April 2, 2018

Neil Malhotra
Claridge Homes
2001-210 Gladstone Avenue
Ottawa, ON
K2P 0Y6

Dear Mr. Malhotra:

Re: Qualitative Pedestrian Level Wind Comfort Update
110 York Street, Andaz Hotel Extension
GWE File No.: 13-039 DTPLW

1. INTRODUCTION

This report provides an updated qualitative wind assessment for the planned extension to the existing Andaz Hotel at the corner of York Street and Dalhousie Street in Ottawa, Ontario. The expansion is planned on the east elevation of the existing hotel overlooking York Street to the north. Our current assessment of wind comfort is based on the computer simulations performed for the original Andaz hotel project, architectural drawings of the expansion provided by NEUF Architects dated February 2018, consideration of existing surrounding buildings, and the Ottawa wind climate.

In the early stages of design development, a qualitative pedestrian wind assessment is useful to identify any significant massing features or design elements which may adversely impact pedestrian activities within the study area, and to provide initial recommendations for mitigation strategies as required.

2. TERMS OF REFERENCE

The focus of this qualitative wind assessment is the planned expansion of the Andaz hotel located at the corner of York Street and Dalhousie Street in Ottawa, Ontario. At completion, the expansion will comprise a 17-storey hotel plus one mechanical penthouse level linked to the existing building on the east elevation over the first two podium levels.

The new building section rises with a rectangular floor plate over one level of underground parking and two podium floors to its full height. The roof of the podium also provides two separate green roof areas: one overlooking York Street and a second nestled between the new and existing buildings.

Regarding wind exposures, the site is located northeast of the downtown city core, and is among existing buildings of lower height for most wind directions except for southeast clusters of similar height buildings around Rideau Street and Cumberland Street. At greater distances, the site is exposed to the Ottawa River to the east and low-rise commercial and residential buildings for the remaining directions. Figure 1 illustrates a site plan for the new expansion, with access points to the existing and new building, and reference markers to assist with the subsequent discussion of wind impacts.

3. METHODOLOGY

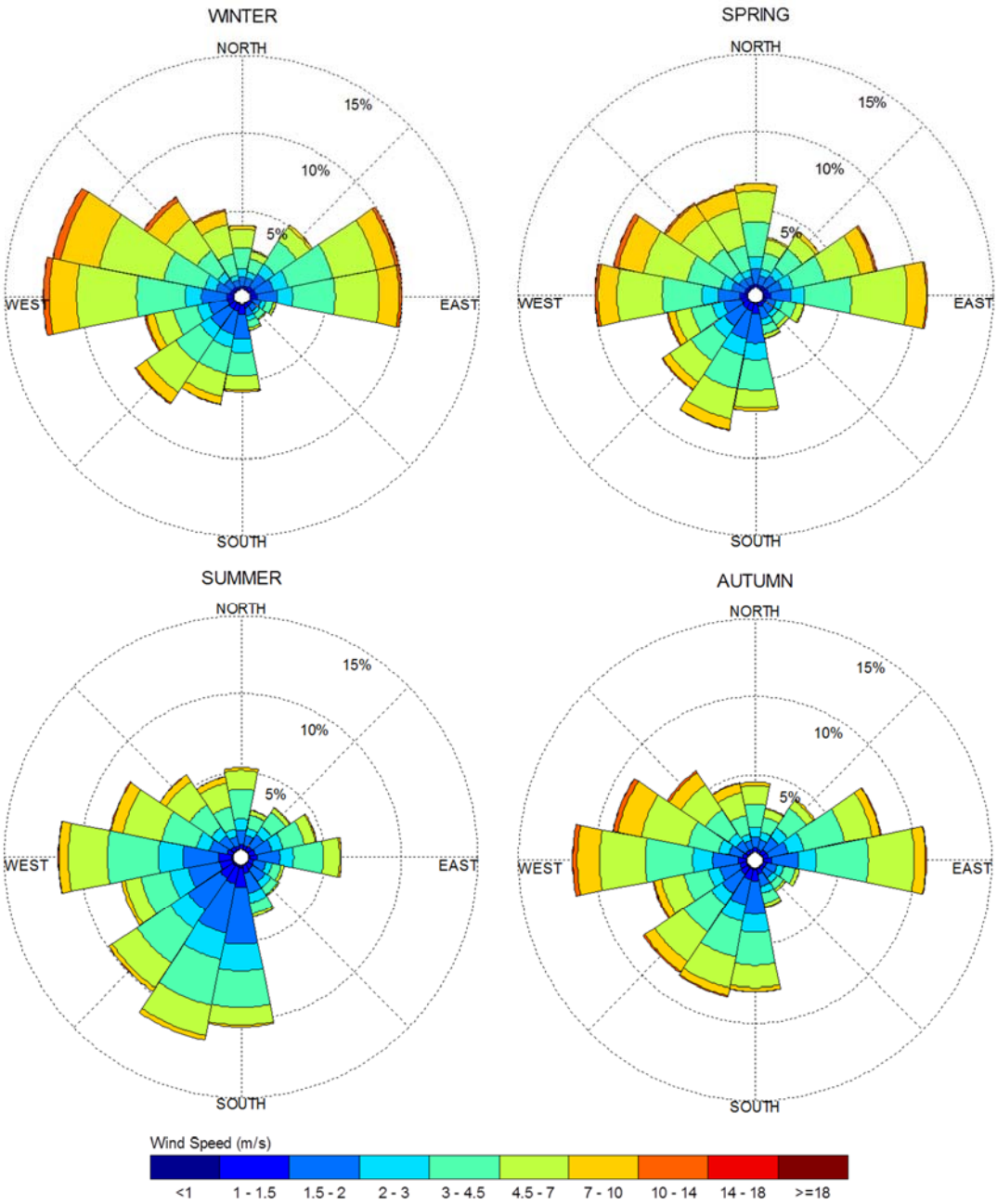
The main aspects of a qualitative pedestrian level wind assessment include (i) how local wind climate interacts with the building massing; (ii) knowledge of wind flow behaviour in typical urban environments; and (iii) understanding of how common wind conditions relate to typical pedestrian comfort levels.

