# FINAL REPORT

# 84-104 PLAINS ROAD EAST & 990 GLENWOOD AVENUE

BURLINGTON, ONTARIO

PEDESTRIAN WIND STUDY
RWDI # 2406823
May 8, 2025

## SUBMITTED TO

**David Vrhovnik**
david@miuragroup.ca

**Miura Development Group**
PO Box 75055 Millcroft
Burlington Ontario Canada L7L 6Y2
T: 905.638.2590

## SUBMITTED BY

**Jennifer Shoniker**
Technical Coordinator / Associate
Jennifer.Shoniker@rwdi.com

**Hanqing Wu, Ph.D., P.Eng.**
Senior Technical Director / Principal
Hanqing.Wu@rwdi.com

**Claire Finoro, P.Eng., PMP**
Senior Project Manager / Associate
Claire.Finoro@rwdi.com

**RWDI AIR Inc.**
600 Southgate Drive
Guelph Ontario Canada N1G 4P6
T: 519.823.1311 x2407

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# EXECUTIVE SUMMARY

RWDI AIR Inc. ("RWDI") was retained to conduct a pedestrian wind assessment for the proposed 84-104 Plains Road East & 990 Glenwood Avenue development in Burlington, ON. The assessment was based on the wind-tunnel testing conducted for the proposed development under the Existing and Proposed configurations of the site and surroundings. The results were analysed using the regional wind climate records and evaluated against the City of Burlington Pedestrian Wind Criteria for pedestrian comfort (pertaining to common wind speeds conducive to different levels of human activity) and pedestrian safety (pertaining to infrequent but strong gusts that could affect a person's footing). The predicted wind conditions are presented in Figures 1A through 2B and Table 1, and are summarized as follows:

- Wind conditions are predicted to meet the safety criterion at all areas assessed in both the Existing and Proposed configurations.
- In the Existing configuration, wind conditions at all areas assessed on and around the site are appropriate for the intended pedestrian use throughout the year.
- With the addition of the proposed development, conditions are anticipated to remain suitable for the intended use on and around the site throughout the year, including all sidewalks and building entrances.
- Wind conditions on the Level 6 amenity areas are expected to be suitable for passive activities throughout the year.

After wind tunnel testing, RWDI received an updated site plan on May 5, 2025. Our review and summary of the changes are detailed in Section 3.3 below.

# TABLE OF CONTENTS

**EXECUTIVE SUMMARY**

**1 INTRODUCTION ..... 1**

**1.1 Project Description ..... 1**

**1.2 Objectives ..... 1**

**2 BACKGROUND AND APPROACH ..... 2**

**2.1 Wind Tunnel Study Model ..... 2**

**2.2 Wind Climate Data ..... 5**

**2.3 Burlington Pedestrian Wind Criteria ..... 6**

**3 RESULTS AND DISCUSSION ..... 7**

**3.1 Grade Level (Locations 1 through 58) ..... 7**

3.1.1 Existing Conditions (Figures 1A and 2A) ..... 7

3.1.2 Proposed Conditions (Figures 1B and 2B) ..... 7

**3.2 Above-Grade Levels (Locations 83 through 96) ..... 7**

**3.3 Design Updates ..... 8**

**4 STATEMENT OF LIMITATIONS ..... 9**

**4.1 Limitations ..... 9**

**4.2 Design Assumptions ..... 9**

**5 REFERENCES ..... 10**

# LIST OF FIGURES

Figure 1A: Pedestrian Wind Comfort Conditions – Existing Configuration – Summer
Figure 1B: Pedestrian Wind Comfort Conditions – Proposed Configuration – Summer
Figure 2A: Pedestrian Wind Comfort Conditions – Existing Configuration – Winter
Figure 2B: Pedestrian Wind Comfort Conditions – Proposed Configuration – Winter

# LIST OF TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

# 1 INTRODUCTION

RWDI AIR Inc. ("RWDI") was retained to conduct a pedestrian wind assessment for the proposed 84-104 Plains Road East & 990 Glenwood Avenue development in Burlington, ON. This report presents the project objectives, approach and the main results from RWDI's assessment. Our Statement of Limitations as it pertains to this study can be found in Section 4 of this report.

## 1.1 Project Description

The proposed development site is located on the south side of Plains Road East between Birchwood Avenue and Glenwood Avenue (Image 1). The proposed building will consist of an 11-storey mixed use building with outdoor amenity spaces on the 6$^{th}$ floor.

## 1.2 Objectives

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




**Image 1: Aerial View of Existing Site and Surroundings (Photo Credit: Google™ Earth)**

# 2 BACKGROUND AND APPROACH

## 2.1 Wind Tunnel Study Model

To assess the wind environment around the proposed project, a 1:300 scale model of the project site and surroundings was constructed for the wind tunnel tests of the following configurations:

A - Existing: Existing site with existing surroundings (Image 2A), and,

B - Proposed: Proposed project with existing surroundings (Image 2B).

The wind tunnel model included all relevant surrounding buildings and topography within an approximate 360m radius around the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 60 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately 1.5 m above local grade in pedestrian areas throughout the study site. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site. Wind speeds were measured for 36 directions in 10-degree increments. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model.

