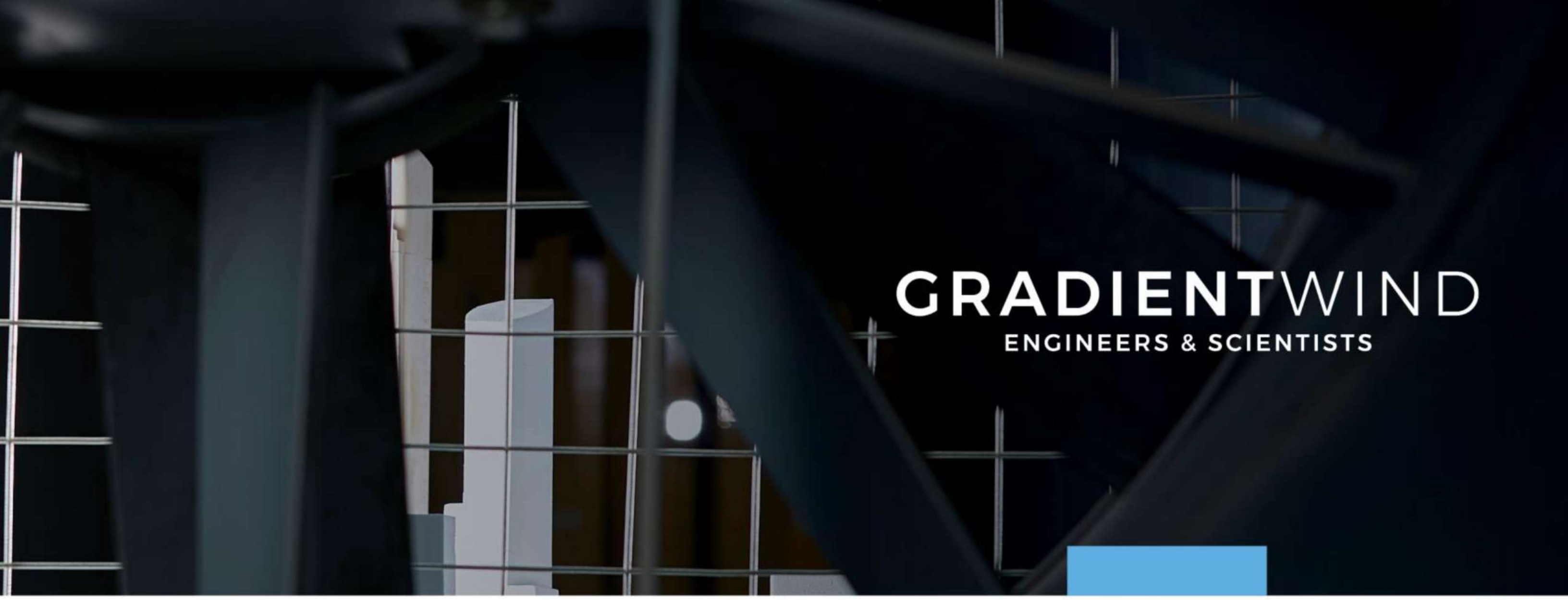
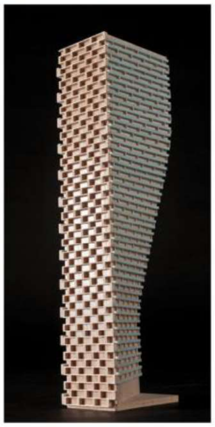


GRADIENTWIND
ENGINEERS & SCIENTISTS

PEDESTRIAN LEVEL WIND STUDY

1994 Scott Street
Ottawa, Ontario

Report: 25-150-PLW



October 28, 2025

PREPARED FOR
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EXECUTIVE SUMMARY

This report describes a pedestrian level wind (PLW) study undertaken to satisfy Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBLA) application submission requirements for the proposed multi-building development located at 1994 Scott Street in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). Our mandate within this study is to investigate pedestrian wind conditions within and surrounding the subject site, and to identify areas where wind conditions may interfere with certain pedestrian activities so that mitigation measures may be considered, where required.

The study involves simulation of wind speeds for selected wind directions in a three-dimensional (3D) computer model using the computational fluid dynamics (CFD) technique, combined with meteorological data integration, to assess pedestrian wind comfort and safety within and surrounding the subject site according to City of Ottawa wind comfort and safety criteria. The results and recommendations derived from these considerations are detailed in the main body of the report (Section 5), illustrated in Figures 3A-9, and summarized as follows:

1) Most grade-level areas within and surrounding the subject site are predicted to experience conditions that are considered acceptable for the intended pedestrian uses throughout the year. Conditions over most surrounding sidewalks, the Westboro LRT Station, nearby pathways, nearby transit stations, Lion's Park, the POPS, parkland dedication, and most building access points are considered acceptable.

    a. Windier conditions are predicted in the urban canyons along Tweedsmuir, Athlone, and McRae Avenue, owing to the existing surroundings comprising a mostly low-scale massing context, particularly the northwest compass quadrant, in combination with the high-speed direct winds that come from the Ottawa River to the northwest.

b. Salient winds are predicted to downwash over the northern and eastern façades of Building A1, the western and northern façades of Building C, the eastern façade of Building B, and accelerate around the northeast corners of Buildings A1 and C, while winds are predicted to channel between Buildings A1 and C along Tweedsmuir Avenue, introducing regions of conditions considered occasionally uncomfortable for walking in these areas.

c. Recommendations regarding mitigation are provided in Section 5.1 of the present study, and an appropriate mitigation strategy is recommended to be developed in collaboration with the building and landscape architects as the design of the proposed development progresses.

d. It is recommended that the lobby entrance serving Building A1 be recessed by at least 1.5 m into the building façade.

2) During the typical use period, wind comfort conditions over the amenity terraces serving the proposed development are predicted to be suitable for a mix of mostly sitting and standing during the typical use period (May to October, inclusive), with isolated windier conditions predicted within the terraces at Levels 7 and 41 serving Building A1. Notably, 1.8-m tall perimeter wind screens were included in the present modelling for the Level 41 and Penthouse Level terraces serving Buildings A1, B, and C.

a. It is recommended to implement perimeter wind screens at least 1.8 m in height along the perimeters of all amenity terraces serving the proposed development. Canopies extending from select building façades may also be considered, particularly the north elevations of Building A1. Programming-dependent inboard mitigation could take the form of a combination of wind screens, raised plantings, and other common landscape elements.

b. The extent of mitigation is dependent on the programming of the terraces, and an appropriate mitigation strategy may be developed as the design of the proposed development progresses to the future Site Plan Control application stages.

3) The foregoing statements and conclusions apply to common weather systems, during which one area within the vicinity of the subject site may experience wind conditions that approach the wind safety threshold, as defined in Section 4.4. An isolated area within the Level 7 amenity terrace serving Building A1 at the northeast corner of the tower may exceed the wind safety criterion on an annual basis. It is recommended to implement a wraparound canopy along the north elevation of the tower above the Level 7 terrace that wraps around the northwest and northeast corners of the tower, in combination with the above-noted targeted mitigation elements.

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Appendix A – Simulation of the Atmospheric Boundary Layer

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Park River Properties on behalf of WV Holdings Inc. to undertake a pedestrian level wind (PLW) study to satisfy Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBLA) application submission requirements for the proposed multi-building development located at 1994 Scott Street in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). Our mandate within the current study is to investigate pedestrian wind conditions within and surrounding the subject site, and to identify areas where wind conditions may interfere with certain pedestrian activities so that mitigation measures may be considered, where required.

Our work is based on industry standard computer simulations using the computational fluid dynamics (CFD) technique and data analysis procedures, City of Ottawa wind comfort and safety criteria, architectural drawings prepared by Roderick Lahey Architect Inc. in July 2025, surrounding street layouts and existing and approved future building massing information obtained from the City of Ottawa, as well as recent satellite imagery.

2. TERMS OF REFERENCE

The subject site is located at 1994 Scott Street in Ottawa, situated to the southwest of the intersection of Scott Street and Tweedsmuir Avenue. The proposed development comprises four buildings: Building A1 (42 storeys), Building A2 (4 storeys), Building B (31 storeys), and Building C (31 storeys). Building A1 is located at the noted intersection, Building A2 is to the south of Building A1, and Buildings C and B are situated to the west and east of Building A2, respectively. A privately-owned publicly accessible space (POPS) is provided to the north of Building A1 and a parkland dedication is to the south of Building C. Buildings A1, B, and C are each topped with a mechanical penthouse (MPH) and are served by underground parking. Access to these underground levels is provided by parking ramps at the southeast corner of Building A1 and at the northwest corner of Building C from Tweedsmuir Avenue, and at the northeast corner of Building B from Athlone Avenue.

Above the underground parking levels, the ground floor of Building A1 comprises a residential lobby with a main entrance and shared building support spaces to the east, bike storage and a garbage room to the west, and commercial spaces to the north and at the southeast corner. Levels 2-6 and 8-10 are reserved for residential use, Level 7 is reserved for indoor amenities, and Level 11 includes an indoor amenity to the south and residential units to the north. The building extends from the east and south elevations at Level 2 and from the north elevation at Level 4. Setbacks from the north, east, and west elevations at Level 7 and from the south elevation at Level 11 accommodate common amenity terraces. The building extends from the north elevation at Level 12 and Levels 12-40 rise with a trapezoidal planform, and are reserved for residential occupancy. A common amenity terrace is provided within a northern setback at Level 41, which also includes indoor amenities to the north and mechanical space to the south.

The ground floor of Building A2 comprises an 'L'-shaped planform, with its short axis-oriented along Tweedsmuir Avenue, and includes a central lobby with a main entrance to the south and residential units throughout the remainder of the level. Levels 2-4 rise with a typical planform, which are reserved for residential use. A common amenity terrace is provided to the north at the rooftop level.

The ground floor of Building B includes commercial spaces at the southeast corner and to the west, and shared building support spaces throughout the remainder of the level. Levels 2-4 and 6-10 are reserved for residential use, while Level 5 includes an indoor amenity to the south and residential units to the north. The building extends from the east, south, and west elevations at Level 2. A setback from the south elevation at Level 5 accommodates a common amenity terrace and private terraces are provided within setbacks from the west and south elevations at Levels 5 and 10, respectively. Levels 11-29 rise with a nominally rectangular planform, and are reserved for residential occupancy. A common amenity terrace is provided to the south at the Penthouse Level, which also includes indoor amenities to the south and mechanical space to the north.

The ground floor of Building C comprises a residential lobby with a main entrance to the west, bike storage to the east, an indoor amenity to the south, and shared building support spaces throughout the remainder of the level. Levels 2-4 and 6-10 are reserved for residential use, while Level 5 includes indoor amenities to the south and residential units to the north. The building extends from the east, south, and west elevations at Level 2 and from all elevations at Level 6 to overhang the podium below. Setbacks are located from all elevations at Level 5 and Level 10; a common amenity terrace is accommodated atop the podium at Level 5. Levels 11-29 rise with a rectangular planform, and are reserved for residential occupancy. A common amenity terrace is located to the south at the Penthouse Level, which also includes indoor amenities to the south and mechanical space to the north.

The near-field surroundings (defined as an area within 200 metres (m) of the subject site) comprise low- and mid-rise massing in all directions, with high-rise buildings to the northeast, and approved high-rise developments at 2026 and 2050 Scott Street to the immediate west. Notably, the Westboro LRT station is under construction across Scott Street to the north. The far-field surroundings (defined as an area beyond the near-field but within a 2-kilometre (km) radius of the subject site) are characterized by low-rise massing from the northwest clockwise to the southwest, with isolated mid-and high-rise buildings along Richmond Road, at Tunney's Pasture, and along Carling Avenue, and mostly low-rise buildings followed by the Ottawa River in the remaining directions. Westboro Beach is located approximately 650 m to the west-northwest.

Site plans for the proposed and existing massing scenarios are illustrated in Figures 1A and 1B, while Figures 2A-2H illustrate the computational models used to conduct the study. The existing massing scenario includes the existing massing and any developments approved by the City of Ottawa.

3. OBJECTIVES

The principal objectives of this study are to (i) determine pedestrian level wind conditions at key areas within and surrounding the development site; (ii) identify areas where wind conditions may interfere with the intended uses of outdoor spaces; and (iii) recommend suitable mitigation measures, where required.

4. METHODOLOGY

The approach followed to quantify pedestrian wind conditions over the site is based on CFD simulations of wind speeds across the subject site within a virtual environment, meteorological analysis of the Ottawa area wind climate, and synthesis of computational data with City of Ottawa wind comfort and safety criteria[1]. The following sections describe the analysis procedures, including a discussion of the noted pedestrian wind criteria.

