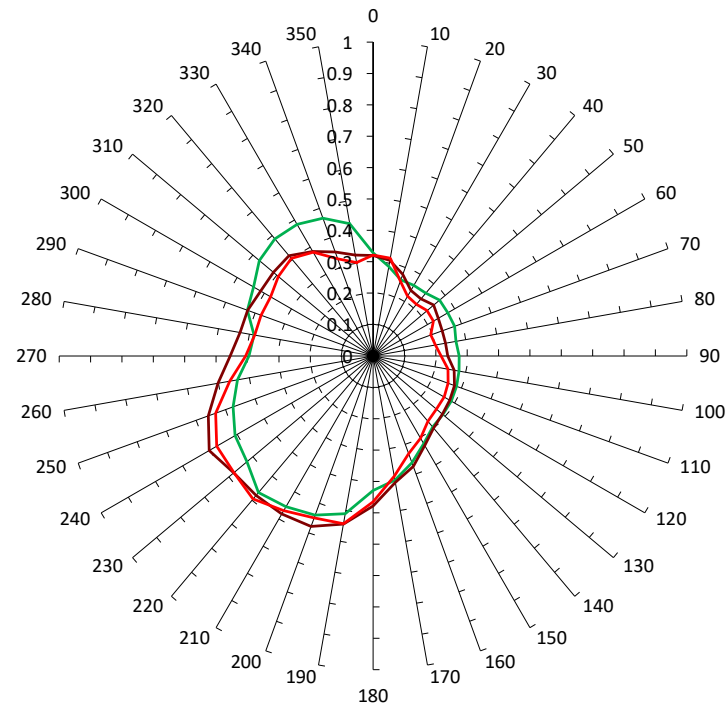
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	22.93%	5.68	2.78%	7.19	0.0100%	13.91
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	23.59%	5.89	3.50%	7.49	0.0158%	14.52
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	22.81%	5.74	3.08%	7.32	0.0118%	14.13

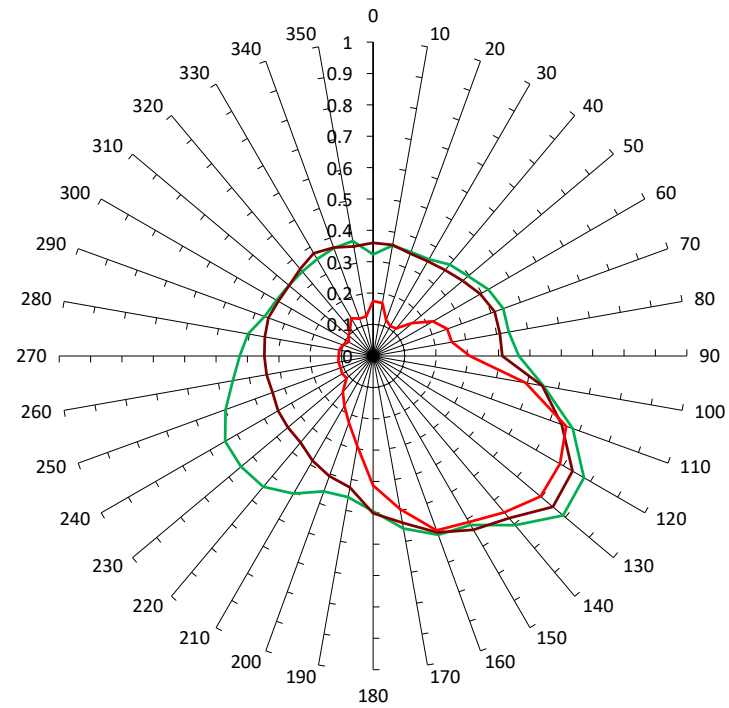
Results for P113

GEM Velocity Coefficients



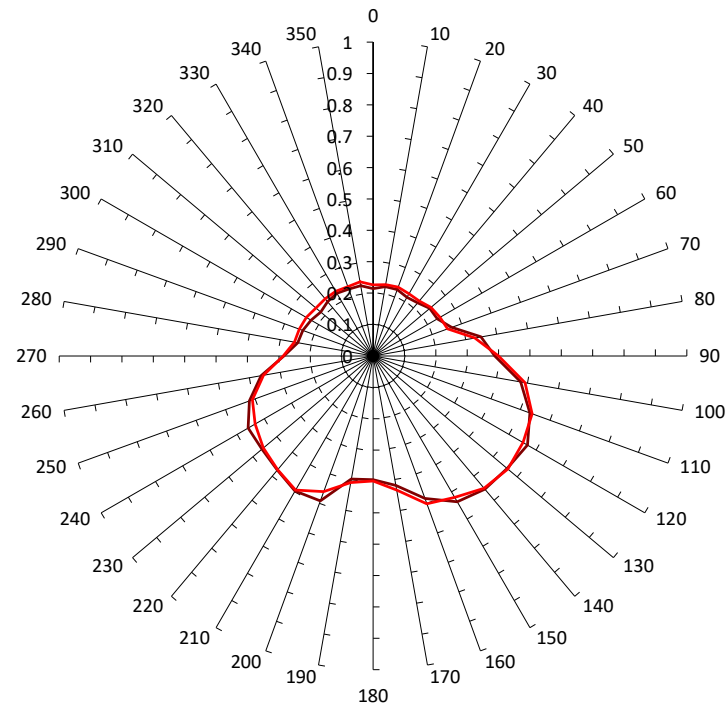
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	13.47%	4.83	0.99%	6.11	0.0013%	11.70
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	17.28%	5.21	1.65%	6.59	0.0034%	12.64
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	15.73%	5.10	1.43%	6.43	0.0027%	12.41

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	16.18%	5.10	1.27%	6.35	0.0017%	12.00
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	6.57%	4.27	0.44%	5.34	< 0.001%	10.61
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.69%	3.51	0.26%	4.50	< 0.001%	9.99

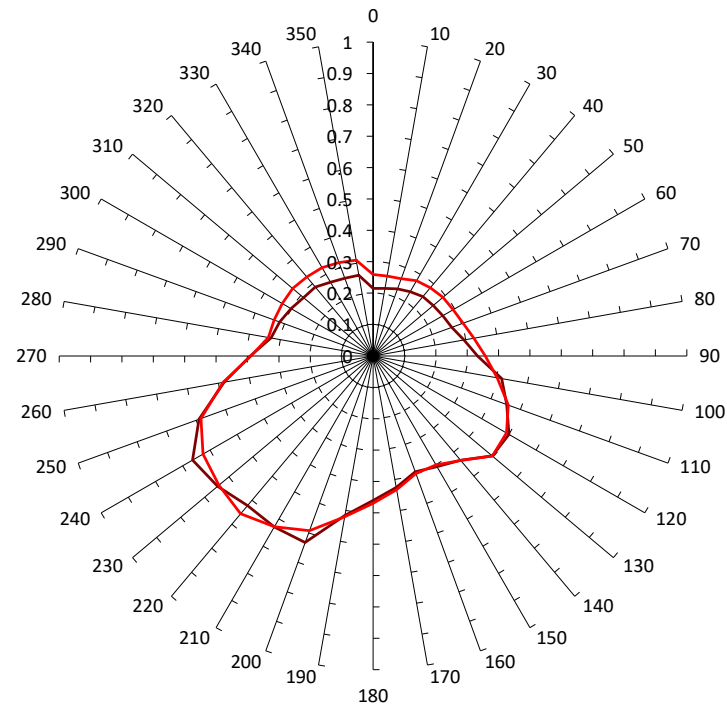
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	8.00%	4.34	0.43%	5.44	< 0.001%	10.34
CONFIGURATION 4: Completed Proposed Development	7.36%	4.28	0.37%	5.36	< 0.001%	10.16

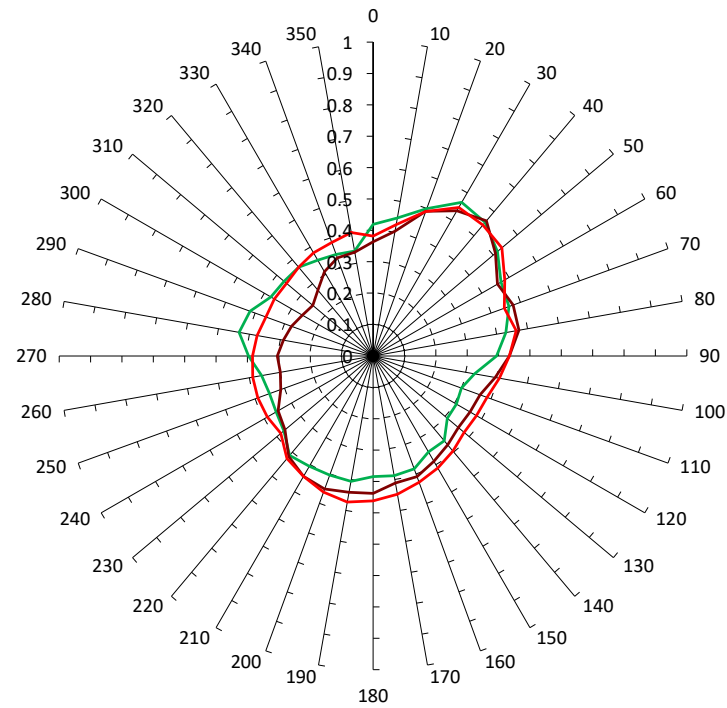
Results for P116

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	17.69%	5.60	2.48%	7.01	0.0085%	13.68
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	17.71%	5.56	2.36%	6.96	0.0078%	13.58

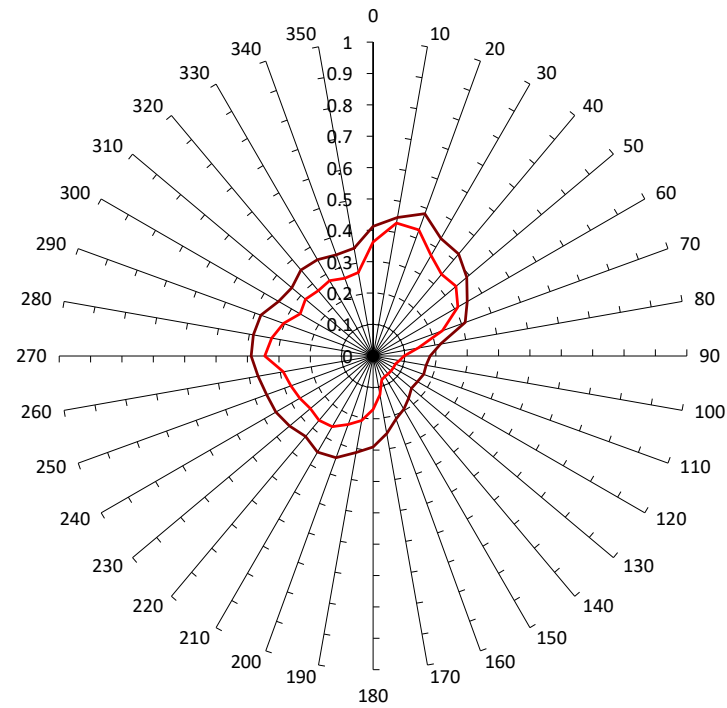
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	5.29%	4.04	0.19%	5.04	< 0.001%	9.44
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	5.39%	4.05	0.21%	5.05	< 0.001%	9.51
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	6.86%	4.22	0.30%	5.33	< 0.001%	9.84

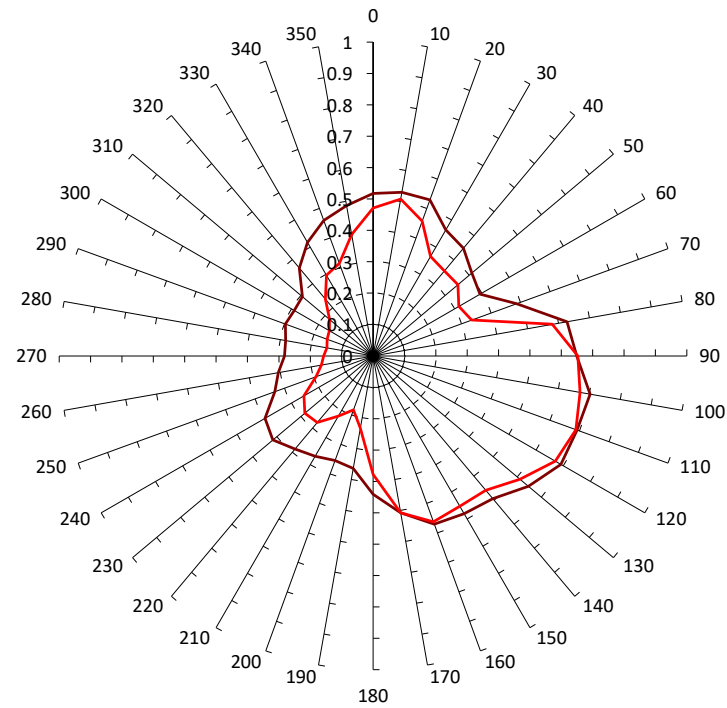
Results for P118

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	2.11%	3.52	0.07%	4.40	< 0.001%	8.33
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	0.47%	2.87	0.01%	3.51	< 0.001%	6.93