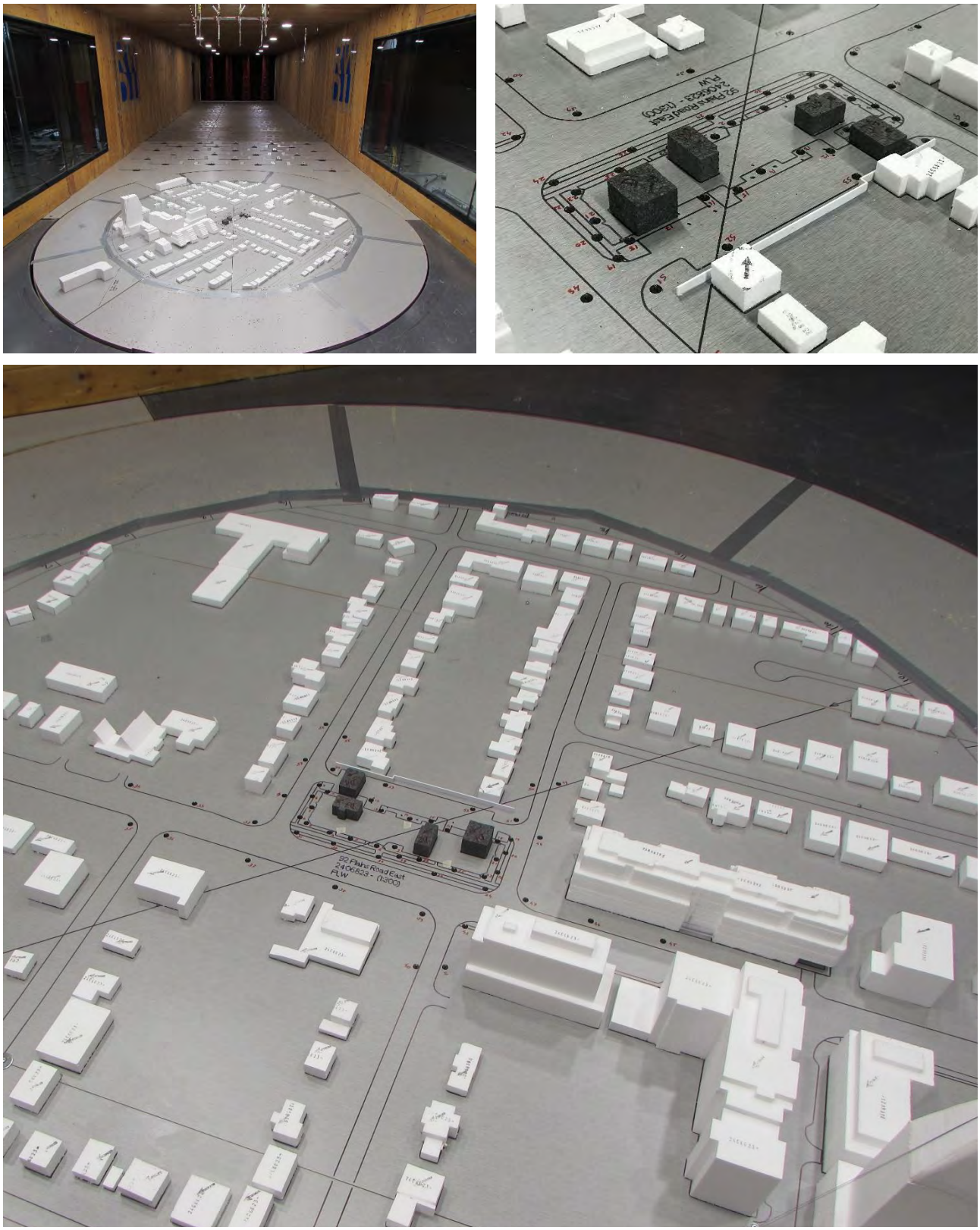


**Image 2A: Wind Tunnel Study Model – Existing Configuration**

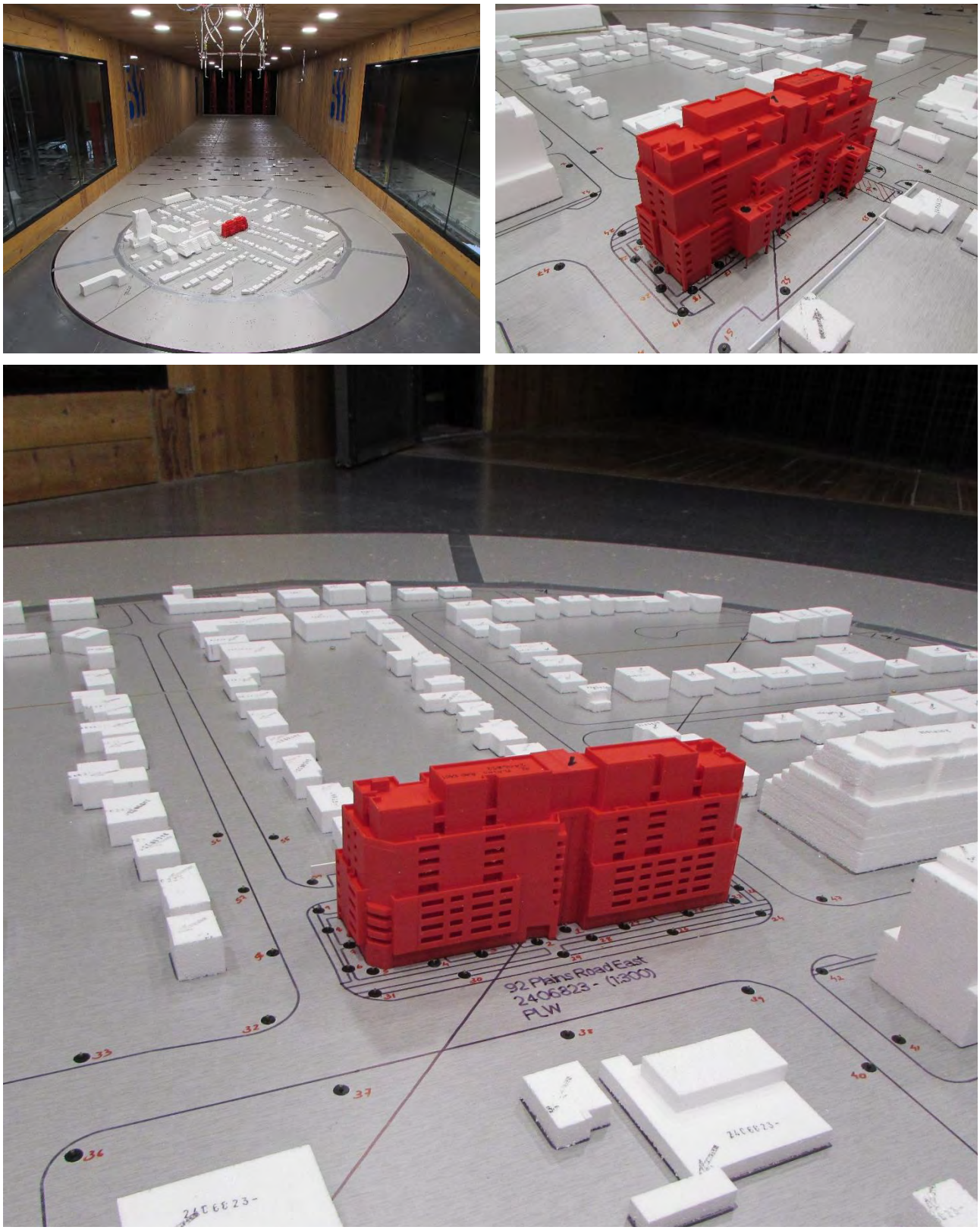
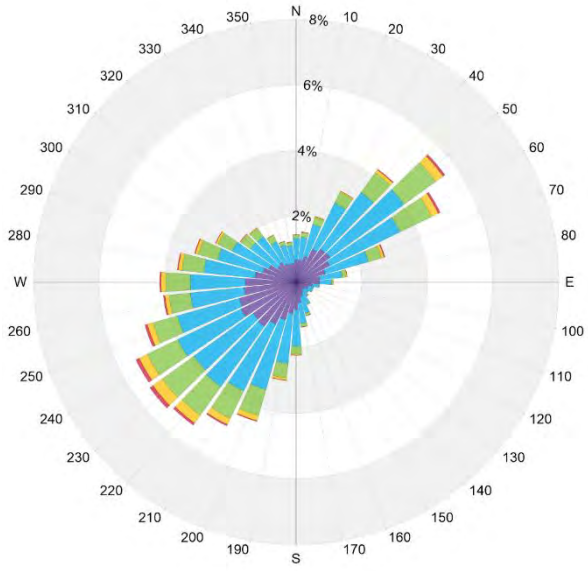



