

April 1, 2020

David Sanche  
Co-CEO  
**Westrich Pacific Corp.**  
200, 1356 Winderemere Way  
Edmonton, Alberta T6W 2J3

Dear Mr. Sanche:

Re: Qualitative Pedestrian Level Wind Assessment  
11023-11045 86 Avenue NW, Edmonton  
GWE File No.: 19-116-DTPLW 2020

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Gradient Wind Engineering Inc. (Gradient Wind) was retained by Westrich Pacific Corp. to undertake a qualitative pedestrian level wind assessment for the proposed residential development at 11023-11045 86 Avenue NW in Edmonton, Ontario. This report provides a qualitative assessment of pedestrian level wind comfort for the noted site based on drawings provided by Westrich Pacific Corp. received in March 2020, consideration of existing and approved future surrounding buildings, statistical knowledge of the Edmonton wind climate, and experience with similar projects in Edmonton. This assessment is informed by testing of the previous design (refer to report: GWE19-116-CFDPLW dated August 22, 2019).

## 1. TERMS OF REFERENCE

The focus of this qualitative pedestrian wind assessment is the proposed residential development at 11023-11045 86 Avenue NW in Edmonton, Ontario. The study site is located on the south side of 86 Avenue NW, mid-block between 111 Street NW to the west and 110 Street NW to the east. The development site is bounded by a laneway to the south, existing low-rise buildings to the west, and an existing five-storey building to the east.

The proposed development is a six-storey residential building with the long axis oriented along 86 Avenue NW. The building planform is nearly rectangular apart from an inset centrally located at the south side, which accommodates a parking entry and an outdoor amenity area. The primary residential entrance is located near the northwest corner of the building.

Regarding wind exposures, the near-field surroundings of the development (defined as an area falling within a 200-metre radius of the site) are characterized by low-rise residential buildings from the northeast clockwise to south, and a mix of low, medium and high-rise buildings for the remaining directions. Notably, the existing 20-storey Garneau Towers building,



*Northeast view of study building*

which is oriented with the long axis of the tower aligned in the north-south direction, is located approximately 70 metres to the west, and the existing 17-storey Claridge House condominium development is located approximately 75 metres to the north of the site. The far-field surroundings (defined as the area beyond the near field and within a two-kilometer radius) are characterized by a mix of low and medium-rise buildings followed by green space and the North Saskatchewan River Valley at lower elevation to the north and northeast, and low and occasional medium-rise buildings to the east and south, transitioning to include occasional high-rise apartment buildings for the remaining directions.

The site plan is illustrated following the main text, with letter tags identifying wind sensitive pedestrian locations considered in this assessment.

## **2. METHODOLOGY**

The main aspects of a qualitative pedestrian level wind assessment include (i) consideration of the statistical properties of the local wind climate; (ii) knowledge of wind flow behaviour in typical urban and suburban environments; and (iii) an understanding of how common wind conditions relate to typical pedestrian activity types.

