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Credit: Core Architects

Date: April 14, 2025

Re: Pedestrian Wind Assessment
248, 250, and 314
Martin Street and 150 Steeles
Avenue East
Milton, ON
SLR Project #241.031807.00001

Prepared by:

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For:

Neatt Communities
77 Main Street East
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Revision	Date	Prepared by	Checked by	Approved by
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Table of Contents

1.0 Introduction

SLR Consulting (Canada) Ltd. (SLR) was retained by Neatt Communities to conduct a pedestrian wind assessment for a development proposal at 248, 250, and 314 Martin Street and 150 Steeles Avenue East in Milton, Ontario (the "Proposed Development"). This report is in support of the combined Official Plan Amendment (OPA) and Zoning Bylaw Amendment (ZBA) planning application for Phase 1 of the development.

1.1 Existing Development

The Proposed Development is located south of Steeles Avenue East, between Martin Street and Bronte Street North. The site is currently vacant. Figure 1 provides an aerial view of the study area.

Immediately surrounding the site are low-rise residential buildings from the northeast through southeast, along Martin Street and beyond; and low-rise commercial buildings along Steeles Avenue East both west and north of the site. Part of the Natural Heritage System (NHS) surrounding Sixteen Mile Creek runs along the southwest edge of the site.

Typically, developments with Site Plan Approval (SPA) within a 500 metre radius are assessed as part of a development proposal. In this case, there were no SPA-approved developments identified within the testing radius. SLR confirmed this with the design team.

Note, when referring to wind directions True North will be utilized. Project North will be utilized when referring to building features. Project North is approximately 45°counter-clockwise from True North.

Figure 1: Aerial view of existing site & surroundings
Credit: Esri, Maxar, Earthstar Geographics, and the GIS User Community (Image Date April 14, 2023)

1.2 Proposed Development

The Proposed Development consists of two phases consisting of 15 development blocks. Phase 1 includes the creation of 4 new public streets, 7 development blocks, a stormwater management pond, and a Natural Heritage Area and buffer zone. Phase 2 is contemplated to include 8 smaller future development blocks which will include within them 3 Community Open Spaces, one public street, and one private street. This assessment focuses on Phase 1 of the Proposed Development (shown in Figures 2 and 3a). Phase 1 includes Blocks 1 through 6, as well as Blocks 8 and 9. Phase 1 also includes Block 7 which is a stormwater management pond, and Blocks 12 and 13, which are the NHS and associated buffer areas.

- **Block 1** is an eight-storey tall L-shaped building that is approximately 30 meters in height, including the mechanical penthouse.
- **Block 2** consists of five rows of four-storey townhomes.
- **Block 3** is an eight-storey tall U-shaped building that is approximately 30 meters in height, including the mechanical penthouse.
- **Block 4** consists of six rows of four-storey townhomes.
- **Block 5** is a ten-storey tall U-shaped building that is approximately 35 meters in height, including the mechanical penthouse.
- **Block 6** is an eight-storey tall building that is approximately 31 meters in height, including the mechanical penthouse.
- **Blocks 8 & 9** consist of a six-storey L-shaped building that is approximately 24 meters tall, including the mechanical penthouse.

The Proposed Development incorporates numerous architectural features that will have a positive influence on pedestrian wind comfort, including stepped facades.

1.3 Areas of Interest

Areas of interest for pedestrian wind conditions include those areas which pedestrians are expected to use on a frequent basis. Typically, these include sidewalks, main entrances, transit stops, plazas and parks.

On-site areas of interest are shown in Figures 3b and 3c. This includes the main entrances to the numerous buildings, secondary entrances and exits, and the retail entrances. There are also several outdoor amenity spaces at grade on Blocks 1, 3, 5, 6, 8, and 9. Additionally, there are outdoor amenity terraces at Level 5 of Blocks 1 and 6; at Level 7 of Block 3; and at Level 8 of Blocks 5 and 6.

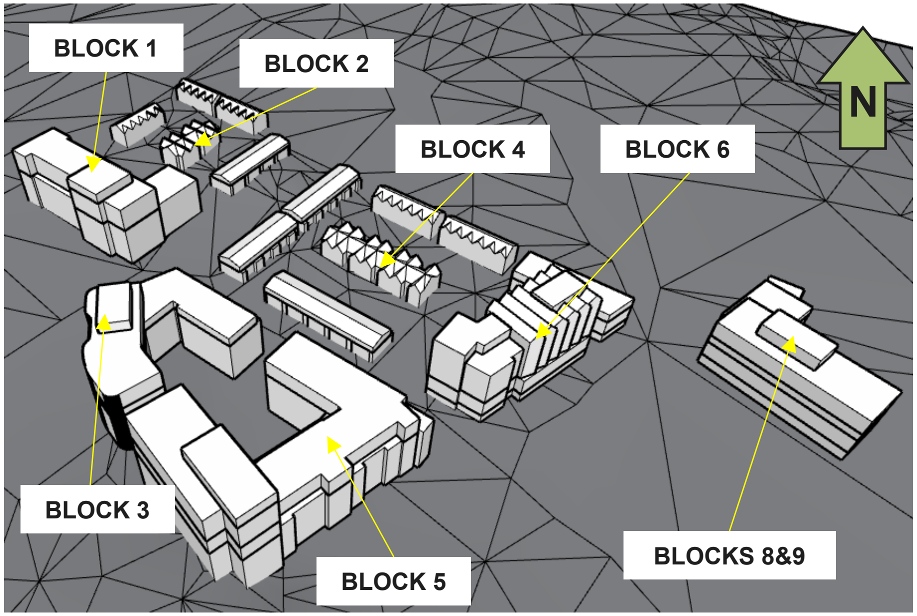


Figure 2: 3D model of Phase 1 of the Proposed Development
Credit: Core Architects

