

## SPECIAL INSPECTION / LIGHTING PHOTOMETRIC TEST

**Date:** 05/22/2020

**Client**

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**Project**

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EOS Fitness  
Lighting Photometric Special Inspection

**Optimized LED Project Number: MCI202002**

### General Information:

has retained Optimized Lighting Engineering and Design to complete on-site photometric testing of the maintenance building upgrade project to ensure compliance with the requirements outlined in the City of Tempe Lighting Ordinance Section 4-803 – Lighting Standards.

All testing, analysis of results, drafting of findings, and approval have been completed by Brett Steven Lorenzen (AZPE# 53437) a fully licensed professional electrical engineer with the State of Arizona and in good standing. Brett Steven Lorenzen is the owner and operator of Optimized Lighting Engineering and Design.

### Statement of Findings:

The site is located within the Agave Center near I-10 and Warner Roads in Tempe, AZ. The building resides in a light industrial/commercial property and does not border any residential neighborhoods or properties either single family or multi-family. This letter is intended to act as a statement of findings when visiting the site to verify the installed lighting fulfills the requirements outlined in the City of Tempe Lighting Ordinance. This building is completely new and all photometric readings were taking with Dr. Meter Photometric Meter.

City of Tempe Development Code Section 4-803 – Lighting Standards:

A. **Illumination in General:**

- a. Exterior lighting shall provide for appropriate and desirable nighttime illumination for all uses on and related to the site, including, but not limited to pedestrian pathways, plazas, courtyards, building entrances, parking, driveways, automatic tellers, and other outdoor spaces commonly used at night. Lighting of the exterior areas shall reduce conflicts between building design and landscape treatments, provide appropriate surveillance for crime-prevention, and minimize glare or intrusive light onto adjoining properties.
  - i. **The engineer generally observed the lighting of the property to blend with the overall appearance of nearby structures and generally comply with the intent of the City of Tempe ordinance. All exterior lighting fixtures are full cut-off.**

B. **Illumination Levels:**

- a. The maximum illumination level for on-site lighting is Forty (40) foot-candles as measured at-grade.
  - i. **PASSED - Lighting levels were taken at grade and no value was found to exceed 39.8fc.**

C. **Mounting and Operation of Fixtures:**

- a. Building mounted light fixtures shall be attached only to walls and the top of the fixture shall not be higher than necessary to illuminate the area required.
  - i. **PASSED - All building mounted light fixtures were observed to be wall-mounted.**
- b. In any residential zoning district or within Fifty (50) feet of any residential zoning district, freestanding light fixtures shall not exceed eighteen (18) feet in height. Within the next fifty (50) to one-hundred fifty (150) feet of any residential zoning district, freestanding light fixtures shall not exceed twenty-five (25) feet in height. In all other locations, freestanding light fixtures shall not exceed thirty (30) feet. Height shall be measured from top of a light fixture to the adjacent grade at the base of the support for that light fixture.
  - i. **PASSED – The property is not near a residential neighborhood and all freestanding poles are under 30' in height.**

