

September 24, 2021

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DRAFT

Re: Qualitative Pedestrian Level Wind Assessment
Rossdale Rezoning, Edmonton
GWE File No.: 21-304-DTPLW

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Dub Architects Ltd. to undertake a qualitative pedestrian level wind assessment for the proposed Rossdale Centre residential development in Edmonton, Alberta. This report provides a qualitative assessment of pedestrian level wind comfort for the noted site based on drawings prepared by Dub Architects Ltd. dated September 2021, consideration of existing and approved future surrounding buildings, statistical knowledge of the Edmonton wind climate, and experience with similar projects in Edmonton.

In the early stages of design development, a qualitative 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 may be required.

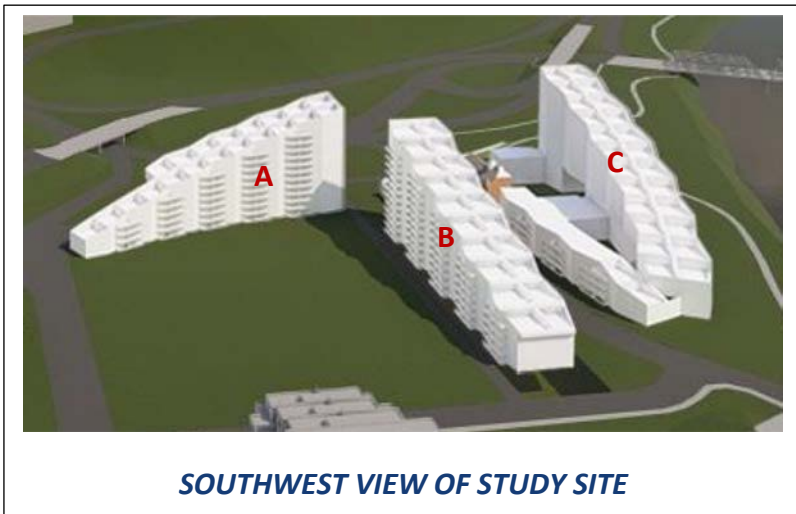
1. TERMS OF REFERENCE

The focus of this qualitative pedestrian wind assessment is the proposed Rossdale Centre development in Edmonton, Alberta. The study site comprises three buildings on three separate parcels of land located south of Rossdale Road and north of 98 Avenue NW, between 101 Street NW and Rossdale Park. The development includes the existing Rossdale Brewery building, which will be retained.

Building A is located south of Rossdale Road and north of Diamond Park, oriented east-west between 100 and 101 Streets NW. Buildings B and C are oriented north-south, located along the west and east sides, respectively, of 100 Street NW, to the southeast of Building A. All three buildings share a similar approximately rectangular planform at grade, with Building C having an additional low-rise wing extending northwest from the south end of the building. The buildings rise 14-, 12-, and 18-storeys, for Buildings A,

B, and C, respectively. An existing laneway provides access from 98 Avenue NW and 100 Street NW to the east and west elevations of Buildings A and B, respectively. A proposed walkway running west-east from 101 Street NW to Rossdale Park passes along the south elevation of Building A, the north elevation of Building B, and bisects Building C at grade.

At the ground level, ramps to below-grade parking are located at the northeast corner of Building A and the south ends of Buildings B and C. Common pedestrian entrances are located along the east end of Building A, the north and south ends of Buildings B and C, and within the Building C bisection. Private entrances serving grade-



level units are located along the remaining elevations. Above Level 1, progressive setbacks in the longitudinal direction accommodate private roof terraces, from the west elevation of Building A and the south elevations of Buildings B and C.

Regarding wind exposures, the near-field surroundings of the development (defined as an area falling within a 200-metre radius of the site) are predominantly open land, comprising the Diamond and Rossdale Parks to the southwest and east, respectively, the North Saskatchewan River further to the east, and bridge approaches to the north and south. Further to the south, the Rossdale development “The Flats”, comprising low- and mid-rise buildings, is under construction. The far-field surroundings (defined as the area beyond the near field and within a two-kilometer radius), are classified as a mixture of low-rise suburban and open exposure from the northeast clockwise to the southwest, and mixed urban-suburban exposure in the remaining directions, with the taller buildings concentrated approximately 750 metres to the north at a higher elevation within the downtown core.

