

**WIND ENVIRONMENTAL CONDITIONS
AROUND THE PROJECT
“RÉSIDENCES SÉVILLE”**

by

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At the request of Mr. Benjamin Sternthal, M.Arch of Kodem Developments inc. and on behalf of Mr. Gideon Pollack of 158115 Canada inc., an assessment of the wind environmental conditions around the proposed new “RÉSIDENCES SÉVILLE” project on the north side of *Rue Ste Catherine ouest* between *Lambert Closse* and *Chomedey* in downtown Montreal has been carried out. The project consists of 3 buildings: Building A is a 25-storey tower 69.7 m high while buildings B and C are 10-storey 28.8 m high each. Clearly the height of the complex exceeds the limiting height of 44 meters applied by the *Ville de Montréal* as far as the examination of wind environmental conditions at pedestrian level are to be determined by an experimental study using a model of the buildings and their surroundings. However, considering the particular building configuration of the proposed project and its neighboring buildings, it was deemed appropriate to carry out and present at the first instance, a wind impact analysis with various recommendations regarding the architectural design of this complex. This report has been prepared in the

English language to avoid translation difficulties of scientific and technical terms pertinent to the wind-engineering field, as established in the current literature.

The author of this report has discussed the proposed project with Mr. Benjamin Sternthal, M. Arch, Ms. Marie Desnoyers, Architect of Cardinal-Hardy, inc. and Ms. Laure Giordani, Architect of acdf*, inc. who has also provided the plans and explained the details of this project. Furthermore, the author of this report has considered the drawings of the project, the surrounding areas and the topography; he has also visited the place to examine the environment of the new complex in terms of surrounding buildings and their influence on the wind conditions around the location of the project. At the present time, the project site is occupied by several low-rise vacant buildings, an open space (parking lot) and the old Seville theatre; the latter is in a dilapidated state, with the exception of its facade.

The evaluation of likely wind conditions around any building configuration is not an easy task. A change in the geometry of the buildings of the project or, more frequently, in the arrangement of buildings in the neighborhood — for example, the construction of one or more new buildings in the area — may change the anticipated or current wind conditions drastically. In the present qualitative assessment, some general comments are made regarding likely wind conditions in the vicinity of the “RÉSIDENCES SÉVILLE” project on streets and public spaces at the pedestrian level by considering the wind climate of Montreal; the present conditions of the surroundings; and the proposed form, geometry and location of the planned complex.

In general, buildings will only induce high wind speeds at lower levels if a significant part of them is exposed to direct wind flows. It is actually the direct exposure to wind rather than building height alone, which causes the problem. The basic wind environment of Montreal in terms of wind speeds and probabilities of exceedance from different directions is presented in Fig. 1. As clearly shown, westerly and southwesterly winds are dominant, while north and northeasterly winds may also be high. Note that these are upper level winds and significant changes may occur near the ground areas. In addition, differences exist between summer and winter wind data. Maximum summer winds are dominant from the west, while winter winds are certainly stronger and they blow primarily from southwest.

In accordance with the plans of the proposed project, the tower of the new complex is partly protected from the strongest westerly / southwesterly winds being into the wake formation of the 16- to 18-storey Montreal Children's Hospital; the Montreal Forum; the 15-storey Alexis Nihon plaza tower; and the 23-storey high Westmount Square tower. Additional buildings upstream influence the turbulence of the oncoming wind but will not change the present conditions in the vicinity of the proposed building regarding the wind regime in its adjacent public places. Wind speed and turbulence conditions are anticipated similar to the current situation given that the 69.7-meter – high tower is within the general outline of other nearby buildings. Having said this, evergreen trees with dense broad foliage or other landscaping elements along Ste Catherine will be positive additions and would improve the wind climate at the pedestrian level. This will be also helpful for the case of easterly winds, which although weaker, they will impinge on the

Chomedey face of the 28.8-meter - high building and would generate corner stream flows on both Ste Catherine and the proposed pedestrian lane perpendicular to Chomedey.

