REPORT

517 PLAINS ROAD EAST

BURLINGTON, ONTARIO

PEDESTRIAN WIND COMFORT ASSESSMENT

PROJECT #2601952

March 12, 2026

SUBMITTED TO

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1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained to conduct a pedestrian wind assessment for the proposed project at 517 Plains Road East in Burlington, Ontario. The objective of this assessment is to provide an evaluation of the potential wind impact of the proposed development in support of the Zoning By-law Amendment (ZBA) and Official Plan Amendment (OPA).

The project site is located on Plains Road East, south of Mary Street and west of Joan Drive. The site is currently a parking lot and is primarily surrounded by low- and mid-rise suburban neighbourhoods in all directions (Image 1).

The project is a mixed-use 11-storey building with 179 residential units and 8 commercial units at grade, with a total gross floor area of approximately 13,573.98 m² (Image 2). Key areas of interest for this assessment include residential and commercial entrances, a parking lot, large balconies at Levels 3 to 11, as well as the public sidewalks and properties surrounding the project site (Image 3).

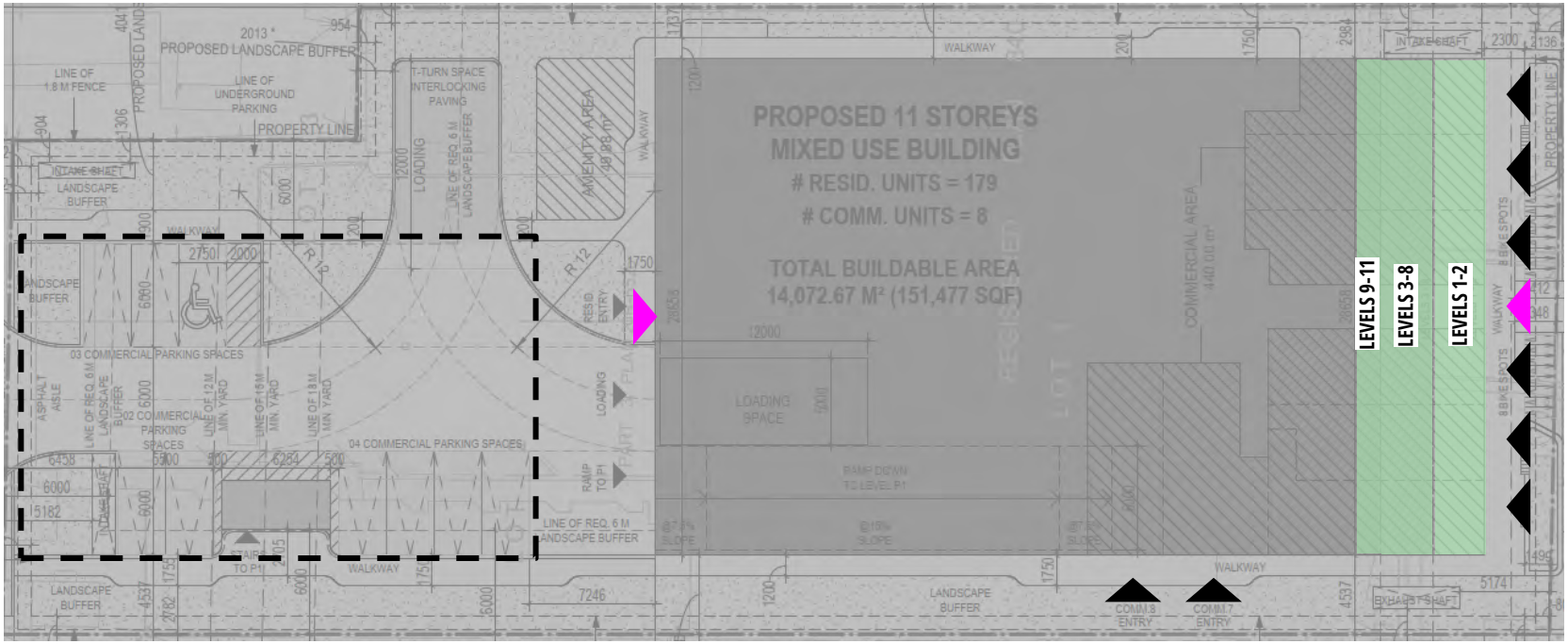


Image 1: Aerial view of the existing site and surroundings
Source: Google Maps



Image 2: 3D architectural render of the proposed development

1. INTRODUCTION



Residential Entrance **Commercial Entrance** **Parking Lot** **Balcony**

True North Project North

Image 3: Floor Plan Identifying Key Areas of Interest

2. METHODOLOGY

2.1 Objective

The objective of this assessment is to provide an evaluation of the potential impact of the proposed development on wind conditions in pedestrian areas on and around it based on Computational Fluid Dynamics (CFD) modelling. The assessment is based on the following:

- A review of the regional long-term meteorological data from Hamilton International Airport;
- Architectural plans of the proposed project received on January 15, 2026, and a 3D model received on December 22, 2025;
- The use of *Orbital Stack*, an in-house CFD tool;
- RWDI's engineering judgment, experience, and expert knowledge of wind flows around buildings[1-3]; and,
- The City of Burlington wind comfort and safety criteria.