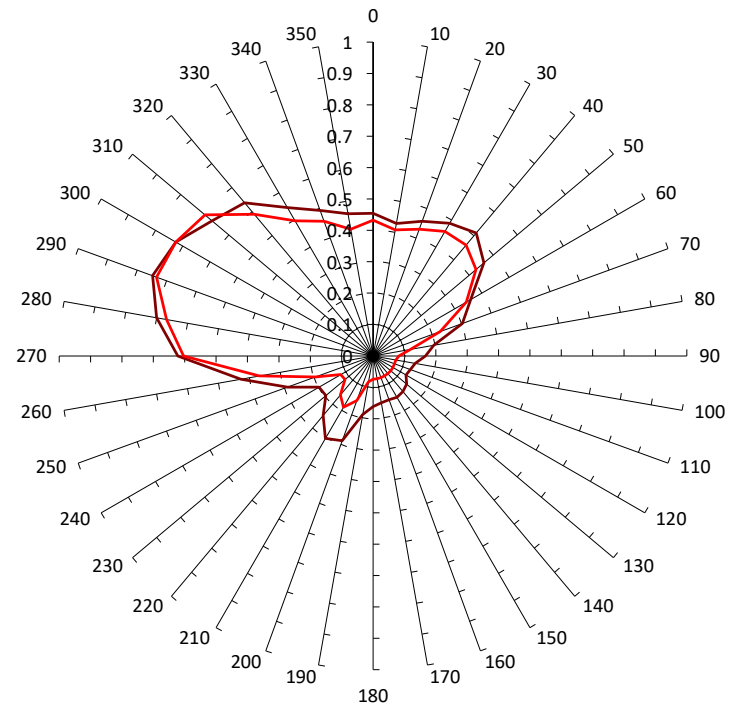
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	9.01%	4.58	0.49%	5.49	< 0.001%	10.54
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	5.53%	4.14	0.31%	4.88	< 0.001%	10.09

Results for P120

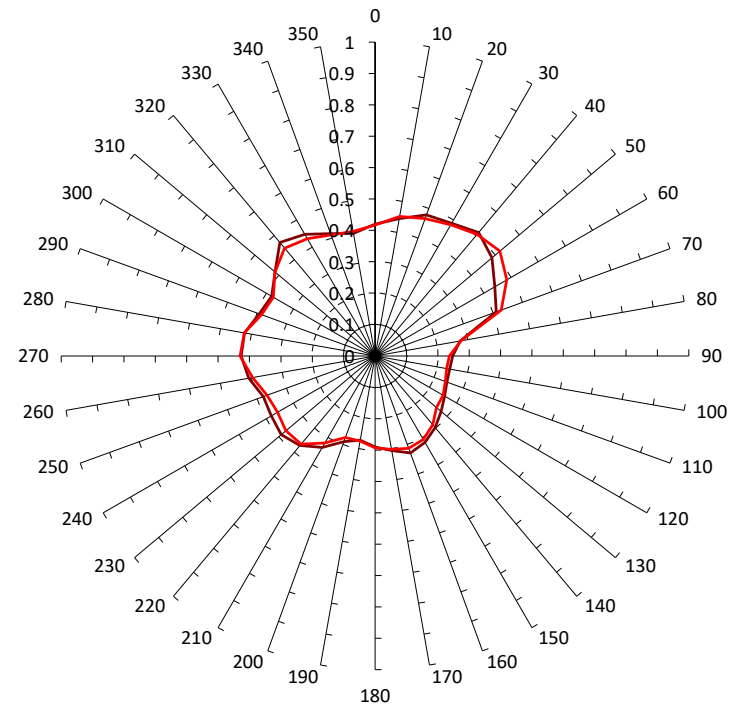
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	10.76%	4.97	1.24%	5.96	0.0078%	13.40
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	9.37%	4.84	1.08%	5.77	0.0066%	13.16

Results for P121

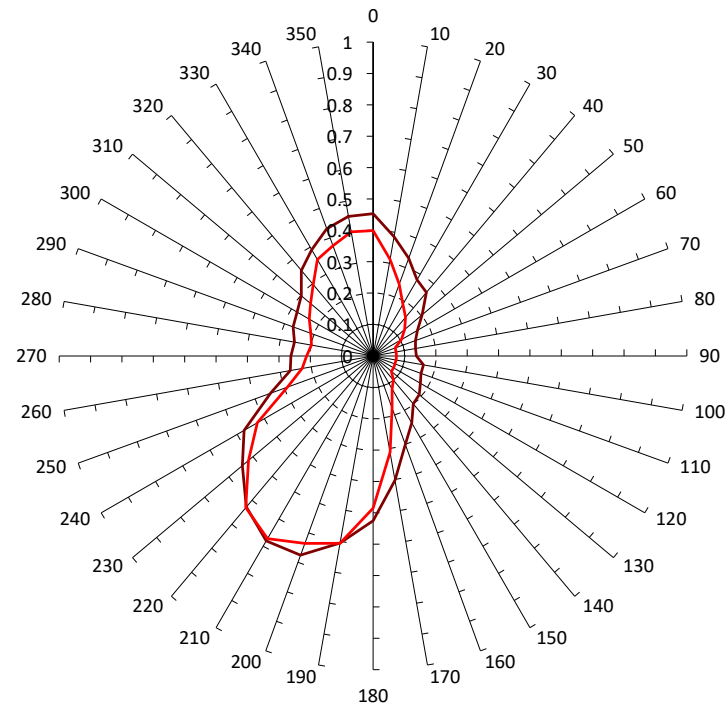
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.93%	3.85	0.14%	4.79	< 0.001%	9.08
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.65%	3.80	0.12%	4.72	< 0.001%	8.96

Results for P122

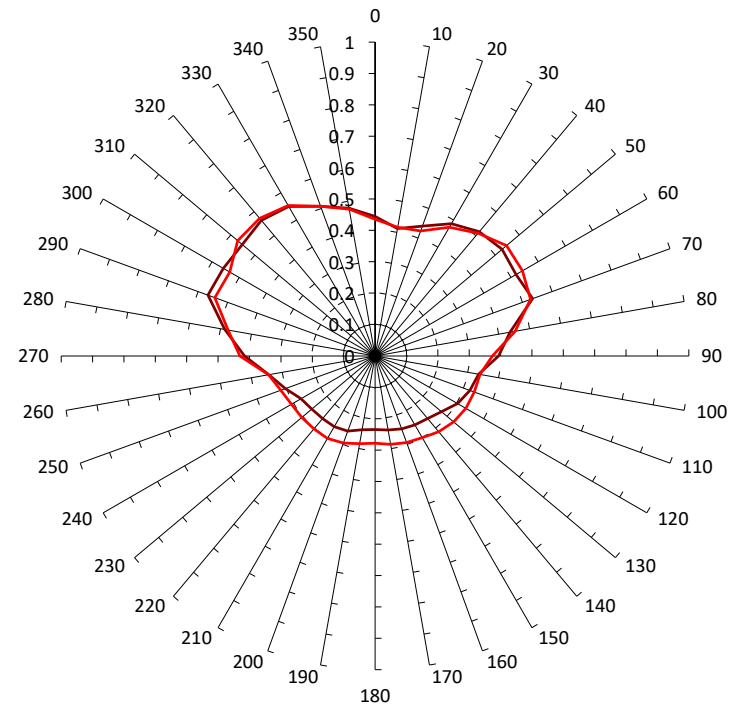
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	13.67%	5.40	2.04%	6.76	0.0075%	13.49
CONFIGURATION 4: Completed Proposed Development	12.28%	5.27	1.75%	6.56	0.0061%	13.21

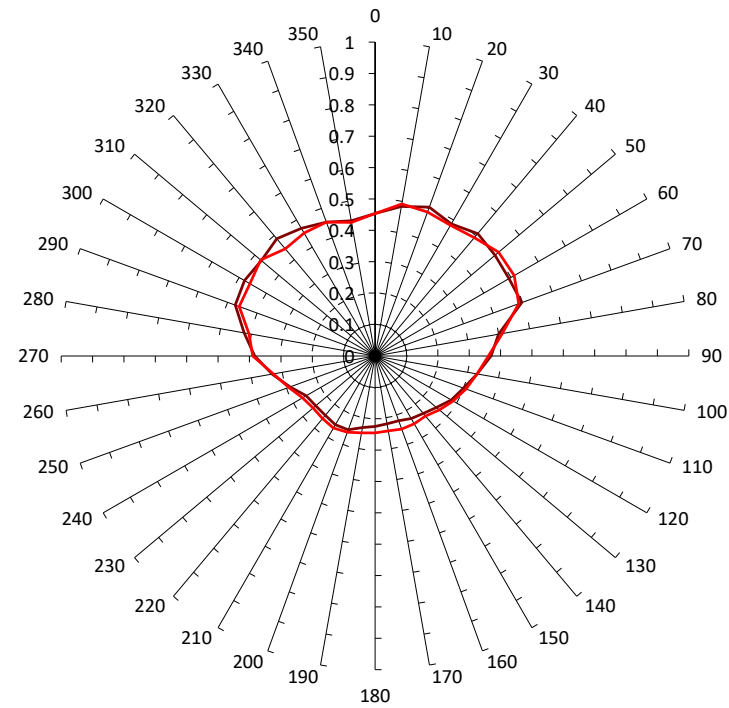
Results for P123

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	6.15%	4.15	0.29%	4.97	< 0.001%	10.31
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	6.27%	4.16	0.28%	5.03	< 0.001%	10.21

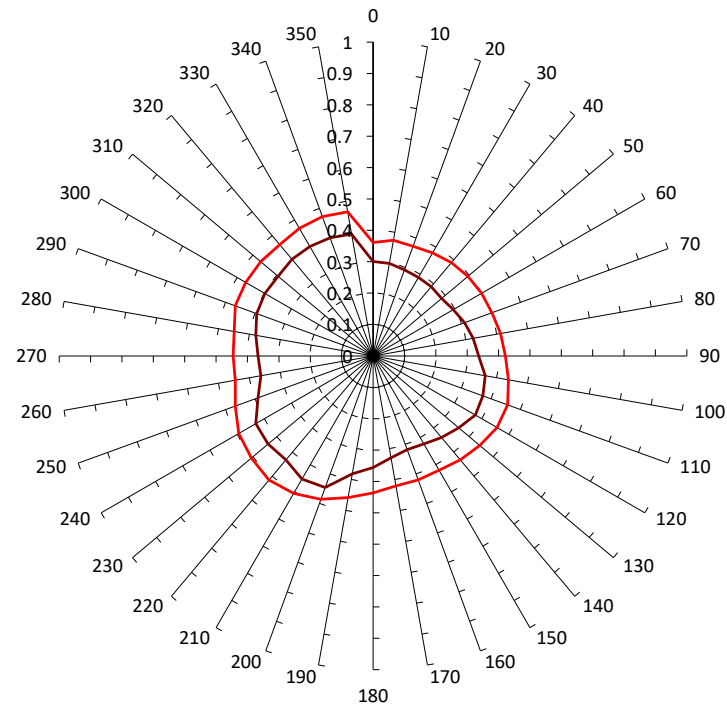
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.72%	3.81	0.13%	4.56	< 0.001%	9.17
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.46%	3.76	0.11%	4.53	< 0.001%	9.00

Results for P125

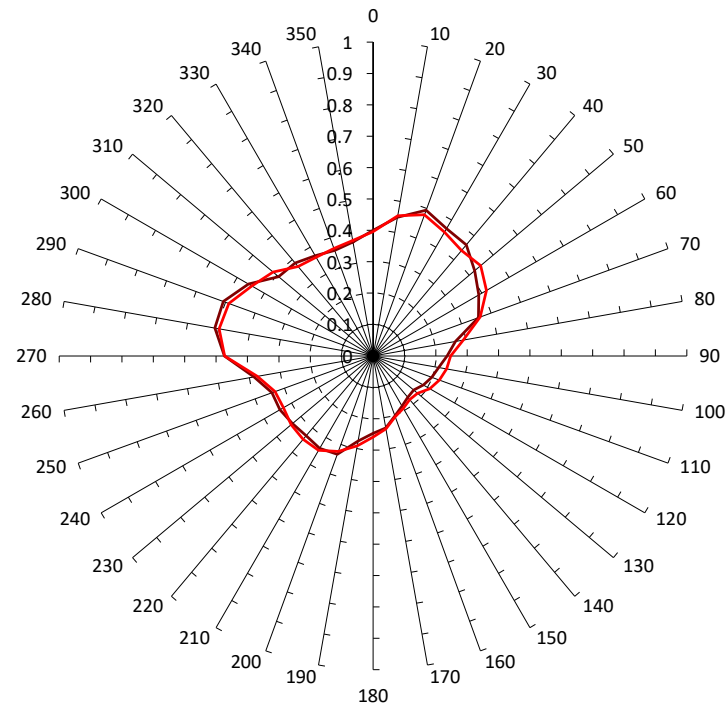
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	4.81%	3.97	0.21%	5.03	< 0.001%	9.52
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	11.78%	4.64	0.70%	5.88	< 0.001%	11.02