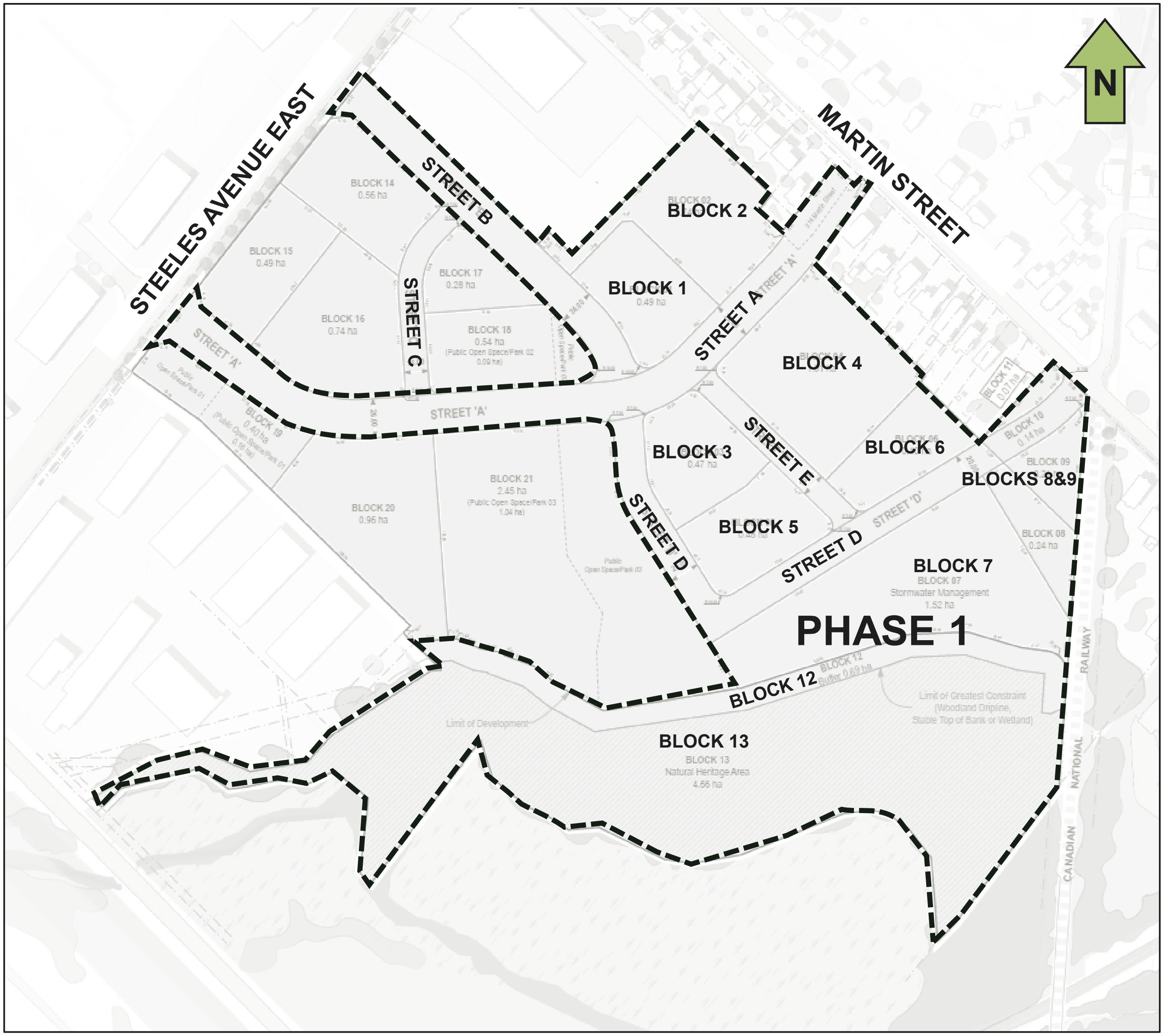


Figure 3a: Phase 1 of the Proposed Development
Credit: Core Architects

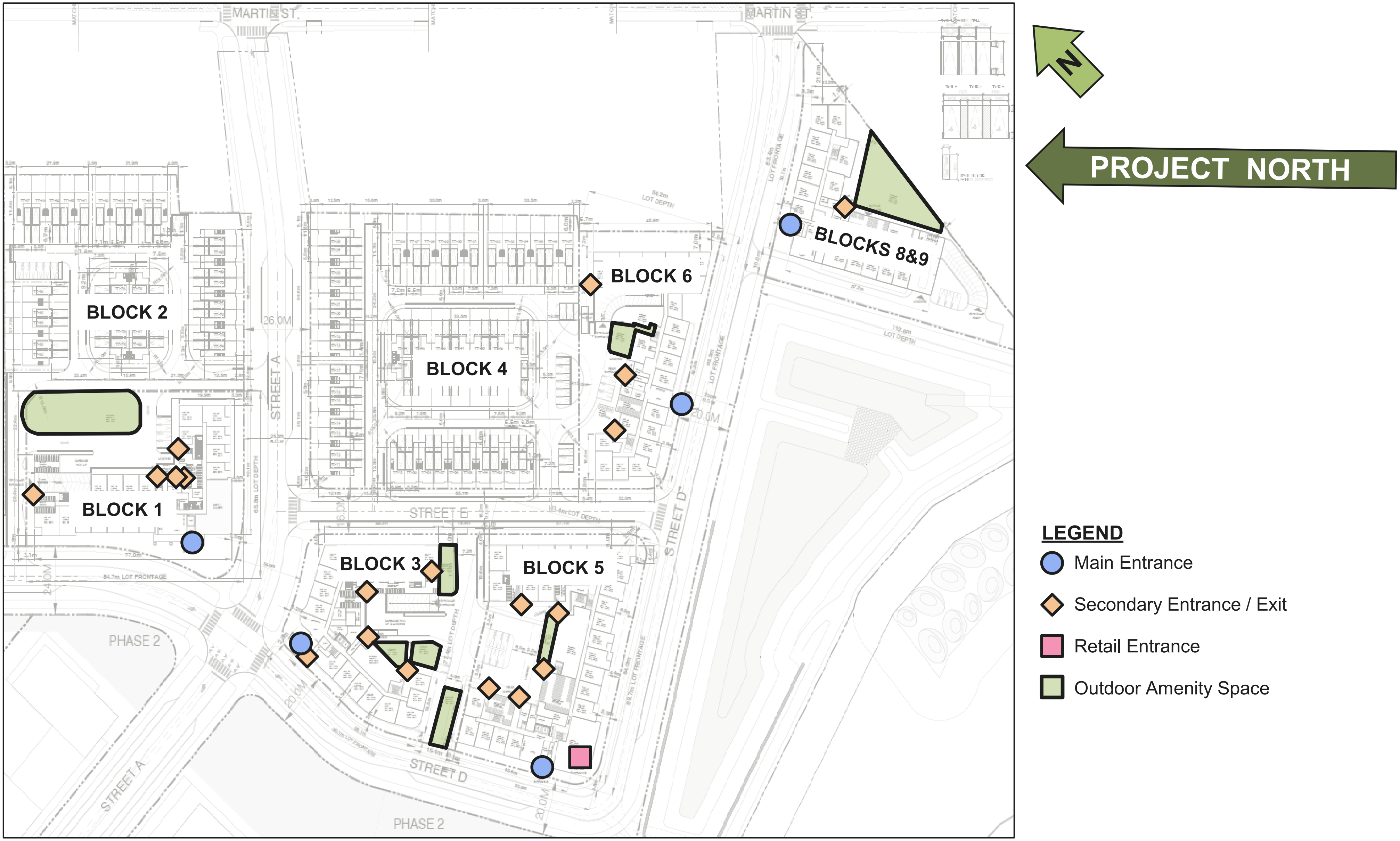


Figure 3b: Areas of interest – Grade, Phase 1
Credit: Core Architects

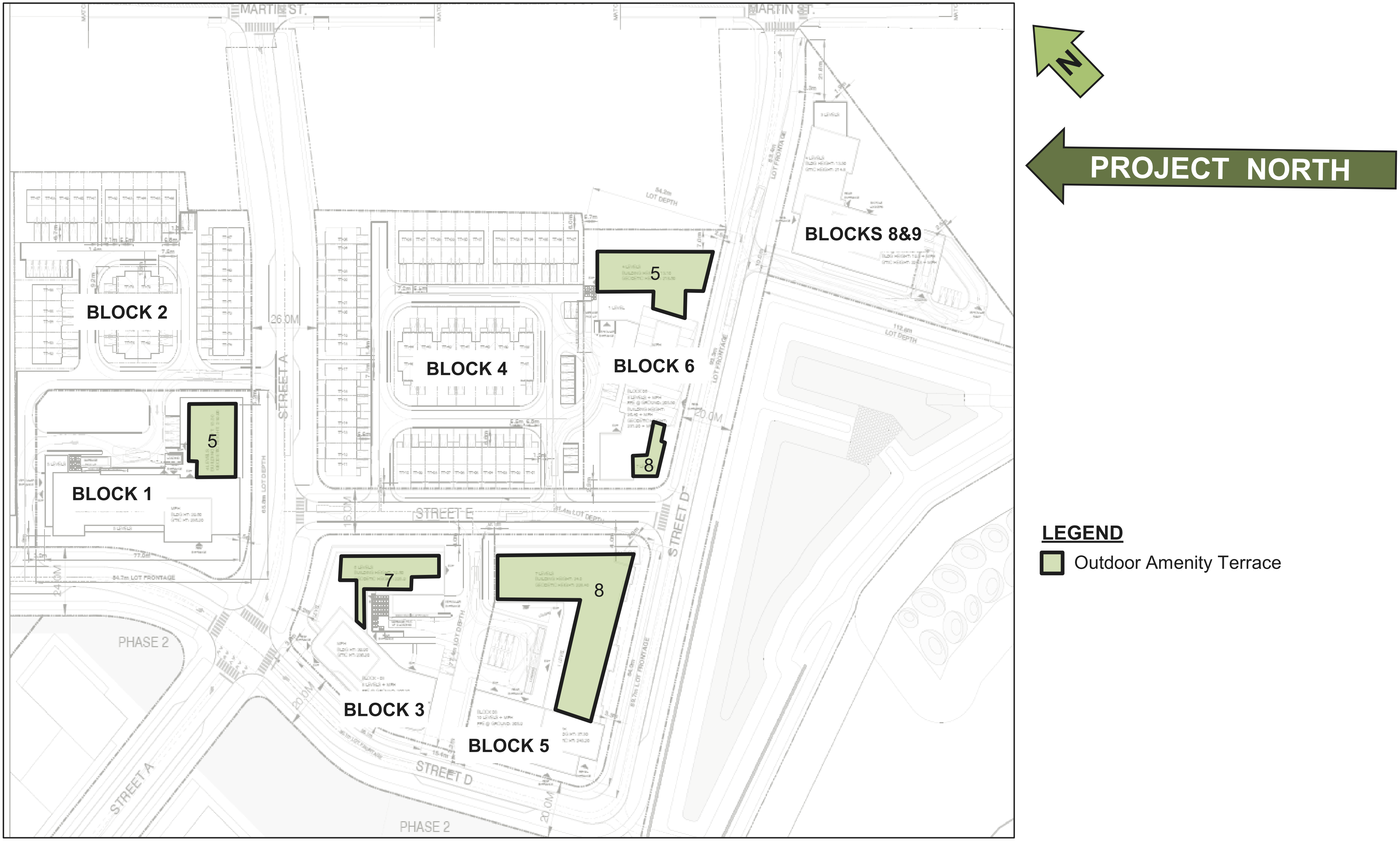


Figure 3c: Areas of interest – Above Grade, Phase 1
Credit: Core Architects

2.0 Approach

A qualitative assessment was conducted using computational fluid dynamics (CFD). As with any approach, there are some limitations with this analysis technique, specifically in the ability to simulate the turbulence of the wind. Nonetheless, a qualitative CFD analysis is a useful tool to identify potential wind issues, as it employs a comparable analysis methodology to that used in quantitative wind tunnel testing.

2.1 Methodology

Wind comfort conditions were predicted on and around the development site to identify potentially problematic windy areas. A 3D model of the Proposed Development, as well as an architectural drawing set, were provided by Core Architects on February 21, 2025, and March 12, 2025, respectively. The simulations were performed using CFD software by Meteodyn Inc. and were conducted on February 25, 2025, and March 18, 2025, for the Existing Configuration, and the Proposed Configuration, respectively. The testing was conducted March 20, 2025.

The 3D space throughout the modelled area (500 metre radius from the Proposed Development) is filled with a three-dimensional grid. The CFD virtual wind tunnel calculates wind speed at each one of the 3D grid points. The upstream “roughness” for each test direction is adjusted to reflect the upwind conditions encountered around the site. Wind flows for 16 compass directions were simulated. Although wind speeds are calculated throughout the modelled area, wind comfort conditions were only plotted for a smaller area immediately surrounding the Proposed Development.

SLR assessed two configurations, for comparison, as follows:

- **Existing Configuration:** Existing site with existing surroundings.
- **Proposed Configuration:** Proposed Development with existing surroundings.

A view of the 3D model used in the wind comfort analysis for each configuration is shown in Figures 4a and 4b.

The CFD-predicted wind speeds for all test directions and grid points were combined with historical wind climate data for the region to predict the occurrence of wind speeds in the pedestrian realm, and to compare against wind criteria for comfort and safety. This analysis was conducted for the Existing Configuration and Proposed Configuration. The analysis of wind conditions is undertaken for four seasons: Winter (January to March), Spring (April to June), Summer (July to September), and Autumn (October to December). However, only the seasonal extremes of summer and winter are discussed within the report. The results of the analysis for spring and autumn seasons can be found in Appendix A.