**Image 2B: Wind Tunnel Study Model – Proposed Configuration**

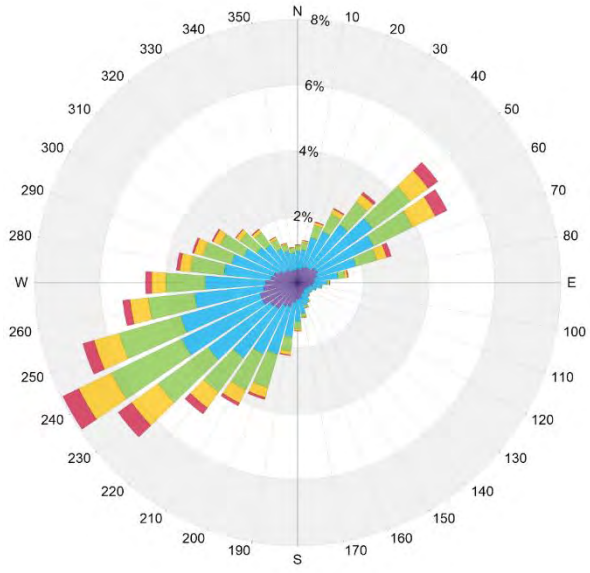
## 2.2 Wind Climate Data

Wind statistics recorded at the John C. Munro Hamilton International Airport between 1990 and 2020, inclusive, were analyzed for the Summer (May through October) and Winter (November through April) seasons. Image 3 graphically depicts the directional distributions of wind frequencies and speeds for these two seasons. Winds from the northeast and southwest directions are predominant in both seasons as indicated by the wind roses. Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10 m) occur for 3.8% of the summer and 12.6% of the winter.

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




**Summer (May – October)**




**Winter (November – April)**

| Wind Speed (km/h) | Probability (%) Summer | Winter |
|---|---|---|
| Calm | 3.9 | 2.3 |
| 1-10 | 33.7 | 21.7 |
| 11-20 | 43.1 | 39.5 |
| 21-30 | 15.5 | 23.9 |
| 31-40 | 3.0 | 9.0 |
| >40 | 0.8 | 3.6 |

**Image 3: Directional Distribution of Winds Approaching John C. Munro Hamilton International Airport between 1990 and 2020.**

## 2.3 Burlington Pedestrian Wind Criteria

The Burlington pedestrian wind criteria, developed in March 2020, are specified in the Guidelines and Terms of Reference, "Pedestrian Level Wind Study". The following defines the criterion in detail.

| Comfort Category | GEM Speed (km/h) | Description |
|---|---|---|
| **Sitting** | ≤ 10 | **Calm or light breezes**<br>• Appropriate for dedicated seating areas such as cafés, patios, and outdoor amenity areas |
| **Standing** | ≤ 14 | **Gentle breezes**<br>• Appropriate for main building entrances, bus stops, and other places where pedestrians may linger |
| **Leisurely Walking** | ≤ 17 | **Moderate winds**<br>• Appropriate for shopping and strolling along retail streets and parks |
| **Fast Walking** | ≤ 20 | **Relative higher speed winds**<br>• Appropriate for areas where pedestrians are walking, running, or cycling without lingering |
| **Uncomfortable** | > 20 | **Strong winds**<br>• Inappropriate due to nuisance for all pedestrian activities<br>• Wind mitigation measures required |

**Notes:**
(1) GEM is defined as the maximum mean wind speed or gust speed divided by 1.85 (whichever is larger). Gust speed can be directly measured in a wind tunnel or represented by mean wind speed + 3*RMS (Root Mean Square) wind speed.
(2) GEM speeds listed above are based on a seasonal exceedance of 20% of the time between 06:00 and 23:00. The criterion has been met if the wind speeds occur at least four out of five days.

| Safety Criterion | Gust Speed (km/h) | Description |
|---|---|---|
| **Exceeded** | > 90 | • Excessive gust speeds<br>• Adverse effect on pedestrian's balance and footing<br>• Wind mitigation is required |

**Notes:**
(1) Based on an annual exceedance of 9 hours or 0.1% of the time for 24 hours a day.
(2) Gust speed can be directly measured in a wind tunnel or represented by mean wind speed + 3*RMS wind speed.

# 3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on site plans in Figures 1A through 2B located in the "Figures" section of this report and the associated wind speeds are presented in Table 1, located in the "Tables" section of this report.

**Wind conditions that meet the safety criterion are predicted at all locations for both configurations assessed.**

## 3.1 Grade Level (Locations 1 through 58)

Wind conditions comfortable for leisurely or fast walking are appropriate for sidewalks and walkways as pedestrians will be active and less likely to remain in one area for prolonged periods of time. Lower wind speeds conducive to standing are preferred at main entrances where pedestrians are apt to linger. Wind speeds comfortable for sitting are preferred for areas intended for passive activities, such as outdoor patios.

### 3.1.1 Existing Conditions (Figures 1A and 2A)

Wind conditions on and around the existing project site are comfortable for sitting, standing or leisurely walking throughout the year (Figures 1A and 2A), which is appropriate for pedestrian use.

*Please note that the Existing configuration included a building that has since been demolished, along with a 3m fence along the southern boundary of the site, during testing. These features would have an insignificant impact on the study, and the results presented in the report remain valid.*

### 3.1.2 Proposed Conditions (Figures 1B and 2B)

With the addition of the proposed project, wind conditions at all locations are predicted to be similar to conditions in the Existing configuration and remain comfortable for sitting, standing or leisurely walking throughout the year which is suitable for the intended usage of the areas (Figures 1B and 2B).