Note that other wind and microclimate issues such as those relating to cladding and structural wind loads, door operability, snow impact, etc. are not part of the scope of this assessment.

2.2 CFD for Wind Simulation

CFD is a numerical technique that can be used for simulating wind flows in complex environments. For this analysis, CFD techniques were used to generate a virtual wind tunnel where flows around the site and its surroundings were simulated in full scale. The computational domain that covered the site and its surroundings was divided into millions of small cells where calculations were performed, yielding a prediction of wind conditions across the entire study domain. CFD excels as a tool for wind modelling, Presenting design advice appropriate for this stage of the planning approvals process, comparing different design and site scenarios, resolving complex flow physics, and helping diagnose problematic wind conditions.

While the computational modelling method used in the current assessment does not explicitly simulate the transient behaviour of turbulent wind, its effects were estimated based on other calculated quantities. RWDI has found this approach to be appropriate for the assessment of typical wind comfort conditions. Wind safety issues, which relate to transient, higher-speed gusts, are discussed qualitatively, based on the CFD predictions and our extensive wind-tunnel experience for similar projects.

In order to quantify the transient behaviour of wind and refine any conceptual mitigation measures, a more detailed assessment would be required using either boundary-layer wind tunnel or transient computational modelling.

2. METHODOLOGY

2.3 Simulation Model

CFD simulations were completed for two scenarios:

- Existing: Existing site and surroundings; and
- Proposed: Proposed development with the existing surroundings.

The computer model of the proposed masterplan development is shown in Image 4, and the Existing and Proposed scenarios are shown in Images 5a and 5b, respectively. The 3D models were simplified to include only the necessary building and terrain details that would affect the local wind flows in the area and around the site. Landscaping and other smaller architectural and accessory features were not included in the computer model to provide more conservative wind conditions (as is the norm for this level of assessment).

The wind approaching the modelled area were simulated for 16 directions (starting at 0°, at 22.5° increments around the compass), accounting for the effects of the atmospheric boundary layer and terrain impacts. Wind data were obtained in the form of ratios of wind speeds at approximately 1.5 m above concerned levels, to the mean wind speed at a reference height. The data was then combined with meteorological records obtained from Hamilton International Airport to determine the wind speeds and frequencies in the simulated areas.