The ground floor plan is illustrated in Figure 1 (following the main text), with letter tags identifying wind sensitive pedestrian locations considered in this assessment.

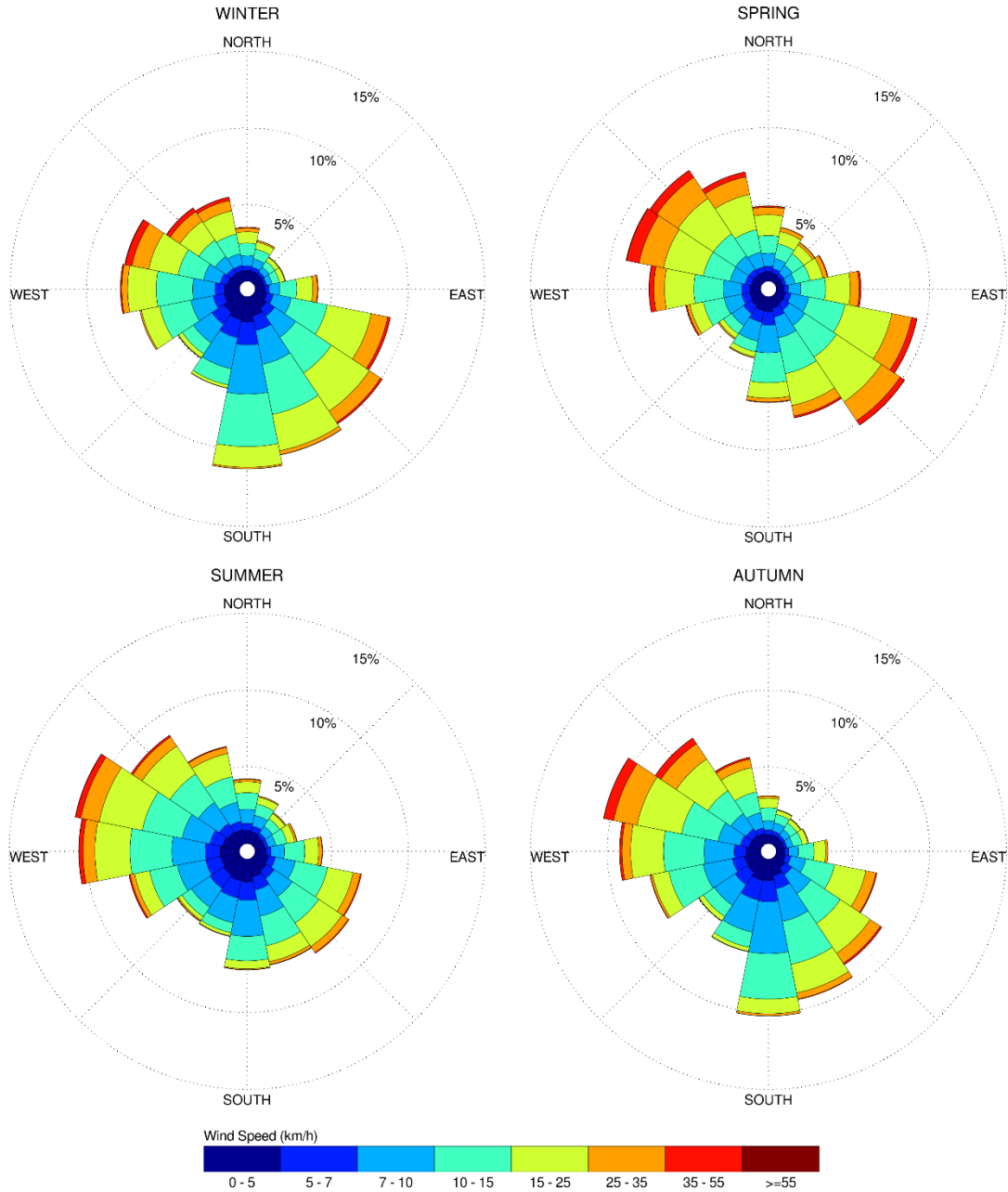
2. METHODOLOGY

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 concerning pedestrian comfort occur from the southeast and northwest. 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