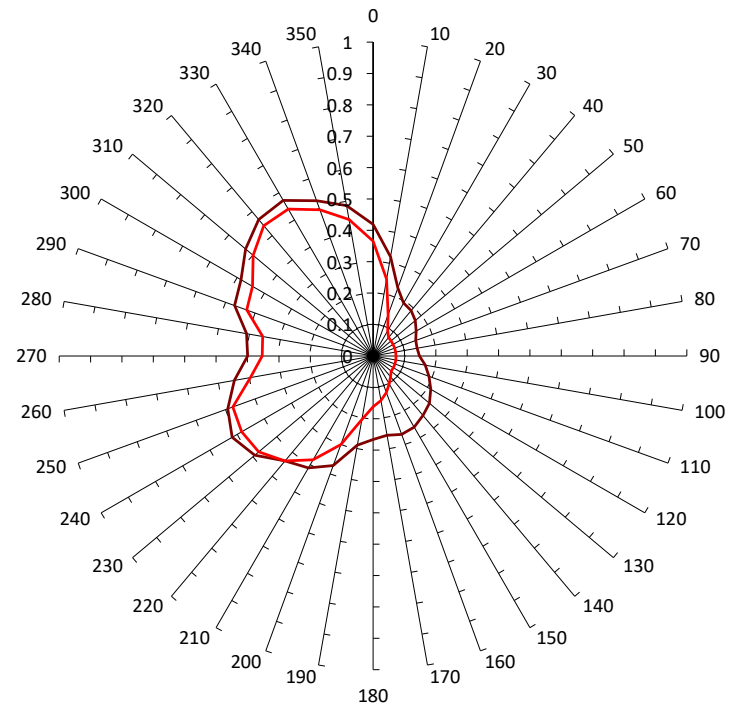
Results for P126

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.73%	3.81	0.18%	4.73	< 0.001%	9.55
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.52%	3.78	0.16%	4.70	< 0.001%	9.37

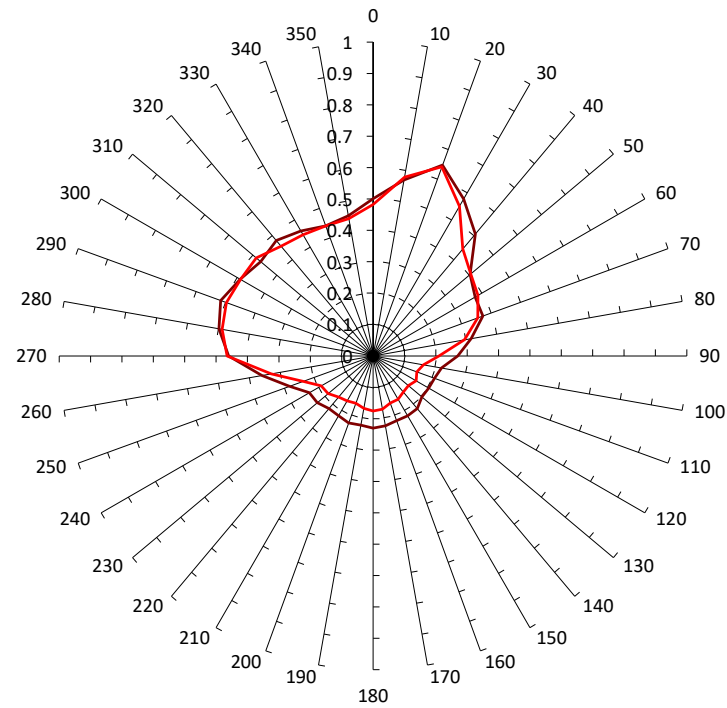
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	8.46%	4.38	0.49%	5.47	< 0.001%	10.66
CONFIGURATION 4: Completed Proposed Development	6.08%	4.13	0.32%	5.14	< 0.001%	10.09

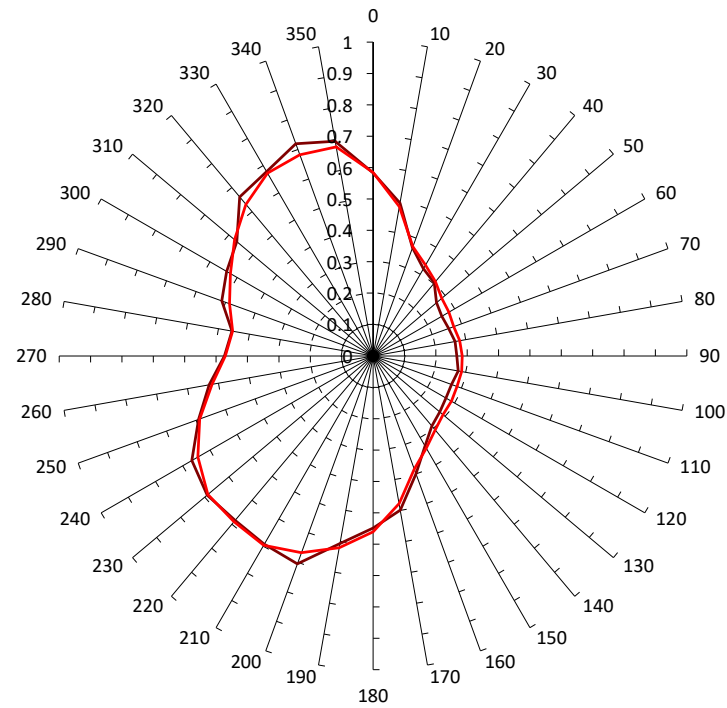
Results for P128

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	5.21%	4.03	0.26%	4.76	< 0.001%	10.13
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	4.66%	3.95	0.22%	4.64	< 0.001%	9.97

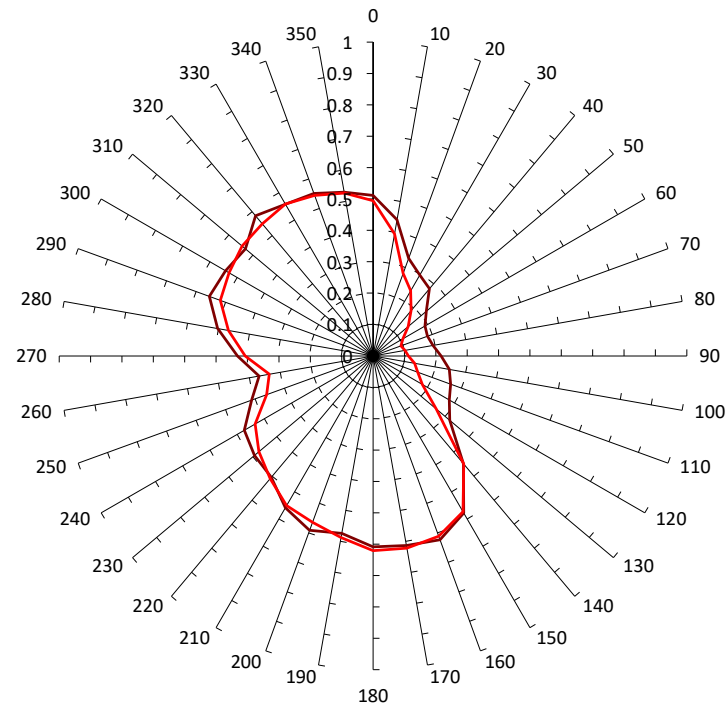
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	24.69%	6.13	4.15%	7.72	0.0189%	14.78
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	23.93%	6.06	3.90%	7.64	0.0169%	14.62

Results for P130

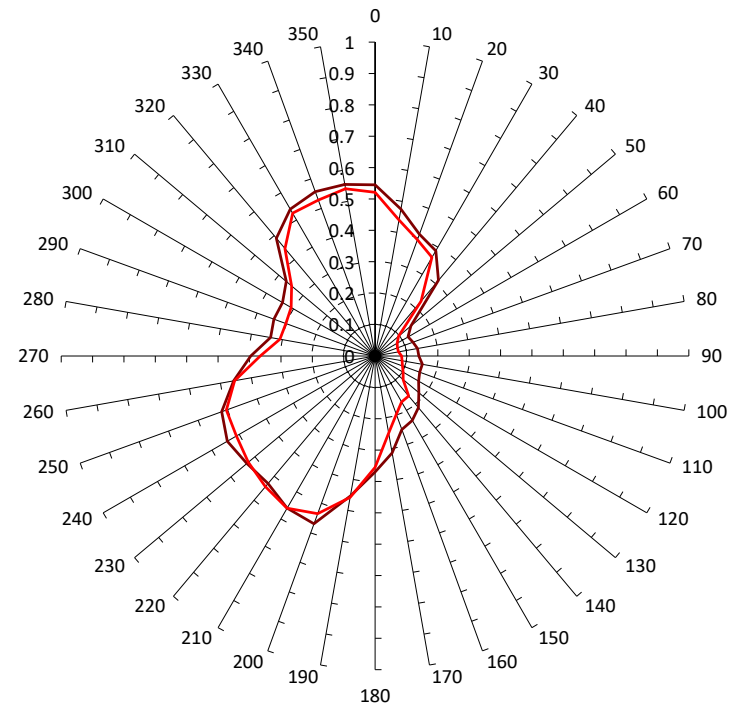
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	16.11%	5.01	1.41%	6.46	0.0022%	12.23
CONFIGURATION 4: Completed Proposed Development	14.67%	4.90	1.25%	6.34	0.0019%	12.07

Results for P131

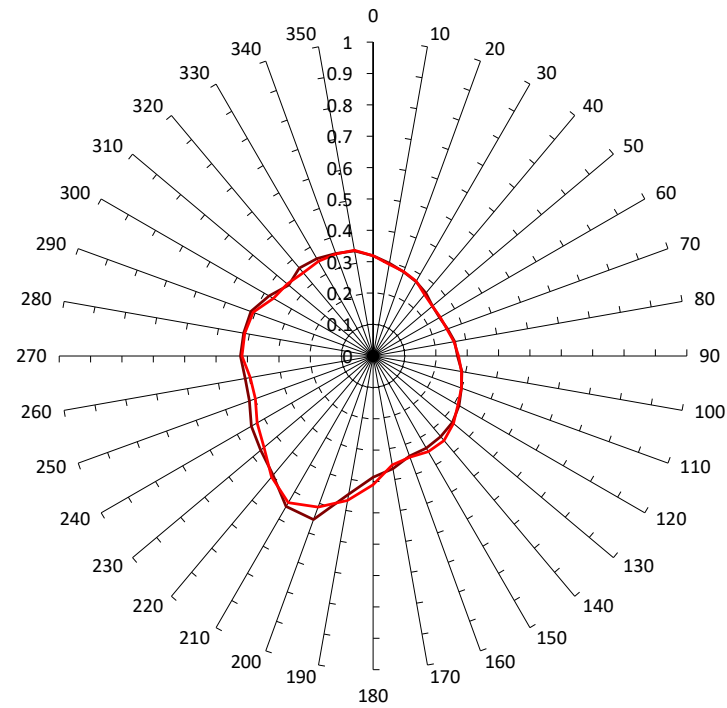
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	14.50%	4.88	1.06%	6.15	0.0015%	11.82
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	13.04%	4.79	0.92%	6.02	0.0012%	11.61

Results for P132

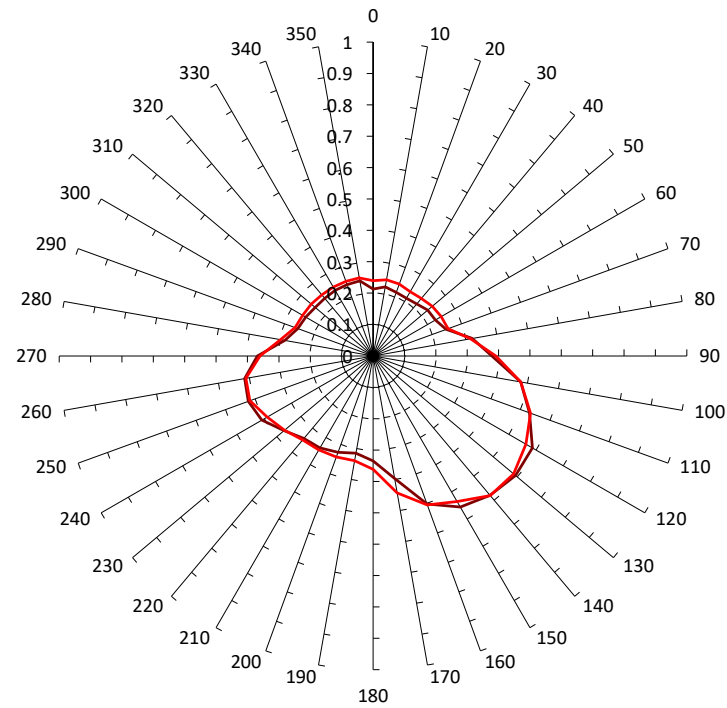
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	9.51%	4.50	0.62%	5.70	< 0.001%	11.05
CONFIGURATION 4: Completed Proposed Development	8.39%	4.39	0.51%	5.57	< 0.001%	10.74