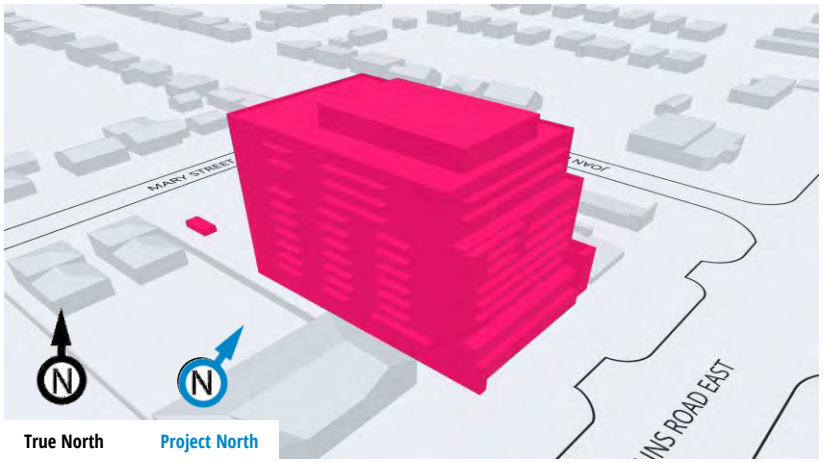




Image 4: Computer model of the proposed development

2. METHODOLOGY

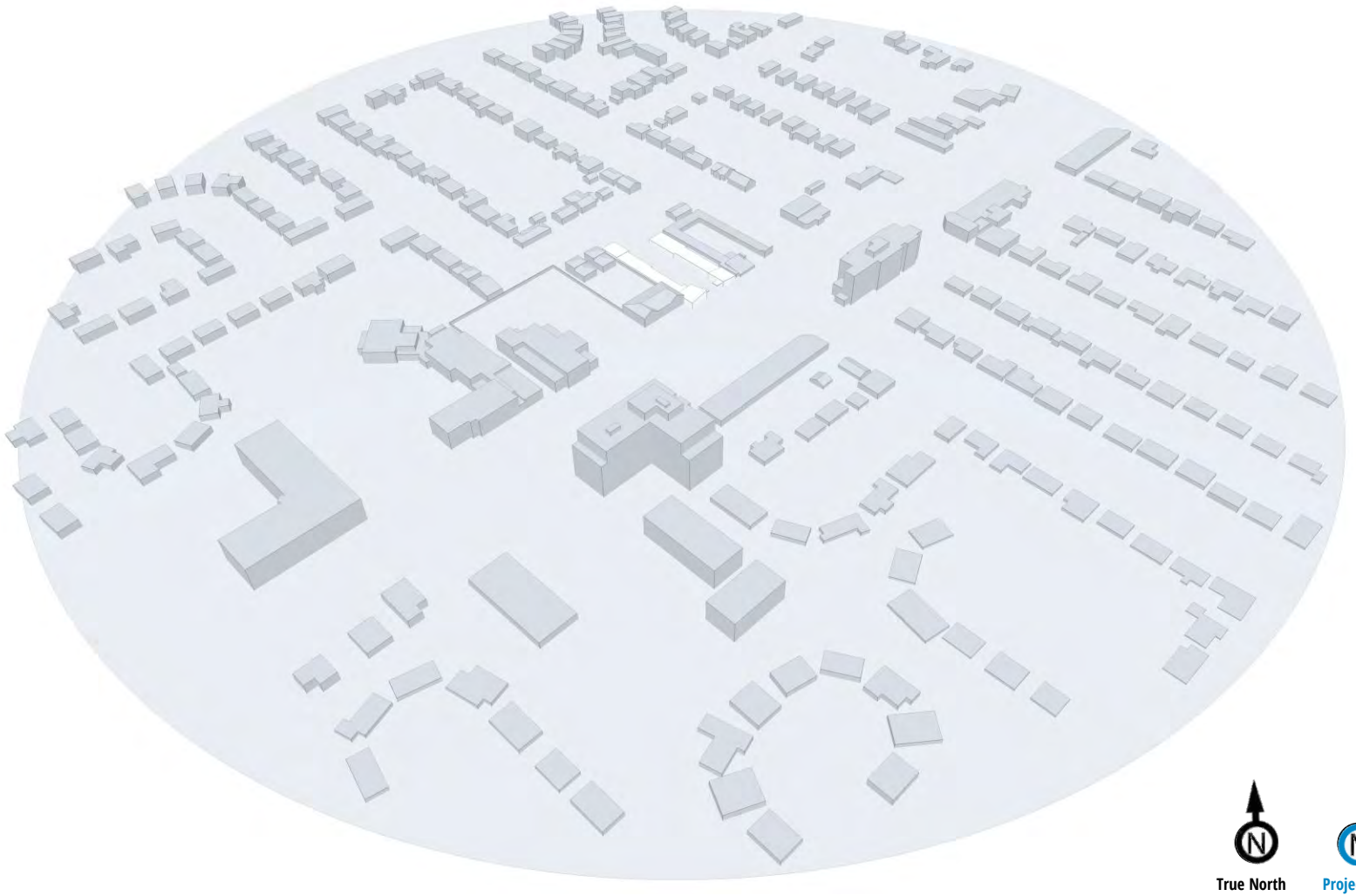


Image 5a: Computer model of the existing site and extended surroundings

2. METHODOLOGY

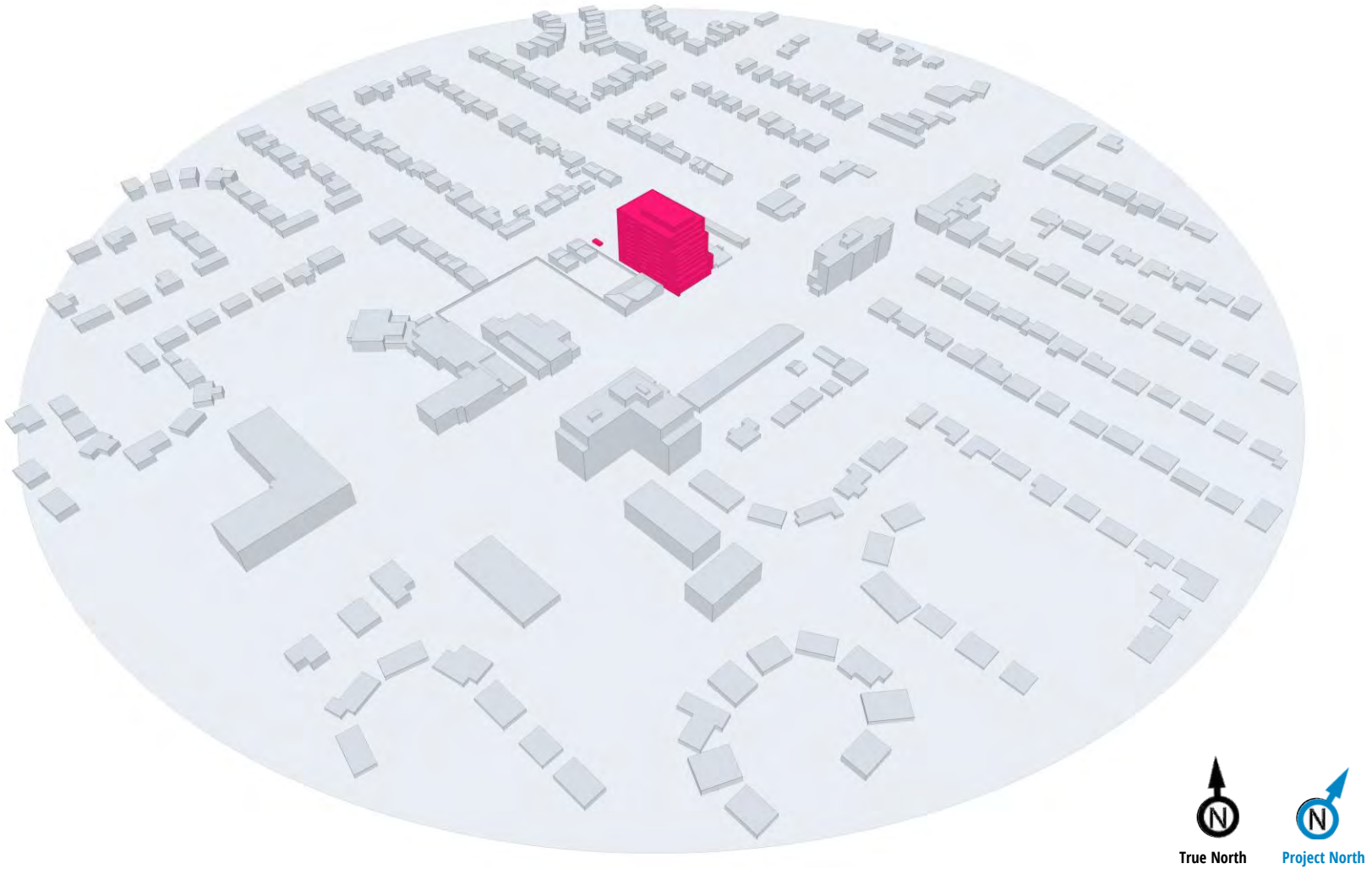


Image 5b: Computer model of the proposed development and extended surroundings

3. METEOROLOGICAL DATA

Wind statistics recorded at Hamilton International Airport between 1994 and 2024, inclusive, were analyzed for the summer (May to October) and winter (November to April) months. Image 6 graphically depicts the directional distributions of wind frequencies and speeds for these periods.