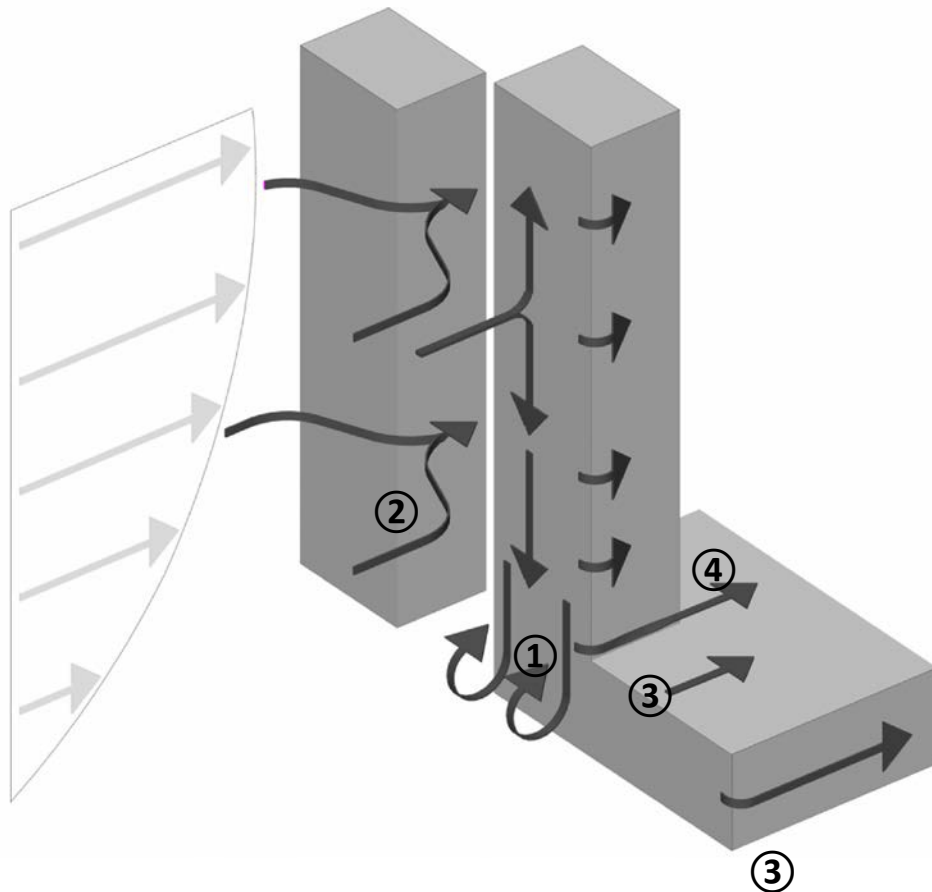
Notes:

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 Rossdale Centre development 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.

Sidewalks along 100 Street NW, inclusive of Building Entrances (Figure 1, Tag A): The north and south ends of 100 Street NW will be alternately sheltered by Building C from the southeast and Building B from the northwest, respectively. Channeling of prominent winds along the roadway is not expected to be exacerbated by the proposed development on account of the relatively low heights and stepped massing of the study buildings. Overall, wind flow along the sidewalk is expected to be comfortable for walking or better throughout the year, which is acceptable. To ensure standing conditions throughout the year at any grade-level entrances along this corridor, it is recommended that they be located within the recessed portions of the building façades.

Diamond Park and Sidewalks along 101 Street NW and 98 Avenue NW, inclusive of Building Entrances (Figure 1, Tags B-F): The majority of Diamond Park (Tag B), 101 Street NW (Tag C), and 98 Avenue NW (Tag D) are expected to continue to experience wind conditions similar to those that existed previous to the introduction of the study buildings. Although the study buildings will provide shielding from the northeast, these winds are a minority in the Edmonton climate, and not significant to pedestrian wind comfort.