Results for P133

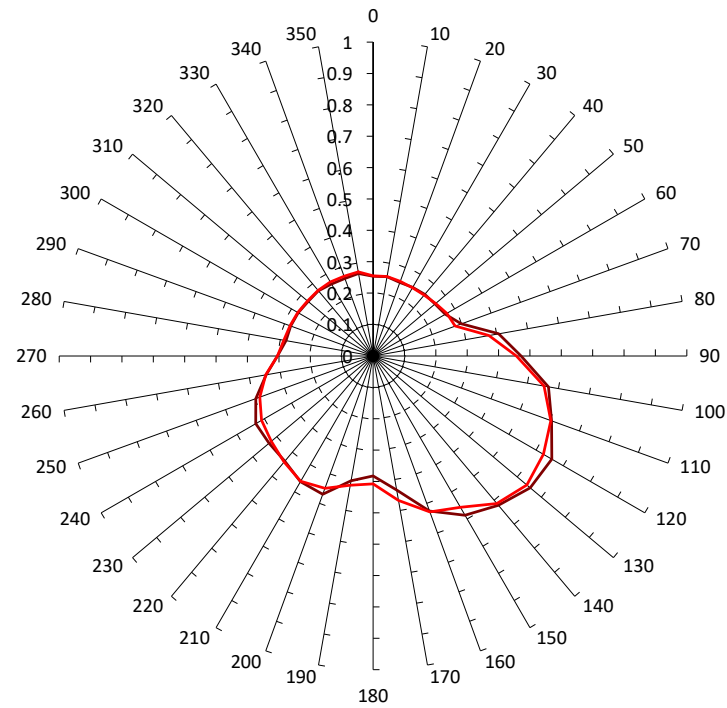
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.78%	3.82	0.17%	4.75	< 0.001%	9.20
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.69%	3.81	0.16%	4.76	< 0.001%	9.13

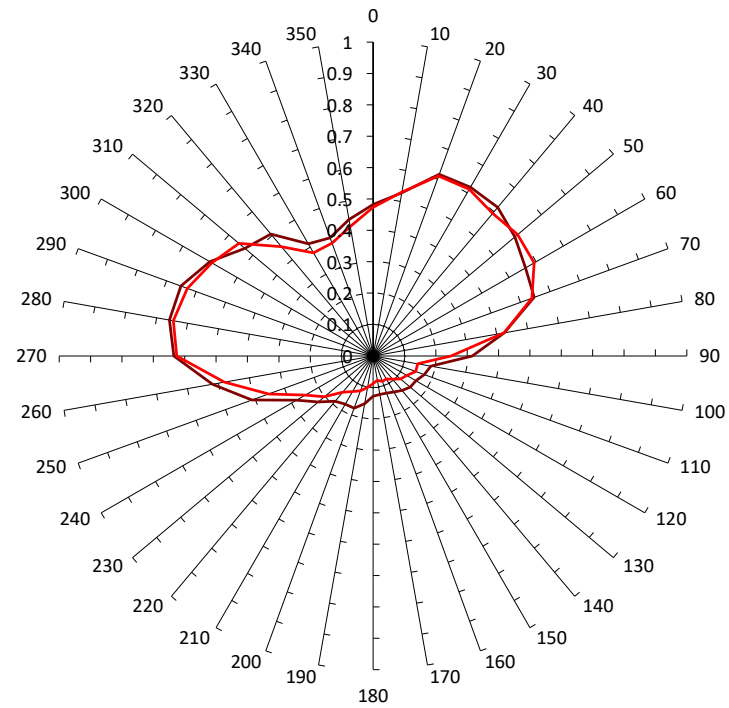
Results for P134

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	7.89%	4.35	0.39%	5.37	< 0.001%	10.17
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	7.36%	4.28	0.35%	5.31	< 0.001%	10.02

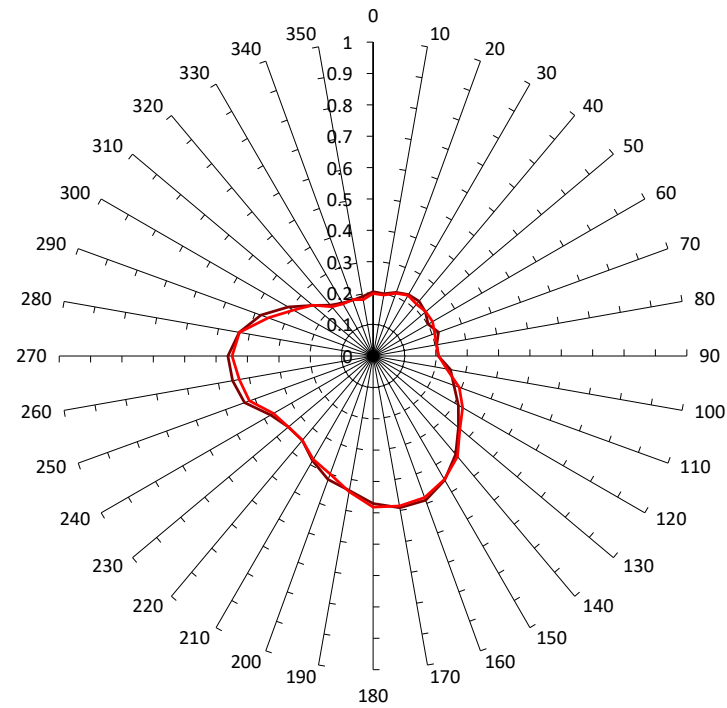
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	12.36%	4.85	1.02%	5.91	0.0034%	12.42
CONFIGURATION 4: Completed Proposed Development	11.57%	4.75	0.89%	5.77	0.0027%	12.17

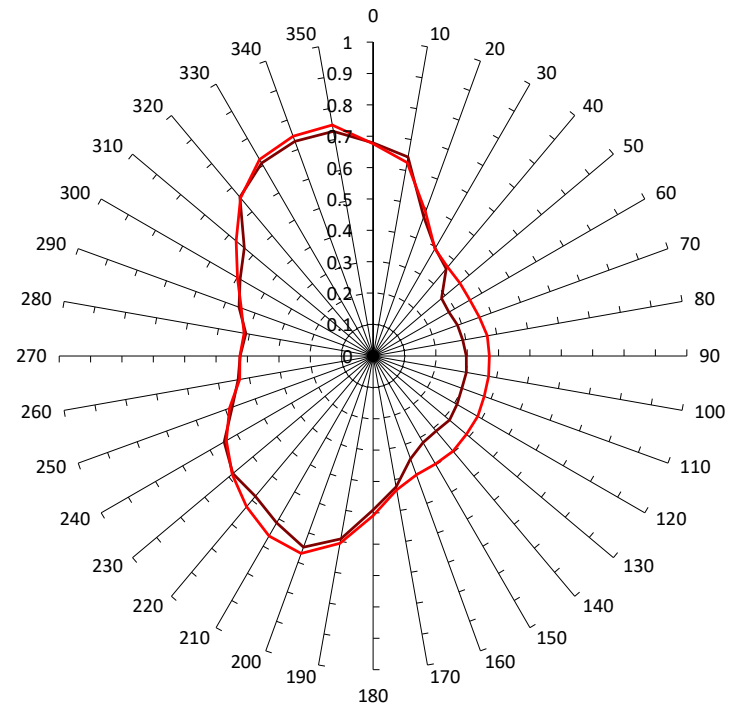
Results for P136

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.98%	3.85	0.24%	5.03	< 0.001%	9.65
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.52%	3.78	0.21%	4.94	< 0.001%	9.46

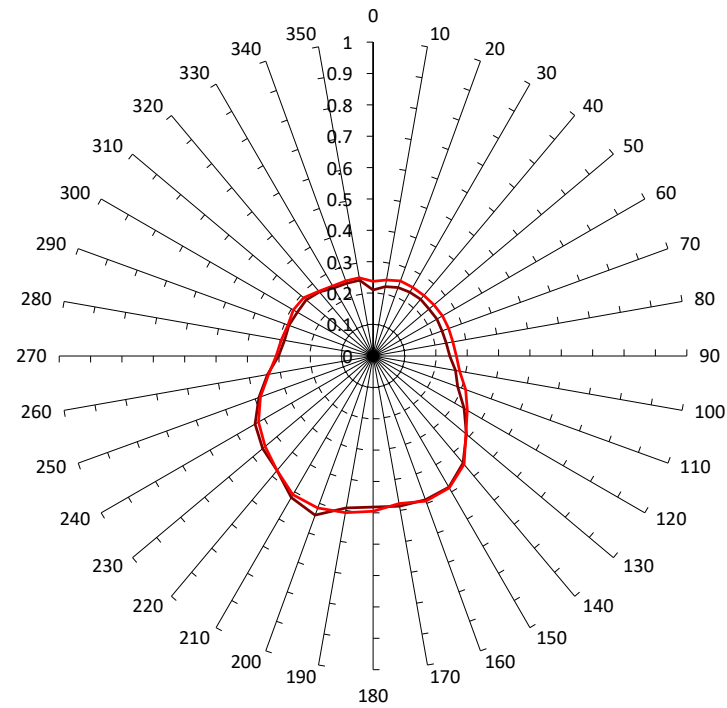
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	21.48%	5.49	2.16%	6.89	0.0054%	13.19
CONFIGURATION 4: Completed Proposed Development	22.24%	5.69	2.65%	7.13	0.0086%	13.72

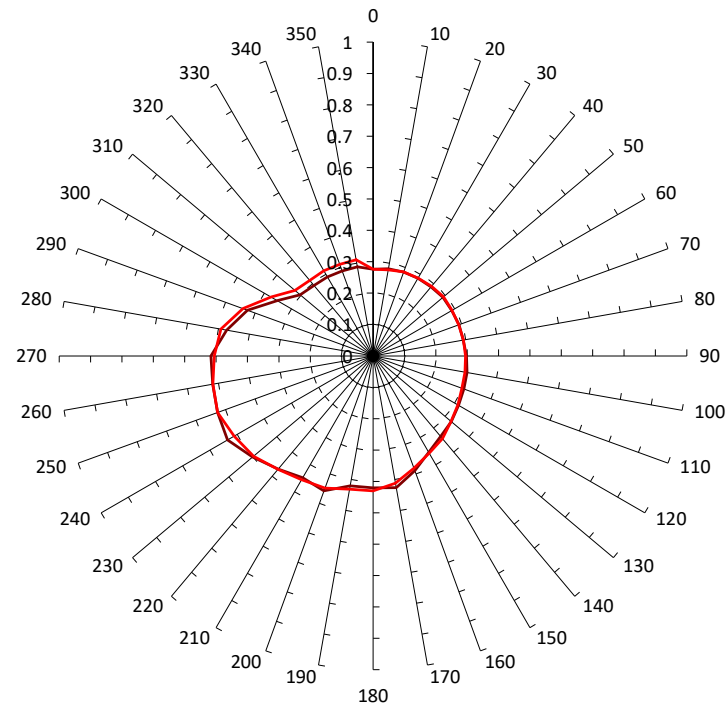
Results for P138

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	7.97%	4.36	0.52%	5.56	< 0.001%	10.71
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	7.41%	4.30	0.47%	5.50	< 0.001%	10.55

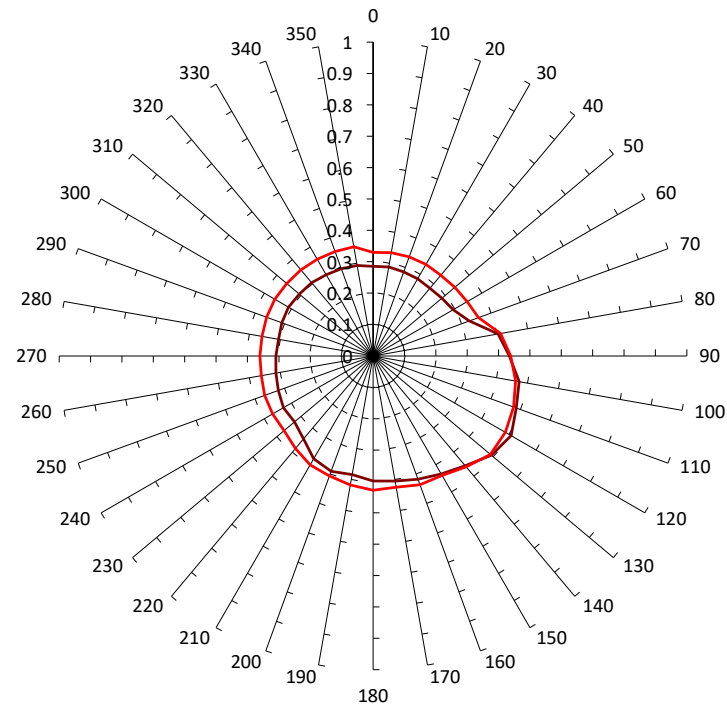
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	10.27%	4.55	0.71%	5.79	< 0.001%	11.17
CONFIGURATION 4: Completed Proposed Development	9.99%	4.52	0.67%	5.76	< 0.001%	11.07