Results are presented through discussion of the wind conditions along major streets and the areas of interest. The comfort criteria are based on predictions of localized wind forces combined with frequency of occurrence. Climate issues that influence a person’s overall “thermal” comfort, (e.g., temperature, humidity, wind chill, exposure to sun or shade) are not considered in the comfort rating.

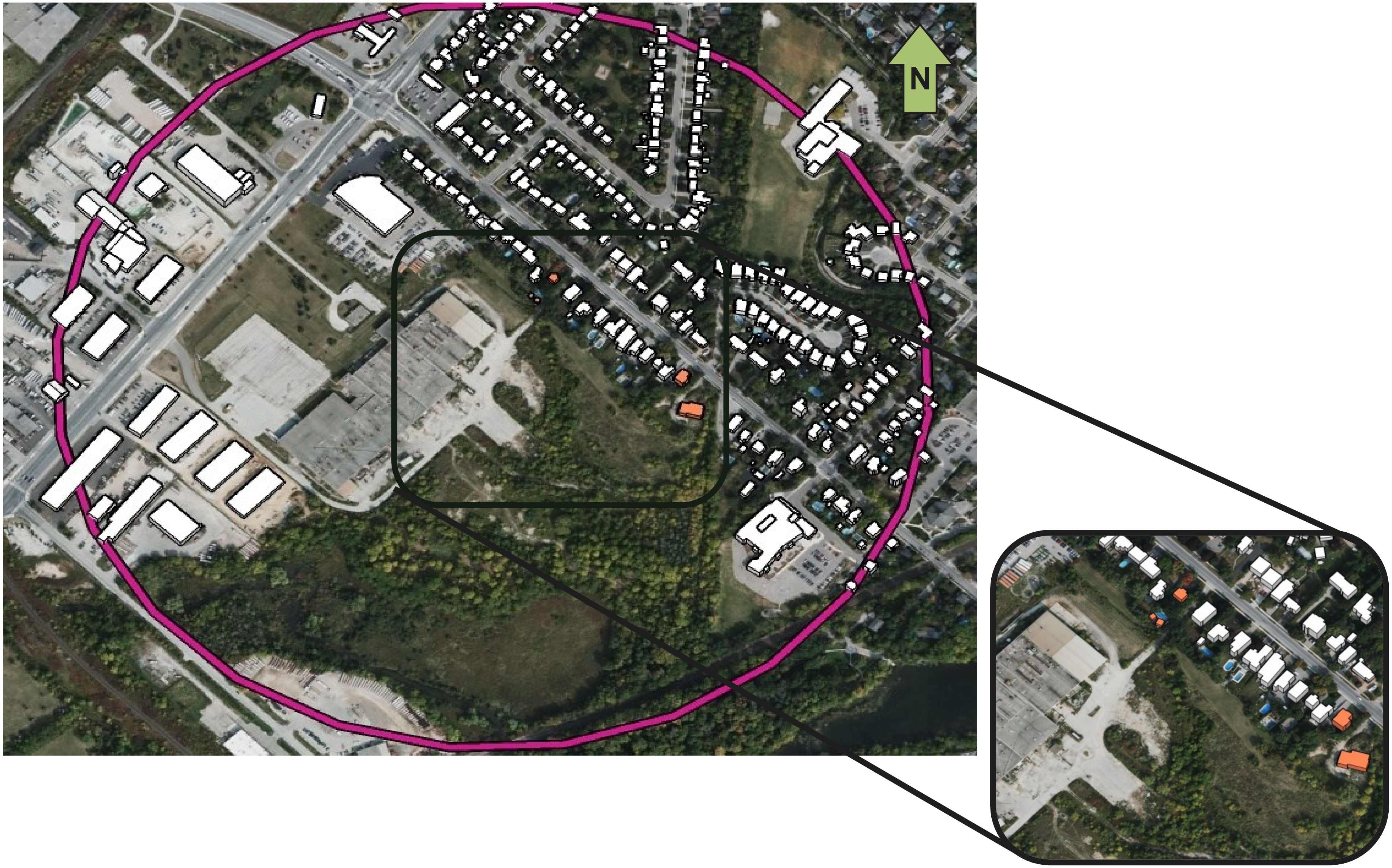


Figure 4a: Existing Configuration

Figure 4b: Proposed Configuration

2.2 Wind Climate

Wind data recorded at Toronto Pearson International Airport for the period of 1991 to 2020 was obtained and analysed to create a wind climate model for the region. Annual and seasonal wind distribution diagrams ("wind roses") are shown in Figure 5. These diagrams illustrate the percentage of time wind blows from the 16 main compass directions. Of main interest are the longest peaks that identify the most frequently occurring wind directions. The annual wind rose indicates that winds approaching from the southwest through northwest and east directions are most prevalent. The seasonal wind roses readily show how the prevalent winds shift throughout the year.

The directions from which stronger winds (e.g., > 30 km/h) approach are also of interest as they have the highest potential of creating problematic wind conditions, depending upon site exposure and the building configurations. The wind roses in Figure 5 also identify the directional frequency of these stronger winds, as indicated in the figure's legend colour key. On an annual basis, strong winds occur from the northwesterly and westerly sectors. All wind speeds and directions were included in the wind climate model.

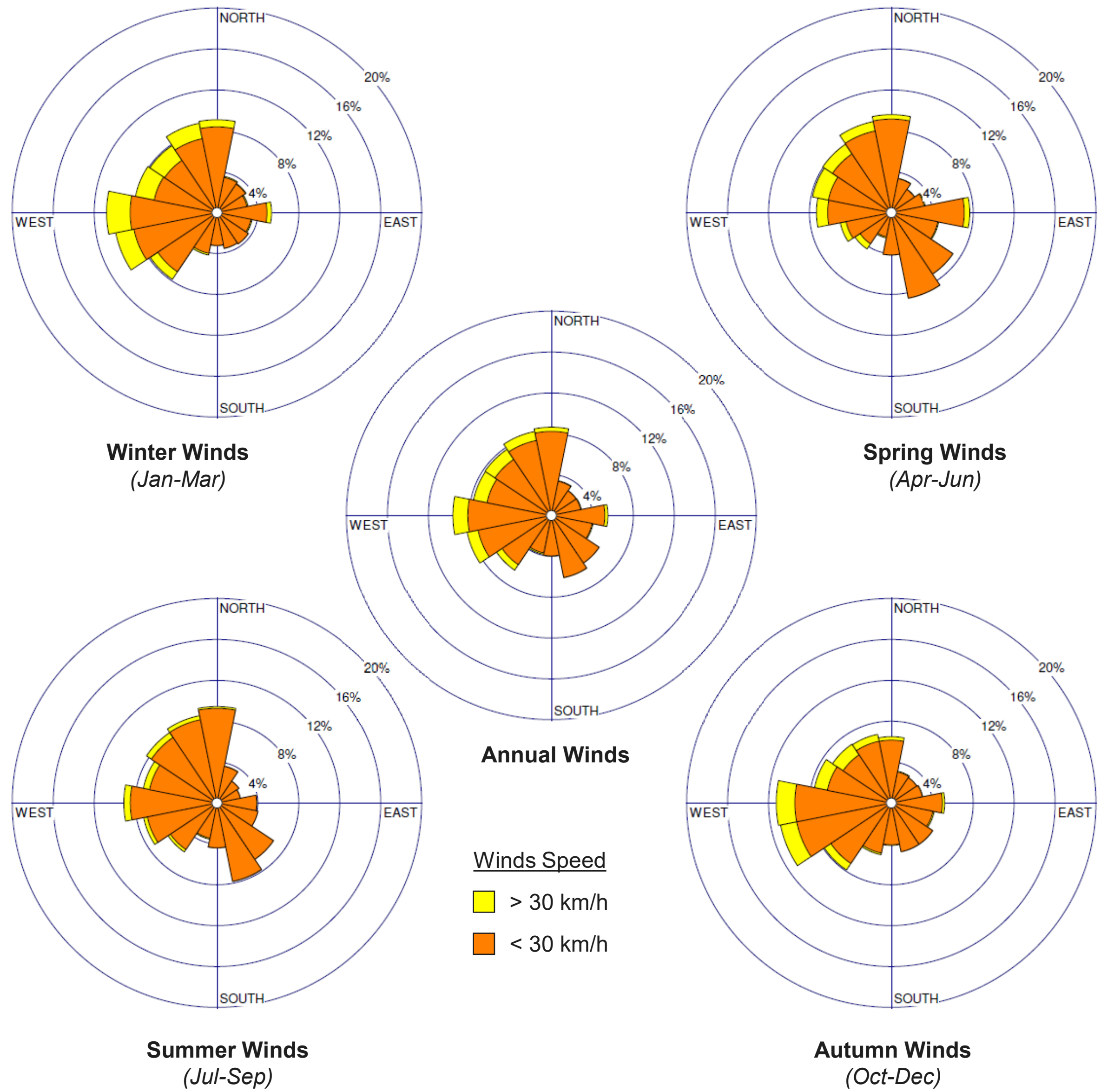


Figure 5: Wind Roses for Toronto Pearson International Airport (1991-2020)

3.0 Pedestrian Wind Criteria

Wind comfort conditions are discussed in terms of being acceptable for certain pedestrian activities and are based on predicted wind force and the expected frequency of occurrence. Wind chill, clothing, humidity and exposure to direct sun, for example, all affect a person's thermal comfort; however, these influences are not considered in the wind comfort criteria.

The comfort criteria, which are based on certain predicted hourly mean wind speeds being exceeded 5% of the time, are summarized in Table 1. Generally, this is equivalent to a wind event of several hours duration occurring about once per week.

The criterion for wind safety in the table is based on hourly mean wind speeds that are exceeded once per year (approximately 0.01% of the time). When more than one event is predicted annually, wind mitigation measures are then advised. The wind safety criterion is shown in Table 2.