Winds from the northeast and southwest are predominant in both summer and winter, 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) are more frequent in the winter (red and yellow bands in Image 6). These winds potentially could be the source of uncomfortable or severe wind conditions, depending on the site exposure and development design.

Wind statistics were combined with the simulated data to predict the wind conditions at the project site and assessed against the wind criteria for pedestrian comfort.

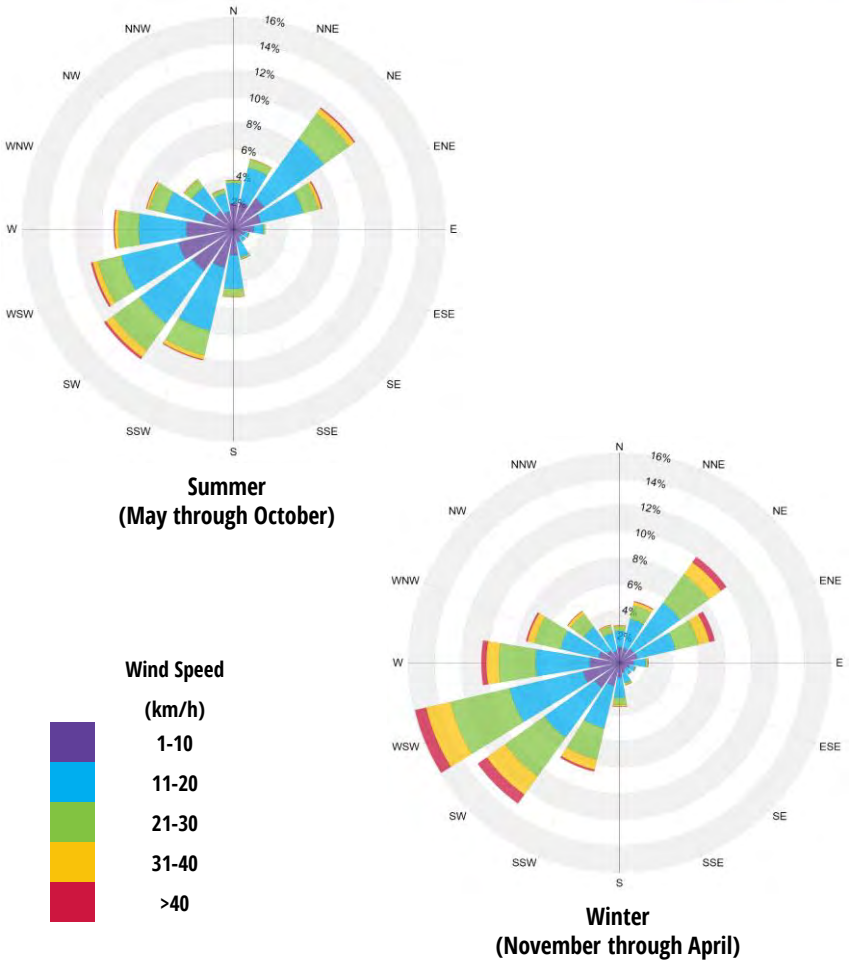


Image 6: Directional distribution of wind approaching Hamilton International Airport (1994 to 2024)

4. WIND CRITERIA

The *Wind Impact Criteria* specified in the *Pedestrian Level Wind Study Guidelines and Terms of Reference* (Guidelines) adopted by the City of Burlington in March 2020 are used in this study. The table to the right presents the criteria.