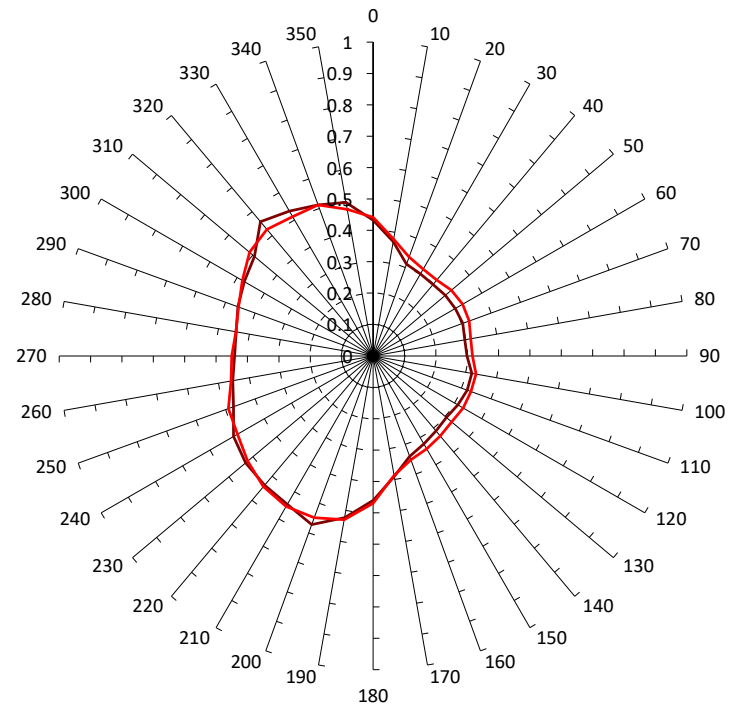
Results for P140

GEM Velocity Coefficients



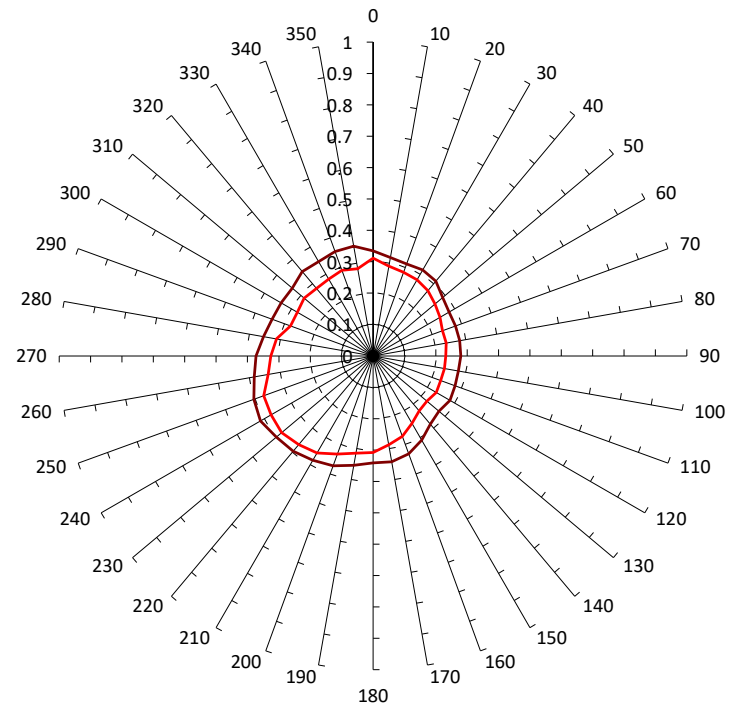
Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	2.36%	3.57	0.07%	4.49	< 0.001%	8.30
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.65%	3.81	0.13%	4.85	< 0.001%	8.88

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	14.79%	4.89	1.07%	6.20	0.0013%	11.74
CONFIGURATION 4: Completed Proposed Development	14.65%	4.87	1.04%	6.19	0.0012%	11.70

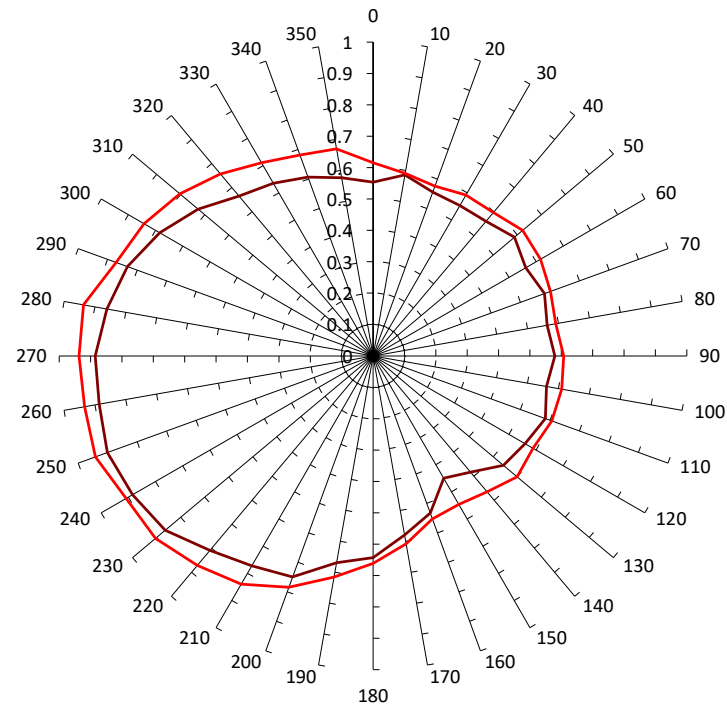
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	2.75%	3.65	0.11%	4.65	< 0.001%	8.78
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	1.44%	3.32	0.05%	4.21	< 0.001%	8.03

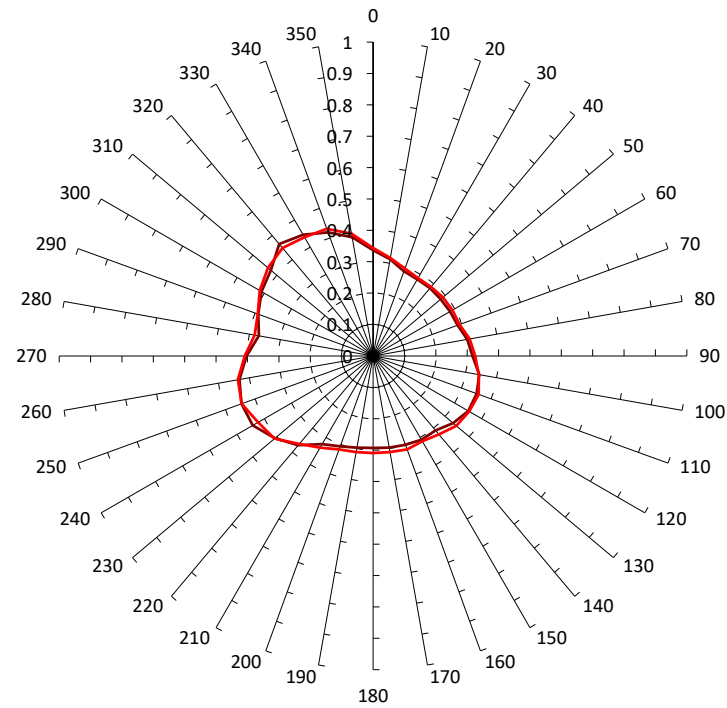
Results for P143

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	35.83%	7.80	13.29%	9.90	0.1900%	19.11
CONFIGURATION 4: Completed Proposed Development	38.95%	8.25	16.68%	10.47	0.2905%	20.16

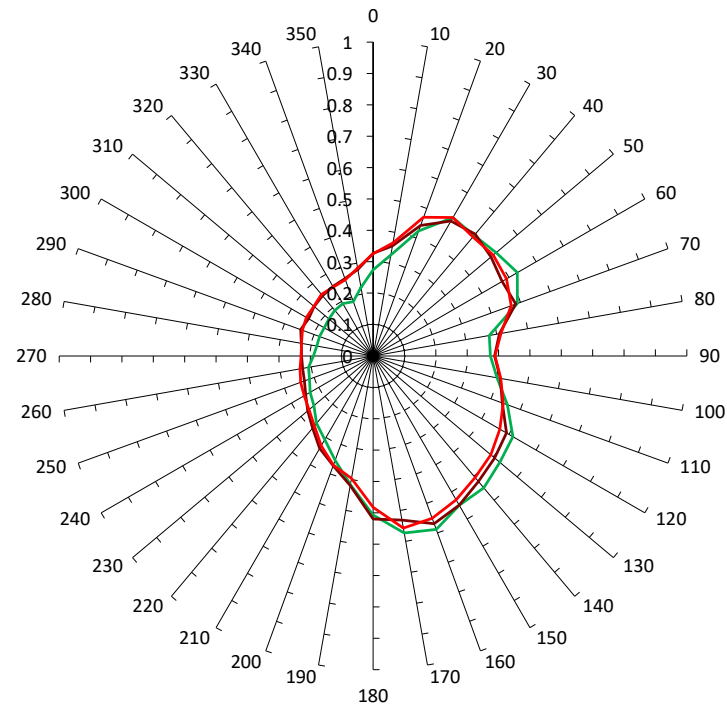
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds						
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.43%	3.77	0.16%	4.75	< 0.001%	9.24
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.42%	3.77	0.16%	4.76	< 0.001%	9.20

Results for P145

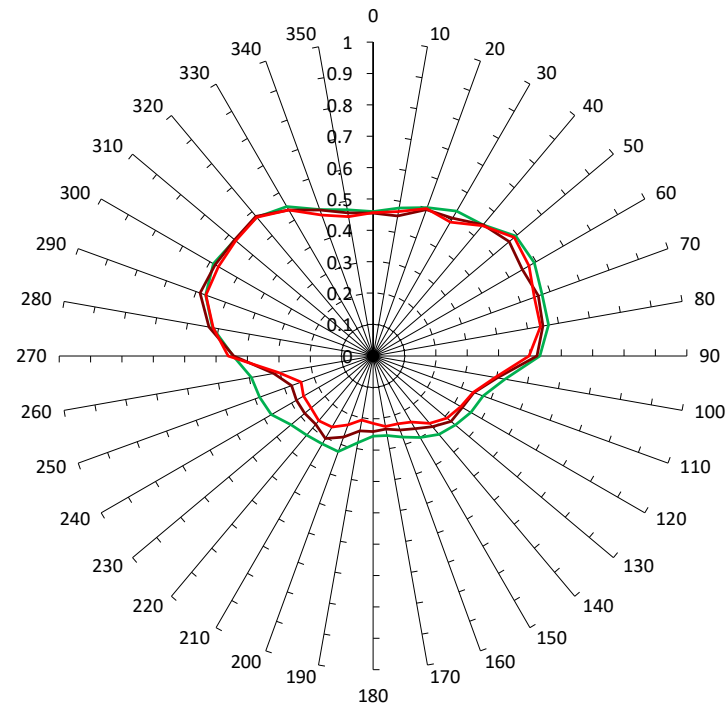
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	4.19%	3.87	0.25%	4.86	< 0.001%	9.83
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	3.90%	3.83	0.21%	4.83	< 0.001%	9.59
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	3.68%	3.79	0.19%	4.76	< 0.001%	9.47