[1] City of Ottawa Terms of References: Wind Analysis
https://documents.ottawa.ca/sites/documents/files/wind_analysis_tor_en.pdf

4.1 Computer-Based Context Modelling

A computer based PLW study was performed to determine the influence of the wind environment on pedestrian comfort over the proposed development site. Pedestrian comfort predictions, based on the mechanical effects of wind, were determined by combining measured wind speed data from CFD simulations with statistical weather data obtained from Ottawa Macdonald-Cartier International Airport. The general concept and approach to CFD modelling is to represent building and topographic details in the immediate vicinity of the subject site on the surrounding model, and to create suitable atmospheric wind profiles at the model boundary. The wind profiles are designed to have similar mean and turbulent wind properties consistent with actual site exposures.

An industry standard practice is to omit trees, vegetation, and other existing and planned landscape elements from the model due to the difficulty of providing accurate seasonal representation of vegetation. The omission of trees and other landscaping elements produces slightly stronger wind speeds.

4.2 Wind Speed Measurements

The PLW analysis was performed by simulating wind flows and gathering velocity data over a CFD model of the site for 16 wind directions. The CFD simulation model was centered on the proposed development, complete with surrounding massing within a radius of 515 m. The process was performed for two context massing scenarios, as noted in Section 2.

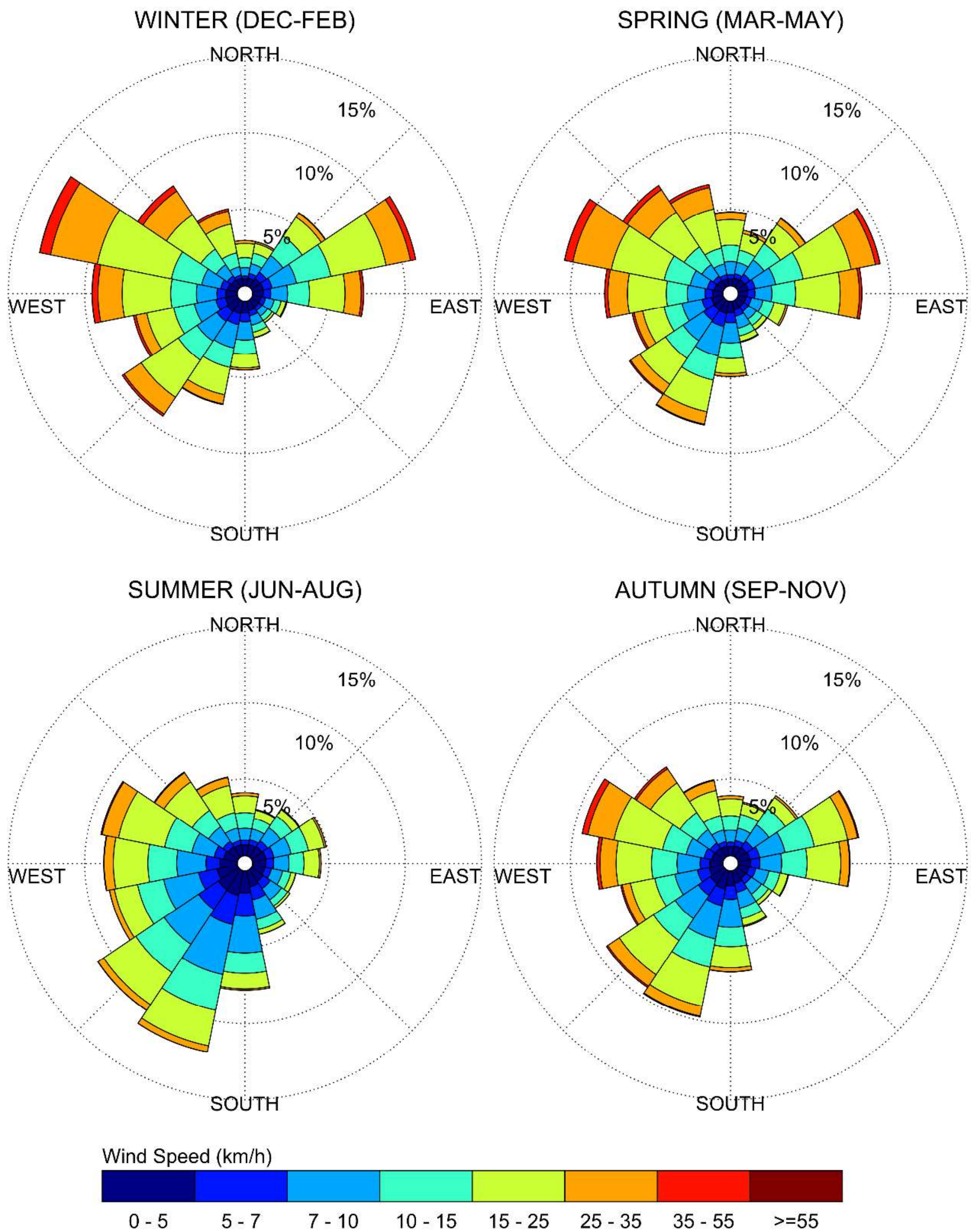
Mean and peak wind speed data obtained over the subject site for each wind direction were interpolated to 36 wind directions at 10° intervals, representing the full compass azimuth. Measured wind speeds approximately 1.5 m above local grade and the common amenity terraces serving the proposed development were referenced to the wind speed at gradient height to generate mean and peak velocity ratios, which were used to calculate full-scale values. Gradient height represents the theoretical depth of the boundary layer of the earth's atmosphere, above which the mean wind speed remains constant. Further details of the wind flow simulation technique are presented in Appendix A.

4.3 Historical Wind Speed and Direction Data

A statistical model for winds in Ottawa was developed from approximately 40 years of hourly meteorological wind data recorded at Ottawa Macdonald-Cartier International Airport and obtained from Environment and Climate Change Canada. Wind speed and direction data were analyzed during the appropriate hours of pedestrian usage (that is, between 06:00 and 23:00) and divided into four distinct seasons, as stipulated in the wind criteria. Specifically, the spring season is defined as March through May, the summer season is defined as June through August, the autumn season is defined as September through November, and the winter season is defined as December through February, inclusive.

The statistical model of the Ottawa area wind climate, which indicates the directional character of local winds on a seasonal basis, is illustrated on the following page. The plots illustrate seasonal distribution of measured wind speeds and directions in kilometers per hour (km/h). Probabilities of occurrence of different wind speeds are represented as stacked polar bars in sixteen azimuth divisions. The radial direction represents the percentage of time for various wind speed ranges per wind direction during the measurement period. The prominent wind speeds and directions can be identified by the longer length of the bars. For Ottawa, the most common winds occur for westerly wind directions, followed by those from the east, while the most common wind speeds are below 36 km/h. The directional prominence and relative magnitude of wind speed changes somewhat from season to season.

SEASONAL DISTRIBUTION OF WIND
OTTAWA MACDONALD-CARTIER INTERNATIONAL AIRPORT



Notes:

1. Radial distances indicate percentage of time of wind events.
2. Wind speeds are mean hourly in km/h, measured at 10 m above the ground.

4.4 Pedestrian Wind Comfort and Safety Criteria – City of Ottawa

Pedestrian wind comfort and safety criteria are based on the mechanical effects of wind without consideration of other meteorological conditions (that is, temperature and relative humidity). The comfort criteria assume that pedestrians are appropriately dressed for a specified outdoor activity during any given season. Five pedestrian comfort classes based on 20% non-exceedance mean wind speed ranges are used to assess pedestrian comfort: (1) Sitting; (2) Standing; (3) Strolling; (4) Walking; and (5) Uncomfortable. The gust speeds, and equivalent mean speeds, are selected based on the Beaufort scale, which describes the effects of forces produced by varying wind speed levels on objects. Wind conditions suitable for sitting are represented by the colour blue, standing by green, strolling by yellow, and walking by orange; uncomfortable conditions are represented by the colour magenta. Specifically, the comfort classes, associated wind speed ranges, and limiting criteria are summarized as follows:

PEDESTRIAN WIND COMFORT CLASS DEFINITIONS

Wind Comfort Class	Mean Speed (km/h)	Description
SITTING	≤ 10	Mean wind speeds no greater than 10 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 16 km/h.
STANDING	≤ 14	Mean wind speeds no greater than 14 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 22 km/h.
STROLLING	≤ 17	Mean wind speeds no greater than 17 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 27 km/h.
WALKING	≤ 20	Mean wind speeds no greater than 20 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 32 km/h.
UNCOMFORTABLE	> 20	Uncomfortable conditions are characterized by predicted values that fall below the 80% target for walking. Brisk walking and exercise, such as jogging, would be acceptable for moderate excesses of this criterion.

Regarding wind safety, the pedestrian safety wind speed criterion is based on the approximate threshold that would cause a vulnerable member of the population to fall. A 0.1% exceedance gust wind speed of 90 km/h is classified as dangerous. From calculations of stability, it can be shown that gust wind speeds of 90 km/h would be the approximate threshold wind speed that would cause an average elderly person in good health to fall. Notably, pedestrians tend to be more sensitive to wind gusts than to steady winds for lower wind speed ranges. For strong winds approaching dangerous levels, this effect is less important because the mean wind can also create problems for pedestrians.

Experience and research on people's perception of mechanical wind effects has shown that if the wind speed levels are exceeded for more than 20% of the time, the activity level would be judged to be uncomfortable by most people. For instance, if a mean wind speed of 10 km/h (equivalent gust wind speed of approximately 16 km/h) were exceeded for more than 20% of the time most pedestrians would judge that location to be too windy for sitting. Similarly, if mean wind speed of 20 km/h (equivalent gust wind speed of approximately 32 km/h) at a location were exceeded for more than 20% of the time, walking or less vigorous activities would be considered uncomfortable. As these criteria are based on subjective reactions of a population to wind forces, their application is partly based on experience and judgment.

Once the pedestrian wind speed predictions have been established throughout the subject site, the assessment of pedestrian comfort involves determining the suitability of the predicted wind conditions for discrete regions within and surrounding the subject site. This step involves comparing the predicted comfort classes to the target comfort classes, which are dictated by the location type for each region (that is, a sidewalk, building entrance, amenity space, or other). An overview of common pedestrian location types and their typical windiest target comfort classes are summarized on the following page. Depending on the programming of a space, the desired comfort class may differ from this table.

TARGET PEDESTRIAN WIND COMFORT CLASSES FOR VARIOUS LOCATION TYPES

Location Types	Target Comfort Classes
Primary Building Entrance	Standing
Secondary Building Access Point	Walking
Public Sidewalk / Bicycle Path	Walking
Outdoor Amenity Space	Sitting / Standing
Café / Patio / Bench / Garden	Sitting / Standing
Transit Stop (Without Shelter)	Standing
Transit Stop (With Shelter)	Walking
Public Park / Plaza	Sitting / Standing
Garage / Service Entrance	Walking
Parking Lot	Walking
Vehicular Drop-Off Zone	Walking

5. RESULTS AND DISCUSSION

The following discussion of the predicted pedestrian wind conditions for the subject site is accompanied by Figures 3A-6B, which illustrate wind conditions at grade level for the proposed and existing massing scenarios and by Figures 8A-D, which illustrate wind conditions over the common amenity terraces serving the proposed development at Levels 7, 11, and 41 at Building A1, at the roof of Building A2, and at Level 5 and the Penthouse Level for Buildings B and C. Conditions are presented as continuous contours of wind comfort throughout the subject site and correspond to the comfort classes presented in Section 4.4.

Wind comfort conditions are also reported for the typical use period, which is defined as May to October, inclusive. Figures 7 and 9 illustrate wind comfort conditions during this period at grade level and within the noted amenity terraces serving the proposed development, respectively, consistent with the comfort classes illustrated in Section 4.4.

The details of these conditions are summarized in the following pages for each area of interest.

5.1 Wind Comfort Conditions – Grade Level

While windier conditions are predicted at some areas at grade, most pedestrian areas within the vicinity of the subject site are nevertheless predicted to be suitable for the intended pedestrian uses throughout the year. The existing surroundings comprise a mostly low-scale massing context, and the vicinity of the subject site and its environs comprise mostly low-rise massing, particularly the northwest compass quadrant. Beyond the near-field, the area is exposed to winds that come off the Ottawa River. Prior to the introduction of the proposed development, prevailing winds during the spring and winter from the northwest quadrant are predicted to accelerate around the exposed northeast corners of the high-rise developments along Scott Street and accelerate within the modest urban canyons along Athlone Avenue, Tweedsmuir Avenue, and McRae Avenue. Regions of conditions that may be considered uncomfortable for walking are located along McRae Avenue, Athlone Avenue, and between the towers at 2026 Scott Street and 2050 Scott Street owing to channelling effects between the high-rise massing.