The criteria for wind comfort and safety used in this assessment are similar to those developed at the Boundary Layer Wind Tunnel Lab of Western University, together with building officials in London, England. They are broadly based on the Beaufort Scale and on previous criteria that were originally developed by Davenport. Similar criteria are used by the Alan G. Davenport Wind Engineering Group Boundary-Layer Wind Tunnel Laboratory for pedestrian wind study projects located around the globe.

Table 1: Wind Comfort Criteria

Comfort Category	Mean Wind Speed Exceeded 5% of the time	Description of Wind Comfort
Sitting	≤ 14 km/h	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper without having it blown away.
Standing	≤ 22 km/h	Gentle breezes suitable for main building entrances and bus stops.
Walking	≤ 29 km/h	Moderate breezes that can be tolerated if one's objective is to walk, run or cycle without lingering.
Fast Walking	≤ 36 km/h	Strong breezes that can be tolerated if one's objective is to walk, run or cycle without lingering.
Uncomfortable	> 36 km/h	Strong winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.

Table 2: Wind Safety Criterion

Safety Criterion	Mean Wind Speed Exceeded Once Per Year (0.01%)	Description of Wind Effects
Exceeded	> 72 km/h	Excessive gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.

4.0 Results

Figures 6a through 9b present graphical images of the wind comfort conditions for the summer and winter months around the Proposed Development. These typically represent the seasonal extremes of best and worst case. Appendix A presents the wind comfort conditions for spring and autumn seasons. The “comfort zones” shown are based on an integration of wind speed and frequency for all 16 wind directions tested with the seasonal wind climate model. The presence of mature trees can lead to wind comfort levels that are marginally more comfortable than shown, during seasons when foliage is present. Appendix B presents the wind safety conditions on an annual basis.

There are generally accepted wind comfort levels that are desired for various pedestrian uses. However, in some climates, these may be difficult to achieve in the winter due to the overall climate. For sidewalks, walkways and pathways, wind conditions suitable for walking or fast walking are desirable year-round but may not be feasible in the winter. For main entrances, transit stops, and public amenity spaces such as parks and playgrounds, wind conditions conducive to standing are preferred throughout the year. For on-site amenity areas, wind conditions suitable for sitting or standing are desirable during the summer, with stronger wind flows, conducive to walking, tolerated in the winter. The most stringent category of sitting is desirable during the summer for dedicated seating areas, such as patios, where calmer wind is expected for the comfort of patrons.

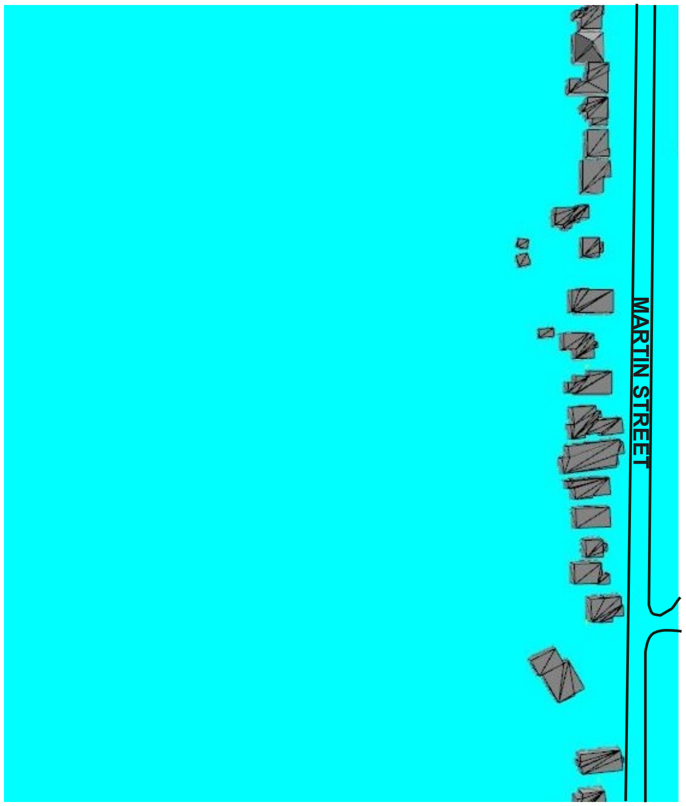
4.1 Building Entrances, Walkways & Amenity Spaces

Existing wind conditions on the vacant site are expected to be comfortable for standing or sitting year-round (Figures 6a and 7a).

In the Proposed Configuration, wind conditions on-site are predicted to be comfortable for sitting or standing during the summer (Figure 6b). During the winter season, wind conditions are expected to be conducive to fast walking or better (Figure 7b). Wind conditions at the main entrances, the secondary entrances and exits, as well as the retail entrances, are generally predicted to be comfortable for sitting or standing throughout the year (Figures 8a and 8b). Exceptions are the main and retail entrances around the southwest corner of Block 5, where wind conditions are anticipated to be suitable for fast walking in the winter. However, this may not be a concern as these entrances are recessed from the main facade, which is a positive design feature.

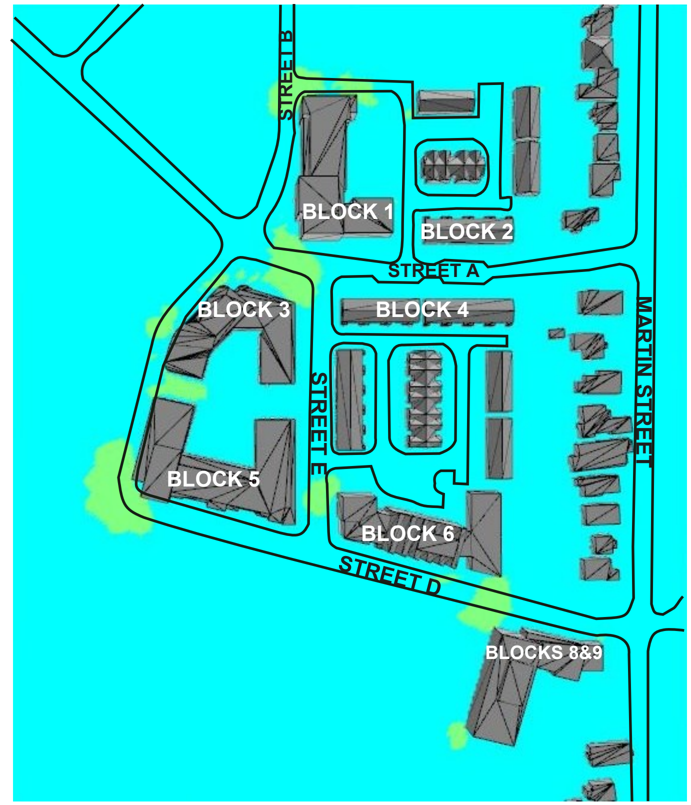
Overall, the locations of the entrances and exits throughout the development are positive, as the doors are placed in well-sheltered areas away from the prevailing winds.

Wind conditions in the outdoor amenity spaces at grade are anticipated to generally be suitable for sitting or standing throughout the year (Figure 8a and 8b). An exception is the amenity space between Blocks 3 and 5, where wind conditions are predicted to be suitable for walking in the winter (Figure 8b). These wind conditions are considered suitable for the intended use.



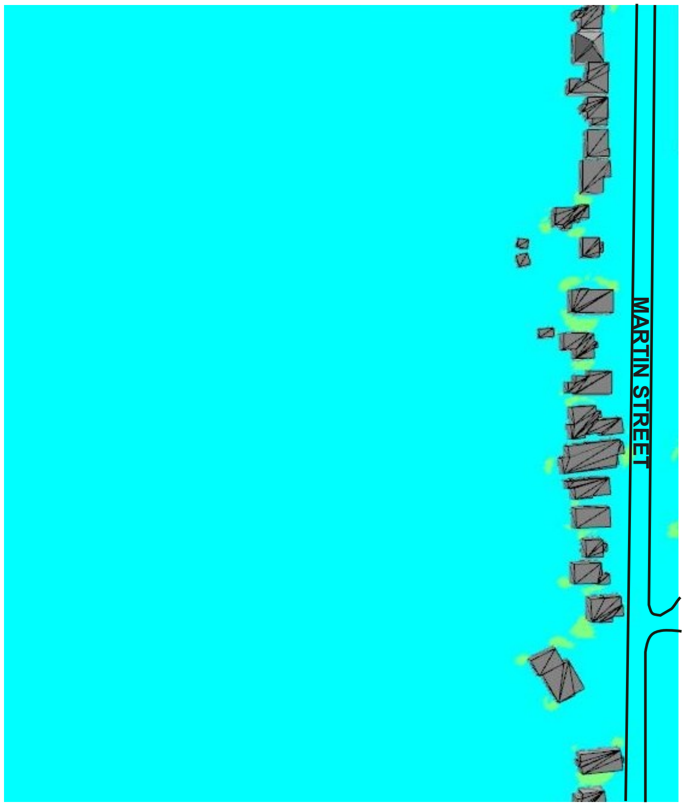
- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

Figure 6a: Existing Configuration – Pedestrian Wind Comfort Summer – On-site & Surrounding Areas