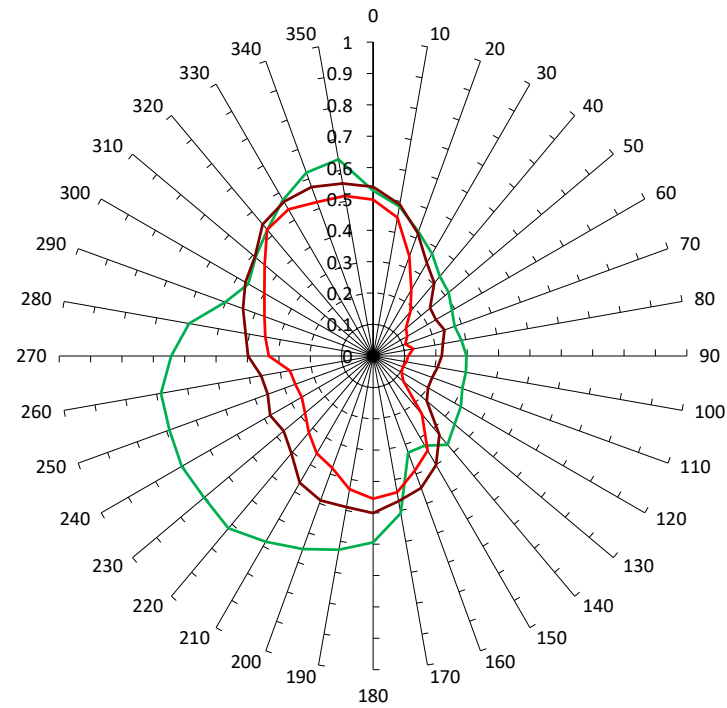
Results for P146

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	9.57%	4.49	0.47%	5.46	< 0.001%	10.82
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	8.32%	4.39	0.42%	5.26	< 0.001%	10.79
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	7.85%	4.35	0.39%	5.20	< 0.001%	10.64

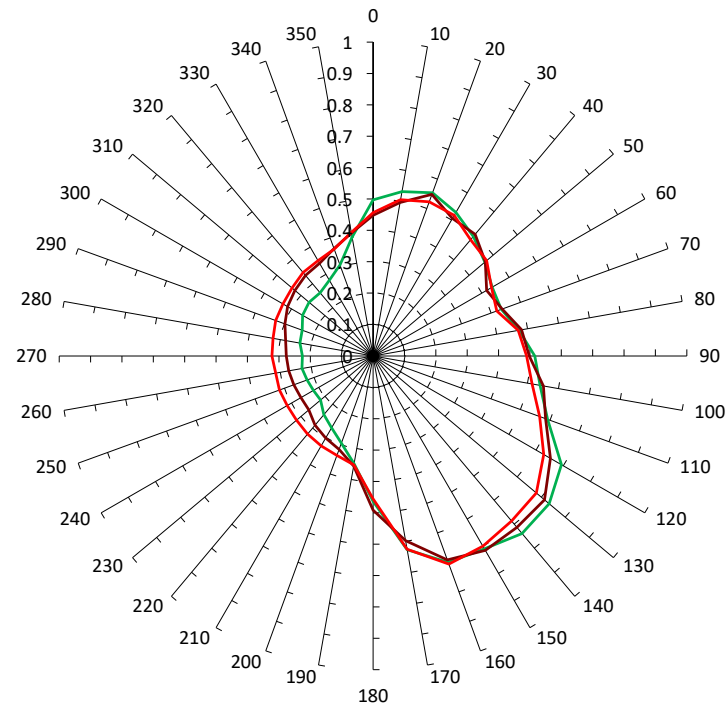
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	25.51%	6.33	5.12%	8.04	0.0276%	15.35
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	7.33%	4.27	0.40%	5.43	< 0.001%	10.32
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	2.85%	3.65	0.12%	4.58	< 0.001%	9.05

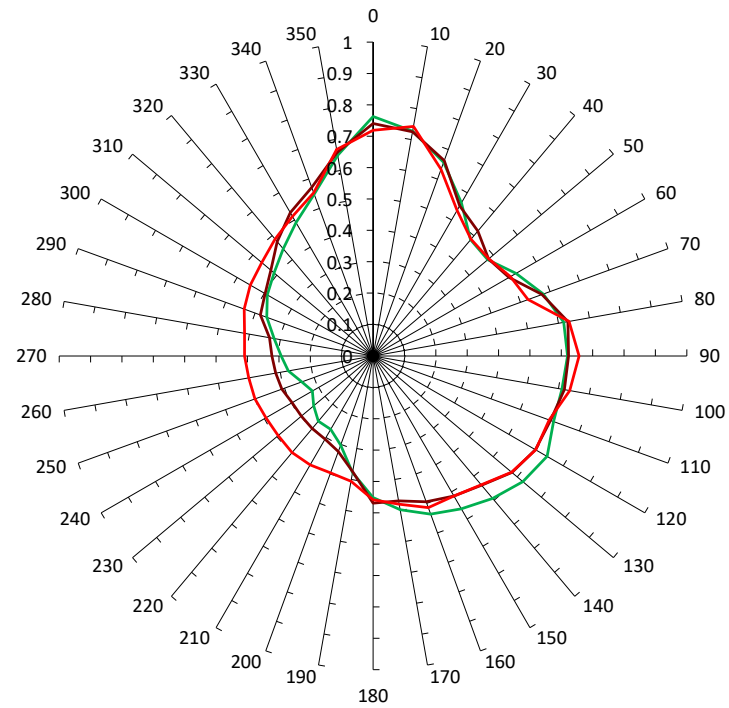
Results for P148

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	7.29%	4.42	0.61%	5.35	0.0012%	11.33
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	7.15%	4.36	0.55%	5.32	< 0.001%	11.11
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	7.14%	4.31	0.53%	5.34	0.0011%	11.10

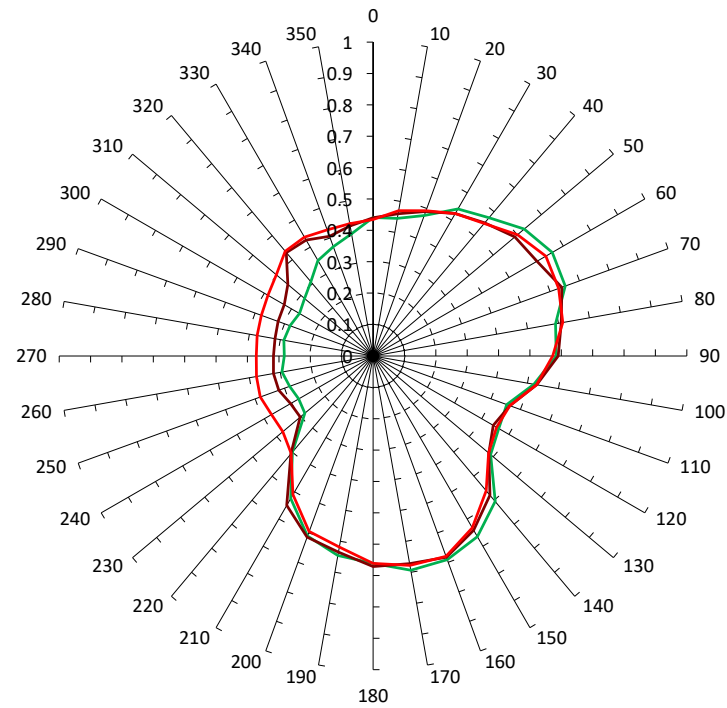
GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	11.49%	4.72	0.59%	5.50	< 0.001%	11.20
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	11.45%	4.70	0.56%	5.50	< 0.001%	11.11
CONFIGURATION 4: Completed Proposed Development	13.46%	4.82	0.68%	5.80	< 0.001%	11.20

Results for P150

GEM Velocity Coefficients



Configuration	Summer Probability of Exceedance (%)	Summer Velocity to Cause (m/s)	Winter Probability of Exceedance (%)	Winter Velocity to Cause (m/s)	Annual Probability of Exceedance (%)	Annual Velocity to Cause (m/s)
CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)						
CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds	14.79%	5.08	1.58%	6.50	0.0038%	12.69
CONFIGURATION 3: Completed Proposed Development with Existing Surrounds	15.05%	5.07	1.54%	6.49	0.0036%	12.64
CONFIGURATION 4: Completed Proposed Development with Existing Surrounds	15.19%	5.01	1.41%	6.43	0.0030%	12.41

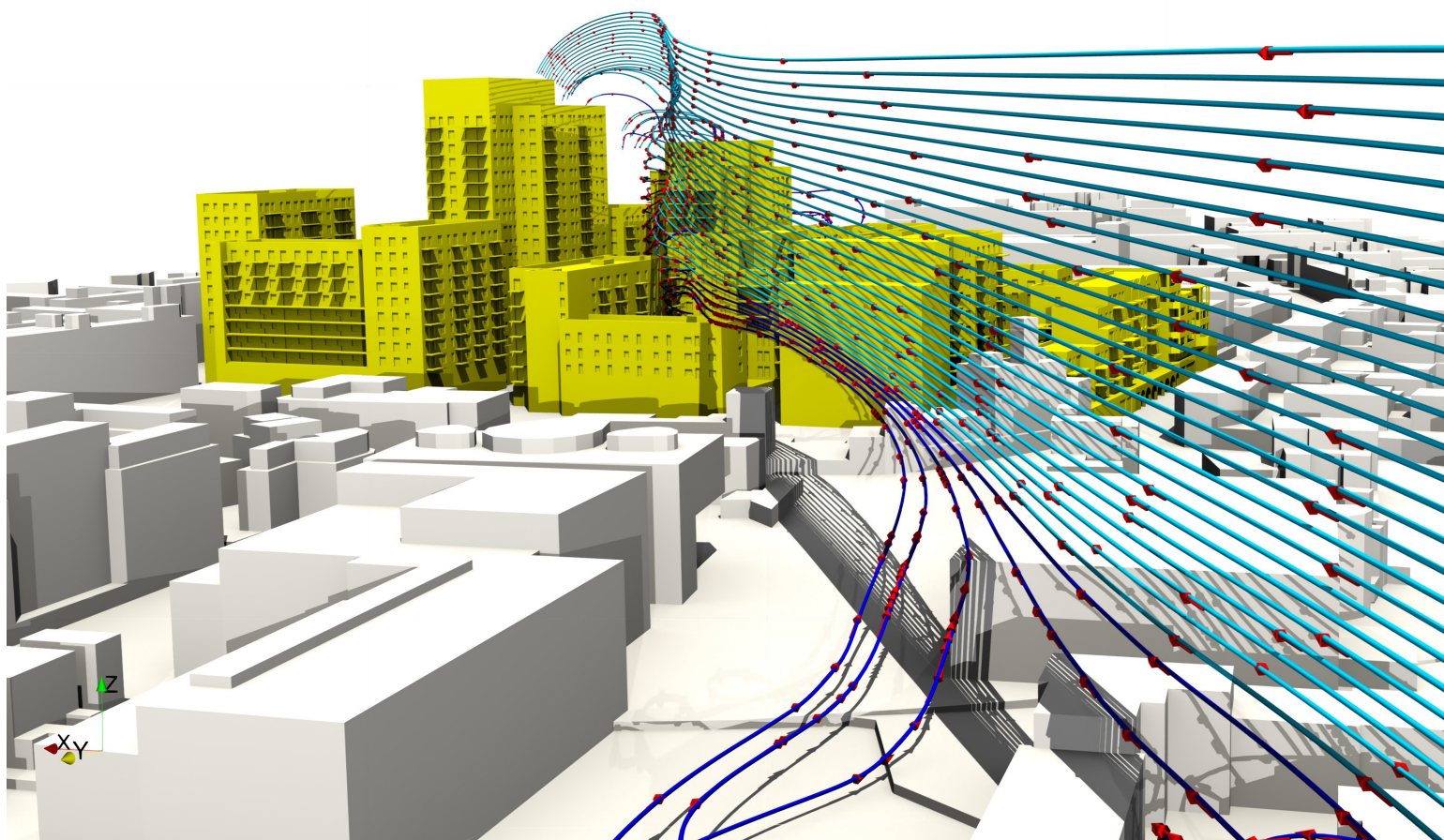
Appendix: Wind Microclimate

Annex 1: Wind Microclimate Assessment (December 2024)

Annex 2: Wind Microclimate CFD Study (December 2024)

WIND MICROCLIMATE CFD STUDY

AYLESHAM CENTRE, LONDON



WG609-08F02(REV0) - WE CFD REPORT
DECEMBER 06, 2024

Prepared for:
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AT THE LEADING EDGE

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Date	Revision History	Non-Issued Revision	Issued Revision	Prepared By	Instructed By	Reviewed & Authorised By
06/12/2024	Initial	-	0	NO	NO	NO
13/12/2024	Initial	-	1	NO	NO	NO

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Executive Summary

Following submission of the planning application, a period of consultation commenced which provided an opportunity for feedback on the proposals from statutory consultees, local community and the general public. The Applicant has continued to engage post-submission of the application.

The revised proposals reduce the number of residential dwellings on-site from 877 to 867 (10 fewer homes). This in turn changes some entrance and balcony locations and marginal changes to massing of some top floor set backs.

However, given the small change in unit numbers/massing, the revised proposals will not materially change the associated wind condition with the development and therefore implications of the Revised Proposed Development on the wind microclimate assessments are not material.

This document provides detail on the wind and microclimate relative to the design changes and should be read in conjunction with the December 2024 ES Addendum Chapter.