The main entrance to the proposed building is located at Location 1, recessed into the middle of the north façade, where wind speeds are predicted to be comfortable for sitting throughout the year (Figures 1B and 2B).

## 3.2 Above-Grade Levels (Locations 83 through 96)

It is generally desirable for wind conditions on terraces intended for passive activities to be comfortable for sitting more than 80% of the time.

Wind speeds on the Level 6 amenity areas are expected to be comfortable for sitting throughout the year which is appropriate for passive patron activities (Figures 1B and 2B).

## 3.3 Design Updates

After wind tunnel testing, RWDI received an updated site plan on May 5, 2025. Changes include the relocation of the outdoor amenity space at grade from the north side of the building to the south side of the building as well as the addition of a commercial entrance at the northeast corner of the building.

The relocation of the amenity space to the south side of the building is not expected to have a significant impact from a wind perspective and the wind conditions in the new location are predicted to be similar to the findings of this report. With the addition of the entrance at the northeast building corner, wind speeds during the winter are expected to be comfortable for leisurely walking which is high than desired for an entrance location. If feasible, it is recommended to recess this entrance into the façade or alternatively add tall wind screens or planters on either side of the door to provide a sheltered space.

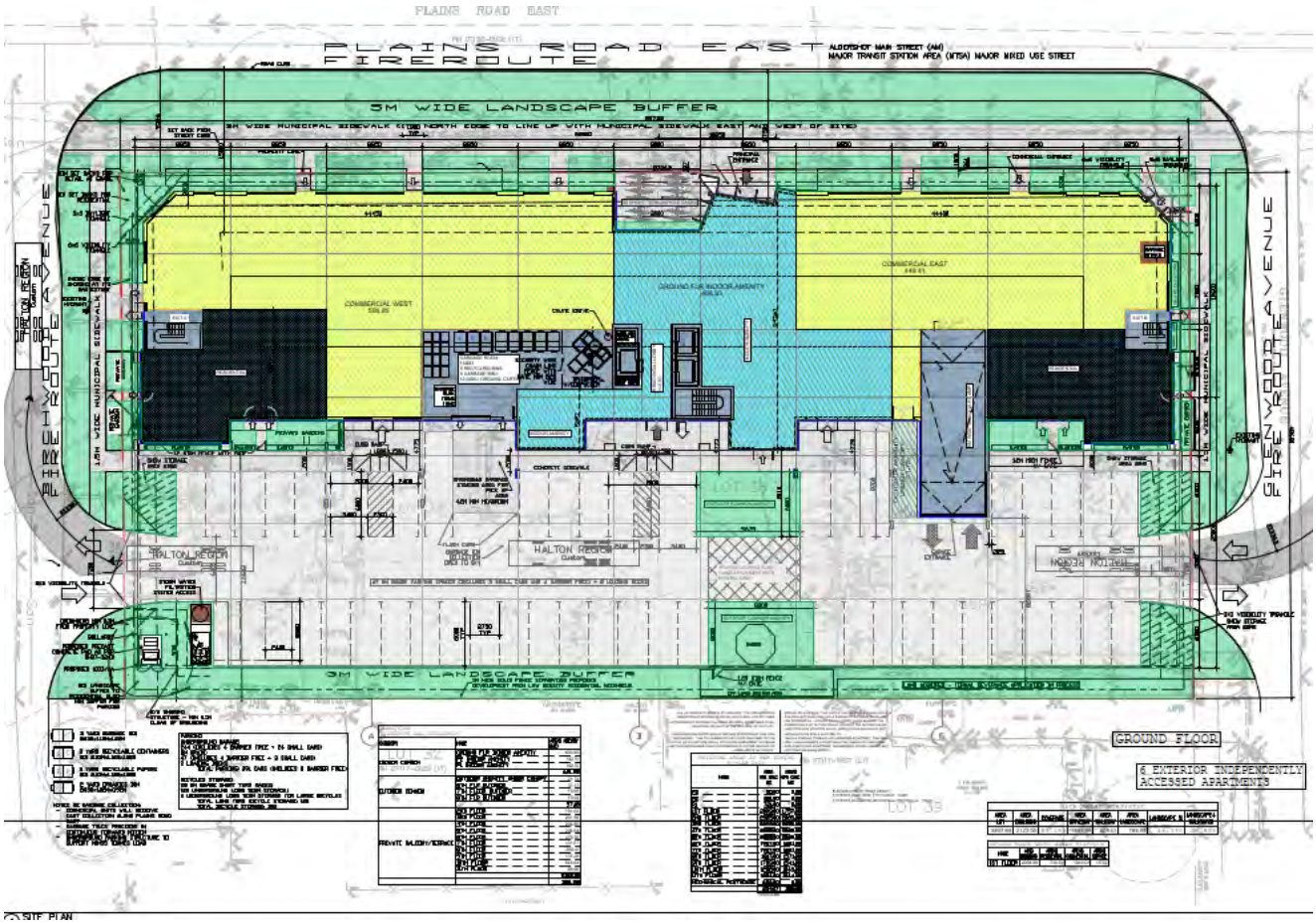



**Image 4: Updated Site**

# 4 STATEMENT OF LIMITATIONS

## 4.1 Limitations

This report entitled was prepared by RWDI AIR Inc. ("RWDI") for Miura Development Group ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

## 4.2 Design Assumptions

RWDI confirms that the pedestrian wind assessment (the "**Assessment**") discussed herein was performed by RWDI in accordance with generally accepted professional standards at the time when the Assessment was performed and in the location of the Project. No other representations, warranties, or guarantees are made with respect to the accuracy or completeness of the information, findings, recommendations, or conclusions contained in this Report. This report is not a legal opinion regarding compliance with applicable laws.