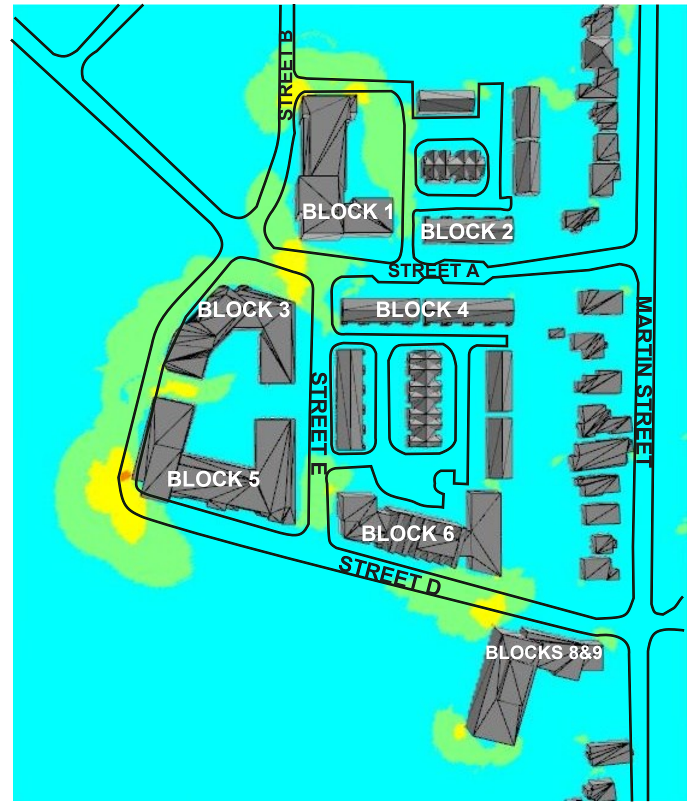
- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

Figure 6b: Proposed Configuration – Pedestrian Wind Comfort Summer – On-site & Surrounding Areas



- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

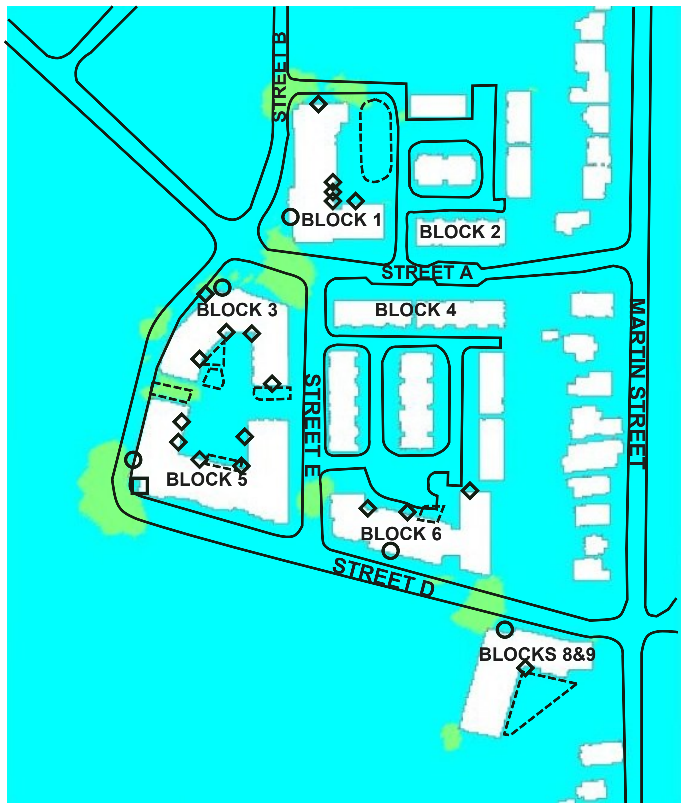
Figure 7a: Existing Configuration – Pedestrian Wind Comfort Winter – On-site & Surrounding Areas



- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

Figure 7b: Proposed Configuration – Pedestrian Wind Comfort Winter – On-site & Surrounding Areas

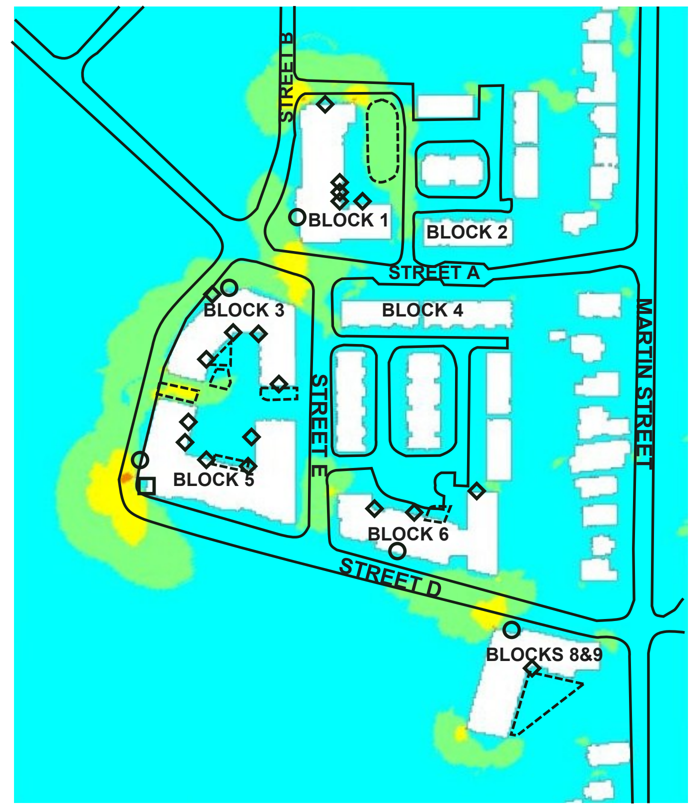
PROJECT NORTH



Sitting
Standing
Walking
Fast Walking
Uncomfortable

Main Entrance
Secondary Entrance / Exit
Retail Entrance
Outdoor Amenity Space

Figure 8a: Proposed Configuration – Pedestrian Wind Comfort Summer – Building Entrances & Walkways



Sitting
Standing
Walking
Fast Walking
Uncomfortable

Main Entrance
Secondary Entrance / Exit
Retail Entrance
Outdoor Amenity Space

Figure 8b: Proposed Configuration – Pedestrian Wind Comfort Winter – Building Entrances & Walkways

4.2 Amenity Terraces

On the outdoor amenity terraces, wind conditions are generally predicted to be comfortable for sitting or standing in the summer season (Figure 9a). However, portions of the Block 5 and Block 6 terraces are expected to be conducive to walking in the summer. During the winter, wind conditions on the terrace are expected to be comfortable for walking or better (Figure 9b).

If use of these outdoor amenity terraces are desired in the spring and autumn seasons, we suggest the design team include wind screens around the perimeter of each individual terrace, to provide local wind shelter and thus improving the wind comfort conditions.

4.3 Surrounding Sidewalks

Existing wind conditions along the sidewalks of Martin Street are expected to be comfortable for standing or better year-round. Wind conditions of the rear yards of the dwellings to the east are expected to be comfortable for sitting or standing year-round (Figures 6a and 7a).

With the Proposed Development in place, wind conditions are predicted to remain suitable for standing or sitting throughout the year on the sidewalks along Martin Street. Wind conditions in the rear yards of the dwellings to the east are predicted to remain comfortable for sitting or standing year-round (Figures 6b and 7b).

These wind conditions are considered suitable for the intended use.

4.4 Wind Safety

In both the Existing Configuration and the Proposed Configuration, the wind safety criterion is expected to be met in all areas assessed at and above grade on an annual basis (Appendix B).

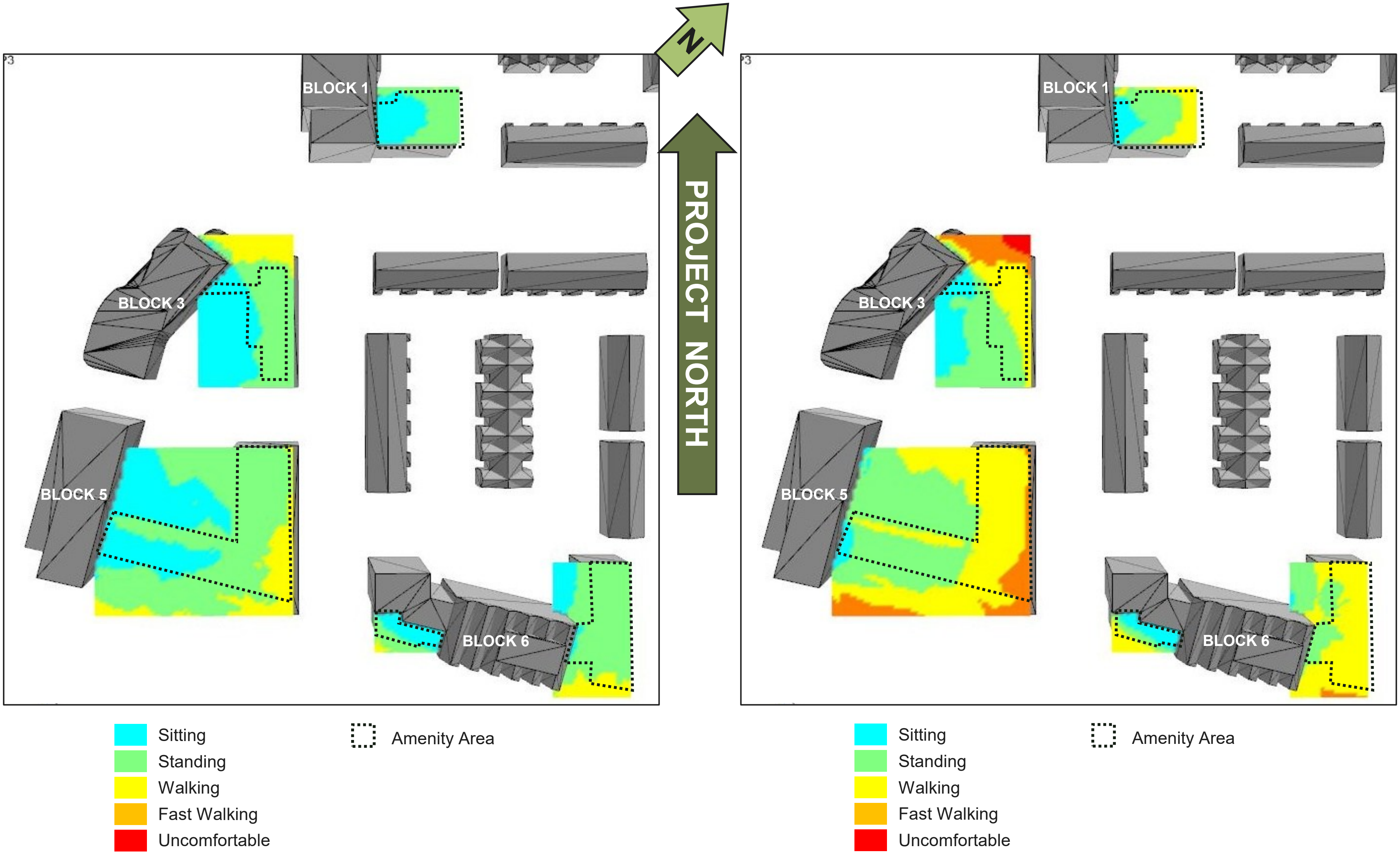


Figure 9a: Proposed Configuration – Pedestrian Wind Comfort Summer – Amenity Terraces