These isolated windier conditions remain following the introduction of the proposed development, with the uncomfortable wind conditions shifted farther southeast along McRae Avenue and modestly ameliorated in the vicinity of the towers at 2026 Scott Street. The wind conditions are expected following the introduction of the proposed development in these contextual surroundings.

Following the introduction of the proposed development, prevailing winds are predicted to downwash over the northern and eastern façades of Building A1, the western and northern façades of Building C, the eastern façade of Building B, and accelerate around the northeast corners of Buildings A1 and C. Additional wind channelling is predicted along Tweedsmuir Avenue between Buildings A1 and C. Wind conditions to the east of Building A1 over Tweedsmuir Avenue are predicted to be suitable for walking for approximately 72% of the time during the spring and 73% during the winter, representing exceedances of 8% and 7% of the walking threshold, respectively. Wind conditions at the northeast corner of Building C are predicted to be suitable for walking for approximately 75% of the time during both the spring and the winter, representing a 5% exceedance of the walking threshold.

An appropriate mitigation strategy to reduce the noted uncomfortable wind conditions introduced following the introduction of the proposed development is recommended to be developed in collaboration with the building and landscape architects. Mitigation elements may include the introduction of additional canopies, as well as mitigation at grade level. The introduction of canopies wrapping around the northwest and northeast corners of Building C, may be considered to assist in deflecting and diffusing the downwashing winds. If feasible in the design, it is also recommended to introduce massing changes such as the chamfering or streamlining of the corners of the podia and towers of Buildings A1 and C, and the inclusion of deeper setbacks along the eastern façades of Building A1 and the western and northern façades of Building C. Wind barriers selectively placed at the northeast corner of Building A1 near the eastern extent of the POPS, as well as along the east façade of Building C and at the northeast corner of Building C, may be beneficial to reduce corner acceleration at grade.

Sidewalks along Scott Street: Under the existing massing, wind comfort conditions along Scott Street are predicted to be suitable for mostly walking, or better, throughout the year, with the exception of the above-noted isolated windier conditions near the intersections of Scott Street/Athlone Avenue and Scott Street/McRae Avenue. Similar conditions are predicted following the introduction of the proposed development, with modest improvements in wind conditions predicted near the intersection of Scott Street and McRae Avenue.

Sidewalks along Tweedsmuir, Athlone, and McRae Avenue: Under the existing massing, wind comfort conditions along Tweedsmuir Avenue are predicted to be suitable for walking, or better, throughout the year. Conditions under the existing massing along Athlone Avenue and McRae Avenue are predicted to be suitable for walking, or better, with areas considered uncomfortable for walking located over isolated portions of the sidewalks along these streets during the spring and winter seasons.

Following the introduction of the proposed development, similar wind conditions are predicted along Athlone Avenue and McRae Avenue, while windier conditions are predicted along Tweedsmuir Avenue as noted above.

Sidewalks along Ashton Avenue: Prior to and following the introduction of the proposed developments, wind comfort conditions along Ashton Avenue are predicted to be suitable for standing, or better, throughout the year. The noted conditions are considered acceptable.

Westboro LRT Station and Pathways along Scott Street: Prior to and following the introduction of the proposed development, wind conditions over the Westboro LRT Station and over the multi-use pathway (MUP) along the north of Scott Street are predicted to be suitable for standing, or better, throughout the year. The noted conditions are considered acceptable.

Nearby Transit Stops: Prior to and following the introduction of the proposed development, wind comfort conditions in the vicinity of the nearby transit stops located to the west of the subject site along Scott Street are predicted to be suitable for standing, or better throughout the year. The noted conditions are considered acceptable.

Lion's Park: Prior to and following the introduction of the proposed development, wind conditions over the existing Lion's Park are predicted to be suitable for mostly sitting during the typical use period. The noted conditions are considered acceptable.

POPS North of Building A1 and the Parkland Dedication: During the typical use period, wind conditions POPS to the north of Building A1 are predicted to be suitable for mostly sitting, with an isolated area suitable for standing near the northeast corner of the space. Wind conditions over the parkland dedication to the south of Building C are predicted to be mostly suitable for sitting during the same period. The noted conditions may be considered acceptable.

Building Access Points: Conditions in the vicinity of the primary access points serving Buildings A2, B, and C are predicted to be suitable for standing, or better, throughout the year, which is considered acceptable.

Conditions of the vicinity of the lobby entrance to the east of Building A1 are predicted to be suitable for standing throughout most of the year, becoming suitable for strolling during winter. It is recommended that the lobby entrance serving Building A1 be recessed by at least 1.5 m into the building façade.

5.2 Wind Comfort Conditions – Common Amenity Terraces

The amenity terraces serving Building A1 at Level 41 and at Buildings B and C at the Penthouse Level, were modelled with 1.8-m tall wind screens along their full perimeters.

Wind comfort conditions within the amenity terraces serving the proposed development are predicted to be suitable for a mix of mostly sitting and standing during the typical use period, with areas suitable for sitting within the lower terraces serving Buildings B and C at Level 5, and the rooftop terrace serving Building A2. Isolated windier conditions are predicted within the terraces at Levels 7 and 41.

To improve comfort levels, mitigation inboard of the terrace perimeters and targeted around sensitive areas is recommended, in combination with wind screens rising to at least 1.8 m above the perimeters of all amenity terraces. Canopies extending from select building façades may also be considered, particularly the north elevations of Building A1. Inboard mitigation could take the form of a combination of wind screens, raised plantings, and other common landscape elements. The extent of mitigation is dependent on the programming of the terraces, and an appropriate mitigation strategy may be developed as the design of the proposed development progresses to the future Site Plan Control application stages.

5.3 Wind Safety

Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, one pedestrian area within the immediate vicinity subject site may experience conditions that approach the wind safety threshold, as defined in Section 4.4. Within the Level 7 amenity terrace serving Building A1, an isolated area near the northeast corner of the terrace where winds are predicted to accelerate around the northeast corner of the tower may experience conditions that exceed the wind safety criterion on an annual basis. Mitigation elements as described above for the amenity terraces are expected to be effective in improving wind comfort over the area and eliminating the potential wind safety exceedance. Particularly, it is recommended to implement a wraparound canopy along the north elevation of the tower above the Level 7 terrace that wraps around the northwest and northeast corners of the tower to diffuse downwashing winds to the terrace level.

5.4 Applicability of Results

Pedestrian wind comfort and safety have been quantified for the specific configuration of existing and foreseeable construction around the subject site. Future changes (that is, construction or demolition) of these surroundings may cause changes to the wind effects in two ways, namely: (i) changes beyond the immediate vicinity of the subject site would alter the wind profile approaching the subject site; and (ii) development in proximity to the subject site would cause changes to local flow patterns.

6. CONCLUSIONS AND RECOMMENDATIONS

A complete summary of the predicted wind conditions is provided in Section 5 and illustrated in Figures 3A-9. Based on computer simulations using the CFD technique, meteorological data analysis of the Ottawa wind climate, City of Ottawa wind comfort and safety criteria, and experience with numerous similar developments, the study concludes the following:

1) Most grade-level areas within and surrounding the subject site are predicted to experience conditions that are considered acceptable for the intended pedestrian uses throughout the year. Conditions over most surrounding sidewalks, the Westboro LRT Station, nearby pathways, nearby transit stations, Lion's Park, the POPS, parkland dedication, and most building access points are considered acceptable.

    a. Windier conditions are predicted in the urban canyons along Tweedsmuir, Athlone, and McRae Avenue, owing to the existing surroundings comprising a mostly low-scale massing context, particularly the northwest compass quadrant, in combination with the high-speed direct winds that come from the Ottawa River to the northwest.

    b. Salient winds are predicted to downwash over the northern and eastern façades of Building A1, the western and northern façades of Building C, the eastern façade of Building B, and accelerate around the northeast corners of Buildings A1 and C, while winds are predicted to channel between Buildings A1 and C along Tweedsmuir Avenue, introducing regions of conditions considered occasionally uncomfortable for walking in these areas.

    c. Recommendations regarding mitigation are provided in Section 5.1 of the present study, and an appropriate mitigation strategy is recommended to be developed in collaboration with the building and landscape architects as the design of the proposed development progresses.

    d. It is recommended that the lobby entrance serving Building A1 be recessed by at least 1.5 m into the building façade.

2) During the typical use period, wind comfort conditions over the amenity terraces serving the proposed development are predicted to be suitable for a mix of mostly sitting and standing during the typical use period (May to October, inclusive), with isolated windier conditions predicted within the terraces at Levels 7 and 41 serving Building A1. Notably, 1.8-m tall perimeter wind screens were included in the present modelling for the Level 41 and Penthouse Level terraces serving Buildings A1, B, and C.

    a. It is recommended to implement perimeter wind screens at least 1.8 m in height along the perimeters of all amenity terraces serving the proposed development. Canopies extending from select building façades may also be considered, particularly the north elevations of Building A1. Programming-dependent inboard mitigation could take the form of a combination of wind screens, raised plantings, and other common landscape elements. The extent of mitigation is dependent on the programming of the terraces, and an appropriate mitigation strategy may be developed as the design of the proposed development progresses to the future Site Plan Control application stages.

3) The foregoing statements and conclusions apply to common weather systems, during which one area within the vicinity of the subject site may experience wind conditions that approach the wind safety threshold, as defined in Section 4.4. An isolated area within the Level 7 amenity terrace serving Building A1 at the northeast corner of the tower may exceed the wind safety criterion on an annual basis. It is recommended to implement a wraparound canopy along the north elevation of the tower above the Level 7 terrace that wraps around the northwest and northeast corners of the tower, in combination with the above-noted targeted mitigation elements.

Sincerely,

Gradient Wind Engineering Inc.

Omar Rioseco, B.Eng.
Junior Wind Scientist

David Huitema, M.Eng., P.Eng.
CFD Lead Engineer

GRADIENTWIND
ENGINEERS & SCIENTISTS
127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	1994 SCOTT STREET, OTTAWA PEDESTRIAN LEVEL WIND STUDY
SCALE	1:2000
DRAWING NO.	25-150-PLW-1A
DATE	SEPTEMBER 10, 2025
DRAWN BY	S.K.
DESCRIPTION	FIGURE 1A: PROPOSED SITE PLAN AND SURROUNDING CONTEXT

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PROJECT: 1994 SCOTT STREET, OTTAWA PEDESTRIAN LEVEL WIND STUDY		DESCRIPTION: FIGURE 1B: EXISTING SITE PLAN AND SURROUNDING CONTEXT
SCALE: 1:2000	DRAWING NO. 25-150-PLW-1B	
DATE: SEPTEMBER 10, 2025	DRAWN BY: S.K.	