The findings and recommendations set out in this report are based on the following information disclosed to RWDI. Drawings and information listed below were received and used to construct the scale model of the proposed 84-104 Plains Road East & 990 Glenwood Avenue project.

| File Name | File Type | Date Received (dd/mm/yyyy) |
|---|---|---|
| **Miura Development Group** | AutoCAD | 11/10/2024 |
| **Site Plan** | PDF | 24/10/2024 |
| **2535-24-12-19-Conceptual Landscape Plan** | PDF | 19/12/2024 |
| **Plains Road Site and Floor Plans** | PDF | 07/05/2025 |

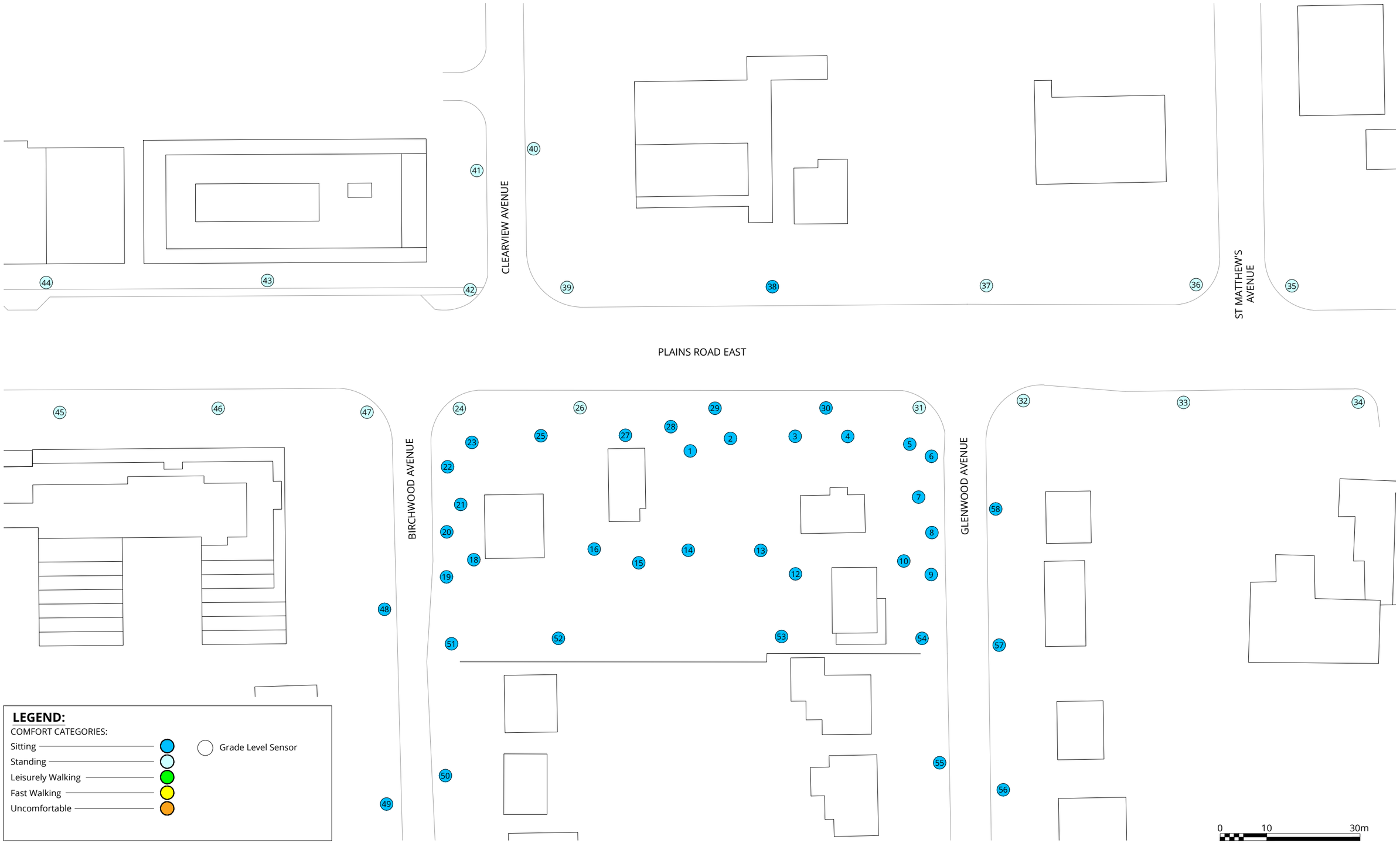
The recommendations and conclusions are based on the assumption that the Project Data and Climate Data are accurate and complete. RWDI assumes no responsibility for any inaccuracy or deficiency in information it has received from others. In addition, the recommendations and conclusions in this report are partially based on historical data and can be affected by a number of external factors, including but not limited to Project design, quality of materials and construction, site conditions, meteorological events, and climate change. As such, the conclusions and recommendations contained in this report do not list every possible outcome.

The opinions in this report can only be relied upon to the extent that the Project Data and Project Specific Conditions have not changed. Any change in the Project Data or Project Specific Conditions not reflected in this report can impact and/or alter the recommendations and conclusions in this report. Therefore, it is incumbent upon the Client and/or any other third party reviewing the recommendations and conclusions in this report to contact RWDI in the event of any change in the Project Data and Project Specific Conditions in order to determine whether any such change(s) may impact the assumptions upon which the recommendations and conclusions were made.

# 5 REFERENCES

1. ASCE Task Committee on Outdoor Human Comfort (2004). *Outdoor Human Comfort and Its Assessment*, 68 pages, American Society of Civil Engineers, Reston, Virginia, USA.
2. Williams, C.J., Hunter, M.A. and Waechter, W.F. (1990). "Criteria for Assessing the Pedestrian Wind Environment," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.36, pp.811-815.
3. Williams, C.J., Soligo M.J. and Cote, J. (1992). "A Discussion of the Components for a Comprehensive Pedestrian Level Comfort Criteria," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.41-44, pp.2389-2390.
4. Soligo, M.J., Irwin, P.A., and Williams, C.J. (1993). "Pedestrian Comfort Including Wind and Thermal Effects," *Third Asia-Pacific Symposium on Wind Engineering*, Hong Kong.
5. Soligo, M.J., Irwin, P.A., Williams, C.J. and Schuyler, G.D. (1998). "A Comprehensive Assessment of Pedestrian Comfort Including Thermal Effects," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.77&78, pp.753-766.
6. Williams, C.J., Wu, H., Waechter, W.F. and Baker, H.A. (1999). "Experiences with Remedial Solutions to Control Pedestrian Wind Problems," *Tenth International Conference on Wind Engineering*, Copenhagen, Denmark.
7. Lawson, T.V. (1973). "Wind Environment of Buildings: A Logical Approach to the Establishment of Criteria", *Report No. TVL 7321*, Department of Aeronautic Engineering, University of Bristol, Bristol, England.
8. Durgin, F. H. (1997). "Pedestrian Level Wind Criteria Using the Equivalent average", *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 66, pp.215-226.
9. Wu, H. and Kriksic, F. (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.104-106, pp.397-407.
10. Wu, H., Williams, C.J., Baker, H.A. and Waechter, W.F. (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004,* Nashville, Tennessee.