Figure 9b: Proposed Configuration – Pedestrian Wind Comfort Winter – Amenity Terraces

5.0 Conclusion & Recommendations

The pedestrian wind conditions predicted for Phase 1 of the Proposed Development at 248, 250, and 314 Martin Street and 150 Steeles Avenue East in Milton have been assessed through CFD modelling techniques. Based on the results of our assessment, the following conclusions have been reached:

- The wind safety criterion is expected to be met in all areas assessed in both the Existing Configuration and the Proposed Configuration, including the amenity terraces.
- With the Proposed Development in place, wind conditions on the site, including the numerous entrances and exits, are expected to be suitable for the intended use year-round.
- Wind conditions on the amenity terraces are expected to be suitable for the intended use. Suggestions are provided if calmer conditions are desired in the spring and autumn seasons.
- In both the Existing Configuration and the Proposed Configuration, wind conditions on the sidewalks surrounding the proposed site are anticipated to be suitable for the intended use throughout the year, including the sidewalk along Martin Street.

6.0 Statement of Limitations

This report has been prepared by SLR Consulting (Canada) Ltd. (SLR) for Neatt Communities (Client) in accordance with the scope of work and all other terms and conditions of the agreement between such parties. SLR acknowledges and agrees that the Client may provide this report to government agencies, interest holders, and/or Indigenous communities as part of project planning or regulatory approval processes. Copying or distribution of this report, in whole or in part, for any other purpose other than as aforementioned is not permitted without the prior written consent of SLR.

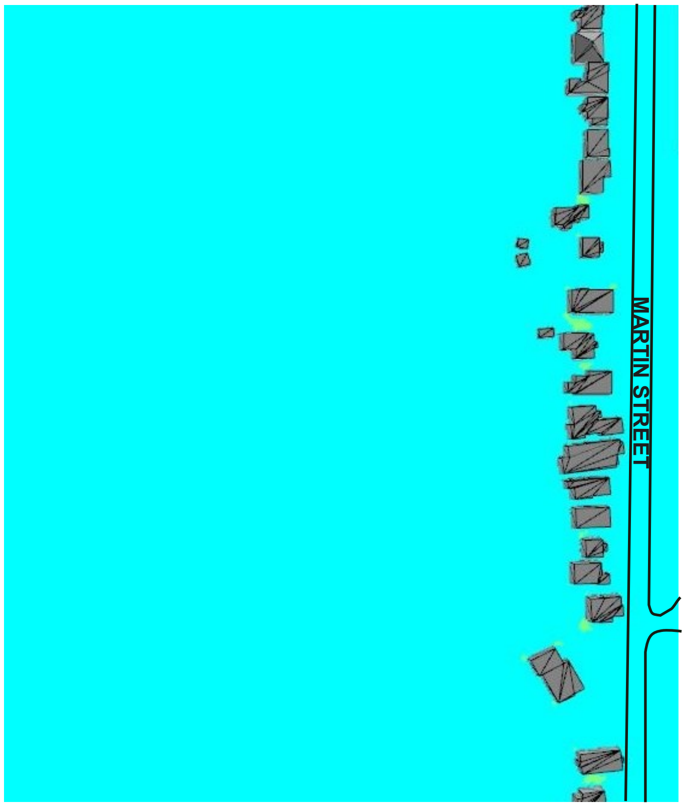
Any findings, conclusions, recommendations, or designs provided in this report are based on conditions and criteria that existed at the time work was completed and the assumptions and qualifications set forth herein.

This report may contain data or information provided by third party sources on which SLR is entitled to rely without verification and SLR does not warrant the accuracy of any such data or information.

Nothing in this report constitutes a legal opinion nor does SLR make any representation as to compliance with any laws, rules, regulations, or policies established by federal, provincial territorial, or local government bodies, other than as specifically set forth in this report. Revisions to legislative or regulatory standards referred to in this report may be expected over time and, as a result, modifications to the findings, conclusions, or recommendations may be necessary.

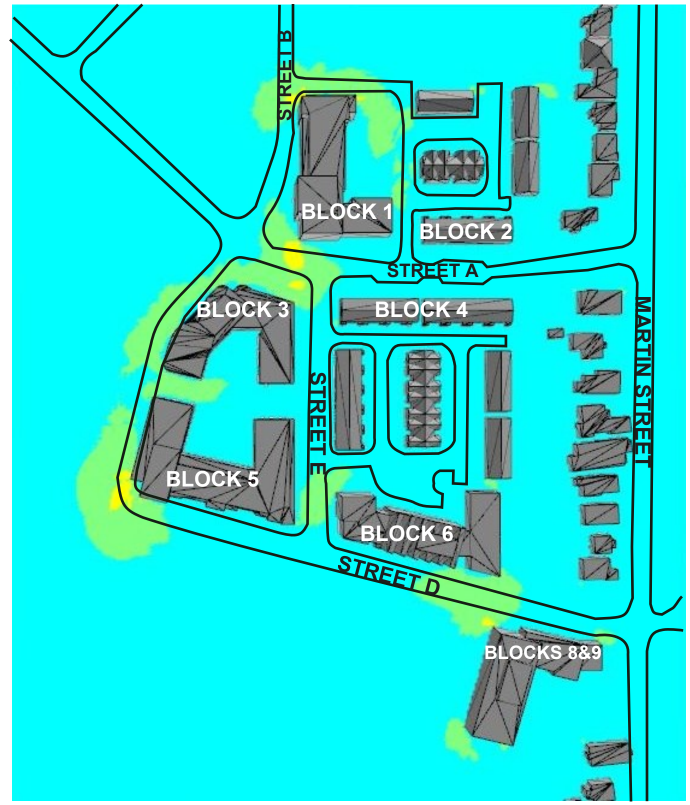
Appendix A

Pedestrian Wind Comfort Analysis
Spring (April – June) and Autumn (October – December)



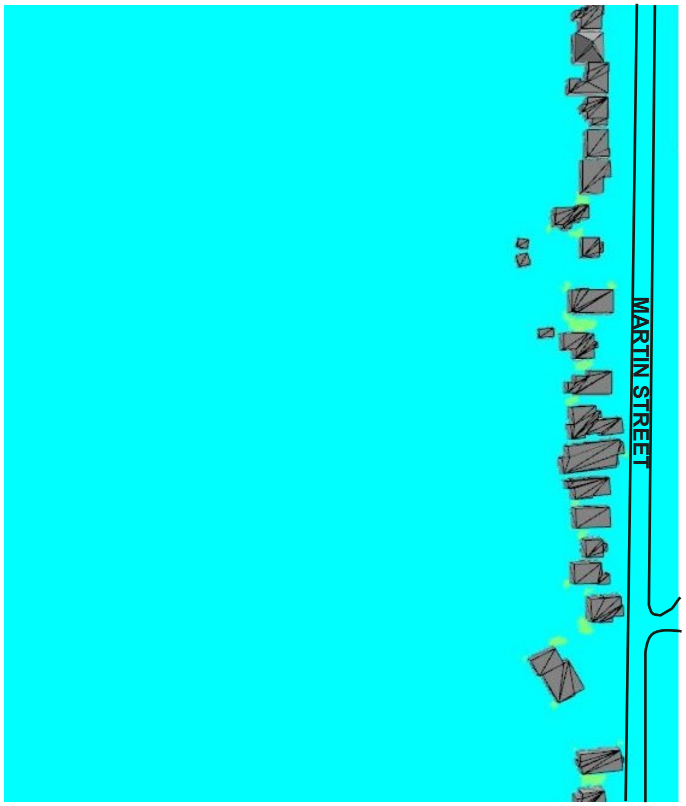
- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

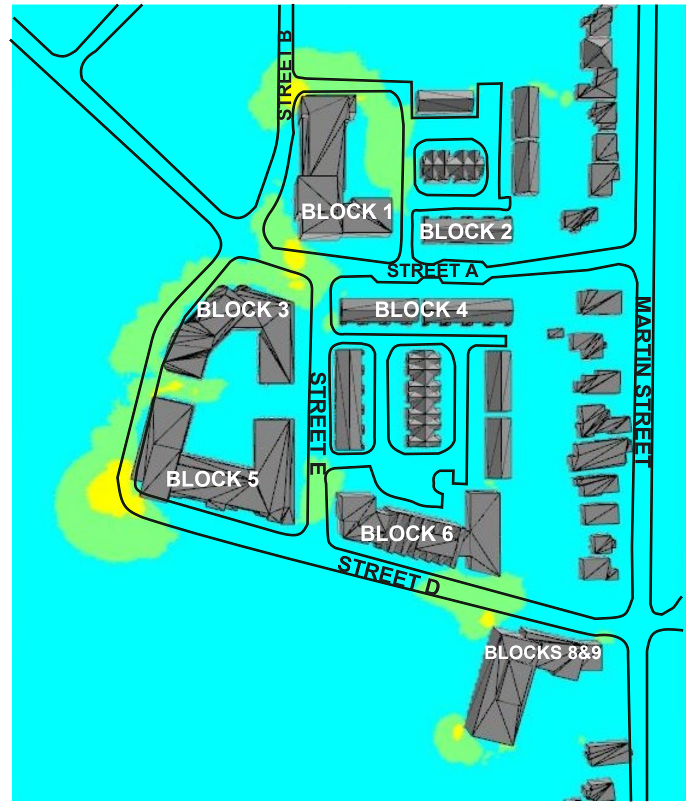
Figure A1a: Existing Configuration – Pedestrian Wind Comfort Spring – On-site & Surrounding Areas



- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

Figure A1b: Proposed Configuration – Pedestrian Wind Comfort Spring – On-site & Surrounding Areas



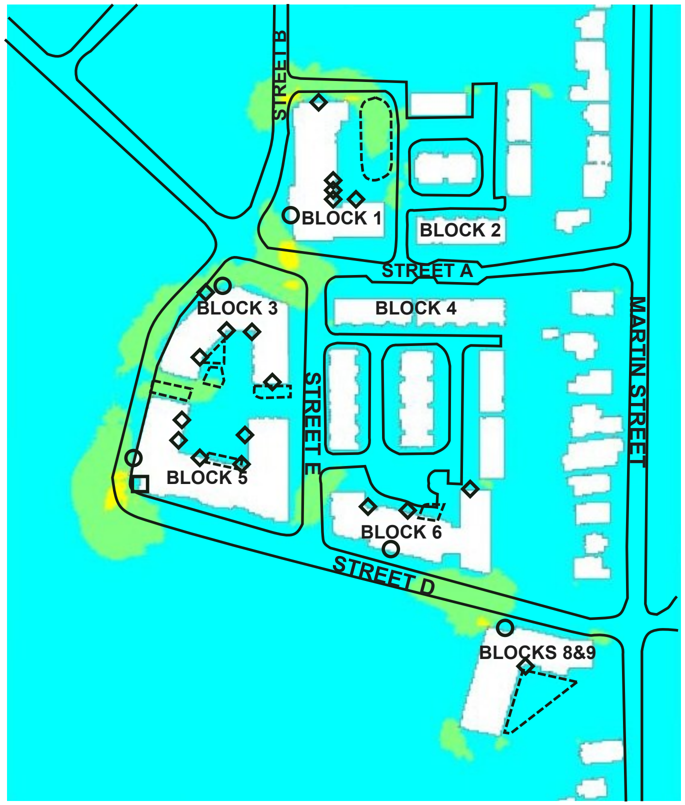


- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

Figure A2a: Existing Configuration – Pedestrian Wind Comfort
Autumn – On-site & Surrounding Areas

- Sitting
- Standing
- Walking
- Fast Walking
- Uncomfortable

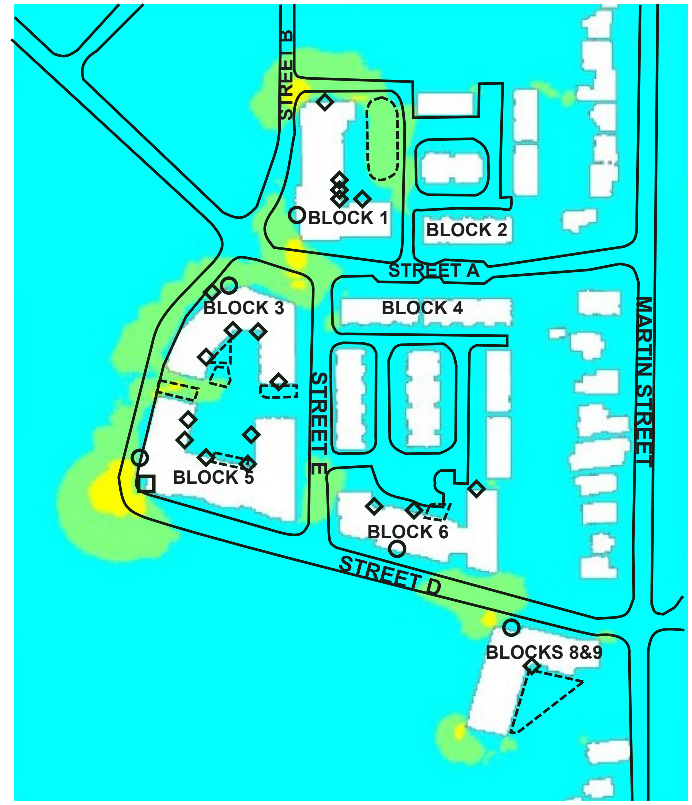
Figure A2b: Proposed Configuration – Pedestrian Wind Comfort
Autumn – On-site & Surrounding Areas



Sitting
Standing
Walking
Fast Walking
Uncomfortable

Main Entrance
Secondary Entrance / Exit
Retail Entrance
Outdoor Amenity Space

Figure A3a: Proposed Configuration – Pedestrian Wind Comfort Spring – Building Entrances & Walkways



Sitting
Standing
Walking
Fast Walking
Uncomfortable

Main Entrance
Secondary Entrance / Exit
Retail Entrance
Outdoor Amenity Space

Figure A3b: Proposed Configuration – Pedestrian Wind Comfort Autumn – Building Entrances & Walkways

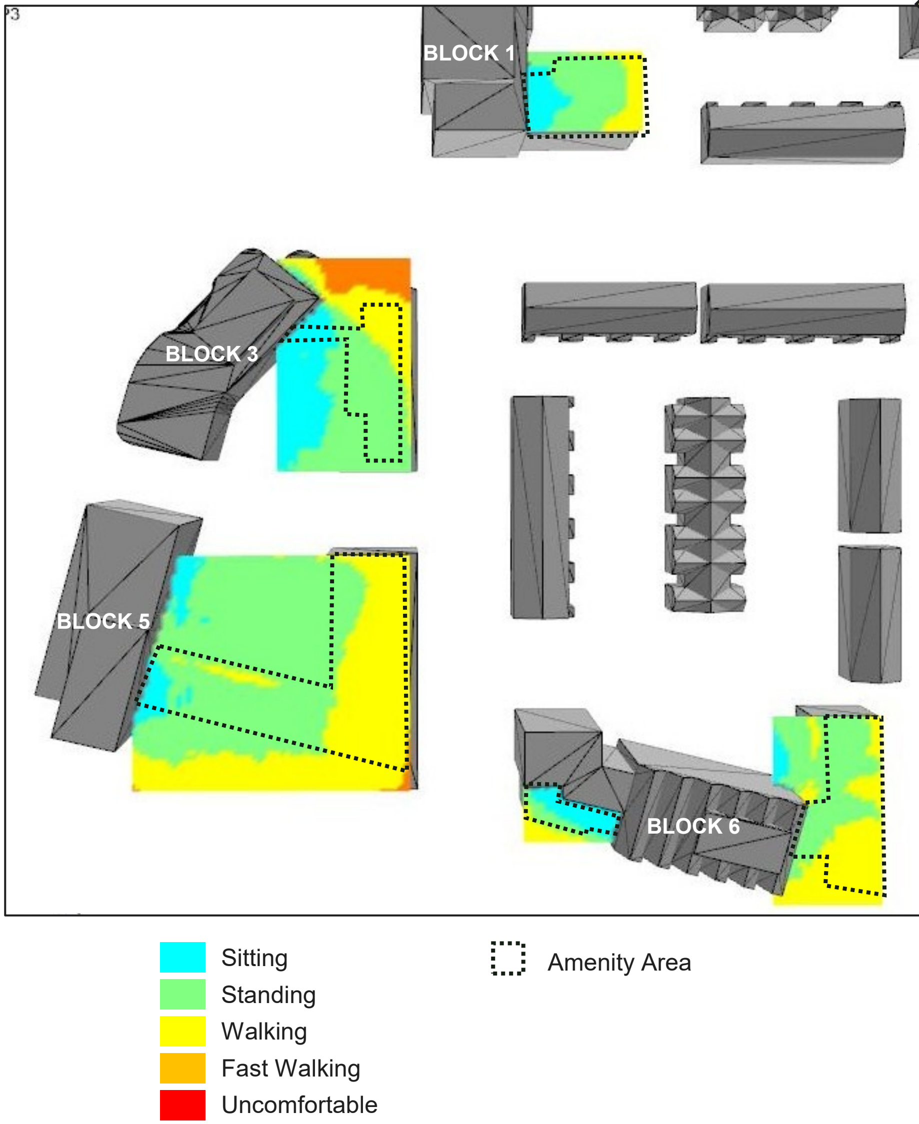


Figure A4a: Proposed Configuration – Pedestrian Wind Comfort Spring – Amenity Terraces