4.1 Pedestrian Comfort

Pedestrian comfort is associated with common wind speeds conducive to different levels of human activity. The assessment considers winds occurring between 6 AM and 11 PM as required by the Guidelines. Wind conditions are considered suitable for sitting, standing, leisurely walking or fast walking if the associated mean wind speeds (see table) are expected for at least four out of five days (**80% of the time**). Speeds that exceed the criterion for Fast Walking are categorized as Uncomfortable.

4.2 Pedestrian Safety

Pedestrian safety is associated with excessive Gust Speeds that can adversely affect a person's balance and footing (based on an annual exceedance of **9 hours or 0.1% of the time**). These are usually infrequent events but deserve special attention due to the potential impact on pedestrian safety.

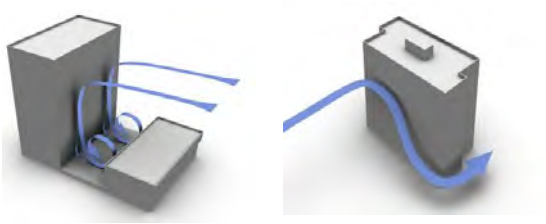
Comfort Category	GEM Speed (km/h)	Description
Sitting	≤ 10	Calm or light breezes • Appropriate for dedicated seating areas such as cafes, patios, and outdoor amenity areas
Standing	≤ 14	Gentle breezes • Appropriate for main building entrances, bus stops, and other places where pedestrians may linger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

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

5. RESULTS AND DISCUSSION

5.1 General Wind Flow Mechanisms

Wind generally tends to flow over buildings of uniform height, without disruption. Buildings that are taller than their surroundings tend to intercept and redirect winds around them. The mechanism in which winds are directed down the height of a building is called *Downwashing*. These flows subsequently move around exposed building corners, causing a localized increase in wind activity due to *Corner Acceleration*. Stepped massing, and canopies that are on the windward sides of buildings can diffuse downwash and reduce the potential wind impact on the ground level. These flow patterns are illustrated in Image 7.



Downwashing *Corner Acceleration*

Image 7: General wind flow patterns

5.2 Simulation Results

The predicted seasonal wind comfort conditions for the Existing and Proposed scenarios are presented in Images 8 and 9, respectively, while those for entrance and above-grade areas are presented in Images 10 and 11. The results are presented as colour contours of wind speeds calculated based on the wind criteria outlined in Section 4. The contours represent wind speeds at a horizontal plane 1.5 m above the levels of interest.

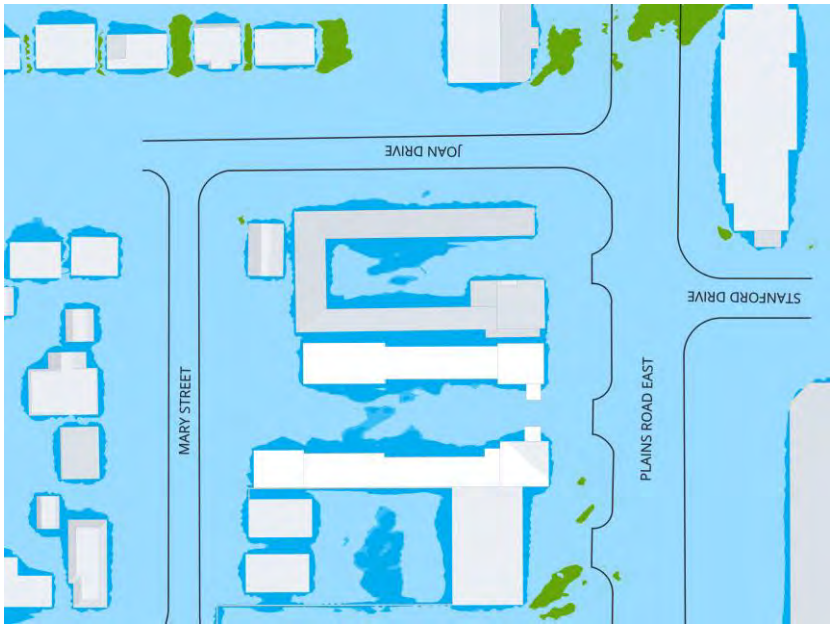
The assessment against the Safety Criterion (Section 4) was conducted qualitatively based on the predicted wind conditions and our extensive experience with wind tunnel assessments in Burlington.

A detailed discussion of the expected wind conditions with respect to the prescribed criteria and applicability of the results follows in Sections 5.3. and 5.4.