# FIGURES




**LEGEND:**

COMFORT CATEGORIES:

- Sitting
- Standing
- Leisurely Walking
- Fast Walking
- Uncomfortable

Grade Level Sensor

**Pedestrian Wind Comfort Conditions**

Existing Configuration

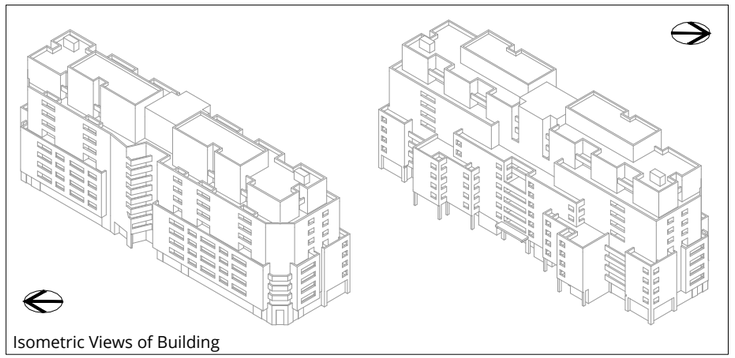
Summer (May to October, 6:00 to 23:00)

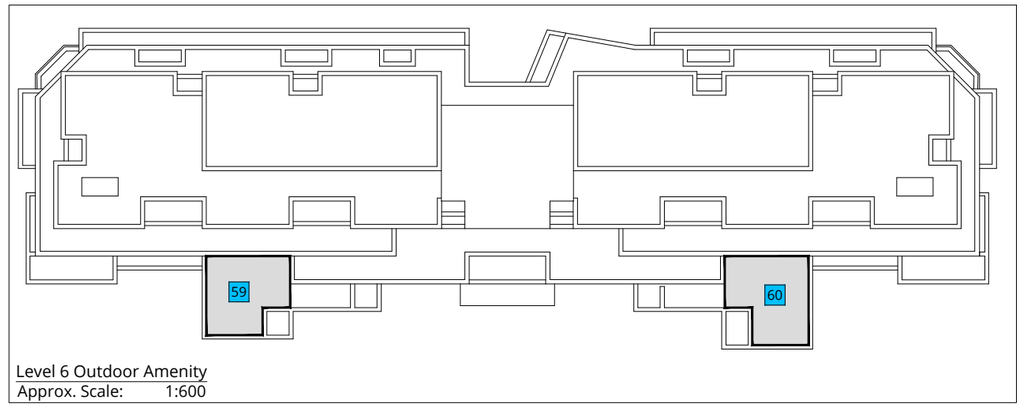
84-104 Plains Road East & 990 Glenwood Avenue - Burlington, ON

True North

Project #2406823

| | | | |
|---|---|---|---|
| Drawn by: | GRE | Figure: | 1A |
| Approx. Scale: | 1:750 | | |
| Date Revised: | Nov. 19, 2024 | | |




CLEARVIEW AVENUE

ST MATTHEW'S AVENUE

PLAINS ROAD EAST

BIRCHWOOD AVENUE

GLENWOOD AVENUE

**LEGEND:**

COMFORT CATEGORIES:

- Sitting
- Standing
- Leisurely Walking
- Fast Walking
- Uncomfortable

- Grade Level Sensor
- Above Grade Level Sensor
- Building Above Removed for Clarity
- Main Entrance Location

0 10 30m

# Pedestrian Wind Comfort Conditions

Proposed Configuration

Summer (May to October, 6:00 to 23:00)

84-104 Plains Road East & 990 Glenwood Avenue - Burlington, ON

True North

Project #2406823

| | |
|---|---|
| Drawn by: GRE | Figure: 1B |
| Approx. Scale: | 1:750 |
| Date Revised: | Nov. 19, 2024 |

CLEARVIEW AVENUE

ST MATTHEW'S AVENUE

PLAINS ROAD EAST

BIRCHWOOD AVENUE

GLENWOOD AVENUE

**LEGEND:**

COMFORT CATEGORIES:

- Sitting
- Standing
- Leisurely Walking
- Fast Walking
- Uncomfortable

Grade Level Sensor

0 10 30m

# Pedestrian Wind Comfort Conditions

Existing Configuration

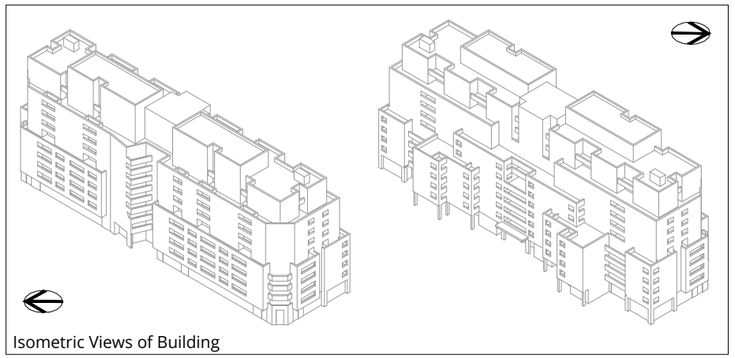
Winter (November to April, 6:00 to 23:00)

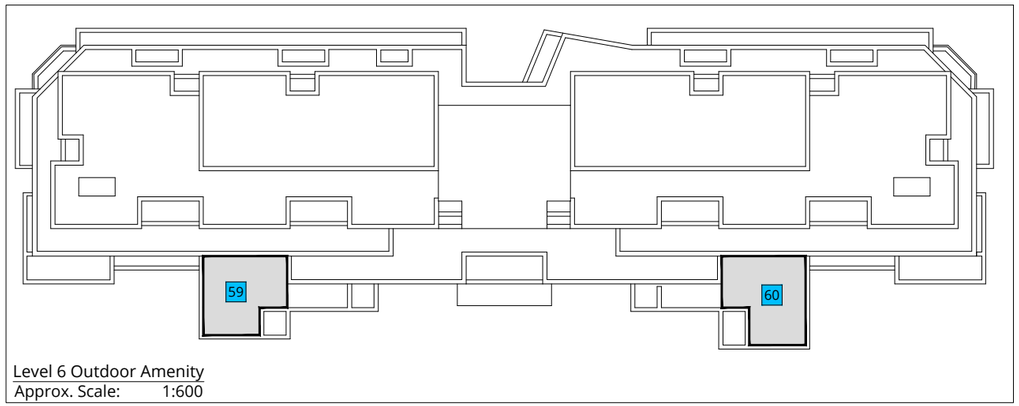
84-104 Plains Road East & 990 Glenwood Avenue - Burlington, ON