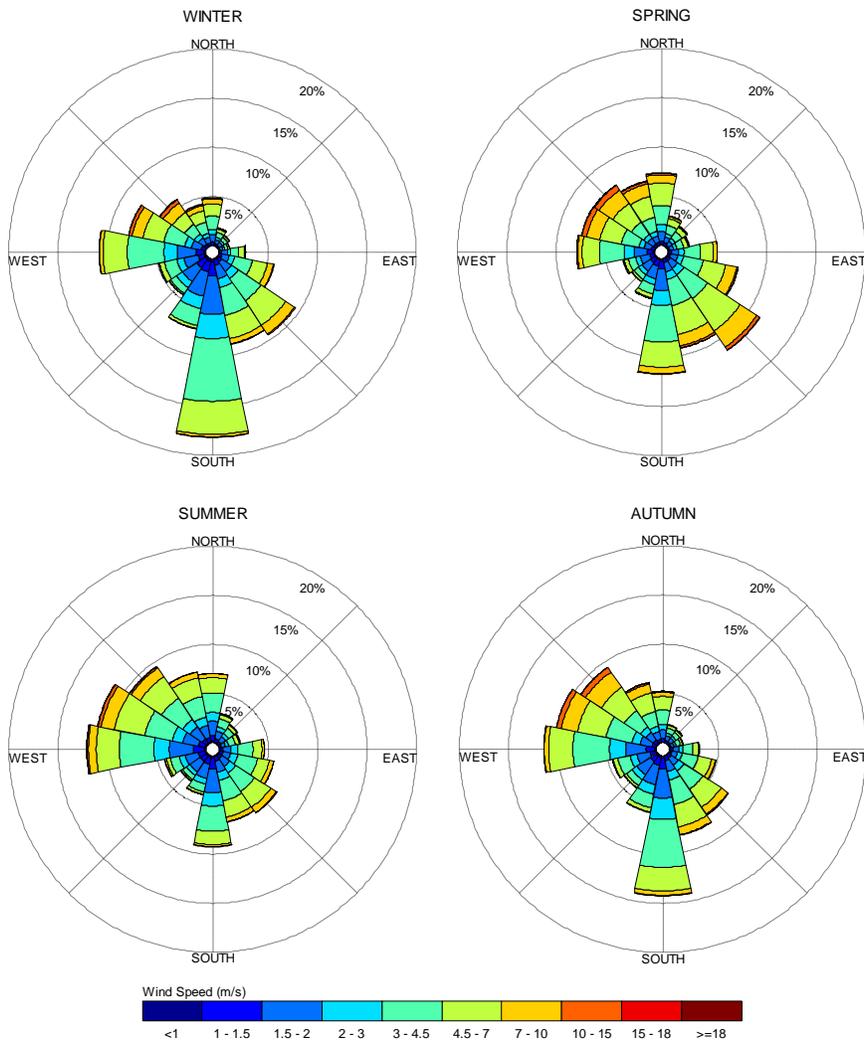
### **2.1 Edmonton Wind Climate**

The statistical model of the Edmonton 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 a 40-



year measurement period. The preferred wind speeds and directions can be identified by the longer length of the bars. For Edmonton, the most common winds influencing pedestrian comfort occur from the northwest and southeast sectors during each seasonal period. Winter and autumn months display large prominence of south winds. The directional preference and relative magnitude of the wind speed varies somewhat from season to season, with the summer months displaying the calmest winds relative to the remaining seasonal periods.