At the northeast corner of Diamond Park and along the south and west elevations of Buildings A and B (Tag E), conditions are expected to be significantly calmer due to the buffering of salient northwesterly and southeasterly winds and are expected to be comfortable for standing or better throughout the year, which is acceptable. At the far east end of 98 Avenue NW conditions are expected to be similarly calmer, but to a lesser extent, due to the shielding exclusively from the northwest. Entrances along the south elevations of Buildings B and C (Tag F) are variably exposed to prominent southeasterly winds and expected to be comfortable for standing or better during the summer and autumn, transitioning to include walking conditions during the remaining seasonal periods. If these will be primary access points recession within the façade or providing overhead canopies and flanking barriers may be required, else the noted conditions are considered acceptable.

North Elevation Entrances (Figure 1, Tags G & H): Although the north elevations are generally exposed to salient northwest winds, this quadrant is shielded in the far field by the dense concentration of high-rise buildings comprising the downtown core. The descent in elevation when approaching from the northwest will also tend to reduce wind speeds. Near building corners, however, conditions may be exacerbated by acceleration effects, which will be stronger at the taller ends of the buildings. Throughout the year, grade level entrances are generally expected to be comfortable for standing or better along Building A's north elevation (Tag G), and for walking or better near the northeast corner and at the north ends of buildings B and C (Tag H). If primary building entrances are located in these windier areas, it is recommended to either recess the entrance within the building façade, or to flank with wind barriers and provide a canopy above.

Building C Covered Entrances (Figure 1, Tag I): Covered entrances within the opening in Building C will be sheltered from the prevailing northwest and southeast winds, with some limited channeling of alternate

wind directions possible through the opening. Conditions are expected to be comfortable for standing or better throughout the year.

Landscaped Areas West of Building C (Figure 1, Tag J): Grade-level areas between Building C and the Rossdale Brewery, and between the two wings of Building C, are exposed to the north, but sheltered in most remaining directions by the brewery and study buildings. Overall, these areas are expected to be comfortable for sitting or more sedentary activities during the summer months, and for standing or better throughout the remaining seasonal periods.

Building C East Elevation Entrances and Beyond (Figure 1, Tags K, L, & M): Conditions over the multi-use path east of the site (Tag K) are expected to be similar or better to those that existed prior to the introduction of the development, due to the increased shielding from salient northwesterly winds. Along the east elevation of Building C (Tag L), entrances are further protected by their proximity to the building façade and are expected to be comfortable for standing or better throughout the year, which is acceptable.

Rossdale Park, to the northeast (Tag M) is similarly expected to experience wind conditions relatively unaffected by the introduction of the development as the additional shielding from the southwest provided by the study buildings is not expected to significantly influence pedestrian wind comfort.

Influence of the Proposed Development on Existing Wind Conditions near the Study Site: Besides those locations discussed above, the introduction of the Rossdale Centre 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 wind conditions similar to those that existed previously.

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 Rossdale Centre development in Edmonton, Alberta.

1. Wind comfort over most grade-level pedestrian-sensitive locations across the full study site is expected to be suitable for the anticipated uses without mitigation. These grade-level areas include nearby sidewalks, parks, walkways, and building access points. Exceptions are the primary entrances at the east side of Building A and the north ends of Buildings B and C, where conditions are expected to be comfortable for walking or better throughout the year. If primary pedestrian entrances are located near these windier locations, then mitigation is recommended, as described in Section 3. It is further recommended that grade-level entrances fronting 100 Street NW be located within the recessed portion of the building façades.
2. Wind conditions over the nearby Diamond Park and Rossdale Park are generally expected to be similar to those that existed prior to the introduction of the study buildings, with improvements expected at select locations defined in Section 3.
3. The introduction of the proposed development 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, parks, 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.