True North

Project #2406823

| | | | |
|---|---|---|---|
| Drawn by: | GRE | Figure: | 2A |
| Approx. Scale: | 1:750 | | |
| Date Revised: | Nov. 19, 2024 | | |




CLEARVIEW AVENUE

ST MATTHEW'S AVENUE

PLAINS ROAD EAST

BIRCHWOOD AVENUE

GLENWOOD AVENUE

**LEGEND:**

COMFORT CATEGORIES:

- Sitting
- Standing
- Leisurely Walking
- Fast Walking
- Uncomfortable

- Grade Level Sensor
- Above Grade Level Sensor
- Building Above Removed for Clarity
- Main Entrance Location

0 10 30m

# Pedestrian Wind Comfort Conditions

Proposed Configuration

Winter (November to April, 6:00 to 23:00)

84-104 Plains Road East & 990 Glenwood Avenue - Burlington, ON

True North

Project #2406823

| | | | |
|---|---|---|---|
| Drawn by: | GRE | Figure: | 2B |
| Approx. Scale: | 1:750 | | |
| Date Revised: | Nov. 19, 2024 | | |

# TABLES

## Table 1: Pedestrian Wind Comfort and Safety Conditions

| Location | Configuration | Wind Comfort | | | | Wind Safety | |
|---|---|---|---|---|---|---|---|
| | | Summer | | Winter | | Annual | |
| | | Speed (km/h) | Rating | Speed (km/h) | Rating | Speed (km/h) | Rating |
| 1 | Existing | 9 | Sitting | 11 | Standing | 46 | Pass |
| | Proposed | 6 | Sitting | 7 | Sitting | 38 | Pass |
| 2 | Existing | 9 | Sitting | 12 | Standing | 47 | Pass |
| | Proposed | 7 | Sitting | 8 | Sitting | 33 | Pass |
| 3 | Existing | 10 | Sitting | 12 | Standing | 51 | Pass |
| | Proposed | 9 | Sitting | 11 | Standing | 48 | Pass |
| 4 | Existing | 10 | Sitting | 12 | Standing | 50 | Pass |
| | Proposed | 10 | Sitting | 13 | Standing | 63 | Pass |
| 5 | Existing | 10 | Sitting | 12 | Standing | 50 | Pass |
| | Proposed | 14 | Standing | 17 | Leisurely Walking | 89 | Pass |
| 6 | Existing | 10 | Sitting | 12 | Standing | 50 | Pass |
| | Proposed | 11 | Standing | 14 | Standing | 67 | Pass |
| 7 | Existing | 9 | Sitting | 12 | Standing | 46 | Pass |
| | Proposed | 8 | Sitting | 9 | Sitting | 51 | Pass |
| 8 | Existing | 8 | Sitting | 10 | Sitting | 44 | Pass |
| | Proposed | 9 | Sitting | 10 | Sitting | 61 | Pass |
| 9 | Existing | 8 | Sitting | 9 | Sitting | 42 | Pass |
| | Proposed | 12 | Standing | 14 | Standing | 67 | Pass |
| 10 | Existing | 8 | Sitting | 10 | Sitting | 41 | Pass |
| | Proposed | 6 | Sitting | 8 | Sitting | 40 | Pass |
| 11 | Existing | - | - | - | - | - | - |
| | Proposed | 5 | Sitting | 6 | Sitting | 38 | Pass |
| 12 | Existing | 8 | Sitting | 10 | Sitting | 41 | Pass |
| | Proposed | 7 | Sitting | 8 | Sitting | 33 | Pass |
| 13 | Existing | 8 | Sitting | 10 | Sitting | 43 | Pass |
| | Proposed | 5 | Sitting | 6 | Sitting | 24 | Pass |
| 14 | Existing | 8 | Sitting | 10 | Sitting | 42 | Pass |
| | Proposed | 4 | Sitting | 5 | Sitting | 23 | Pass |
| 15 | Existing | 9 | Sitting | 11 | Standing | 50 | Pass |
| | Proposed | 6 | Sitting | 7 | Sitting | 33 | Pass |
| 16 | Existing | 9 | Sitting | 12 | Standing | 46 | Pass |
| | Proposed | 7 | Sitting | 8 | Sitting | 36 | Pass |
| 17 | Existing | 5 | Sitting | 6 | Sitting | 24 | Pass |
| | Proposed | 6 | Sitting | 8 | Sitting | 31 | Pass |

## Table 1: Pedestrian Wind Comfort and Safety Conditions

| Location | Configuration | Wind Comfort | | | | Wind Safety | |
|---|---|---|---|---|---|---|---|
| | | Summer | | Winter | | Annual | |
| | | Speed (km/h) | Rating | Speed (km/h) | Rating | Speed (km/h) | Rating |
| **18** | Existing | 8 | Sitting | 10 | Sitting | 42 | Pass |
| | Proposed | 6 | Sitting | 7 | Sitting | 32 | Pass |
| **19** | Existing | 8 | Sitting | 9 | Sitting | 39 | Pass |
| | Proposed | 11 | Standing | 14 | Standing | 55 | Pass |
| **20** | Existing | 8 | Sitting | 10 | Sitting | 45 | Pass |
| | Proposed | 10 | Sitting | 12 | Standing | 49 | Pass |
| **21** | Existing | 9 | Sitting | 11 | Standing | 52 | Pass |
| | Proposed | 9 | Sitting | 11 | Standing | 42 | Pass |
| **22** | Existing | 9 | Sitting | 11 | Standing | 47 | Pass |
| | Proposed | 10 | Sitting | 12 | Standing | 60 | Pass |
| **23** | Existing | 10 | Sitting | 12 | Standing | 50 | Pass |
| | Proposed | 12 | Standing | 15 | Leisurely Walking | 68 | Pass |
| **24** | Existing | 12 | Standing | 14 | Standing | 56 | Pass |
| | Proposed | 13 | Standing | 15 | Leisurely Walking | 62 | Pass |
| **25** | Existing | 10 | Sitting | 12 | Standing | 50 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 54 | Pass |
| **26** | Existing | 11 | Standing | 13 | Standing | 52 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 53 | Pass |
| **27** | Existing | 10 | Sitting | 12 | Standing | 49 | Pass |
| | Proposed | 9 | Sitting | 11 | Standing | 43 | Pass |
| **28** | Existing | 10 | Sitting | 12 | Standing | 48 | Pass |
| | Proposed | 9 | Sitting | 12 | Standing | 46 | Pass |
| **29** | Existing | 10 | Sitting | 13 | Standing | 50 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 62 | Pass |
| **30** | Existing | 10 | Sitting | 13 | Standing | 52 | Pass |
| | Proposed | 12 | Standing | 15 | Leisurely Walking | 82 | Pass |
| **31** | Existing | 11 | Standing | 13 | Standing | 53 | Pass |
| | Proposed | 13 | Standing | 16 | Leisurely Walking | 71 | Pass |
| **32** | Existing | 11 | Standing | 13 | Standing | 54 | Pass |
| | Proposed | 11 | Standing | 14 | Standing | 53 | Pass |
| **33** | Existing | 11 | Standing | 14 | Standing | 54 | Pass |
| | Proposed | 10 | Sitting | 13 | Standing | 52 | Pass |
| **34** | Existing | 11 | Standing | 14 | Standing | 58 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 56 | Pass |