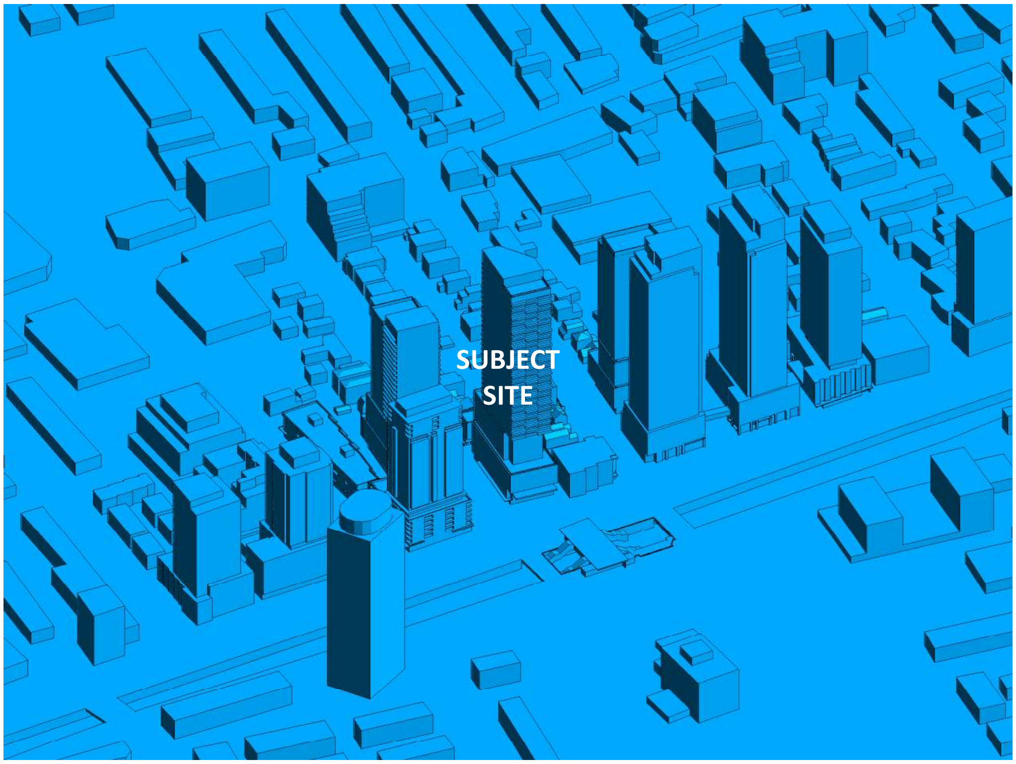


FIGURE 2A: COMPUTATIONAL MODEL, PROPOSED MASSING, NORTH PERSPECTIVE

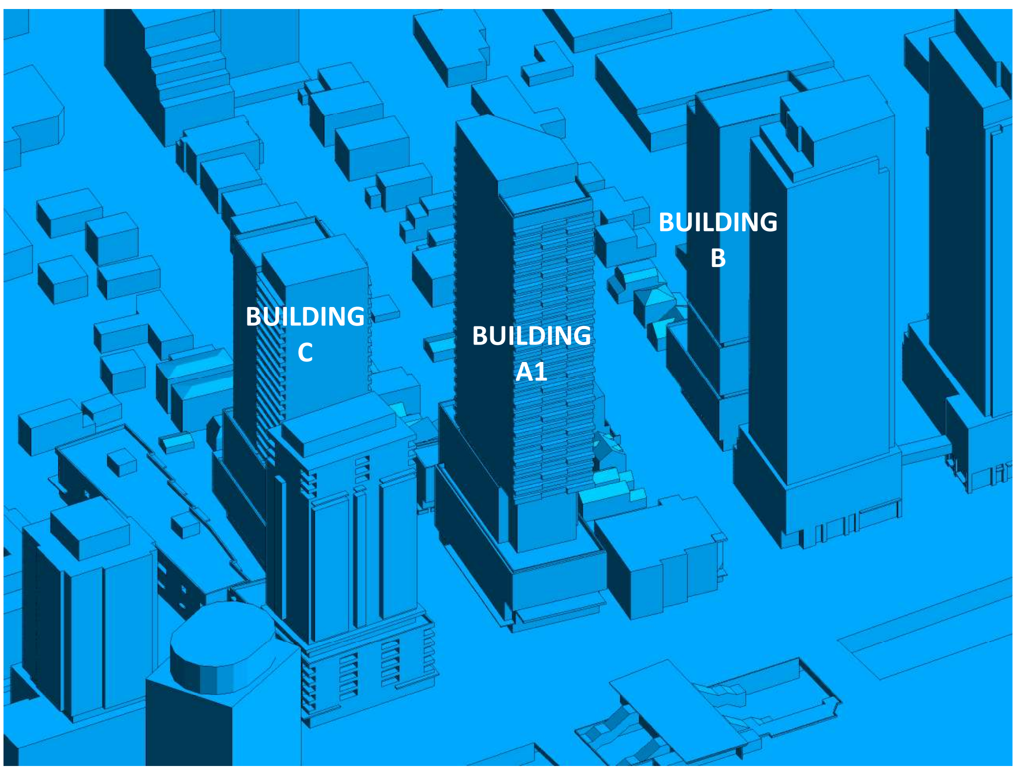


FIGURE 2B: CLOSE UP OF FIGURE 2A

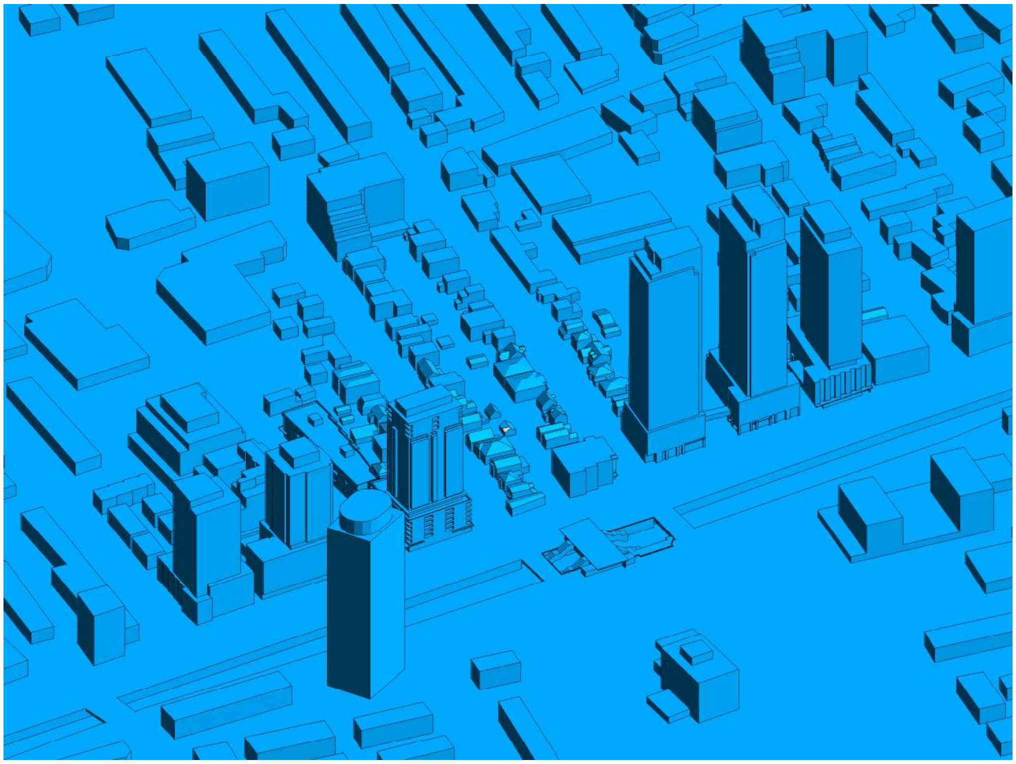


FIGURE 2C: COMPUTATIONAL MODEL, EXISTING MASSING, NORTH PERSPECTIVE

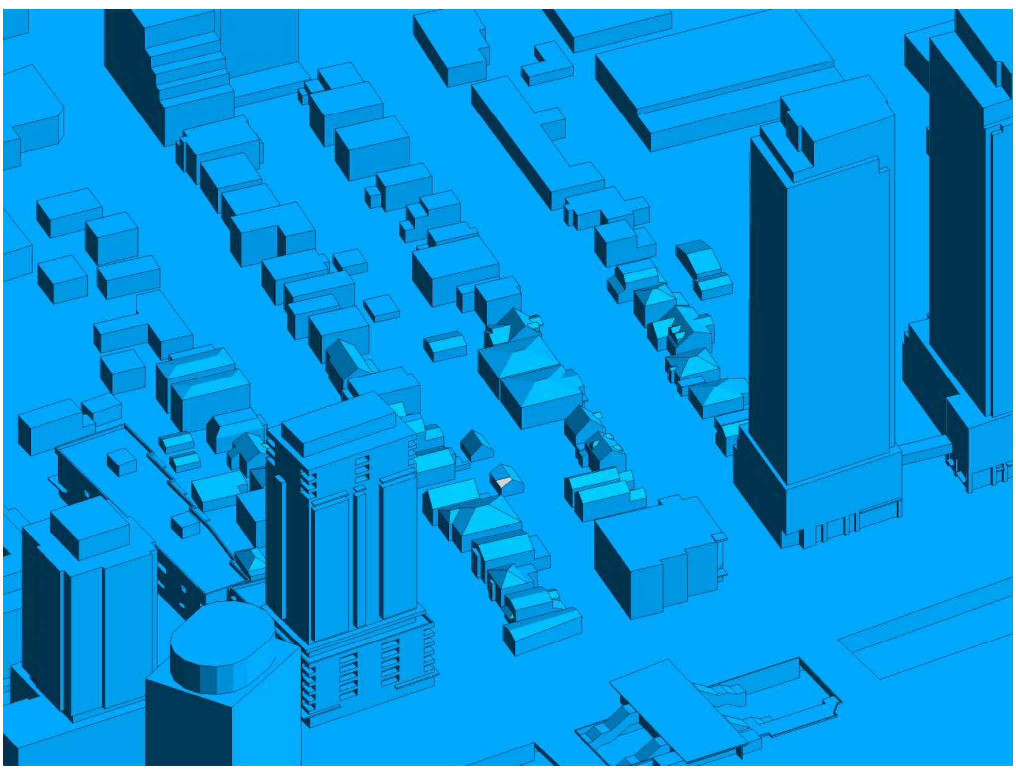


FIGURE 2D: CLOSE UP OF FIGURE 2C

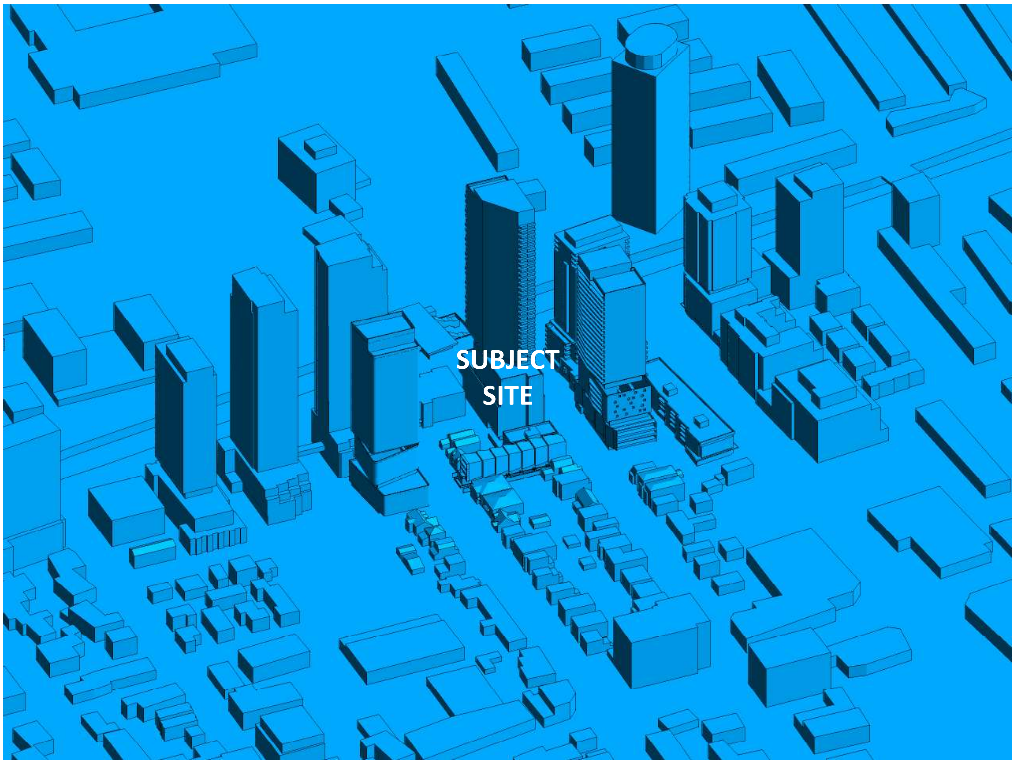


FIGURE 2E: COMPUTATIONAL MODEL, PROPOSED MASSING, SOUTH PERSPECTIVE

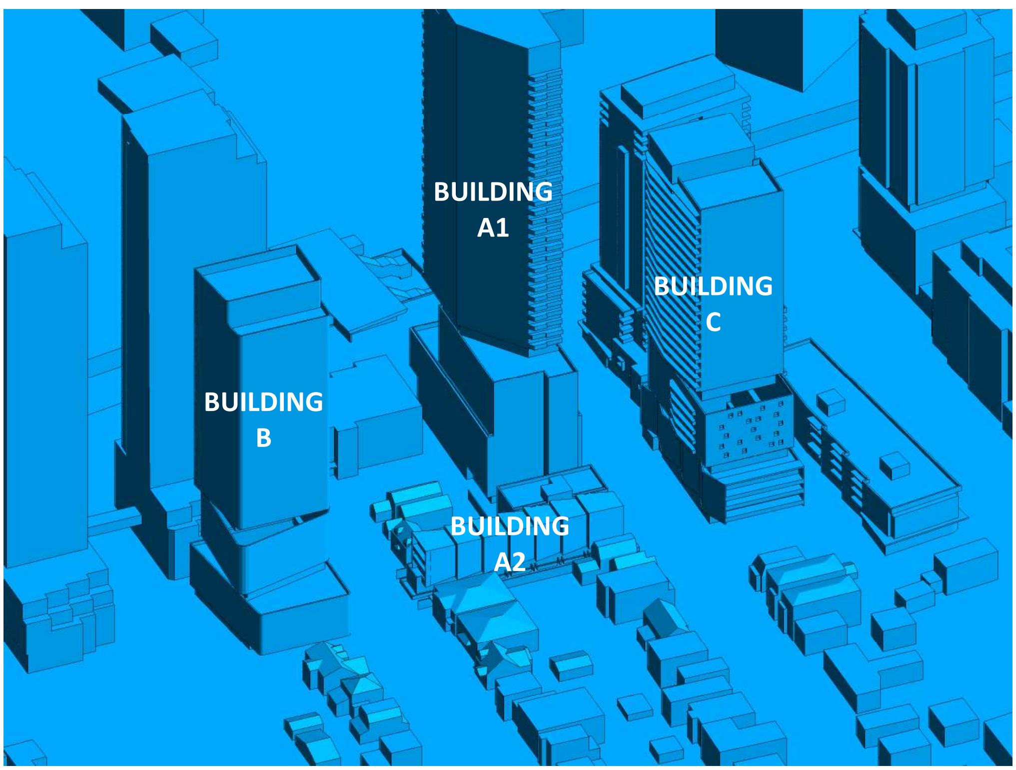


FIGURE 2F: CLOSE UP OF FIGURE 2E

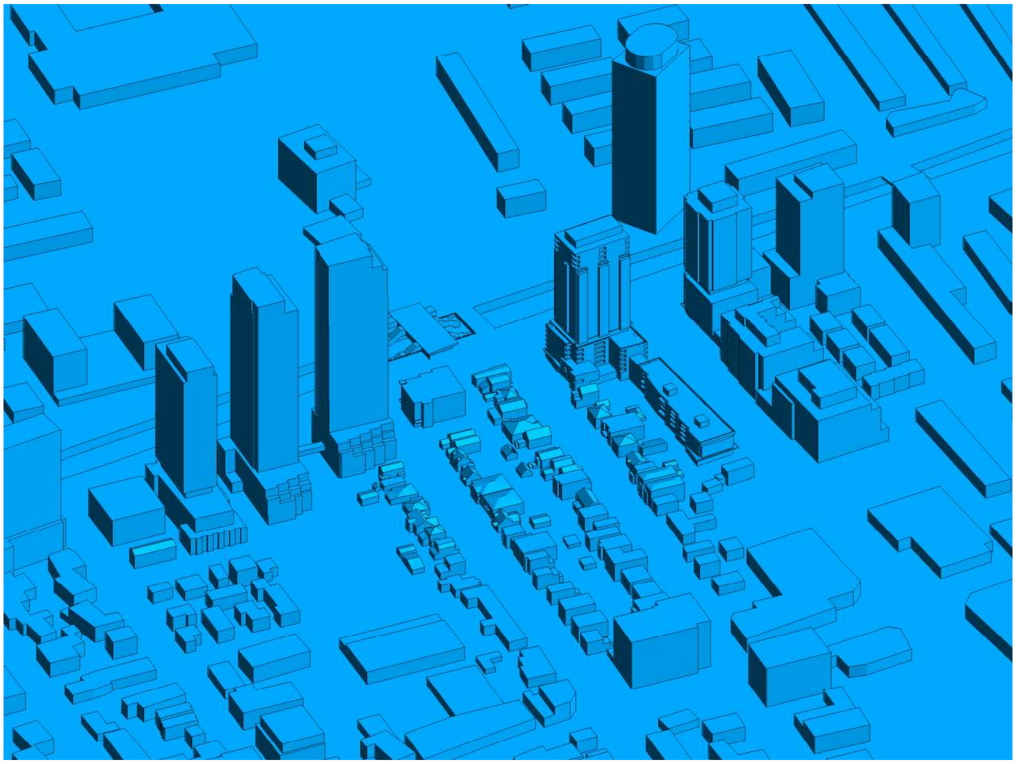


FIGURE 2G: COMPUTATIONAL MODEL, EXISTING MASSING, SOUTH PERSPECTIVE

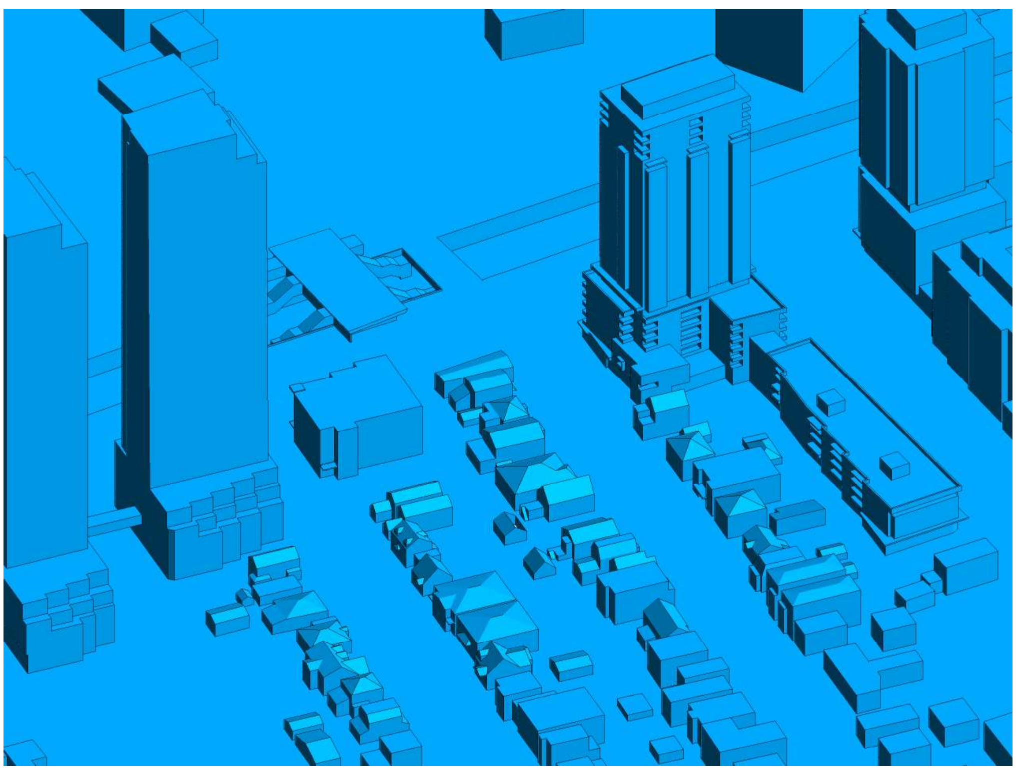


FIGURE 2H: CLOSE UP OF FIGURE 2G

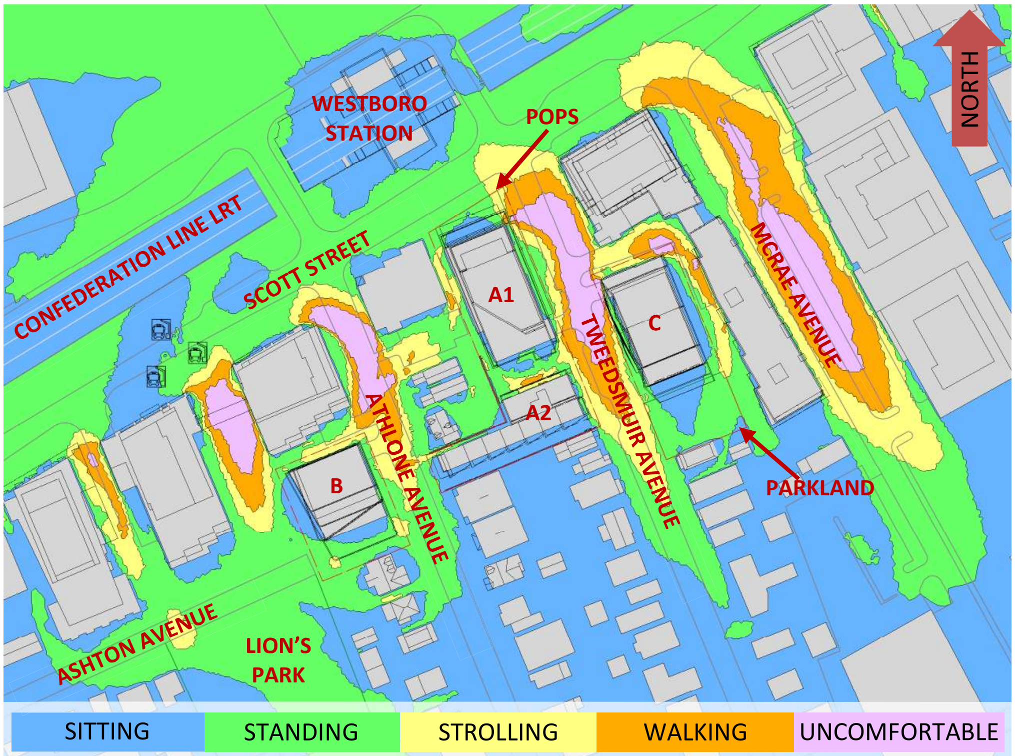


FIGURE 3A: SPRING – WIND COMFORT, GRADE LEVEL – PROPOSED MASSING

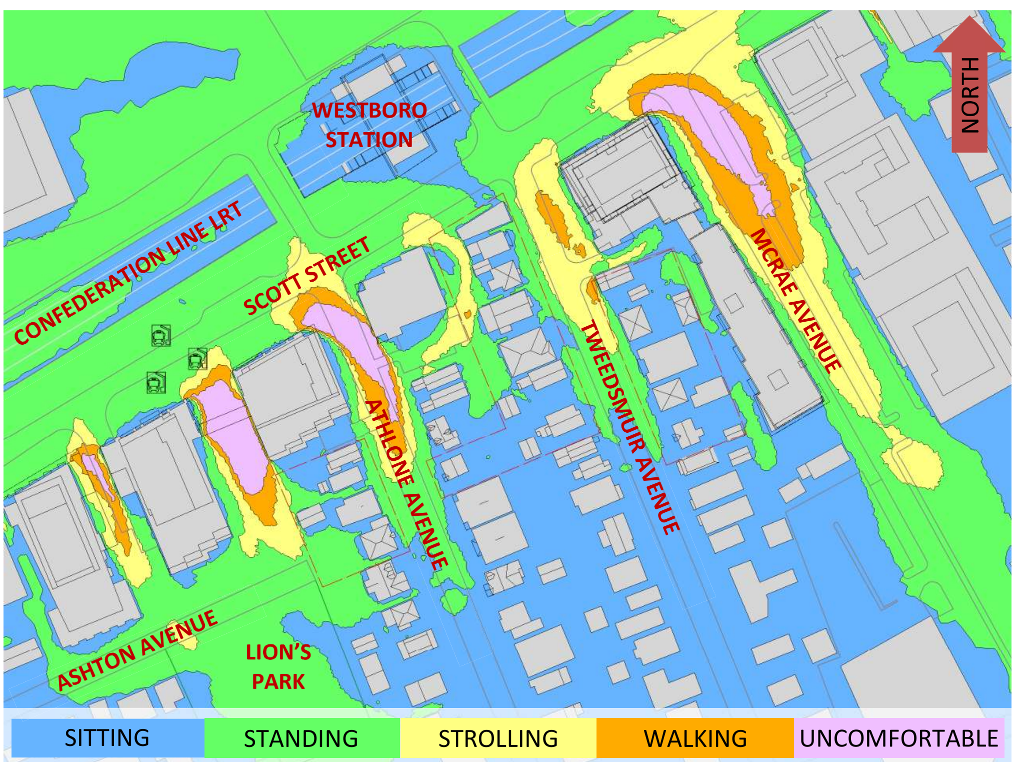


FIGURE 3B: SPRING – WIND COMFORT, GRADE LEVEL– EXISTING MASSING

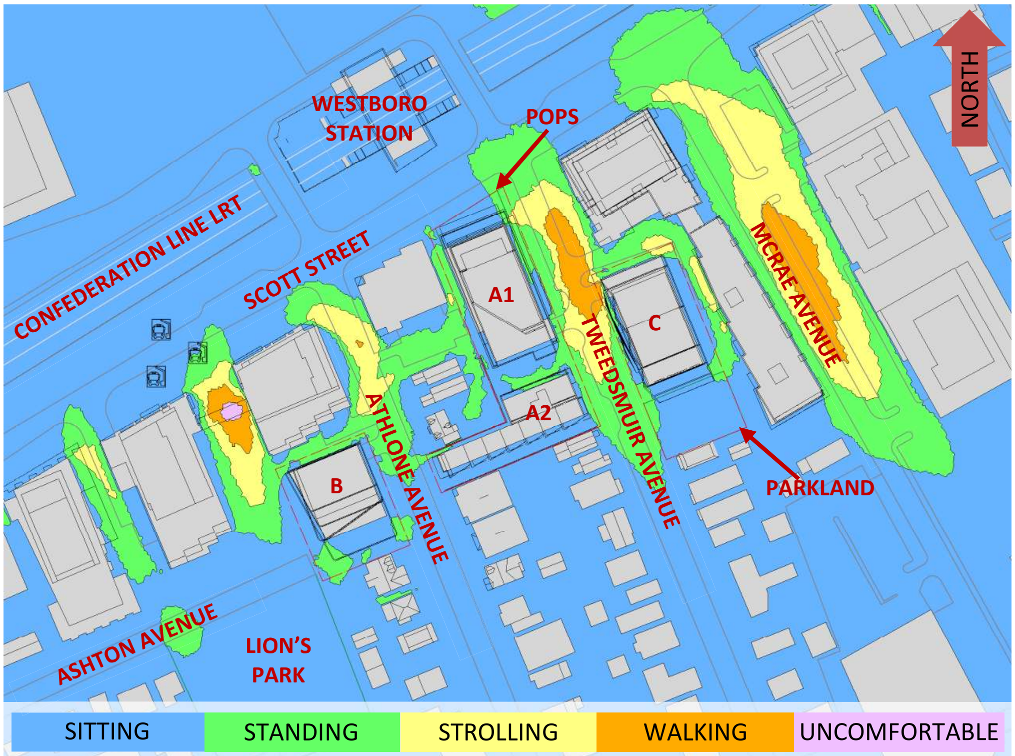


FIGURE 4A: SUMMER – WIND COMFORT, GRADE LEVEL – PROPOSED MASSING

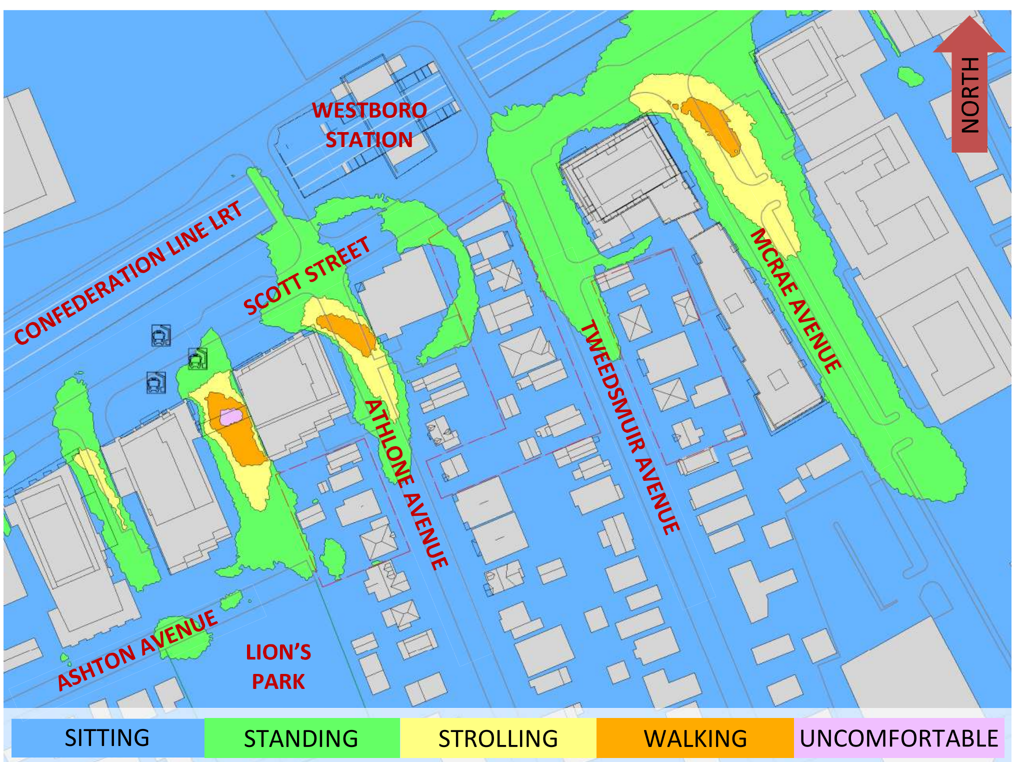


FIGURE 4B: SUMMER – WIND COMFORT, GRADE LEVEL– EXISTING MASSING

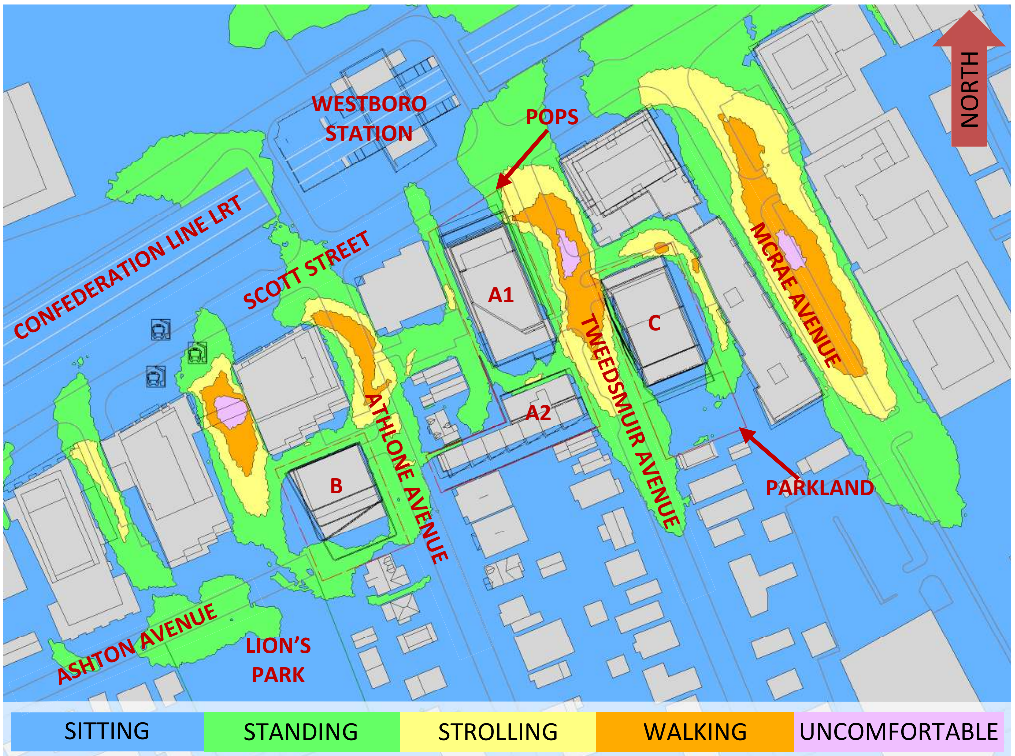


FIGURE 5A: AUTUMN – WIND COMFORT, GRADE LEVEL – PROPOSED MASSING