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,

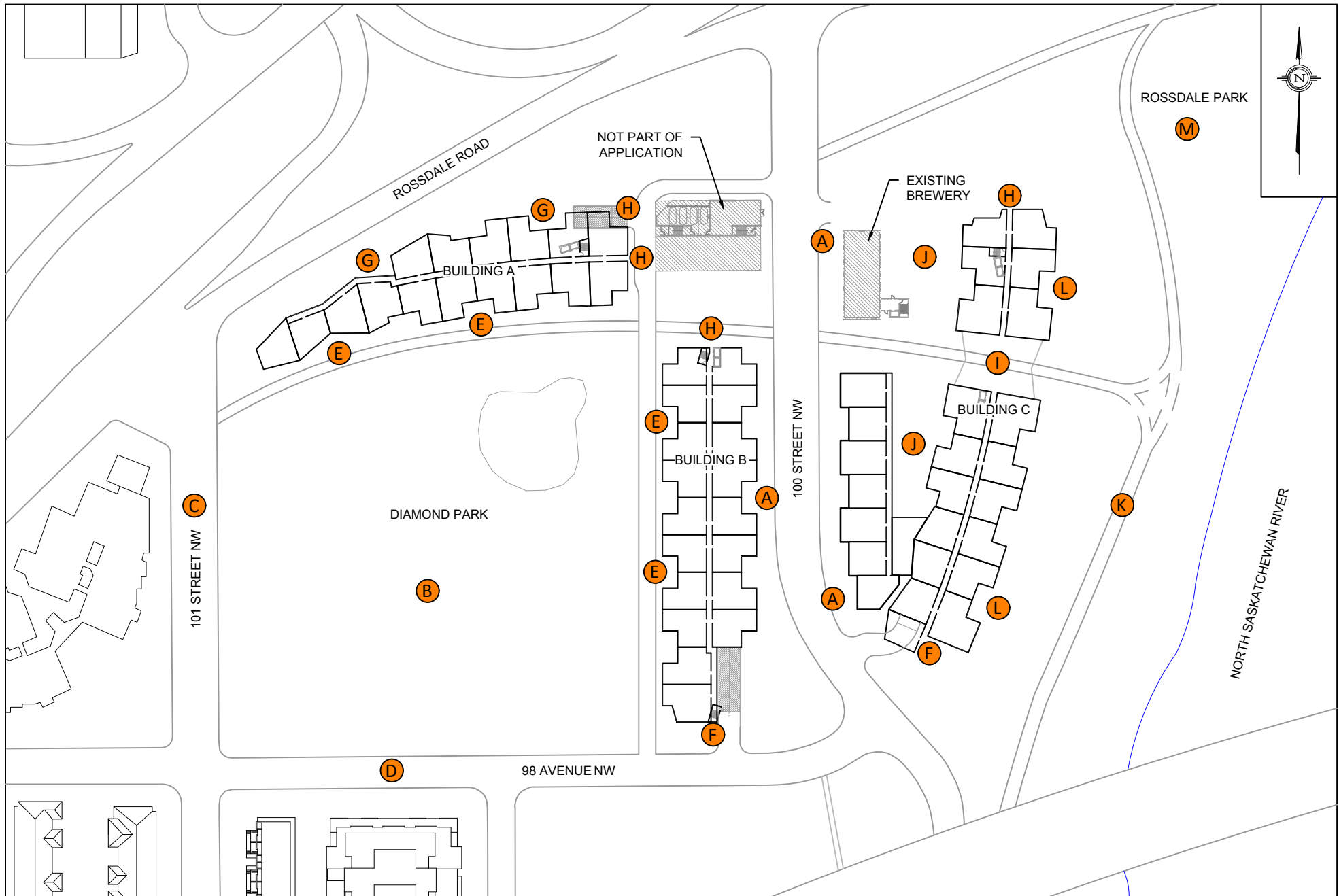
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PROJECT	ROSSDALE REZONING, EDMONTON QUALITATIVE PEDESTRIAN LEVEL WIND ASSESSMENT	
SCALE	1:1500 _(APPROX.)	DRAWING NO. GW21-304-DTPLW-1
DATE	SEPTEMBER 24, 2021	DRAWN BY P.S.

DESCRIPTION

FIGURE 1:
GROUND FLOOR PLAN
WITH REFERENCE MARKERS