**Table 1: Pedestrian Wind Comfort and Safety Conditions**

| Location | Configuration | Wind Comfort | | | | Wind Safety | |
|---|---|---|---|---|---|---|---|
| | | Summer | | Winter | | Annual | |
| | | Speed (km/h) | Rating | Speed (km/h) | Rating | Speed (km/h) | Rating |
| **35** | Existing | 11 | Standing | 14 | Standing | 58 | Pass |
| | Proposed | 10 | Sitting | 13 | Standing | 57 | Pass |
| **36** | Existing | 11 | Standing | 14 | Standing | 56 | Pass |
| | Proposed | 10 | Sitting | 13 | Standing | 54 | Pass |
| **37** | Existing | 11 | Standing | 14 | Standing | 57 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 56 | Pass |
| **38** | Existing | 10 | Sitting | 12 | Standing | 54 | Pass |
| | Proposed | 12 | Standing | 14 | Standing | 60 | Pass |
| **39** | Existing | 11 | Standing | 13 | Standing | 55 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 53 | Pass |
| **40** | Existing | 11 | Standing | 14 | Standing | 59 | Pass |
| | Proposed | 11 | Standing | 14 | Standing | 59 | Pass |
| **41** | Existing | 12 | Standing | 15 | Leisurely Walking | 65 | Pass |
| | Proposed | 11 | Standing | 14 | Standing | 67 | Pass |
| **42** | Existing | 12 | Standing | 15 | Leisurely Walking | 65 | Pass |
| | Proposed | 13 | Standing | 15 | Leisurely Walking | 71 | Pass |
| **43** | Existing | 11 | Standing | 13 | Standing | 59 | Pass |
| | Proposed | 10 | Sitting | 12 | Standing | 56 | Pass |
| **44** | Existing | 12 | Standing | 14 | Standing | 68 | Pass |
| | Proposed | 12 | Standing | 15 | Leisurely Walking | 68 | Pass |
| **45** | Existing | 13 | Standing | 16 | Leisurely Walking | 61 | Pass |
| | Proposed | 12 | Standing | 15 | Leisurely Walking | 58 | Pass |
| **46** | Existing | 13 | Standing | 16 | Leisurely Walking | 75 | Pass |
| | Proposed | 12 | Standing | 15 | Leisurely Walking | 61 | Pass |
| **47** | Existing | 12 | Standing | 15 | Leisurely Walking | 59 | Pass |
| | Proposed | 12 | Standing | 15 | Leisurely Walking | 62 | Pass |
| **48** | Existing | 9 | Sitting | 10 | Sitting | 53 | Pass |
| | Proposed | 10 | Sitting | 13 | Standing | 56 | Pass |
| **49** | Existing | 8 | Sitting | 9 | Sitting | 40 | Pass |
| | Proposed | 8 | Sitting | 10 | Sitting | 48 | Pass |
| **50** | Existing | 7 | Sitting | 9 | Sitting | 34 | Pass |
| | Proposed | 8 | Sitting | 10 | Sitting | 46 | Pass |
| **51** | Existing | 9 | Sitting | 11 | Standing | 43 | Pass |
| | Proposed | 11 | Standing | 14 | Standing | 57 | Pass |

## Table 1: Pedestrian Wind Comfort and Safety Conditions

| Location | Configuration | Wind Comfort | | | | Wind Safety | |
|---|---|---|---|---|---|---|---|
| | | Summer | | Winter | | Annual | |
| | | Speed (km/h) | Rating | Speed (km/h) | Rating | Speed (km/h) | Rating |
| **52** | Existing | 8 | Sitting | 10 | Sitting | 41 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 55 | Pass |
| **53** | Existing | 7 | Sitting | 9 | Sitting | 36 | Pass |
| | Proposed | 11 | Standing | 14 | Standing | 64 | Pass |
| **54** | Existing | 7 | Sitting | 9 | Sitting | 38 | Pass |
| | Proposed | 10 | Sitting | 12 | Standing | 54 | Pass |
| **55** | Existing | 8 | Sitting | 10 | Sitting | 41 | Pass |
| | Proposed | 8 | Sitting | 10 | Sitting | 51 | Pass |
| **56** | Existing | 8 | Sitting | 10 | Sitting | 43 | Pass |
| | Proposed | 9 | Sitting | 11 | Standing | 48 | Pass |
| **57** | Existing | 9 | Sitting | 11 | Standing | 48 | Pass |
| | Proposed | 11 | Standing | 13 | Standing | 61 | Pass |
| **58** | Existing | 8 | Sitting | 11 | Standing | 45 | Pass |
| | Proposed | 12 | Standing | 14 | Standing | 67 | Pass |
| **59** | Existing | - | - | - | - | - | - |
| | Proposed | 7 | Sitting | 9 | Sitting | 46 | Pass |
| **60** | Existing | - | - | - | - | - | - |
| | Proposed | 8 | Sitting | 9 | Sitting | 44 | Pass |

| Season | Months | Hours |
|---|---|---|
| **Summer** | May - October | 6:00 - 23:00 for comfort |
| **Winter** | November - April | 6:00 - 23:00 for comfort |
| **Annual** | January - December | 0:00 - 23:00 for safety |

| Configurations | |
|---|---|
| **Existing** | Existing site and surroundings |
| **Proposed** | Project with existing surroundings |

| Comfort Speed (km/h) | |
|---|---|
| (20% Seasonal Exceedance) | |
| ≤ 10 | Sitting |
| 11 - 14 | Standing |
| 15 - 17 | Leisurely Walking |
| 18 - 20 | Fast Walking |
| > 20 | Uncomfortable |

| Safety Speed (km/h) | |
|---|---|
| (0.1% Annual Exceedance) | |
| ≤ 90 | Pass |
| > 90 | Exceeded |