Regarding strong north-northeasterly winds, there is also little concern about pedestrian-level wind conditions. The proposed new “RÉSIDENCES SÉVILLE” building is unlikely to generate significantly more adverse wind conditions at the pedestrian level in comparison with those presently on this site. Indeed, the wind regime in this area is dominated by the wake of other tall buildings such as the 20-storey hotel-apartment building *La Tour Belvedere* on the north side of de Maisonneuve Ouest between Lambert-Closse and Chomedey; the 15-storey residential tower at the SW corner of Chomedey and de Maisonneuve Ouest; the 24-storey *Le Moyne* hotel-suites, the 12-storey Clarion hotel, and the 22-storey *Le Monfort*, all along de Maisonneuve Ouest boulevard; whereas other neighboring buildings upstream these NE wind directions are low, i.e. 3- to 4-storey high. Isolated tall buildings do exist at a larger distance, but their impact on the wind regime around the proposed complex will only be marginal. Pedestrian level wind conditions are expected to be fluctuating but the intensity of these fluctuations will be on the low side causing no problems to the pedestrians. It should be noted however, that northeasterly winds often bring large quantities of snow with them. In this case, snow would be expected to accumulate on the flat roof of the proposed 10-storey high buildings, as well as on the above-mentioned proposed pedestrian lane.

The architectural design of the proposed new complex also includes a number of elements that tend to mitigate the wind conditions at the sidewalk level

around the complex and the public green-spaces around. First and foremost, the different heights of the building sections of the proposed residence (10 and 25-storeys) constitute a desirable juxtaposition, which reduces the wind force of the down-flow impinging on the sidewalks around the project for several wind directions. The courtyard to be formed west of each of the 10-storey buildings is also a feature favorable to the wind flow due to the additional wake conditions of low speed created in this area. The stepped façade on the Ste Catherine side of the complex, as well as the commercial entrances with canopies along Ste Catherine and the recessed student entrances with canopies along Lambert-Closse and Chomedey are also beneficial for reducing the wind speeds at the pedestrian level. Furthermore, the sculptured texture of the building façades by introducing some small (about 1-ft wide) horizontal metal plates all around the building envelopes of the complex is an advantage as far as the wind-building interaction is concerned. This is due to the fact that these elements form obstructions to the down flow of the standing vortex appearing on the building façades and also disrupt the associated stagnation-formed vortices when the wind blows near-perpendicularly to the respective face of the building. Making these architectural elements a bit more pronounced – say 2-ft wide – particularly along the long façade of the tower on the Lambert-Closse side would be even more helpful for the amelioration of pedestrian level winds.

It should be noted that all the remarks made in this report have qualitative character and provide a general analysis of the anticipated wind conditions in the environment of the proposed new building for the main wind directions in Montreal assuming present conditions of surroundings. As mentioned previously in

this report, the construction of new buildings in the vicinity of the proposed project may change the wind regime drastically.

By considering the general project arrangement and features it appears that the likely wind conditions in the vicinity of the proposed project will be generally acceptable. Assuming the present surrounding configurations and general topography and based on fundamental wind engineering principles along with the experience obtained from other projects, it is the author's expert opinion that the potential amplification of wind speeds and turbulence conditions around the project will not create dangerous or unacceptable pedestrian level winds in the area. **Winds will likely be within the limits prescribed by the *Ville de Montréal*.** Although quantification of any risk and probability of occurrence of particular wind conditions anywhere in the area cannot be made without a detailed experimental study carried out in a boundary layer wind tunnel simulating the natural wind conditions around this particular building, it appears that such a study may not be absolutely necessary for the “RÉSIDENCES SÉVILLE” project by considering the absolute and relative height of the buildings and their configurations, as well as the surrounding buildings and topography.