3.1. Ottawa Wind Climate

The statistical model of the Ottawa 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 metres per second. 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 longer length of the bars can identify the preferred wind speeds and directions. For Ottawa, the most common winds affecting pedestrian comfort occur from the southwest clockwise to the northwest, as well as those from the east. 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

OTTAWA INTERNATIONAL AIRPORT, OTTAWA



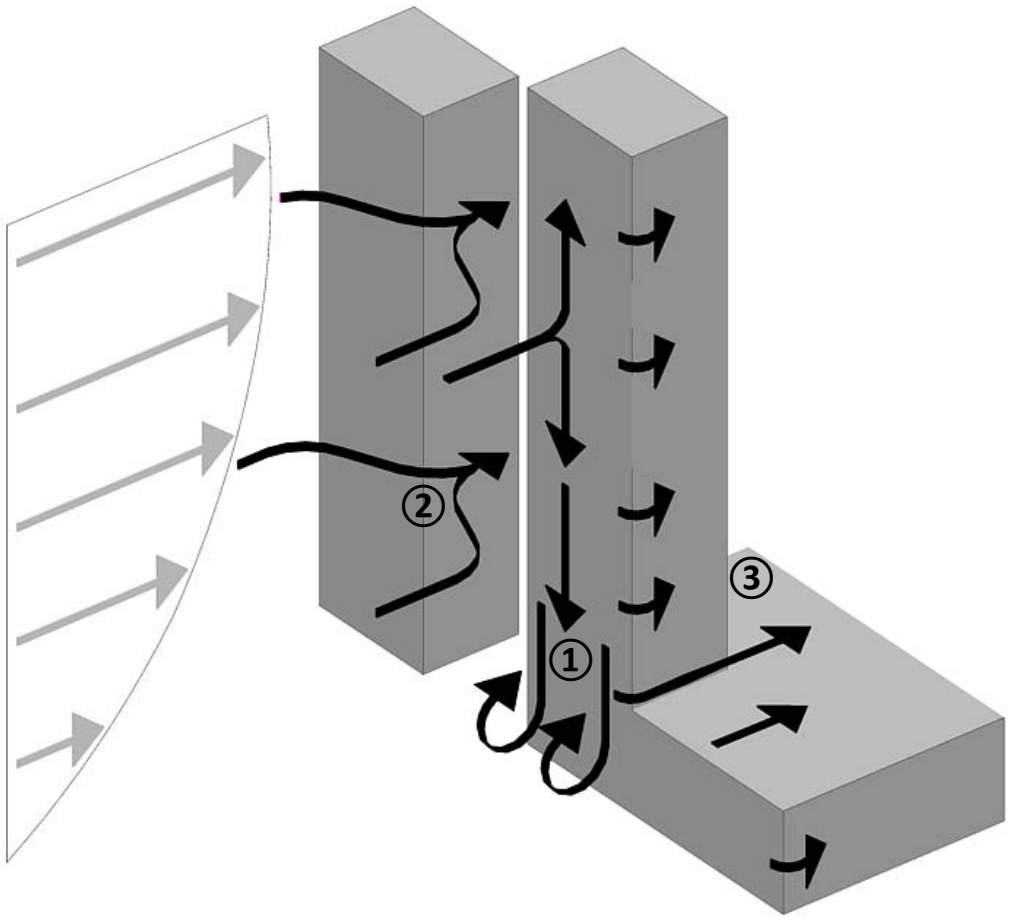
Notes:

1. Radial distances indicate percentage of time of wind events.
2. Wind speeds represent mean hourly wind speeds measured at 10 metres above the ground.

3.2. 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 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 over a site, include phenomena known as downwash, channelling, and shielding, and are illustrated in the image below. Downwash ① relates to the effect of wind flows against a tall building, whereby much of the wind impinging 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 podium produce the strongest downwash effects at grade, while the presence of protruding balconies and a tower setback from the podium edge serve to mitigate downwash effects at the ground level. Channelling ② refers to acceleration of wind through gaps between buildings, while shielding ③ relates to the beneficial effects of sensitive areas being in the calm zones on the leeward side of prevailing winds.



3.3. Pedestrian Wind Comfort Guidelines – City of Ottawa

Pedestrian comfort criteria are based on mechanical wind effects without consideration of other meteorological conditions (i.e., temperature, relative humidity). The City of Ottawa criteria provide an assessment of comfort, assuming pedestrians are appropriately dressed for a specified outdoor activity during any given season. Five pedestrian comfort classes and corresponding gust wind speed ranges are used to assess pedestrian comfort, which include (i) Sitting; (ii) Standing; (iii) Strolling; (iv) Walking; (v) Uncomfortable; and (vi) Dangerous. More specifically, the comfort classes, associated wind speed ranges, and limiting criteria are summarized as follows:

(i) **Sitting:** Mean wind speeds less than or equal to 10 km/h, occurring at least 80% of the time. The gust equivalent mean wind speed is approximately 14 km/h.

(ii) **Standing:** Mean wind speeds less than or equal to 14 km/h, occurring at least 80% of the time. The gust equivalent mean wind speed is approximately 20 km/h.

(iii) **Strolling:** Mean wind speeds less than or equal to 17 km/h, occurring at least 80% of the time. The gust equivalent mean wind speed is approximately 25 km/h.

(iv) **Walking:** Mean wind speeds less than or equal to 20 km/h, occurring at least 80% of the time. The gust equivalent mean wind speed is approximately 30 km/h.

(v) **Uncomfortable:** Uncomfortable conditions are characterized by predicted values that fall below the 80% target for walking. Brisk walking and exercise, such as jogging, would be acceptable for moderate excesses of this criterion.

(vi) **Dangerous:** Gust equivalent mean wind speeds greater than or equal to 90 km/h, occurring more often than 0.1% of the time, are classified as dangerous. From calculations of stability, it can be shown that gust wind speeds of 90 km/h would be the approximate threshold wind speed that would cause an average elderly person in good health to fall.

Gust speeds are used in the criteria because people tend to be more sensitive to wind gusts than to steady winds for lower wind speed ranges. For strong winds approaching dangerous levels, this effect is less important because the mean wind can also cause problems for pedestrians. The mean gust speed ranges are selected based on 'The Beaufort Scale', which describes the effect of forces produced by varying wind speeds and levels on objects.