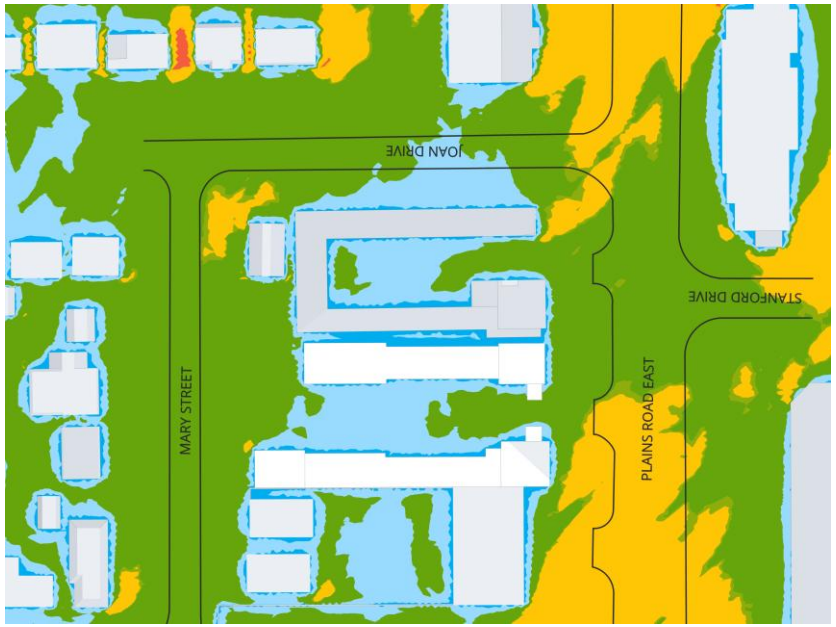
Target Conditions

Generally, wind speeds comfortable for fast walking or leisurely walking are appropriate for sidewalks and walkways; lower wind speeds comfortable for standing are required for main entrances where pedestrians may linger, and calm wind speeds suitable for sitting are desired in areas where passive activities are anticipated, such as the balconies, especially during the summer when these areas are typically in use.

5. RESULTS AND DISCUSSION



(a) SUMMER



(b) WINTER

True North Project North

SAFETY: The criterion will be met at all areas assessed

COMFORT: SITTING | STANDING | LEISURELY WALKING | FAST WALKING | UNCOMFORTABLE

Image 8: Predicted wind conditions – EXISTING – GROUND LEVEL

5. RESULTS AND DISCUSSION



(a) SUMMER



(b) WINTER

COMFORT: SITTING | STANDING | LEISURELY WALKING | FAST WALKING | UNCOMFORTABLE

Parking Lot

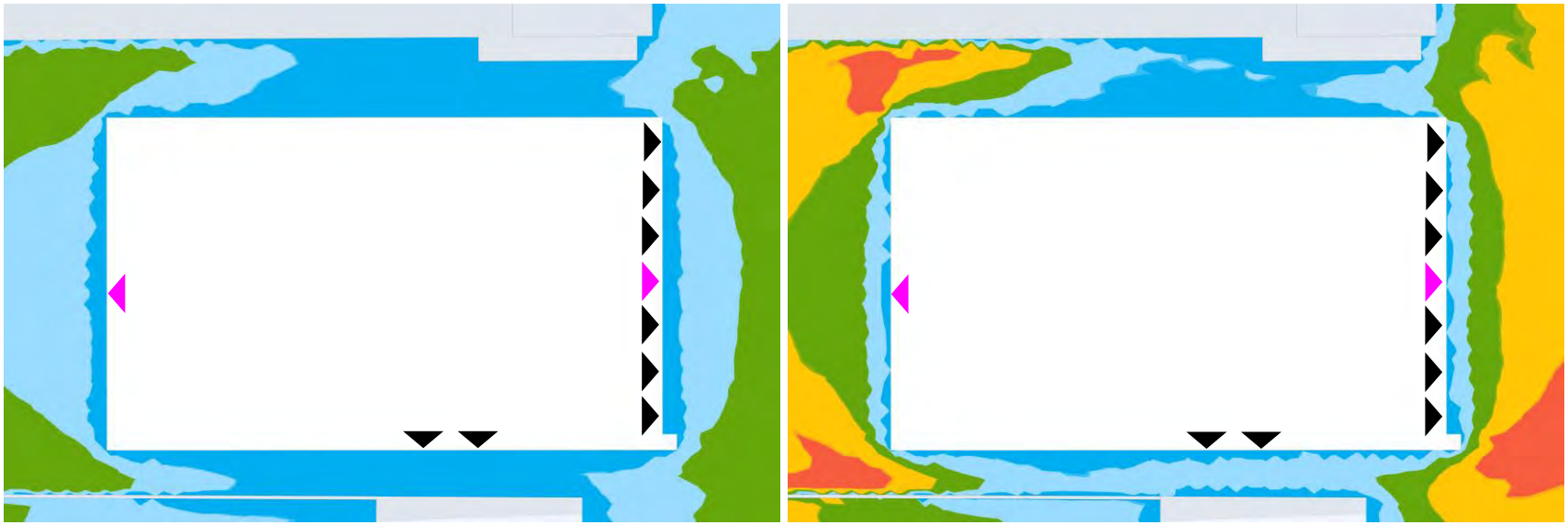
SAFETY: The criterion will be met at all areas assessed