Wind Climate of Montreal

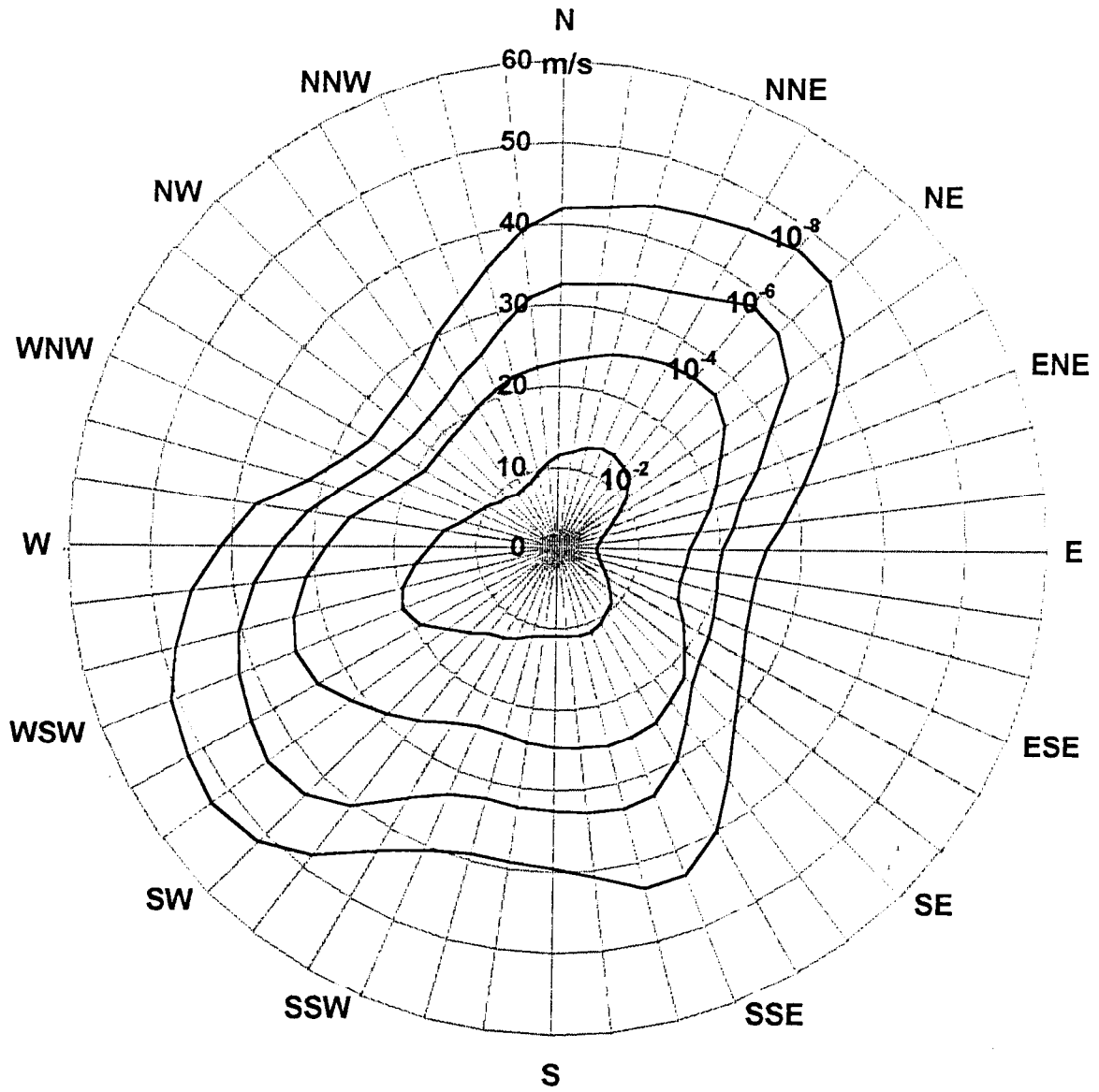


Figure 1