The key findings from the assessment are as follows:

- The wind conditions at the ground level are safe. The wind conditions on the elevated levels are also safe.
- The wind conditions at many of the informal seating areas within the Site are suitable for the intended use.
- The wind conditions on most of the terraces of the building within the Site are suitable for the intended use.

However, there are some minor isolated areas where the wind conditions are unsuitable for the intended use, including:

- Isolated areas on the balconies

Based on the currently tested mitigation measures and the minor remaining areas of wind comfort issues it can be concluded that, with the inclusion of similar mitigation measures to the ones already tested in other areas (i.e. 1.5m Balustrades), the remaining uncomfortable areas on balconies, as shown within this report, will thereafter have acceptable conditions.

Furthermore, the development would then be deemed safe and comfortable for its intended usage in all areas.

Furthermore, where there were significant residual adverse effects previously identified in the ES, these are shown to be removed with the mitigation tested.



Figure 1. CoL Comfort Contours, Proposed Scheme with Existing Surrounds and Mitigation, Summer Condition, Elevated Terraces

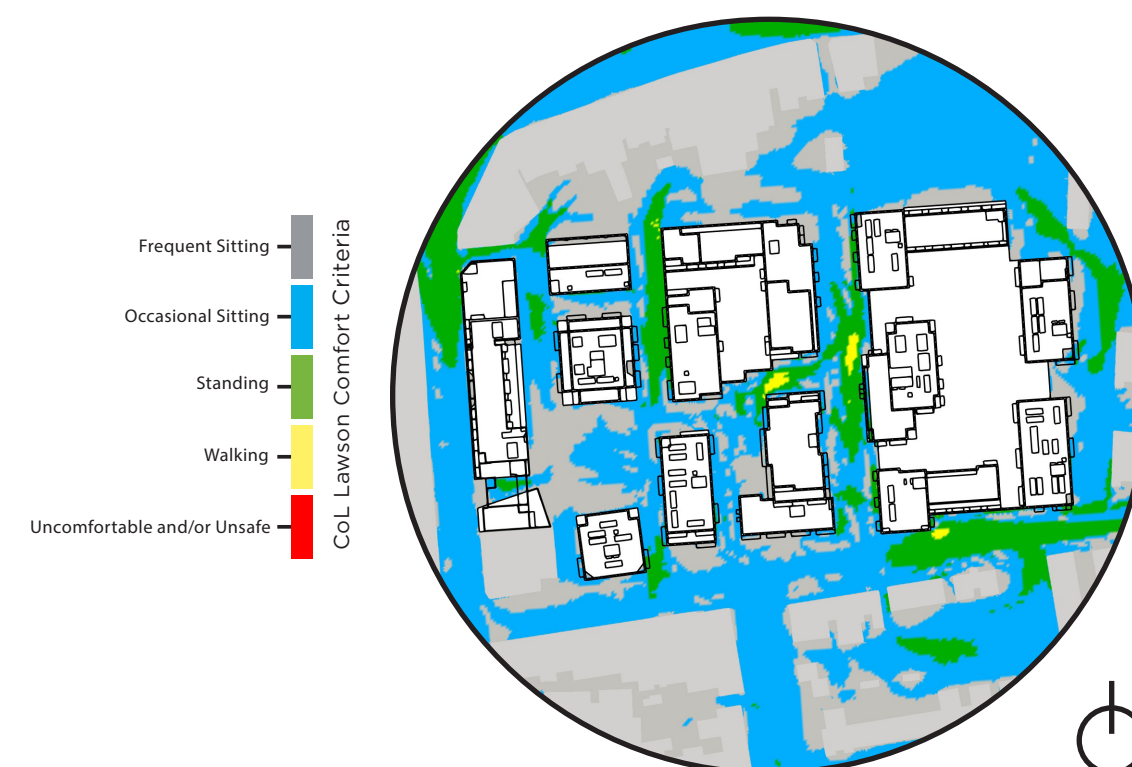


Figure 2. CoL Comfort Contours, Proposed Scheme with Existing Surrounds and Proposed Mitigation, Winter Condition, Ground Level

CONTENTS

1. Introduction
2. Environmental Wind Speed Criteria
3. CFD Methodology
4. Meteorological Data for London
5. Results and Discussion
6. Summary and Conclusions
7. References
Appendix A – Wind Effects Glossary
Appendix B – Wind Speed Up Fields
Appendix C – Tested Mitigation Outline

1. Introduction

This Wind and Microclimate CFD Study has been prepared by WINDTECH Consultants to accompany an addendum to the application for full planning permission for the phased mixed-use redevelopment of the Alysham Center site in Southwark, London. The application is submitted on behalf of Berkeley Homes (South East London) Ltd. The development has been modelled based upon the 3D model provided on November 25th, 2024.

Description of the Proposed Development

The site is bound by Peckham Bus Station to the north, Mckerrell Road to the east, Hanover Park to the south, and Rye Lane to the west. Figure 3 shows a plan view of the Existing Site. Figure 4 shows a plan view of the Proposed Site. The Proposed Development has two phases. Phase 1 is comprised of Buildings M1 through M6. Phase 2 is comprised of Buildings C1 through C4, H1 through H3, N1 through N2, and R1 through R2. The tallest building, Building M1, is approximately 25 storeys tall.

Scope of the CFD Study

Simulations of the wind microclimate were conducted to quantitatively assess the effect of the Proposed Development on the wind microclimate.

The assessment was undertaken through Computational Wind Engineering (CWE), which uses Computational Fluid Dynamic (CFD) techniques to model a 'virtual wind tunnel' and simulate conditions around the site. This report contains the methodology and results from these simulations.

Wind speed contour plots representing the local wind speed-up ratios are derived from the simulations and are then combined with a statistical model of the regional wind climate (which accounts for the directional strength and frequency of occurrence of the prevailing regional winds). The wind speed-up ratios are then used in conjunction with the City of London (CoL) criteria for comfort and safety.

In total, one configuration was tested in the simulations, which are as follows:

1. Revised Proposed Scheme with Existing Surrounds and Proposed Mitigation



Figure 3. Existing Site



Figure 4. Proposed Site

2. Environmental Wind Speed Criteria

Wind Effects on People

The acceptability of wind in any area is dependent upon its use. For example, people walking or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant. Various researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, A.D. Penwarden, etc., have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities.

A.D. Penwarden (1975) Criteria for Gust Wind Speeds

The following table developed by A.D. Penwarden (1975) is a modified version of the Beaufort Scale, and describes the effects of various wind intensities on people. Note that the effects column relates to wind conditions that occur frequently (approximately once per week on average). Higher ranges of wind speeds can be tolerated for rarer events.

Type of Winds	Wind	Wind Speed (m/s)	Effect
Calm, light air	1	0-1.5	Calm, no noticeable wind
Light breeze	2	1.6-3.3	Wind felt on face
Gentle breeze	3	3.4-5.4	Hair is disturbed, Clothing flaps
Moderate breeze	4	5.5-7.9	Raises dust, dry soil and loose paper. Hair disarranged
Fresh breeze	5	8.0-10.7	Force of wind felt on body
Strong breeze	6	10.8-13.8	Umbrellas used with difficulty, hair blows straight, difficult to walk steadily. Wind noise on ears unpleasant
Near gale	7	13.9-17.1	Inconvenience felt when walking
Gale	8	17.2-20.7	Generally impedes progress. Great difficulty with balance
Strong gale	9	20.8-24.4	People blown over by gusts

Table 1. Summary of Wind Effects on People (A.D. Penwarden, 1975)

T.V. Lawson Criteria for Mean Wind Speeds

In 1973, T.V. Lawson quotes that A.D. Penwarden’s Beaufort 4 (as listed in Table 1) would be acceptable if it is not exceeded for more than 4% of the time; and Beaufort 6 would be unacceptable if it is exceeded more than 2% of the time. Later, in 1975, T.V. Lawson presented a set of criteria very similar to those of A.G. Davenport’s. These are presented in Table 2 and Table 3.

Classification	Activities	Annual Maximum Mean
Safety (all weather areas)	Accessible by the general public	15m/s
Safety (fair weather areas)	Private outdoor areas (balconies, terraces etc.)	20m/s

Table 2. Safety Criteria by T.V. Lawson (1975)

Classification	Activities	95th Percentile Maximum Mean (approx once per week)
Business Walking	Objective walking from A to B	8m/s < V < 10m/s
Pedestrian Walking	Slow walking etc.	6m/s < V 8m/s
Short Exposure Activities	Pedestrian standing or sitting for short times	4m/s < V < 6m/s
Long Exposure Activities	Pedestrian sitting for a long duration	V < 4m/s

Table 3. Comfort Criteria by T.V. Lawson (1975)

T.V. Lawson (1980) presented a further set of criteria that has been widely adopted in the UK. These criteria are based on Beaufort scale levels and have a variable probability of exceedance. These criteria are based on mean wind speeds and are outlined in Table 4 below.

Classification	Human Activities	Percentage of Exceedance and Beaufort Scale
Roads and Carparks	Difficult to walk steadily	2% > Beaufort 6
Business Walking	Unacceptable as main public accessways	2% > Beaufort 5
Pedestrian Walking	Acceptable for walking, main public accessways	4% > Beaufort 4
Sitting	Generally acceptable for walking & short duration stationary activities such as window-shopping, standing or sitting in plazas	6% > Beaufort 3

Table 4. Comfort Criteria by T.V. Lawson (1980) Criteria

Wind Speed Criteria Used for this Study

For this study, the measured wind conditions for the various critical outdoor trafficable areas within and around the subject development are compared against the City Lawson Criteria for pedestrian wind comfort and safety. The criteria are described in the “Wind Microclimate Guidelines for Developments in the City of London”.

The Lawson Criteria were initially developed by Tom Lawson, who was a Professor of Industrial Aerodynamics at Bristol University, and have been widely adopted by planning authorities in the UK. The adjusted City of London Lawson Criteria, referred to as the City Lawson Criteria, comprises both comfort and safety criteria. The comfort criteria sets out distinct pedestrian activities, with less active pursuits requiring more benign wind conditions; while the safety criteria relate to the speed at which a person is likely to be blown over. The comfort and safety criteria have been provided in Table 5 and Table 6. The corresponding contour colours are shown in Figure 5 below.

Classification	Activities	Mean and GEM wind speed (5% exceedance)
Frequent Sitting	Acceptable for frequent outdoor sitting use, e.g. restaurant, cafe.	2.5m/s
Occasional Sitting	Acceptable for occasional outdoor seating, e.g. general public outdoor spaces, balconies and terraces intended for occasional use, etc.	4.0m/s
Standing	Acceptable for entrances, bus stops, covered walkways or passageways beneath buildings.	6.0m/s
Walking	Acceptable for external pavements, walkways.	8.0m/s
Uncomfortable	Not comfortable for regular pedestrian access.	> 8.0m/s

Table 5. City Lawson Comfort Criteria (July 2021)

Classification	Activities	Mean and GEM wind speed (0.022% exceedance)
Pedestrian Safety Limit	Presents a safety risk for pedestrians, especially to more vulnerable members of the public.	15m/s

Table 6. City Lawson Safety Criteria (July 2021)



Figure 5. City of London (CoL) Contours

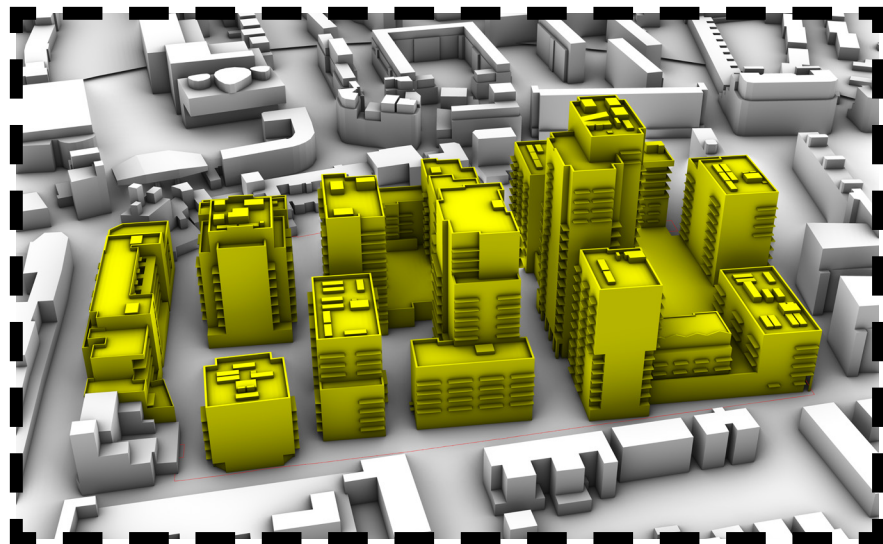
3. CFD Methodology

Numerical Setup

The numerical modelling was conducted using the HELYX 3.4.0 computational package. A detailed wind driven flow simulation was conducted in order to assess the wind speeds throughout the lobby space. The characteristics of the CFD simulation are detailed in Table 7 below.

