

October 14, 2019

Background on Optical Measurements and Calculations

Watchfire Signs has manufactured outdoor electric signs since 1932 and led signs since 1996. We have more than 60,000 led signs in operation worldwide.

Incandescent signs were commonly measured using illuminance measurements, partly because the light bulb is ideally a point source of light, illuminating equally in all directions, and illuminance meters are commonly available and inexpensive. Foot-candle measurements are made at a defined distance from the sign and the magnitude depends on the physical size of the sign.

LED signs are highly directional however, which is an advantage in an urban setting since the light can be directed more precisely to the intended audience. Luminance measurements have been used to specify LED signs by the industry. The candela per square meter (NITs) unit allows a specification that does not depend on size or viewing distance.

The study done on the sign adjacent to a residential area used actual lab measurements made on modules using an illuminance meter. These measurements and extrapolations are then scaled up to the size of the sign and the distance corrections are made using the inverse square law.

Watchfire adopted brightness standards set forth by both the ISA (International sign Association) and OAAA (Outdoor Advertising Association of America). The standards used are based on the studies of Dr. Lewin and the IESNA (Illuminating Engineering Society of North America).

Below is a list of some of the measurement equipment used by Watchfire engineers.

Equipment used by Watchfire engineers to make lighting measurements:

Foot-candles/Lux - Minolta Illuminance Meter T-10

NITs/candela/sq. m – Minolta Luminance Meter LS-100

Sign Calibration – Minolta CS-1000 Spectra radiometer

SIGN LIGHTING STUDY

Sign Details

Size: 5' x 16' Digital Led Display

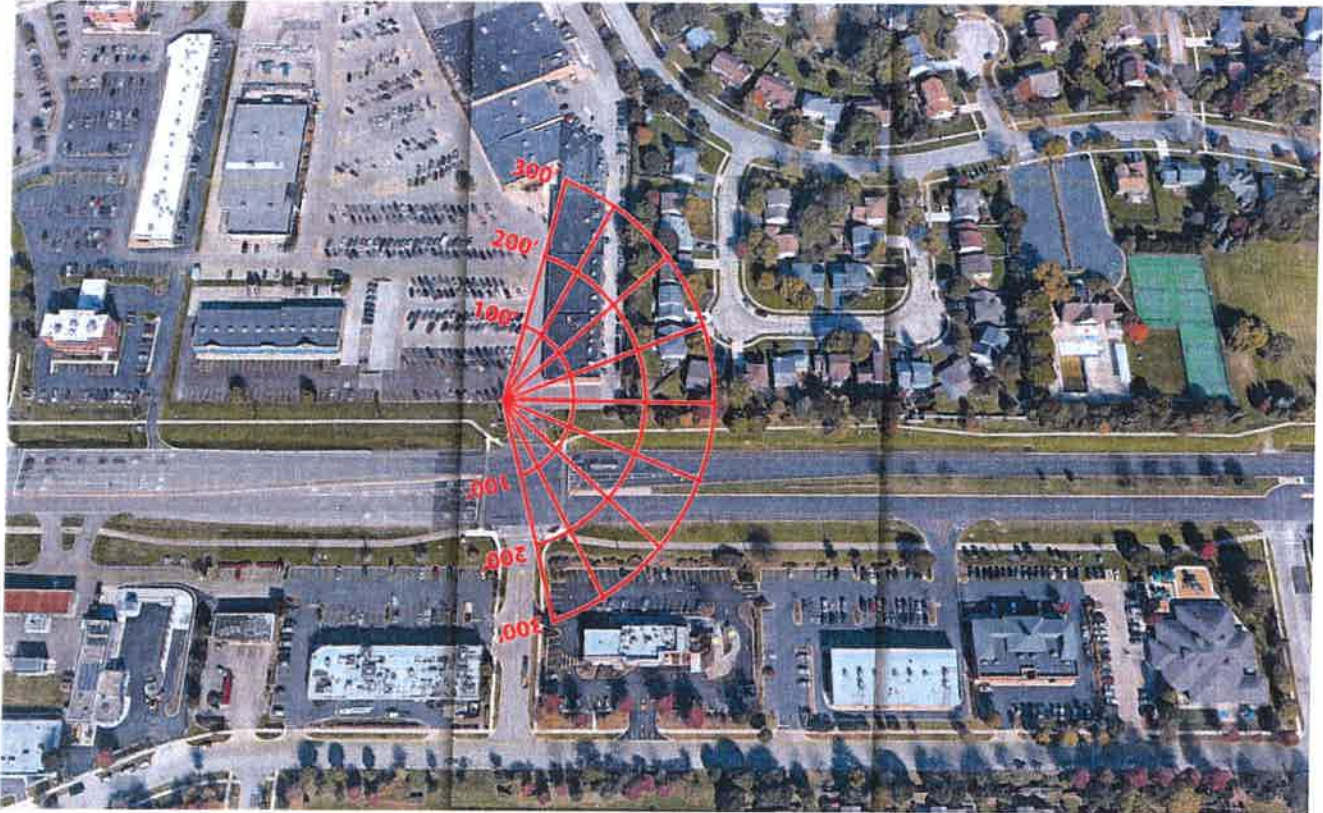
Location: *Garden Fresh Market, 955 W. 75th street*

