

SHADOW ANALYSIS REPORT | WILLOW TREE TOWER, HALIFAX NS

INTRODUCTION

The following study and attached images illustrate the impact of shadows produced by the proposed development at different time and monthly intervals on the Halifax North Commons. The conducted simulations were prepared by creating a digital model of the proposed development and surrounding built context at true longitude and latitude coordinates of the Quinpool and Robie Street intersection and Halifax North Commons.

In addition, the digital model has been built with elevation and grading extrapolated from Google Earth and available topographic survey data throughout the development site. Thus impacts to the North Commons as it relates to the development can be accurately documented and illustrated in context with the change in grade.

Shadow impacts were calculated as the percentage of shadow covering the North Commons for the proposed development at both 20 storeys and 29 storeys. The percentage of shadow impacts from all other buildings combined was also calculated. Comparing these data quantifies the impact of shadows from the proposed development on public open space versus the impact of existing buildings.

The study looks at four key seasonal events at regular intervals:

- Equinoxes September and March 21st at 9am, 12pm, 3pm, 5:30pm
- Winter Solstice December 21st at 9am, 12pm, 1:30pm, 3:30pm
- Summer Solstice June 21st at 9am, 12pm, 3pm, 6pm

SHADOW POTENTIAL

It is important to note that diagrams produced by this study convey the shadow 'potential' as a result of the of the new building. The study does not take into account the percentage of overcast weather and its impacts on the total hours of sunshine per day. Thus the actual shadow impact resulting from the development can be substantially less when winter months in Halifax are on average 75% overcast.¹ For simplification, this study does not take into account the existing trees along the Commons perimeter, which would cast heavy shadows during the afternoon and evening.

¹Source: <http://www.livingin-canada.com/climate-halifax.html> and <http://www.livingin-canada.com/climate-halifax.html>

IMPACT SUMMARY

EQUINOX | MARCH 21 & SEPTEMBER 21

The equinox occurs between the summer and winter solstices (spring and fall) where the hours of daylight are approximately equal to hours of night. The sun rises at 7:01am and sets at 7:13pm resulting in a total of 12h 12m 04s of daylight.

From sunrise to noon there is no shadow impact from the proposed development on the Halifax North Commons. At the 3:00pm interval, the development's shadow covers 1.4% at 20 storeys and 2.3% at 29 storeys, while other buildings cover 1.9% of the North Commons. The proposed development's shadow is limited to the southern edge of the North Commons. At the 5:30pm interval, the development's shadow covers 1.4% at 20 storeys and 1.6% at 29 storeys, while other buildings cover 15.3% of the Commons. The development shadow is again limited to the southernmost edge of the North Commons.

WINTER SOLSTICE | DECEMBER 21

The winter solstice corresponds with the shortest day of the year when the sun is at its lowest solar angle which results in the longest prolonged shadows during the year. The sun rises at 7:48am and sets at 4:37pm resulting in a total of 8 hours and 48 minutes of sunlight.

Because of the sun's low angle, the proposed development casts a shadow on the westernmost edge of the North Commons by 12:00pm, covering 0.5% at 20 storeys and 2% at 29 storeys, while other buildings cover 1.1%. At the 1:30pm interval, the development's shadow covers 3.6% at 20 storeys and 5.6% at 29 storeys, while other buildings cover 5.6% of the North Commons. Shadows from the development are still on the west side of the North Commons, but are beginning to move east. By the next interval at 3:30pm, the development's shadow covers 9.1% at 20 storeys, 10.3% at 29 storeys, and other buildings cover 15.2% of the North Commons. By now the development's shadow is long and thin as it passes over the Emera Oval.

SUMMER SOLSTICE | JUNE 21

The summer solstice corresponds with the longest day of the year when the sun is at its highest solar angle. The sun rises at 5:28am and sets at 9:04pm, resulting in 15h 34m 15s of sunlight.

From sunrise to noon there is no shadow impact from the proposed development on the Halifax North Commons. During the next interval at 3:00pm, the proposed development's shadow covers 0.2% at 20 storeys and 0.6% at 29 storeys, limited to the southernmost point of the North Commons at the baseball diamond. Other buildings' shadows cover 0.5% of the North Commons. At 6:00pm, while other buildings cover 4.9% of the North Commons, the proposed development covers only 0.2%, again at the southernmost point of the North Commons.

SUMMARY

During the summer solstice and equinoxes, shadows from the proposed development at either 20 or 29 storeys have minimal impact on the North Commons, covering only the southernmost portion and only from mid to late afternoon. Shadow coverage at the studied intervals range from 0.2% to 2.3%. Shadow impacts are most apparent during the Winter solstice when shadows are consistently long throughout the day. By 3:30 the development's shadow is passing over the Emera Oval as a long, thin shadow. At this interval, the building at either height's shadow covers 22% of the Oval footprint while the pavilion's shadow covers 11%.