True North

Project North

Image 9: Predicted wind conditions – PROPOSED – GROUND LEVEL

5. RESULTS AND DISCUSSION



(a) SUMMER

(b) WINTER

COMFORT: SITTING | STANDING | LEISURELY WALKING | FAST WALKING | UNCOMFORTABLE

Residential Entrance

Commercial Entrance

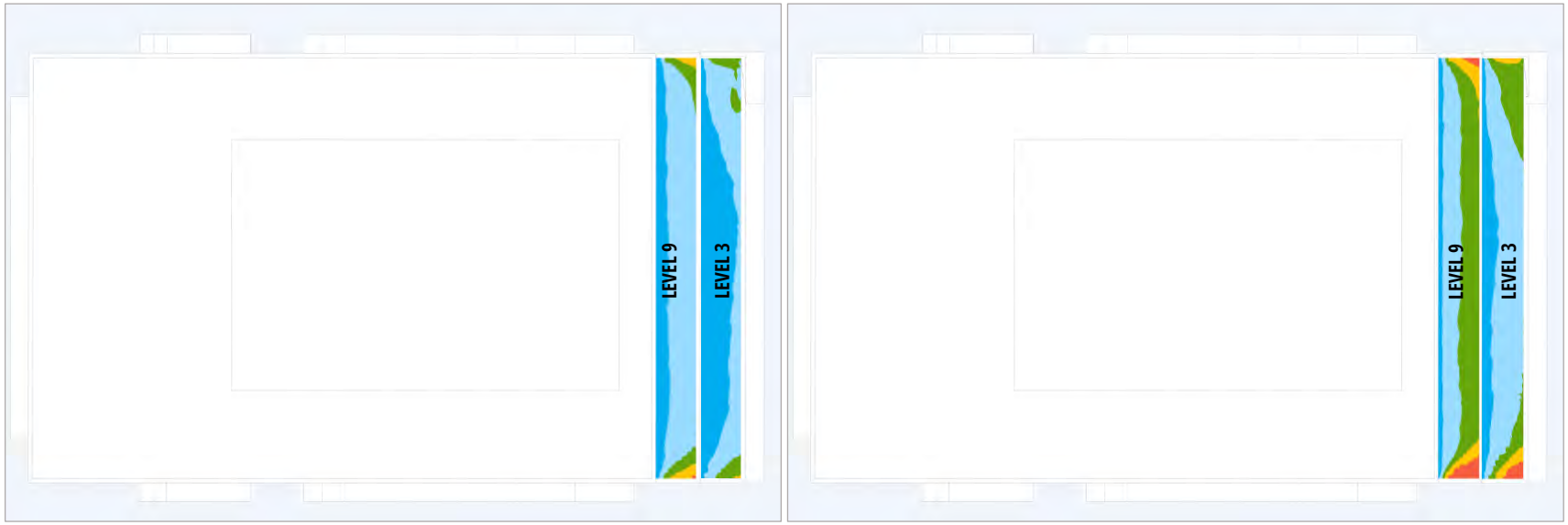
True North

Project North

SAFETY: The criterion will be met at all areas assessed

Image 10: Predicted wind conditions – PROPOSED – ENTRANCES

5. RESULTS AND DISCUSSION



(a) SUMMER

(b) WINTER

True North

Project North

SAFETY: The criterion will be met at all areas assessed

COMFORT: SITTING | STANDING | LEISURELY WALKING | FAST WALKING | UNCOMFORTABLE

Image 11: Predicted wind conditions – PROPOSED – ABOVE-GRADE LEVEL

5. RESULTS AND DISCUSSION

Project north differs from true north; all referenced to wind directions are based on True North and site and built features are referenced to project north.

5.3 Existing Scenario

The existing site is currently a parking lot and is mostly surrounded by low-rise buildings, and a few mid-rise buildings on Plains Road East. As such, there are no structures that would redirect wind to create unfavourable conditions on the site. Wind conditions at most areas on and around the site are considered comfortable for sitting or standing in the summer (Image 8a). During the winter, wind conditions comfortable for standing or leisurely walking are observed in most areas. Higher wind speeds comfortable for fast walking are predicted to the east and north of the site on Plains Road East near the mid-rise buildings (Image 8b). The pedestrian wind safety criterion is met at all areas assessed in the existing configuration.

5.4 Proposed Scenario

5.4.1 Grade-Level

The proposed development, at 11 storeys, would be taller than the buildings in the immediate surrounding area and comparable to the new mid-rise building that is being completed to the south on Plains Road East. The proposed building would be exposed to wind at high elevations and would redirect wind around it, resulting in increased wind speeds in the immediate vicinity of the site.