Light measurements are completed in foot-candles. A foot-candle is the amount of light produced by a single candle when measured from 1 foot away. For reference, a 100-watt light bulb produces 137 foot-candles at 1 foot away, .0548 foot-candles at 50 feet and .0137 foot-candles at 100 feet.

The table represents the total increase in ambient light produced by the sign under normal or typical operation at night. The ambient light increases will be less than shown in the chart since they fail to consider any objects blocking the line of site to the sign. Obstructions such as trees would further reduce real world overall ambient light increases. In addition to obstructions any existing light within the viewing cone will further diminish any light increase.

	<i>0 degrees</i>	<i>20 degrees</i>	<i>40 degrees</i>	<i>60 degrees</i>	<i>75 degrees</i>
<i>100'</i>	0.2081	0.1717	0.1159	0.0524	0.0104
<i>200'</i>	0.0520	0.0429	0.0290	0.0131	0.0026
<i>300'</i>	0.0231	0.0191	0.0129	0.0058	0.0012

Light values in foot-candles at night under typical operation





Conclusion

Given the above comparisons and measurements, the area will see an almost undetectable difference in ambient light after installation of the digital led displays. Ambient light levels are more heavily impacted by street, building, and landscape lights than the increases produced by a led display

Ray Digby

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On Premise Quote



QUOTE NUMBER: 1904262.0 (Version 0) DATE: 2/28/2019

SIGN ID: 1250673 W10-FV

North Shore Sign Co Inc 216700
Ken Fogel, Project Consultant
1925 Industrial Drive
Libertyville, IL 60048
847-816-7020
kenf@northshoresigns.com

Shipping Destination
North Shore Sign Co Inc
1925 Industrial Drive
Libertyville, IL 60048

Job Site
Name: Garden Fresh Market
Address:
City: Naperville
State: IL Zip:

PRODUCT SPECIFICATIONS

Pixel Pitch: W10mm LED RGB
Pixel Matrix: 150 X 480
Cabinet Size: 5ft 5in H x 16ft 3in L x 8in D
Viewing Area: 5ft H x 16ft L
Cabinet Style: Double Face Twinpak
Character Size: 18 lines / 96.0 Characters at a 3" type
Approx. Weight: 1824.00 Lbs.
Warranty: Standard 5 Year Watchfire warranty applies.
Mfg. Lead Time: 2-4 weeks (after this document is signed & returned and receipt of down payment).
Electrical Service: 240 VOLT 4 WIRE 54.0 amps (27.00 per face). Refer to the Installation manual for details on wiring. Based on 18 hours of operation a day, plus or minus 10% depending on how the sign is programmed.
Example: 67.2 KWHrs a day x \$0.07 = \$4.70/Day

OPTIONS

Software	Ignite OP
Communications	4G Wireless w/ 5 Year Cellular Data Plan
Software Training	Web Based Software Training
Temperature Sensor	w/15 ft Cable
Cabinet Separation	Standard Up To 15 Feet
Power Requirements	Standard As Quoted
Sign Mounting Kit	Not Ordered / Not Required
Warranty	Standard 5-Year Parts Warranty
Personal Computer	PC Not ordered. Ignite Included
Technician On-Site	Not Ordered
Spare parts kit	Not Ordered

STANDARD FEATURES

Brightness	Daytime 7000 NITs Maximum;Nighttime 700 NITs Maximum
Color	LED RGB
Color Capability	Min. 1.2 Quintillion
Includes	Ignite Graphics Software
Video	Up to 30FPS
Viewing Angles	150 Horizontal/95 Vertical