Solver	Coupled
Formulation	Implicit
Time	Steady
Operating Conditions	Pressure
Viscous Model	Realizable K-Epsilon (2 Equation) Standard Wall Functions
Pressure-Velocity Coupling	Coupled
Discretization	Pressure (Standard) Momentum (Second Order Upwind)
Boundary Conditions	Velocity Normal Inlet Outlets
Under Relaxation Factors	0.4 for the pressure 0.7 for momentum
Residuals	0.001 for Continuity, Momentum, K, Epsilon Equations

Table 7. CFD Simulation Setup



Boundary Conditions

The wind velocity inside and outside the development was evaluated by solving the Reynolds' Averaged Navier Stokes (RANS) equations for the flow. A cylindrical computational domain with a height of 400 meters and a radius of 500 meters was generated, as shown in Figures 6 and 7. The side walls of the computational domain were used as the computed inlet and outlet for the boundary layer input. 16 wind directions were analysed across the seasonal cases for this study for each site configuration.

Computational Mesh and Grid Independence Study

A grid independence study was undertaken for the external wind speeds of the computational model, for the Southerly wind case. Results from the two grids employed (G1 & G2) were measured at chosen located for various heights. These included y=10m, y=22.5m as well as y=30m. The grid properties and grid independence results are summarised in Tables 8 and 9. G1 was chosen for simulation in order to maximise computational efficiency.

Grid	Element	Base Mesh Size (m)	Cell Count (x10E6)
G1	Hexahedral	0.28	31.7
G2	Hexahedral	0.32	37.3

Table 8. Grid Properties

Grid	G1 Velocity Magnitude (m/s)	G2 Velocity Magnitude (m/s)	Percentage Difference (%)
G1	3.53	3.59	-1.78
G2	5.33	5.28	-1.05

Table 9. Grid Independence Results

Figure 6. Computational Domain (Proposed Site with Existing Surrounds)

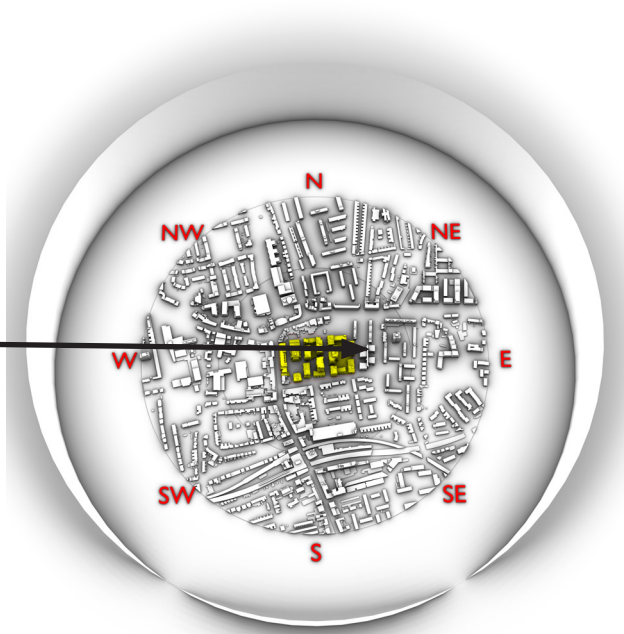


Figure 7. Computational Grid (Proposed Site with Existing Surrounds)



4. Meteorological Data for London

Meteorological Data

Details of the wind climate of the London region have been determined from a detailed statistical analysis of measured mean wind speed data from three London area airports: Heathrow, Gatwick and Stanstead Airport. A total of 136 years of wind climate data has been collected from the meteorological sites and the data has been corrected so that it represents winds over standard open terrain at a height of 10m above ground. The corrected data is summarised in Table 9 and illustrated in Figures 10 and 11. The data indicates that the prevailing wind speeds for the region occur from the south-western quadrant.

Approaching Wind Speeds

The approaching wind terrain category was assessed using the terrain descriptions from Eurocode 1: Actions on Structures – Part 1-4: General Actions-Wind Actions (BS EN 1991-1-4:2005) and International Standard Wind Actions on structure (ISO 4354). The approaching terrain profiles were combined with the local wind climate to determine the site wind speeds. A selection of these are presented in Table 10 and were used to determine the inputs conditions for the CFD simulations. The site hourly mean wind speeds are used when determining the speed up ratio for a given wind direction.

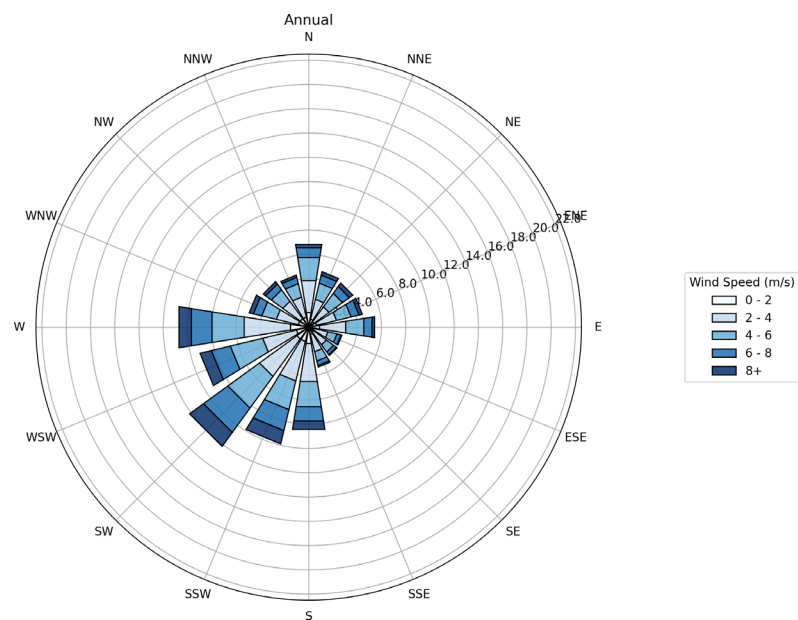


Figure 8. Annual Mean Wind Speeds and Frequencies of Occurrence for the London Area (corrected to open terrain at 10m)

Wind Direction	Weekly (5%) Wind Speeds (m/s)	1 Year Wind Speeds (m/s)	Percent of All Observations %
0	5.3	13.2	2.2
10	5.5	13.0	2.2
20	5.8	12.7	2.2
30	5.8	12.8	2.2
40	5.9	12.5	2.2
50	5.9	12.3	2.1
60	5.9	12.3	2.1
70	5.7	12.2	2.0
80	5.5	11.9	2.0
90	5.3	11.6	1.7
100	5.1	11.1	1.6
110	4.9	10.8	1.4
120	4.8	10.5	1.4
130	4.7	10.5	1.4
140	4.6	10.9	1.4
150	4.7	11.6	1.5
160	5.1	12.6	1.8
170	5.7	13.7	2.2
180	6.3	14.4	2.7
190	6.9	14.6	3.3
200	7.4	15.4	4.2
210	7.7	16.0	5.0
220	7.9	16.3	5.6
230	7.7	16.1	5.3
240	7.5	16.1	4.8
250	7.2	16.1	4.1
260	7.1	16.2	3.9
270	6.9	15.8	3.4
280	6.6	15.1	3.0
290	6.0	14.9	2.5
300	5.9	14.4	2.3
310	5.7	13.8	2.2
320	5.5	13.4	2.2
330	5.4	12.9	2.1
340	5.2	13.0	2.1
350	5.2	13.0	2.1

Table 10. Directional Wind Speeds for the London Area (corrected to open terrain at 10m)

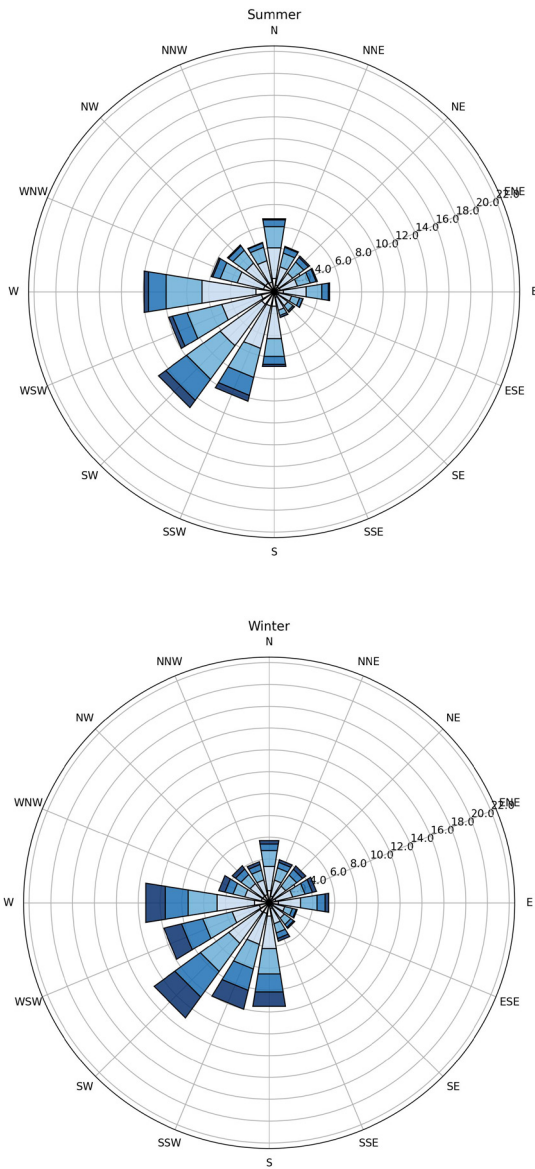


Figure 9. Seasonal Summer and Winter Mean Wind Speeds and Frequencies of Occurrence for the London Area (corrected to open terrain at 10m)

Wind Direction	Terrain Category (EN 1991-1-4, ISO 4354)	Basic Hourly Mean Wind Speed at 10m Height (m/s)	Site Hourly Mean Wind Speed at 10m Height (m/s)
220	III	7.9	7.8
60	III	5.9	5.8

Table 11. Hourly Mean Site Wind Speeds

5. Results and Discussion
Annual Safety Contours

The Annual Safety Contours are shown in Figures 10 through 11.

One scenario is shown: (1); Proposed Scheme with Existing Surrounds and Proposed Mitigation.

Observations

- The ground level wind conditions are safe.
- The wind conditions on the elevated levels of the Proposed Scheme are safe.
- Note** The presented results show full consistency with the previous submitted wind tunnel testing throughout the site and surrounds where the design and proposed mitigation remains unchanged.

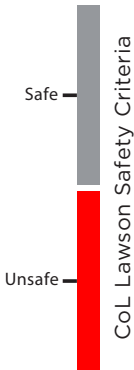


Figure 10. CoL Safety Contours, Proposed Scheme with Existing Surrounds and Proposed Mitigation, Annual Condition, Ground Level

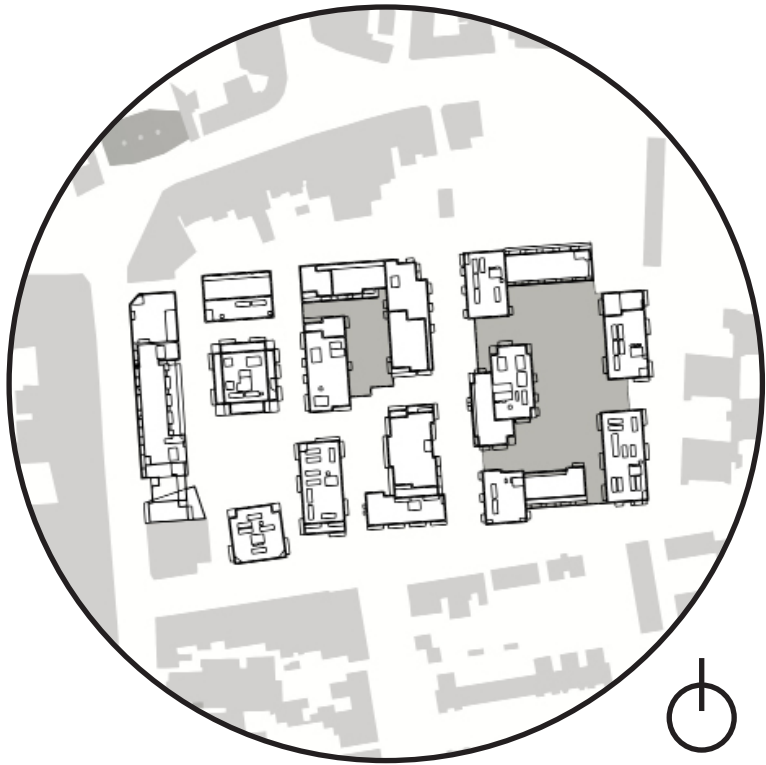


Figure 11. CoL Safety Contours, Proposed Scheme with Existing Surrounds and Proposed Mitigation, Annual Condition, Elevated Amenity