## SEASONAL DISTRIBUTION OF WINDS FOR VARIOUS PROBABILITIES EDMONTON INTERNATIONAL AIRPORT, EDMONTON, ALBERTA



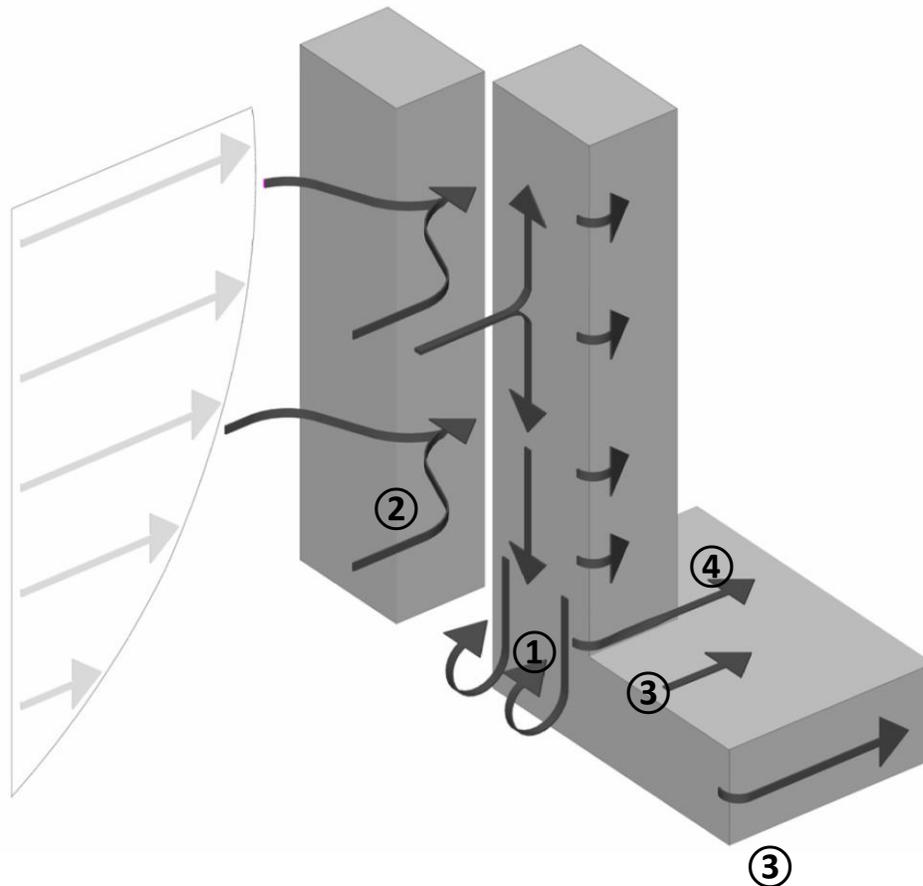
**NOTES:**

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.

## 2.2 Massing vs. Climate – Geometric Effects

The physical features of a development site that are most influential to the local wind conditions include the massing and relative spacing of surrounding buildings, the geometry and orientation of the study building, and the alignment of the study building with respect to statistically prominent wind directions.

Wind flow characteristics which combine to determine how conditions will develop include phenomena known as downwash, channelling coupled with acceleration, and shielding, as illustrated in the image below. Downwash ① relates to the effect of winds against a tall building, whereby much of the impinging flow on the windward side of the building, nominally below two-thirds of the total height, is directed to lower levels. Taller buildings with smooth façades and no podiums produce the strongest downwash effects at grade, while the presence of protruding balconies and a tower setback from the podium edge mitigates downwash effects at the ground level. Channelling ② refers to acceleration of wind through gaps between buildings, while acceleration of wind ③ occurs around building corners. Shielding ④ relates to calm zones on the leeward side of buildings, protected from prevailing winds.



### 2.3 Pedestrian Comfort and Safety Guidelines

The pedestrian wind comfort guidelines used by Gradient Wind, which correspond to industry-accepted standards, are based on the correlation between a variety of pedestrian activity types and acceptable wind speed ranges for those activities. More specifically:

- Wind conditions are comfortable for *sitting* when gust wind speeds no greater than 16 km/h occur at least 80% of the time;
- Wind conditions are comfortable for *standing* when gust wind speeds no greater than 22 km/h occur at least 80% of the time; and
- Wind conditions are comfortable for *walking* when gust wind speeds no greater than 30 km/h occur at least 80% of the time.

These guidelines are based on gust wind speeds, since people are most sensitive to wind gusts rather than to constant wind speeds. The guidelines are applied to the intended use of an outdoor area. For example, an entrance to a building should be suitable for standing, but need not be suitable for sitting, while a public sidewalk need only be suitable for walking in most circumstances.

## 3. ANTICIPATED PEDESTRIAN COMFORT

Based on consideration of the proposed residential development at 11023-11045 86 Avenue NW in Edmonton, surrounding building massing, and the relationship to the local wind climate, the following statements summarize our assessment of wind comfort at key pedestrian areas.

**86 Avenue NW Sidewalk, Including Adjacent Primary Entrance (Tags A and B):** The 86 Avenue NW sidewalk is shielded from prominent southeasterly and northwesterly wind directions by the existing low-rise massing, while remaining somewhat exposed to less prominent easterly and westerly winds. The study building is not expected to contribute to wind channeling along the adjacent sidewalk due to the low height of the building. Overall, wind conditions over the sidewalk (Tag A) are expected to be suitable for sitting during the summer, autumn and winter and standing or better during the spring. The adjacent primary entrance (Tag B) is expected to experience wind conditions suitable for sitting year-round. These conditions are acceptable.