4. ANTICIPATED PEDESTRIAN COMFORT

Based on consideration of the new expansion, surrounding building massing, and the relationship to the local wind climate, the following statements summarize our opinion of how these influences will affect pedestrian comfort at key areas.

Dalhousie Access To New Expansion & Receiving Area of Existing Hotel (Figure 1, Tags A, B and C): Access to the new building from Dalhousie Street is located along a passageway near the back end of the existing hotel. The entrance is well shielded by existing buildings and the new building for virtually all wind directions. Limited exposure to southeast winds is not significant due to the low probability of strong winds from these wing angles. The adjacent receiving doors of the Andaz Hotel will have the same exposures and similar wind comfort conditions. As such, wind comfort over these areas is expected to be suitable for standing or better year-round, which is acceptable for building access points. The passageway itself may experience somewhat windier conditions but is also expected to provide acceptable wind comfort to pedestrians.

Dalhousie Sidewalk & Main Hotel Entrance (Figure 1, Tag D): Pedestrian comfort along Dalhousie Street sidewalk is expected to be somewhat windier due to downwash from the existing façade and greater exposure. Nonetheless, wind comfort along the sidewalk will be suitable for standing during the three warmer seasons and suitable for walking during the winter. Conditions will be calm at the central entrances beneath the canopy and recessed into the building perimeter.

Sidewalk and Building Access on York Street (Figure 1, Tag E): Prominent westerly winds approaching the site will flow largely unimpeded over the York Street sidewalk. Winds shedding off the west (Dalhousie) elevation will also contribute to grade level winds to create moderately windy conditions along the sidewalk as well as at the existing entrance of the hotel and two new access points of the new building. The low height podium of the new building will allow wind to expand over its roof, somewhat relieving winds at grade level. The outcome of these combined influences will be to create wind comfort suitable for standing during summer and autumn and suitable for walking during winter and spring. These conditions are acceptable for sidewalks and secondary entrances.

Green Roofs at 2nd Floor (Figure 1, Tag F): Although the green roofs at level two will not be accessible to occupants, wind is a consideration to ensure acceptable roof performance. In this regard, wind speeds

expected to occur over both green roof areas are expected to be moderate due to the protection provided by the existing building and proposed expansion.

Existing vs. Future Wind Conditions: The introduction of the proposed development at 110 York Street is not expected to deteriorate pedestrian wind comfort over neighbouring areas at grade. Although modest changes to wind speeds may occur beyond the development site with the proposed building present, nearby building entrances, sidewalks, and other pedestrian areas will continue to experience wind conditions similar to those that presently exist without the proposed building in place.

Within the context of typical weather patterns, excluding anomalous local storm events, such as thunderstorms, tornadoes and downbursts, no dangerous or consistently strong wind conditions are expected anywhere over the subject site on an annual basis. During such events, wind conditions are influenced by specific local meteorological conditions and building geometries that cannot be predicted through a qualitative analysis.

5. SUMMARY AND RECOMMENDATIONS

Based on a qualitative review of architectural drawings, surrounding building massing, and the Ottawa wind climate, the following statements summarize our prediction of future wind conditions for the proposed hotel expansion:

1. Wind comfort at grade-level pedestrian-sensitive locations over the study site is expected to be suitable for the anticipated uses without mitigation. These areas include nearby sidewalks, existing and future hotel and commercial entrances, service entrances, and building exits.

2. The presence of the proposed development will not result in degradation of wind conditions for surrounding buildings.

The foregoing analysis and statements are based on knowledge and experience of wind flow patterns for the study site and in similar settings. As such, this assessment is intended to ensure adequate pedestrian safety, and to provide general guidance relating to pedestrian comfort over the full study site.