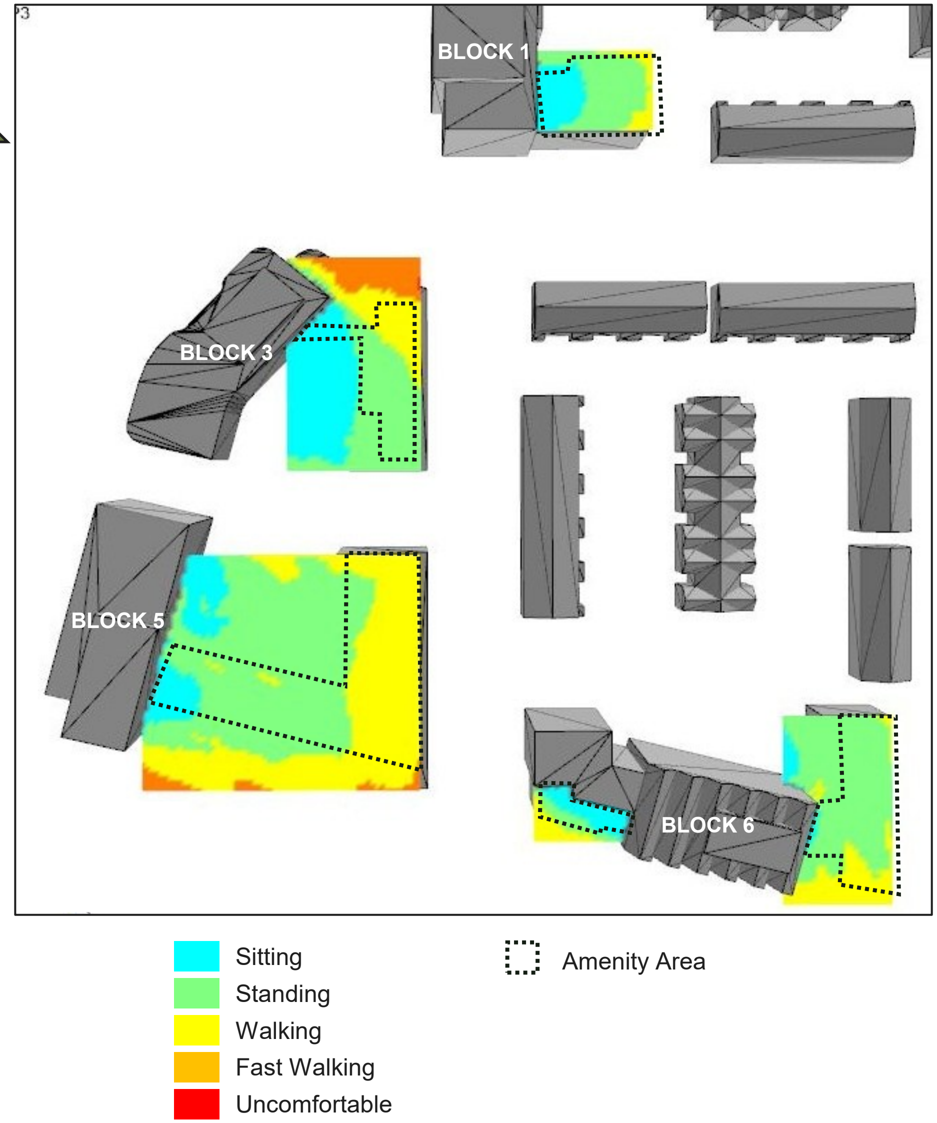
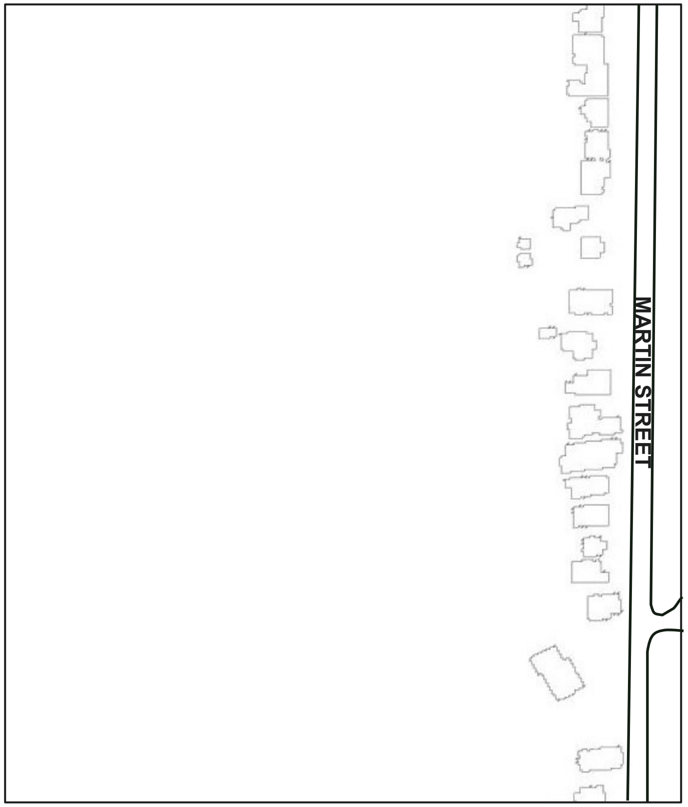


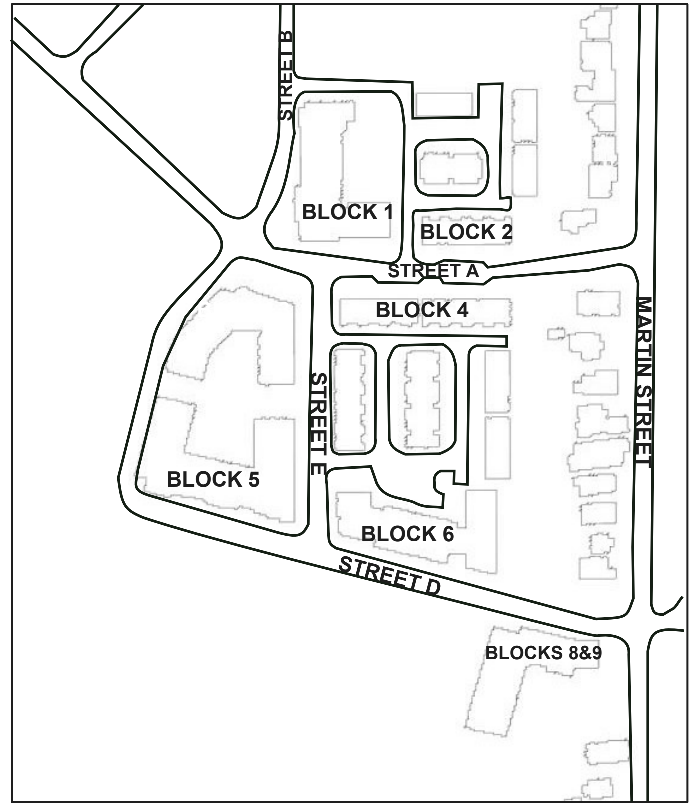
Figure A4b: Proposed Configuration – Pedestrian Wind Comfort Autumn – Amenity Terraces

Appendix B

Pedestrian Wind Safety Analysis

Annual





Exceeded Safety Criterion

Exceeded Safety Criterion

Figure B1a: Existing Configuration – Wind Safety Annual – On-site & Surrounding Areas

Figure B1b: Proposed Configuration – Wind Safety Annual – On-site & Surrounding Areas

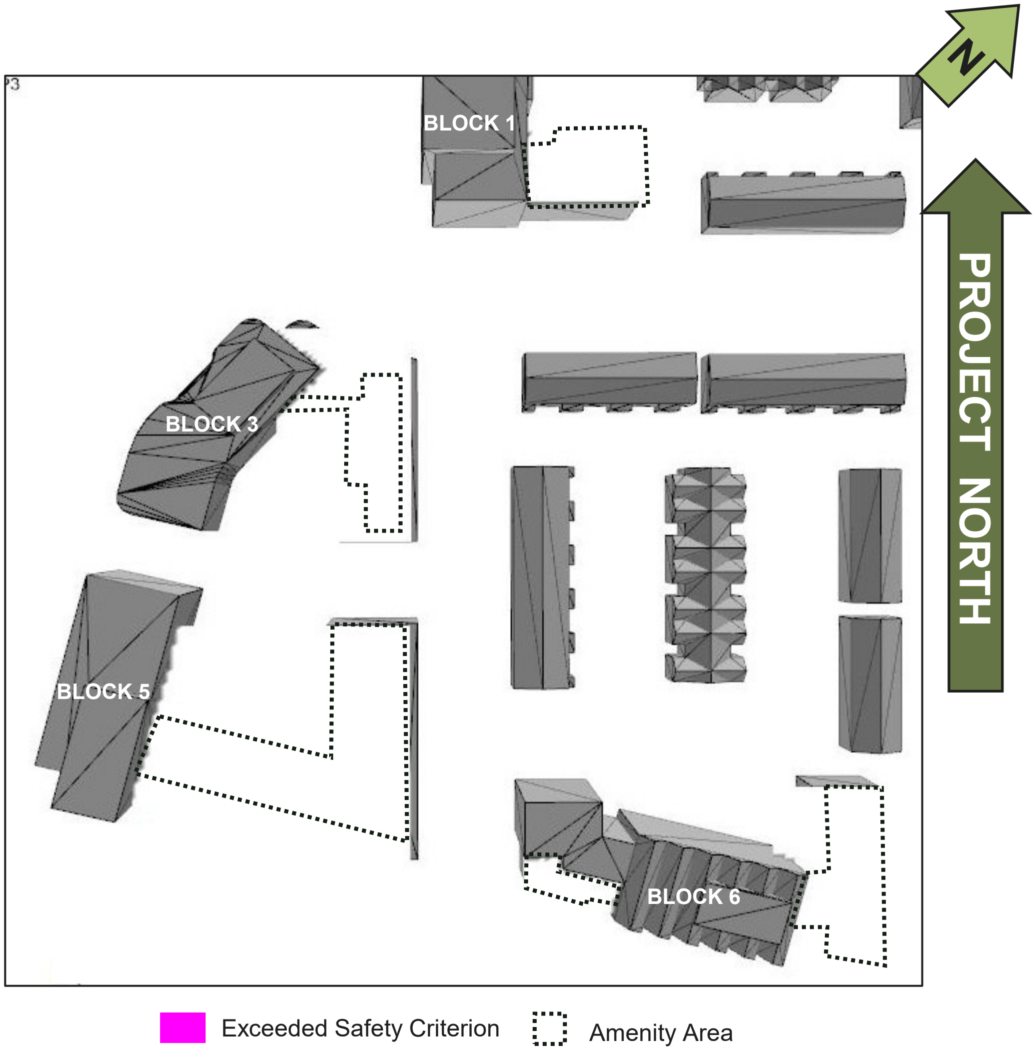


**Figure B2: Proposed Configuration – Wind safety
Annual – Amenity Terraces**