**Walkway West of Building (Tag C):** The walkway along the west side of the building, inclusive of any adjacent side entrances, is well-shielded from all wind directions by the study building and surrounding massing, and is expected to experience acceptable conditions suitable for sitting throughout the year.

**Laneway South of Building, Including Collection Area, Parking Entry and Adjacent Entrances (Tag D):** The laneway south of the site is well shielded from westerly winds by the existing 20-storey Garneau Towers apartment building and from remaining prominent wind directions by the surrounding massing, including low-rise buildings to the southeast and a mix of low and high-rise buildings to the northwest. Overall, the laneway is largely expected to be suitable for sitting throughout the year. The parking entry, collection area, and any entrances adjacent to the laneway will be afforded additional protection from the building façade and are expected to be suitable for sitting throughout the year. These conditions are acceptable.

**Grade-Level Outdoor Amenity Area, Including Any Adjacent Entrances (Tag E):** The grade-level outdoor amenity area is well shielded from all direct winds by the study building and surrounding massing. This space and any building entrances serving the courtyard are expected to experience wind conditions comfortable for sitting throughout the year without the need for mitigation.

**Influence of the Proposed Development on Existing Wind Conditions near the Study Site:** The introduction of the proposed development is not expected to significantly influence pedestrian wind comfort over neighbouring areas. Nearby building entrances, sidewalks, laneways, parking areas, and other pedestrian-sensitive areas beyond the development site are expected to continue to experience acceptable wind conditions.

The proposed Maclab Garneau development (19 and 30 storeys) is located approximately 100 metres northwest of the site. Should this development become built as proposed, locations within and surrounding the study site are expected to experience similar or improved a wind conditions throughout the year due to additional shielding from prominent northwesterly winds.

**Applicability of Predictions:** The forgoing statements and conclusions apply to common weather systems, during which no dangerous or consistently strong wind conditions are expected anywhere over the study site. During such extreme weather events, (e.g. thunderstorms, tornadoes, and downbursts), pedestrian safety is the main concern. However, these events are generally short-lived and infrequent and there is often sufficient warning for pedestrians to take appropriate cover.



#### **4. SUMMARY AND RECOMMENDATIONS**

Based on a qualitative analysis of architectural drawings, surrounding building massing, and the Edmonton wind climate, the following general statements summarize our prediction of future wind conditions for the proposed residential development at 11023-11045 86 Avenue NW in Edmonton, Ontario.

1. Wind comfort at all grade-level pedestrian sensitive locations across the study site is expected to be suitable for the anticipated uses without mitigation. These areas include sidewalks, building access points, and the outdoor amenity area.
2. The introduction of the proposed building is not expected to significantly influence pedestrian wind comfort at neighbouring areas beyond the development site. In particular, nearby building entrances, sidewalks, laneways, parking areas, and other pedestrian-sensitive areas beyond the development site are expected to continue to experience wind conditions similar to those that presently exist without the proposed building in place.
3. If built as proposed, the Maclab Garneau development northwest of the site will provide additional shielding from prominent northwesterly winds. Pedestrian locations within and surrounding the study site are therefore expected to experience similar or improved a wind conditions throughout the year.

The forgoing statements and conclusions apply to common weather systems, during which no dangerous or consistently strong wind conditions are expected anywhere over the study site. During such extreme weather events, (e.g. thunderstorms, tornadoes, and downbursts), pedestrian safety is the main concern. However, these events are generally short-lived and infrequent and there is often sufficient warning for pedestrians to take appropriate cover.

This concludes our qualitative assessment of pedestrian wind comfort. Please advise the undersigned of any questions or comments.