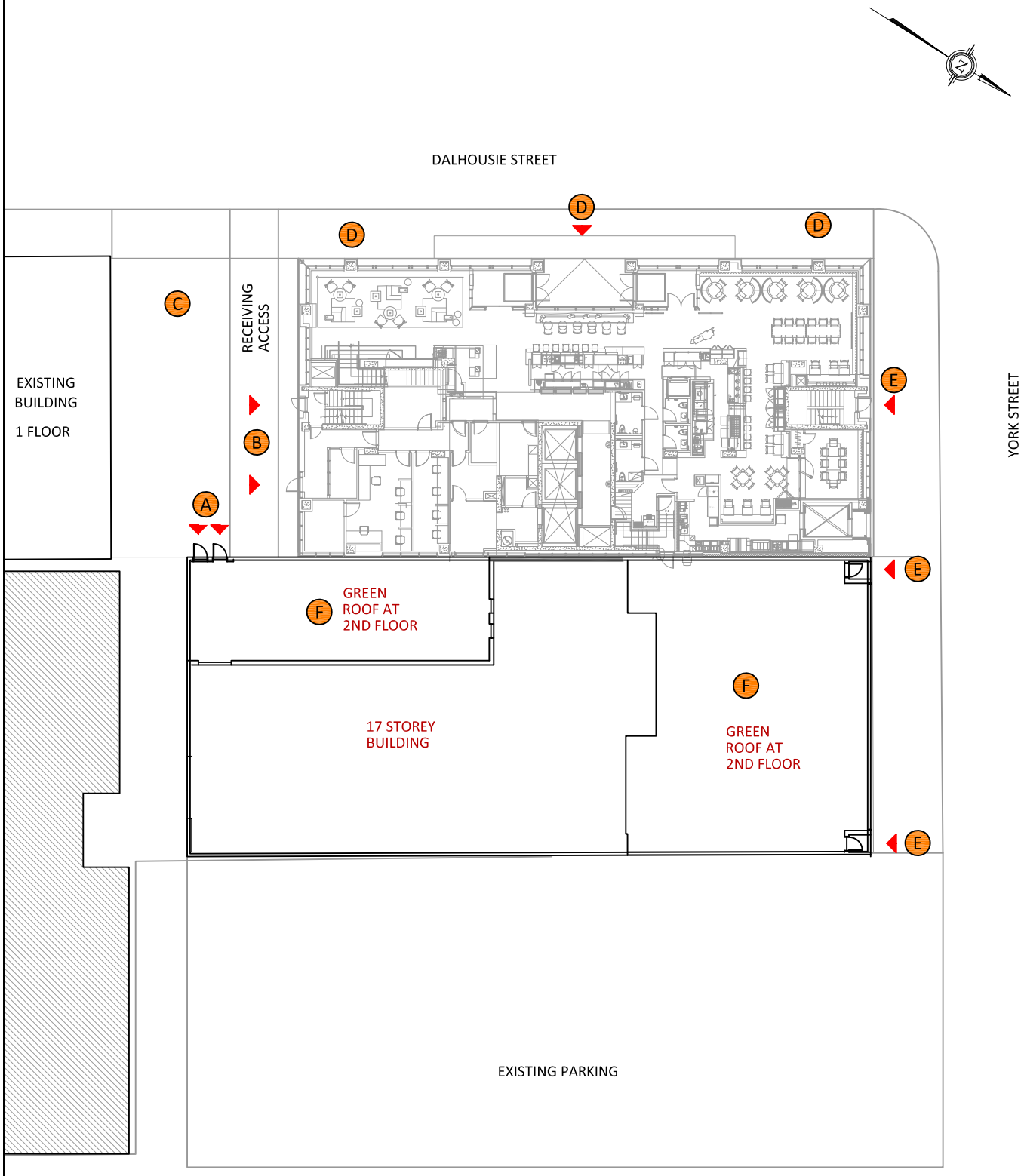
This concludes our qualitative assessment of pedestrian wind comfort. Please advise the undersigned of any questions or comments.

Sincerely,

Gradient Wind Engineering Inc.

Vincent Ferraro, M.Eng., P.Eng.
Managing Principal

GWE13-039 DTPLW



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GRADIENT WIND ENGINEERING INC

PROJECT	ANDAZ HOTEL EXPANSION, OTTAWA QUALITATIVE PEDESTRIAN LEVEL WIND ASSESSMENT
SCALE	1:400 (APPROX.)
DRAWING NO.	GWE13-039-DTPLW-2018-1
DATE	MARCH 29, 2018
DRAWN BY	K.A.

DESCRIPTION

FIGURE 1:
EXISTING GROUND FLOOR PLAN
AND PROPOSED 2ND FLOOR
WITH REFERENCE MARKERS