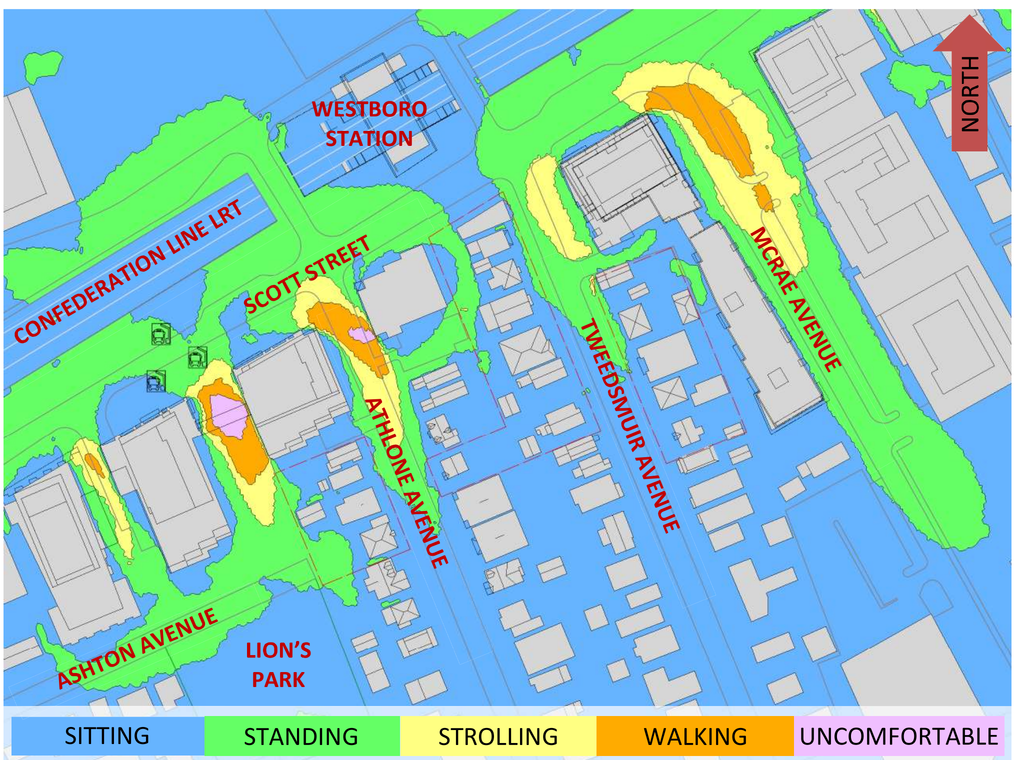


FIGURE 5B: AUTUMN – WIND COMFORT, GRADE LEVEL– EXISTING MASSING

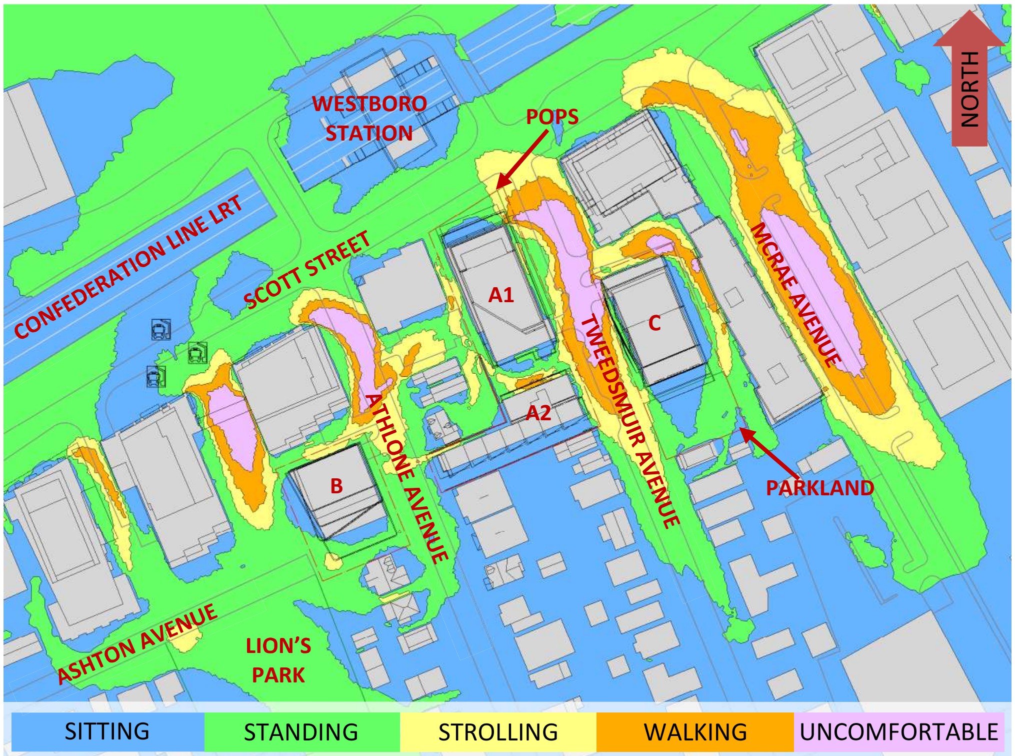


FIGURE 6A: WINTER – WIND COMFORT, GRADE LEVEL – PROPOSED MASSING

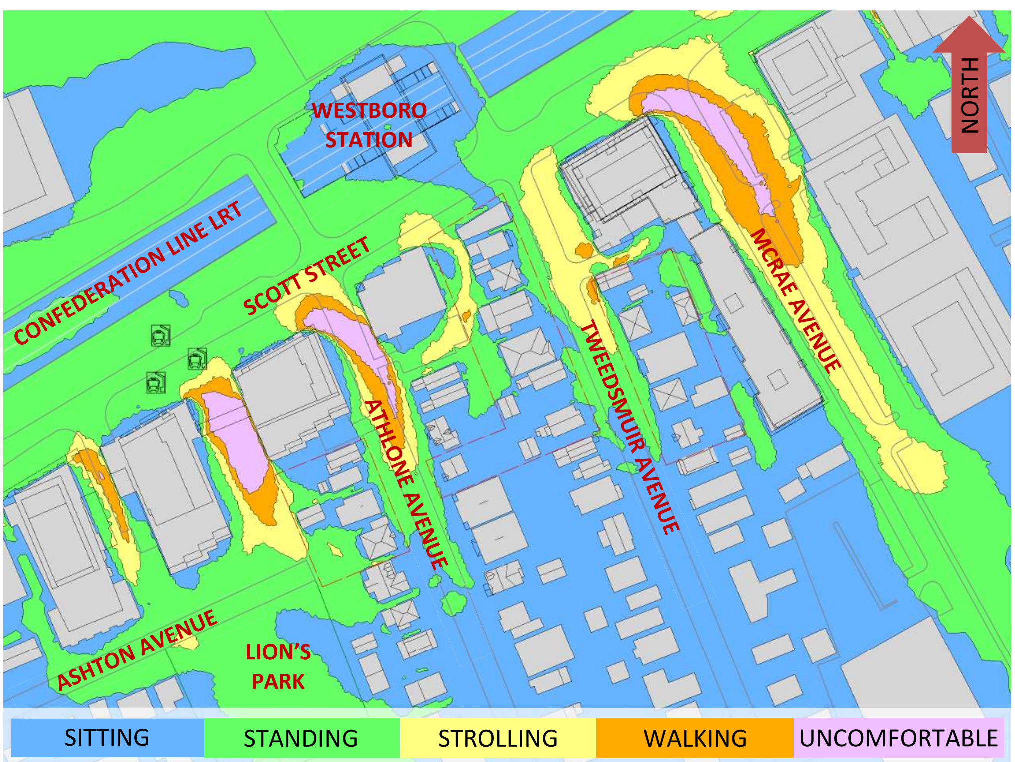


FIGURE 6B: WINTER – WIND COMFORT, GRADE LEVEL– EXISTING MASSING

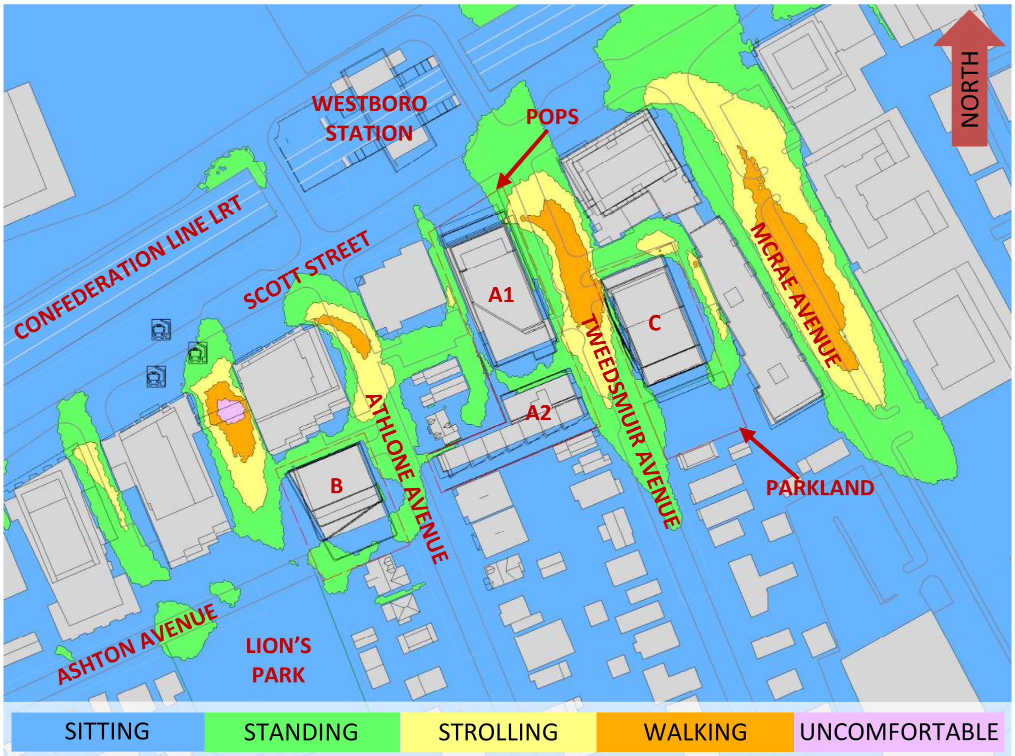


FIGURE 7: TYPICAL USE PERIOD – WIND COMFORT, GRADE LEVEL – PROPOSED MASSING

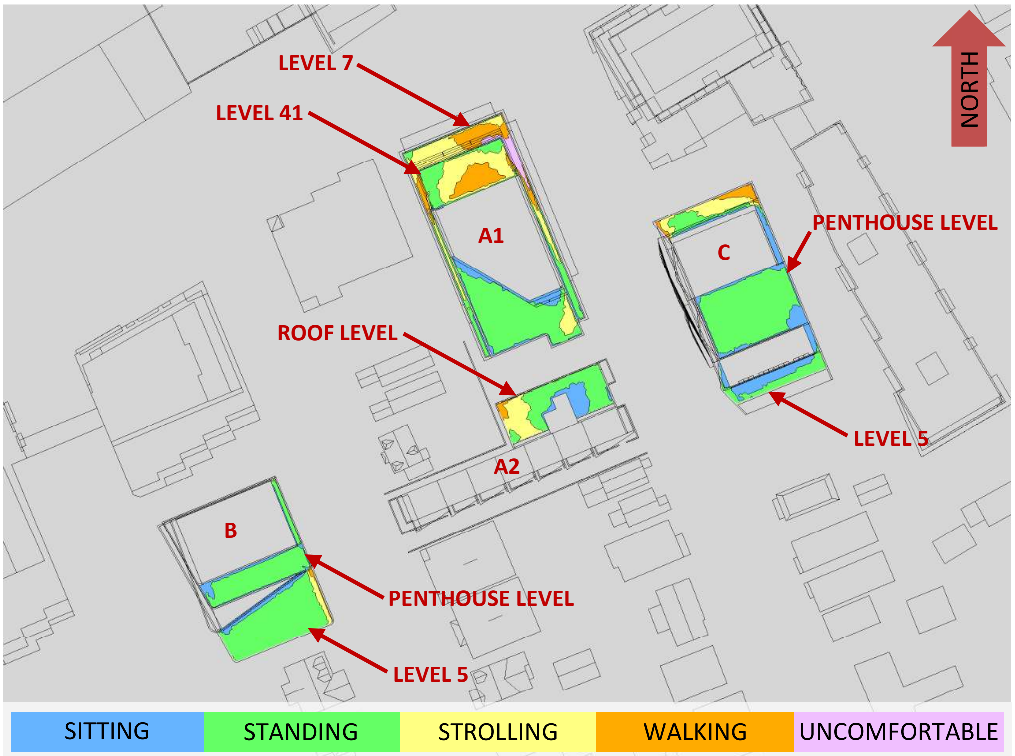


FIGURE 8A: SPRING – WIND COMFORT, COMMON AMENITY TERRACES

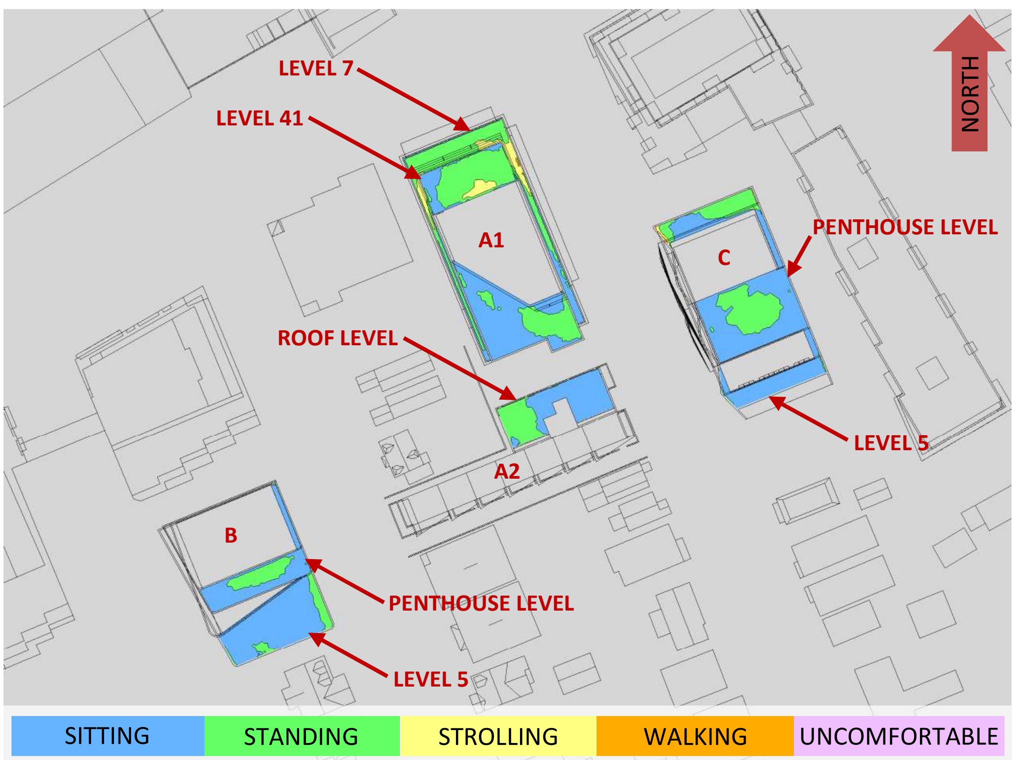


FIGURE 8B: SUMMER – WIND COMFORT, COMMON AMENITY TERRACES

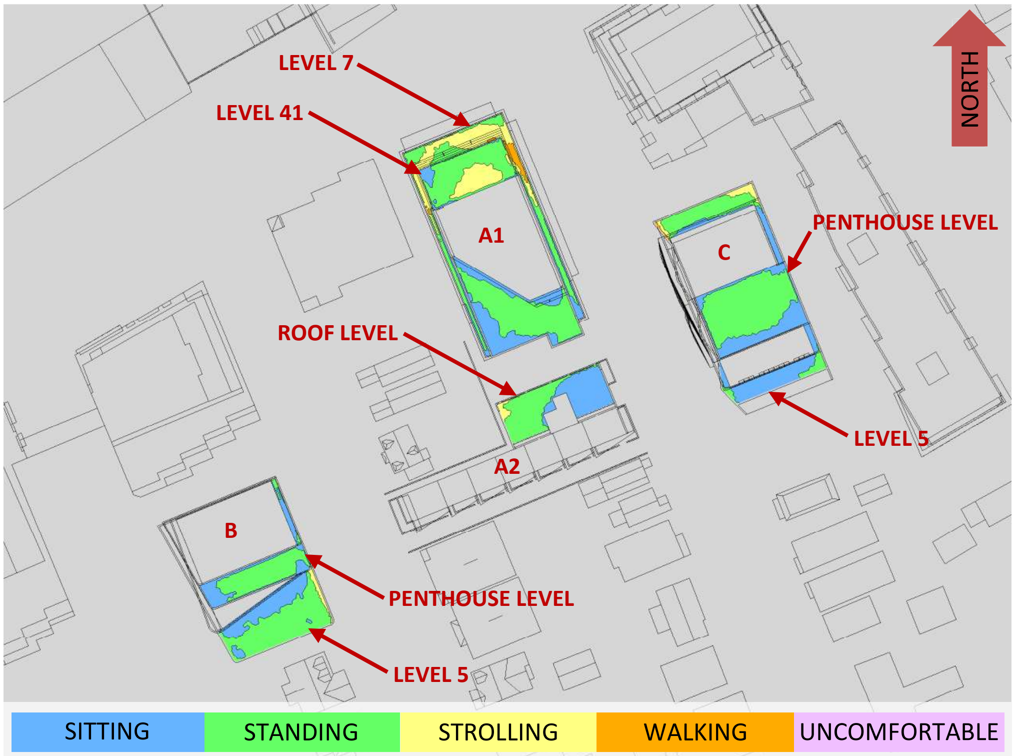


FIGURE 8C: AUTUMN – WIND COMFORT, COMMON AMENITY TERRACES

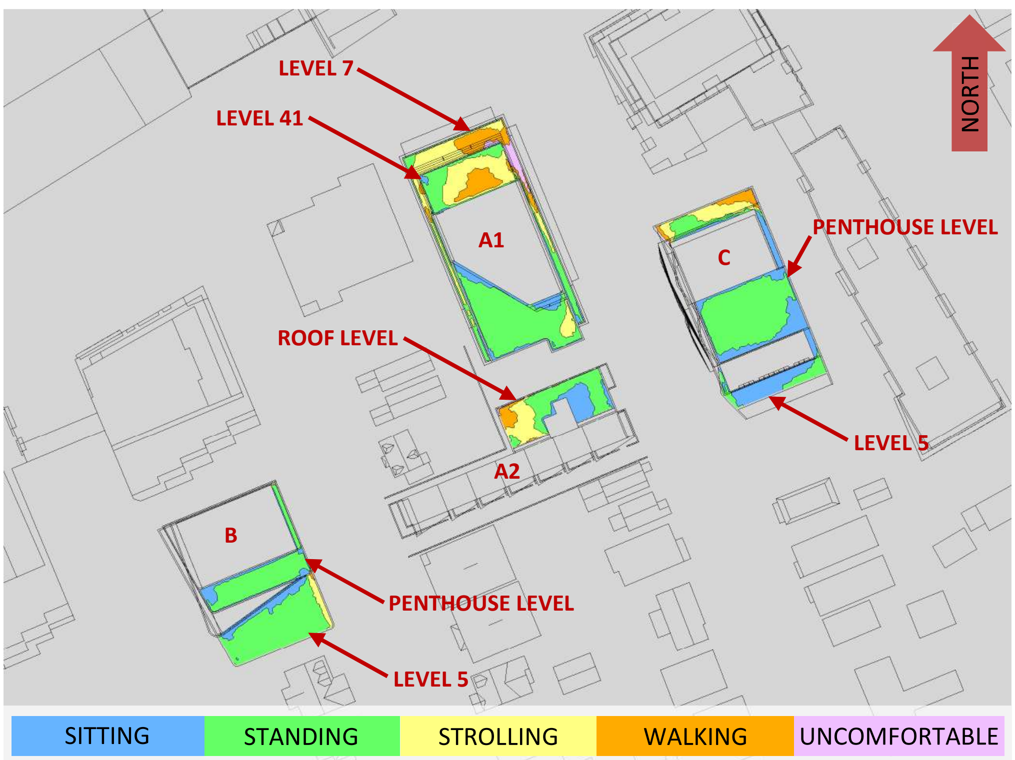


FIGURE 8D: WINTER – WIND COMFORT, COMMON AMENITY TERRACES

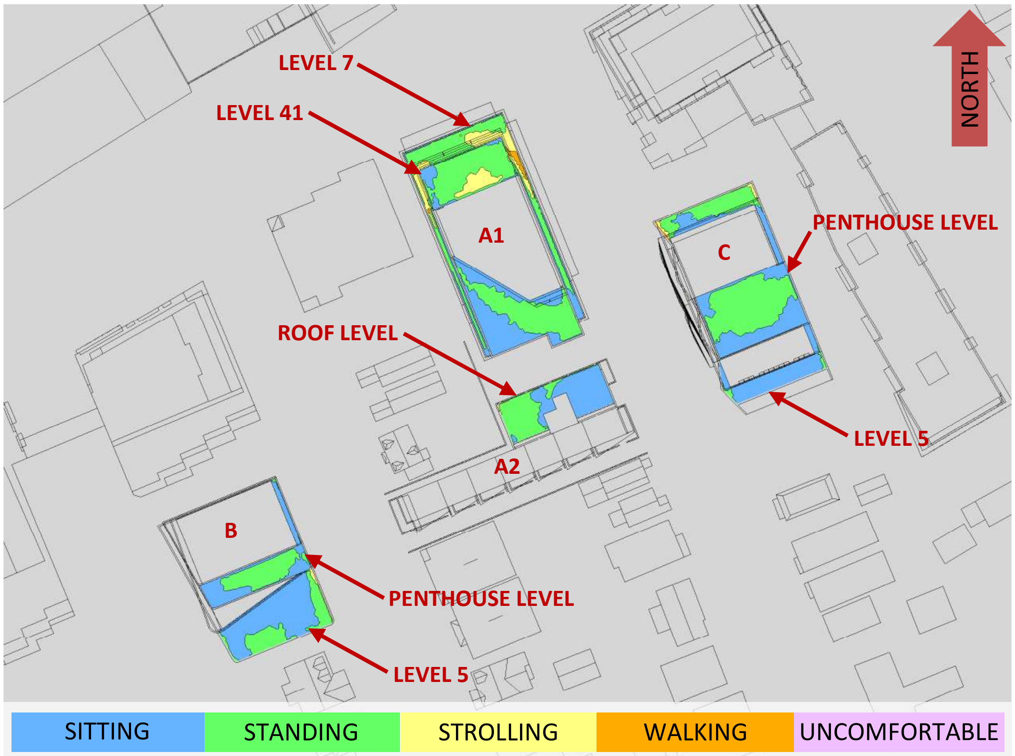
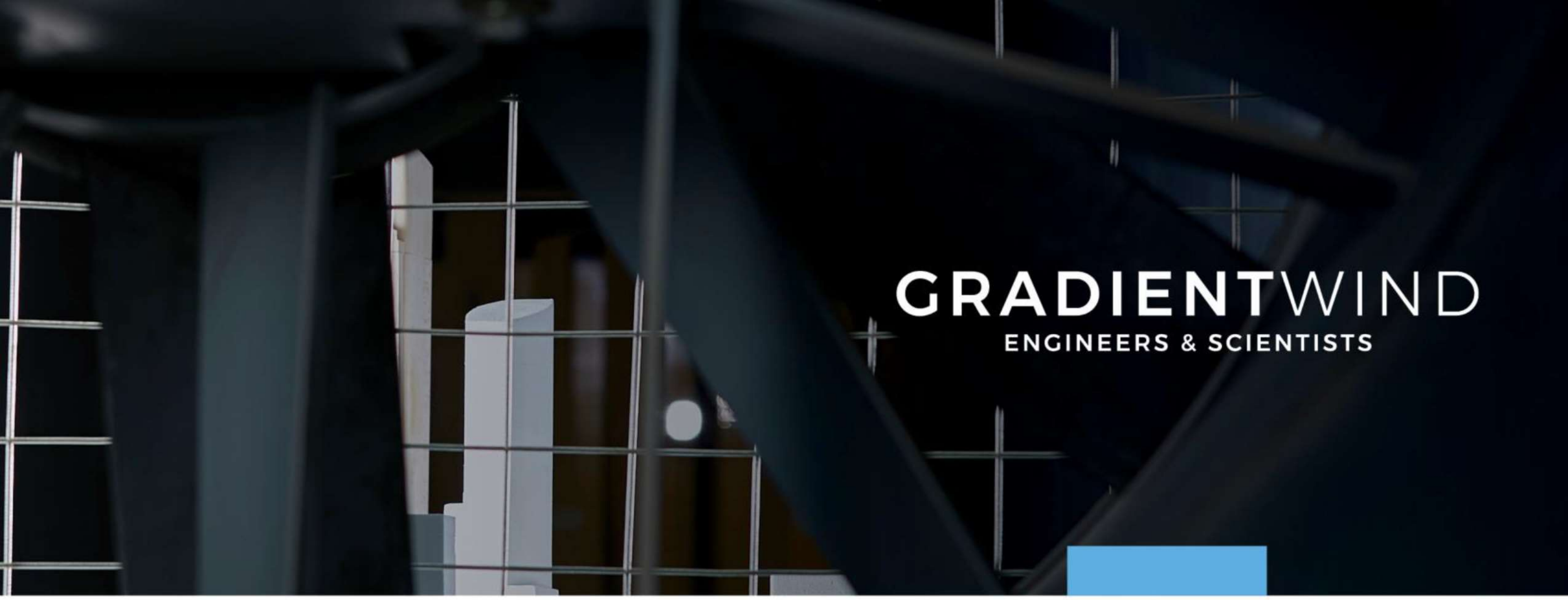
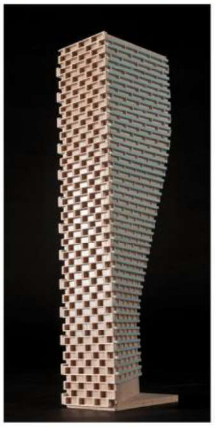


FIGURE 9: TYPICAL USE PERIOD – WIND COMFORT, COMMON AMENITY TERRACES





APPENDIX A

SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER

SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER

The atmospheric boundary layer (ABL) is defined by the velocity and turbulence profiles according to industry standard practices. The mean wind profile can be represented, to a good approximation, by a power law relation, Equation (1), giving height above ground versus wind speed (1), (2).

$$U = U_g \left(\frac{Z}{Z_g}\right)^{\alpha} \qquad \text{Equation (1)}$$

where $\boldsymbol{U}$ = mean wind speed, $\boldsymbol{U_g}$ = gradient wind speed, $\boldsymbol{Z}$ = height above ground, $\boldsymbol{Z_g}$ = depth of the boundary layer (gradient height), and α is the power law exponent.

For the model, U_g is set to 6.5 metres per second (m/s), which approximately corresponds to the 60% mean wind speed for Ottawa based on historical climate data and statistical analyses. When the results are normalized by this velocity, they are relatively insensitive to the selection of gradient wind speed.

Z_g is set to 540 m. The selection of gradient height is relatively unimportant, so long as it exceeds the building heights surrounding the subject site. The value has been selected to correspond to our physical wind tunnel reference value.

α is determined based on the upstream exposure of the far-field surroundings (that is, the area that is not captured within the simulation model).

Table 1 presents the values of α used in this study, while Table 2 presents several reference values of α. When the upstream exposure of the far-field surroundings is a mixture of multiple types of terrain, the α values are a weighted average with terrain that is closer to the subject site given greater weight.

TABLE 1: UPSTREAM EXPOSURE (ALPHA VALUE) VS TRUE WIND DIRECTION

Wind Direction (Degrees True)	Alpha Value (α)
0	0.21
22.5	0.23
45	0.24
67.5	0.25
90	0.25
112.5	0.24
135	0.24
157.5	0.24
180	0.24
202.5	0.25
225	0.25
247.5	0.19
270	0.19
292.5	0.19
315	0.19
337.5	0.20

TABLE 2: DEFINITION OF UPSTREAM EXPOSURE (ALPHA VALUE)

Upstream Exposure Type	Alpha Value (α)
Open Water	0.14-0.15
Open Field	0.16-0.19
Light Suburban	0.21-0.24
Heavy Suburban	0.24-0.27
Light Urban	0.28-0.30
Heavy Urban	0.31-0.33

The turbulence model in the computational fluid dynamics (CFD) simulations is a two-equation shear-stress transport (SST) model, and thus the ABL turbulence profile requires that two parameters be defined at the inlet of the domain. The turbulence profile is defined following the recommendations of the Architectural Institute of Japan for flat terrain (3).

$$I(Z) = \begin{cases} 0.1\left(\dfrac{Z}{Z_g}\right)^{-\alpha-0.05}, & Z > 10\text{ m} \\ 0.1\left(\dfrac{10}{Z_g}\right)^{-\alpha-0.05}, & Z \leq 10\text{ m} \end{cases} \quad \text{Equation (2)}$$