- c. Controls for rest-rooms identified for general public use shall be of the style that cannot be turned off or on by users other than employees of the business.
    - i. **NOT APPLICABLE – no general public restrooms are provided**
  - d. All luminaires for security shall be vandal resistant that resist tampering, incorporate vandal resistant refractors (lens) and be provided with a gasket or seal that is designed to resist rain, dust, and insect contamination.
    - i. **PASSED – all light fixtures found in the drawings and witnessed on-site are outdoor rated and contain the ability to prevent rain, dust, and insects.**
  - e. Outdoor light fixtures which are full cut-off to direct all light below a horizontal plane through the bottom of the fixture -and have no lens which drops below the fixture may use any illumination source up to a maximum of (40) foot-candles.
    - i. **PASSED – All free-standing light poles and wall-packs are full cut-off.**
  - f. Outdoor light fixtures, which have a lens or diffuser which is visible below the horizontal plane and constructed of white opal glass, are considered non-cutoff and filtered and shall be limited to the light output equal to one-hundred (100) watt incandescent light bulb, no greater than one-thousand seven hundred (1700) lumens.
    - i. **NOT-APPLICABLE – All fixtures produce more than 1,700 lumens.**
  - g. Outdoor light fixtures which have a lens or diffuser which is visible above the horizontal plan and constructed of clear or prismatic glass are considered non-cutoff and non-filtered and shall be limited to the light output equal to a fifty (50) watt incandescent bulb no greater than six hundred (600) lumens.
    - i. **NOT-APPLICABLE – All fixtures produce more than 600 lumens.**
  - h. Conduit shall be concealed.
    - i. **PASSED – all conduit is concealed.**
  - i. The foot-candle level at the property line adjacent to a single-family district shall not exceed on-half (0.5) foot-candles. Lighting next to a residential use shall not spill over onto that use.
    - i. **NOT APPLICABLE – property is not located near a residential district**
  - j. Lighting fixtures used to illuminate an outdoor advertising sign (billboard) shall be mounted on the top fo the sign structure and shall comply with the shielding requirements of this chapter.
    - i. **NOT APPLICABLE – This property does not have an outdoor advertising sign.**
  - k. Ornamental twinkling lights are permitted when part of a window display, patio, landscape or other integral part of a business, provided they do not exceed on-half (0.5) foot-candles at the property line and do not conflict with the other provisions of adjacent residential use.
    - i. **NOT APPLICABLE – This property does not have ornamental twinkling lights.**
- D. **Specific Areas to be Illuminated:**
- a. All loading docks shall be illuminated dusk to dawn, with four (4) foot-candles of light at finish grade.
    - i. **NOT APPLICABLE – This business does not have a formal loading tock only an employee entrance.**
  - b. Carport parking structures shall be illuminated from dusk to dawn with three (3) foot-candles, including adjacent landscape area at finish grade.
    - i. **NOT APPLICABLE – This business does not have any carport structures.**
  - c. Parking structures and parking garages shall be illuminated from dawn to dusk with ten (10) foot-candles and from dusk to dawn with (4) foot-candles. Sub-level parking shall be continuously illuminated with twenty-four (24) hours a day with four (4) foot-candles at finish grade. Transitional lighting will be required at all entry areas.
    - i. **NOT APPLICABLE – This business does not contain any parking structures or garages.**
  - d. All stairwells, landings, and under the lowest landing shall be continuously illuminated with five (5) foot-candles.
    - i. **NOT APPLICABLE - This building does not contain any exterior stairwells.**
  - e. Breezeway lighting shall be illuminated from dusk to dawn with four (4) foot-candles. Transitional lighting will be required at all entry areas to breezeway corridors.
    - i. **NOT APPLICABLE – This building does not contain any breezeways.**
  - f. Exterior pedestrian pathways and adjacent landscape areas within twenty (20) feet of the pathway shall be illuminated from dusk to dawn with one-half (0.5) foot-candles of light at finish grade.
    - i. **PASSED – Some points along pathways were less than .5fc, however, once freestanding pole lights are producing full light output this should pass.**
  - g. Pedestrian gates shall be illuminated from dusk to dawn with five (5) foot-candles of light at finish grade and two (2) foot-candles within a 15-foot radius.
    - i. **NOT APPLICABLE – This building does not have any pedestrian gates.**
  - h. Retention areas shall be illuminated from dusk to dawn with on-half (0.5) foot-candles of light at finished grade.
    - i. **NOT APPLICABLE – This property does not contain any retention areas.**
  - i. Cluster or gang mailboxes shall be illuminated from dusk to dawn with five (5) foot-candles of light for a (15) foot radius of the mailboxes.
    - i. **NOT APPLICABLE – This property does not contain any mailboxes.**
  - j. Parking spaces for motor vehicles and bicycles shall be illuminated dusk-dawn with two (2) foot-candles.

- i. **PASSED – Two light poles appear to produce about 3-times as much light as the other 6 poles. These two poles pass, all points tested around these meet or exceed the ordinance and correspond to computer photometrics. However, the other 6 poles have testing points that are significantly below the City of Tempe requirements of 2.0FC in parking spaces and 1.0FC in drive aisles. Contractor shall coordinate with design team to get all fixture to obtain the same high lumens. OLED will need to return to retest before issuing compliance certificate.**
- k. Parking lot drive aisles shall be illuminated dusk to dawn with one (1) foot-candle.
  - i. **PASSED – Two light poles appear to produce about 3-times as much light as the other 6 poles. These two poles pass, all points tested around these meet or exceed the ordinance and correspond to computer photometrics. However, the other 6 poles have testing points that are significantly below the City of Tempe requirements of 2.0FC in parking spaces and 1.0FC in drive aisles. Contractor shall coordinate with design team to get all fixture to obtain the same high lumens. OLED will need to return to retest before issuing compliance certificate.**
- l. Refuse areas shall be illuminated with two (2) foot-candles and (5) foot-candles at the center-point of the gates.
  - i. **PASSED – Wall mounted lights and free standing pole lights adequately illuminate refuse area to over 2FC with over 5FC at the gates.**
- m. Building entrances shall be illuminated with five (5) foot-candles at the entrance and two (2) foot-candles within a fifteen (15) foot radius from the center point of the entrance.
  - i. **PASSED – All building entrances are illuminated within five feet with five (5) foot-candles and two (2) foot-candles within a fifteen (15) foot radius.**
- n. Vehicular gates at operator or locking mechanisms shall be illuminated with five (5) foot-candles at the entrance and two (2) foot-candles within a fifteen (15) foot radius from the center point of the entrance.
  - i. **NOT APPLICABLE – Building does not contain any vehicular gates.**
- o. Secondary lighting may be required to supplement the primary security lighting due to design elements and landscape conflicts in order to meet the criteria.
  - i. **NOT APPLICABLE – Landscaping does not appear to conflict with the lighting to fulfill the requirements of this section.**
- p. Locations where money transactions occur at drive-thru windows, ATM machines, pick-up windows, ticket windows, etc. shall be illuminated during business hours with five (5) foot-candles and two (2) foot-candles within fifteen (15) foot radius.
  - i. **NOT APPLICABLE – This building does not have any exterior ATM Machines, Drive-thru windows, Pick-up windows, or Ticket windows.**

I, Brett Lorenzen, a registered professional electrical engineer in the State of Arizona, do hereby verify that I physically completed the above-mentioned photometric lighting tests. Based on my findings I am unable to fully approve all exterior lighting conditions meet or exceed the City of Tempe Lighting Ordinance Section 4-803.