Sincerely,

***Gradient Wind Engineering Inc.***



Megan Jee, MEng.,  
Project Manager

*GWE19-116-DTPLW 2020*



Andrew Sliadas, M.A.Sc., P.Eng.,  
Principal

# GRADIENTWIND

ENGINEERS & SCIENTISTS

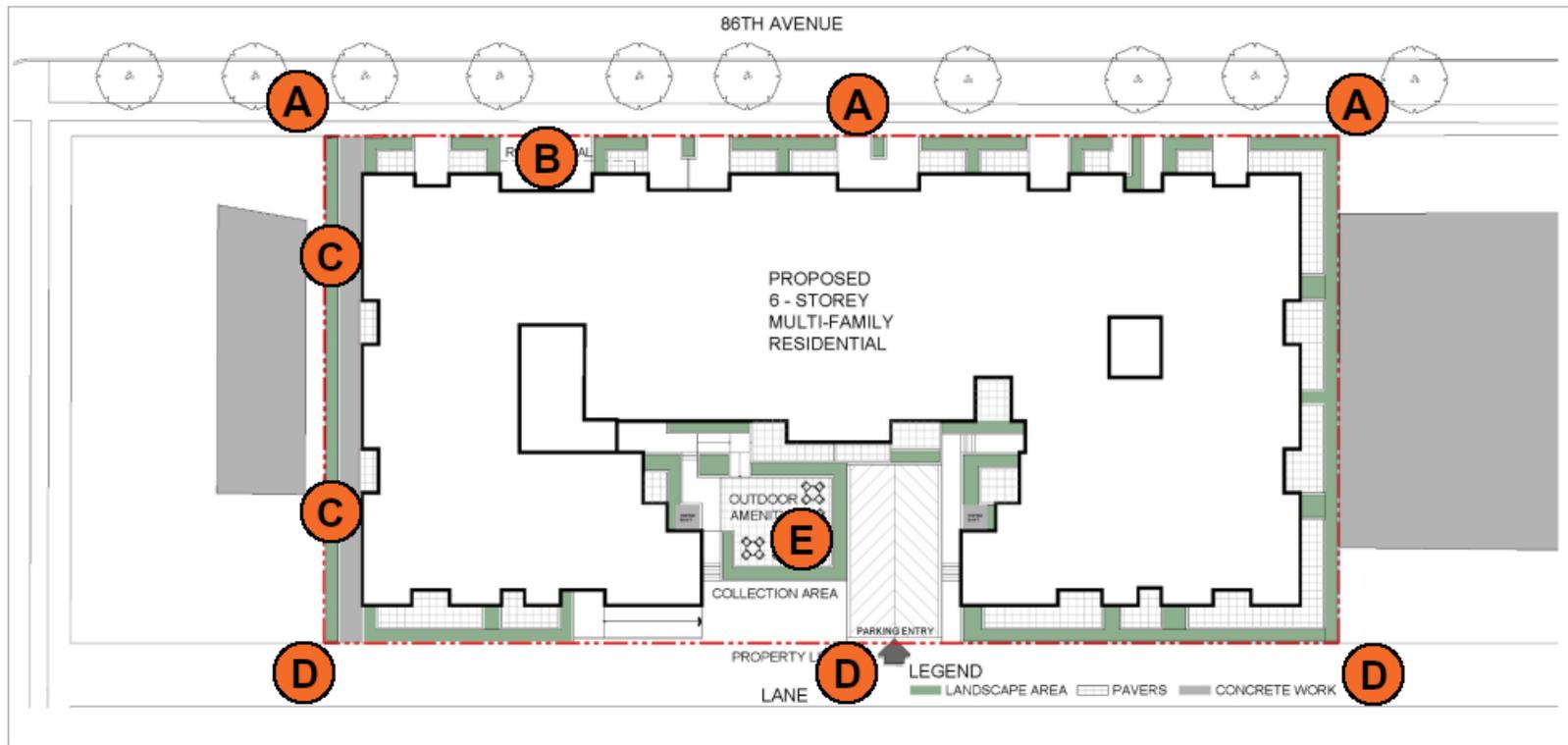


Figure 1. Site Plan with Letter Tags