$$L_t(Z) = \begin{cases} 100\text{ m}\sqrt{\dfrac{Z}{30}}, & Z > 30\text{ m} \\ 100\text{ m}, & Z \leq 30\text{ m} \end{cases} \quad \text{Equation (3)}$$

where ***I*** = turbulence intensity, $\boldsymbol{L_t}$ = turbulence length scale, ***Z*** = height above ground, and **α** is the power law exponent used for the velocity profile in Equation (1).

Boundary conditions on all other domain boundaries are defined as follows: the ground is a no-slip surface; the side walls of the domain have a symmetry boundary condition; the top of the domain has a specified shear, which maintains a constant wind speed at gradient height; and the outlet has a static pressure boundary condition.

REFERENCES

[1] P. Arya, "Chapter 10: Near-neutral Boundary Layers," in *Introduction to Micrometeorology*, San Diego, California, Academic Press, 2001.

[2] S. A. Hsu, E. A. Meindl and D. B. Gilhousen, "Determining the Power-Law Wind Profile Exponent under Near-neutral Stability Conditions at Sea," vol. 33, no. 6, 1994.

[3] Y. Tamura, H. Kawai, Y. Uematsu, K. Kondo, and T. Okhuma, "Revision of AIJ Recommendations for Wind Loads on Buildings," in *The International Wind Engineering Symposium, IWES 2003*, Taiwan, 2003.