Wind conditions at most areas at grade near the proposed site are expected to be comfortable for standing or leisurely walking in the summer, and for leisurely walking or fast walking during winter (Image 9). Low speeds comfortable for sitting or standing are predicted at most areas close to the building facades in the summer and winter. These speeds are appropriate for pedestrian activities expected on the sidewalks and parking lots, and conducive to the expected activities at the residential and commercial entrance areas (Image 10).

Compared to the existing scenario, higher wind speeds comfortable for leisurely walking in the summer, and fast walking in the winter, are expected around the corners of the proposed building and along Plains Road East. During winter, a marginal increase in wind speeds is also expected to the west of the building on-site and to the northwest of the site on Mary Street, resulting in conditions comfortable for fast walking. These conditions are conducive to the active and transient pedestrian use expected in the parking and sidewalk areas.

Conditions that can be potentially uncomfortable for pedestrian use are expected occasionally in small areas at the western corners, and in a small section of the sidewalk at the southeast corner of the proposed development, due to corner-accelerated wind flows.

The pedestrian safety criterion is expected to be met at all areas assessed at grade level.

5. RESULTS AND DISCUSSION

To improved uncomfortable wind conditions, the design team may consider incorporating evergreen landscaping, tall fences or wind screens (minimum 2 m tall, solid or at most 30% porous) around the building corners. If feasible, the design team may also consider an overhead trellis along the south side of the building extending into the site from the southeast corner of the building to counteract the downwashing flows .

Image 12 presents examples of the wind control features recommended. RWDI can assist with the selection of wind control features as the design advances.



Image 12: Wind control measures applicable to building corners

5.4.2 Levels 3 and 9 Balconies

It is generally desirable for wind conditions in areas intended for passive activities to be comfortable for sitting or standing.

The stepped building design results in step-back balconies at Levels 3 and 9 (see Image 3), and wind comfort results for these areas are presented in Image 11. Wind conditions at the balcony areas are expected to be comfortable for sitting or standing in the summer, with higher wind speeds comfortable for leisurely walking in small areas near the eastern corners. These wind conditions are generally appropriate for passive activities; low speeds comfortable for sitting may be desirable in the summer in areas planned for seating, dining or other such idling activities.

It is recommended to locate seating areas within calmer wind zones that are comfortable for sitting. If lower speeds are desired in specific areas, we recommend incorporating landscaping or screens/guardrails that are at least 1.5 m tall to the north and south of the desired areas for wind protection (Image 13).

In the winter months, wind speeds are generally expected to be comfortable for standing or leisurely walking, with higher wind speeds comfortable for fast walking predicted to occur in the same windier areas identified in the summer season. Potentially uncomfortable wind conditions may occasionally occur in small areas at the southeast corners of the balconies. This is considered acceptable given the limited outdoor use anticipated during colder months.

The pedestrian safety criterion is expected to be met at all areas on the balconies.



Image 13: Examples of wind control strategies at balconies

6. SUMMARY

RWDI was retained to provide an assessment of the potential pedestrian level wind impact of the proposed development at 517 Plains Road East in Burlington, Ontario. Our assessment was based on computational modelling, simulation and analysis of wind conditions for the proposed development design, in conjunction with the local wind climate data and wind criteria specified by the City of Burlington. Our findings are summarized as follows:

- Existing wind conditions are considered suitable for the intended use throughout the year, where wind speeds meet the pedestrian safety criterion.
- With the addition of the proposed development wind conditions at ground level, including the residential and commercial entrances, as well as the parking lot, are expected to be appropriate for the intended usage.
- Potentially uncomfortable wind speeds are expected in localized areas near the exposed western corners, as well as in a small section of the sidewalk at the southeast corner of the proposed development in the winter.
- Wind conditions on the Levels 3 and 9 balconies are expected to be suitable for general passive use during the summer. Higher than desired wind conditions are expected during the winter; however, this may not be a concern given the limited use of these areas in colder months.
- The wind conditions at the grade level resulting from the addition of the proposed project, and conditions on the balconies are expected to meet the wind safety criterion.

7. DESIGN ASSUMPTIONS

The findings/recommendations in this report are based on the conceptual plans and building geometry communicated to RWDI in December 2025 and January 2026. Should the details of the proposed design and/or geometry of the building change significantly, results may vary.

File Name	File Type	Date Received (mm/dd/yyyy)
Plains Road - Site Plan	.PDF	01/15/2026
Plains Road 3D	.SKP	12/22/2025

Changes to the Design or Environment

It should be noted that wind comfort is subjective and can be sensitive to changes in building design and operation that are possible during the life of a building. In the event of changes to the design, construction, or operation of the building in the future, RWDI could provide an assessment of their impact on the discussions included in this report. It is the responsibility of Others to contact RWDI to initiate this process.

8. STATEMENT OF LIMITATIONS

This report was prepared by Rowan Williams Davies & Irwin Inc. for BryDec Developments Inc. ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein and authorized scope. The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

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.

9. REFERENCES

1. H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004,* Nashville, Tennessee.

2. H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, vol.104-106, pp.397-407.

3. C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", *10th International Conference on Wind Engineering*, Copenhagen, Denmark.