Brett Lorenzen, PE, LEED AP BD&C  
President  
Optimized Lighting Engineering and Design  
05/19/2020

W RANCH RD

S 52ND ST

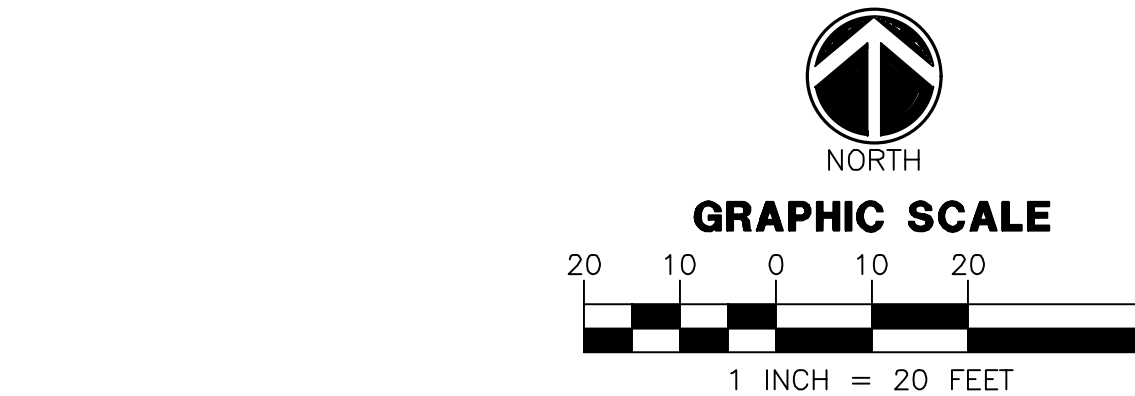
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### CALCULATIONS

EOS SITE LIGHTING  
 1462 points  
 HORIZONTAL FOOTCANDLES  
 Average 2.5  
 Maximum 7.3  
 Minimum 0.5  
 Avg:Min 4.96  
 Max:Min 14.60  
 Coef Var 0.45

### LEGEND

- EXISTING OFFSITE STREET LIGHT  
 GE LIGHTING ERL1\_07B330  
 candela file 'ERL1\_07B330\_IES'  
 1 lamp(s) per luminaire, photometry is absolute  
 Light Loss Factor = 1.000, watts per luminaire = 58  
 mounting height= 25 ft  
 number locations= 15, number luminaires= 15  
 kw all locations= 0.9
- EATON - McGRW-EDISON  
 GLEON-AF-04-LED-E1-SWQ-1200  
 candela file 'GLEON-AF-04-LED-E1-SWQ-1200.ies'  
 64 lamp(s) per luminaire, photometry is absolute  
 Light Loss Factor = 0.900, watts per luminaire = 258  
 mounting height= 30 ft  
 number locations= 16, number luminaires= 16  
 kw all locations= 4.1
- EATON - McGRW-EDISON  
 GLEON-AF-04-LED-E1-T4FT-1200  
 candela file 'GLEON-AF-04-LED-E1-T4FT-1200.ies'  
 64 lamp(s) per luminaire, photometry is absolute  
 Light Loss Factor = 0.900, watts per luminaire = 258  
 mounting height= 30 ft  
 number locations= 2, number luminaires= 2  
 kw all locations= 0.5
- EATON - McGRW-EDISON  
 GWC-AF-01-LED-E1-SL4-600  
 candela file 'GWC-AF-01-LED-E1-SL4-600.ies'  
 16 lamp(s) per luminaire, photometry is absolute  
 Light Loss Factor = 0.900, watts per luminaire = 34  
 mounting height= 18 ft  
 number locations= 4, number luminaires= 4  
 kw all locations= 0.1
- EATON - McGRW-EDISON  
 GWC-AF-01-LED-E1-SL2  
 candela file 'GWC-AF-01-LED-E1-SL2.ies'  
 16 lamp(s) per luminaire, photometry is absolute  
 Light Loss Factor = 0.900, watts per luminaire = 59  
 mounting height= 12 ft  
 number locations= 6, number luminaires= 6  
 kw all locations= 0.4



### PHOTOMETRIC CALCULATION SHEET. FOR INFORMATION ONLY.

PROJECT NAME:  
 EOS FITNESS

Reviewed for Code Compliance  
**APPROVED**  
 08/15/2019

DESIGN BY: CRC **PH-1**

