SECTION 16500 - LIGHTING - LUMINAIRES AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

B. General:

1. Section specifies requirements for all luminaires, lamps, ballasts, and accessories.

2. The Contractor shall be responsible for luminaire quantities, lengths and clearances required and shall inform the Architect in writing, at the time the bid submission is made, of discrepancies or variances found with fixtures or details specified herein or in the luminaire schedule and other contract documents.

1.2 STANDARDS

A. Codes:

1. Luminaires, components, and installation shall be in accordance with the American National Standards Institute, the latest revision of the National Electrical Code (N.E.C.), ASHRAE/IESNA – Standard 90.1 and applicable federal, state, and local codes and regulations.

B. U.L. Listing:

1. Luminaires, ballasts, transformers, and other electrical components shall be manufactured in strict compliance with the appropriate requirements of the Underwriter's Laboratories, Inc. and others that may be applicable. The appropriate Underwriter's Laboratories, Inc. labels shall be affixed to luminaires in a position concealing it from normal view.

2. The Contractor shall be responsible for coordinating the characteristics and the appropriate U.L. labeling of luminaires and their components with the ambient conditions which will exist when the luminaires are installed.

1.3 SUBMITTALS

A. Procedure: In accordance with Division One.

B. Shop Drawings and Product Data Submittals:

1. Contractor shall submit a complete list of lighting products intended to be furnished with manufacturer and catalog designations, along with currently quoted lead times for delivery of same. Should the Contractor anticipate that the delivery schedule of specified product may adversely impact the construction schedule, it shall be brought to the attention of the owner at this time. Request for fixture substitution on the basis of delivery schedule will not be permitted.
2. Submit shop drawings and product data in accordance with the requirements of the general conditions and as described herein and elsewhere in the contract documents. The Contractor shall submit data for approval of the Architect. Luminaires shall not be installed without the approval of its shop drawings, product data and/or sample.

C. Samples

1. Upon request, submit samples of custom luminaires, modified, and substitution items for the purpose of ascertaining photometric performance, quality of visible parts and details, maintenance features, methods of installation, and safety features. These samples shall be submitted for approval at no expense to the Owner, with transportation prepaid. The samples will be returned to the Contractor after the review has been completed at the expense of the Contractor.

D. Alternates and Substitutions

1. Manufacturers listed in the Luminaire Schedule shall be assumed capable of supplying the listed luminaires unless exceptions are set forth in their quotations. Any such exceptions shall immediately be brought to the attention of the Architect and the Lighting Designer.

2. Should the Contractor elect to consider products other than those specified, the items must be submitted fourteen days in advance of the bid. Failure to submit within that deadline constitutes a guarantee that the specified products will be supplied. The lighting designer will invoice the contractor, at senior designer hourly rates, to review any product not listed in the specification. Submittal of a bid for this project shall include a written acknowledgment of these terms from the contractor.

3. Contractor shall provide itemized costs for all luminaires.

PART 2 – PRODUCTS

2.1 FIXTURES

A. LED LIGHT FIXTURES

1. A LED system shall include a luminaire, power module, heat management, wiring harness, and jacks compatible with project control system, to make a complete and functioning system.

2. Controls shall allow smooth and even color fade between colors, including white.

3. Life (mean time between failure, MTBF) shall be 75,000 + hours.

4. LEDs to be sourced from an approved manufacturer and selectively binned for color consistency.

5. Shop drawings are required and shall include life (hours) at 70% and 50% lumen maintenance with plot graph of measured and extrapolated data. Initial lumens for each specified color temperature LED shall be listed individually.
6. LED luminaires shall be listed and labeled by Underwriters’ Laboratories, Inc. or other testing agency acceptable to local code authorities, for installation in fireproof or non-fireproof construction, damp or wet locations, as required.

7. Luminaires, LEDs and labor, shall be under full warranty for a period of not less than one year from the date of written final acceptance.

B. LED DRIVERS
1. LEDs and drivers where possible shall be supported and recognized as a compatible system by both manufacturers.
2. Drivers shall use 6 -40 VDC input voltages with true DC constant current output.
3. Drivers shall have reverse polarity protection, open circuit protection and require no minimum load.
4. Drivers shall be at least 85% efficient.
5. Drivers shall be impervious to harsh environments, be waterproof and use plug and play connections.
6. Drivers shall be 100% dimmable, unless otherwise specified
7. Drivers, and labor, shall be under full warranty for a period of not less than one year from the date of written final acceptance.

2.2 LIGHTING CONTROLS
1. Control of lighting will be in accordance with current operational lighting controls at LaGuardia Community College.
2. Acceptable methods of control will be Photo Controls, Time Switches or Integration with LGACC building lighting control center.
3. Exterior lighting shall be controlled by lighting control center to provide lighting control by level of exterior illumination as well as by time control.

PART 3 - EXECUTION

3.1 INSTALLATION
1. Provide luminaires at locations, and of types, as indicated on the contract drawings.
2. Contractor shall be responsible for coordinating with the other trades
3. Contractor shall be responsible for installing fixtures with proper ventilation so as not to exceed the temperature rating of the lighting fixtures or lamps.
4. Notify the Architect about field conditions at variance with plans and/or specifications before commencing installation. Failure to do so shall exonerate the Architect from responsibility for problems resulting from same, and work required to correct the discrepancy shall be performed by the Contractor with no additional compensation.
5. Prior to ordering lighting equipment, the Contractor shall verify locations and recess depths, final voltages, and ceiling trims compatibility. Additional charges for failure to verify locations will not be allowed.

6. Lamps must be operational at time of turn over to the owner.

7. Luminaires to be cleaned prior to opening the facility.

8. Install luminaires in strict conformance with manufacturer's recommendation and instructions.

9. Contractor is required to protect fixtures from damage during installation and up to time of acceptance by the Architect. Broken fixtures, glassware, plastics, lamps etc. must be replaced by the Contractor with new parts without expense to the owner.

10. It shall be the responsibility of the Electrical Contractor to receive and store the necessary materials and equipment for installation of the dimmer system. It is the intent of these specifications and plans to include everything required for proper and complete installation and operation of the dimming system, even though every item may not be specifically mentioned. The contractor shall deliver on a timely basis to other trades any equipment that must be installed during construction.

3.2 AIMING AND ADJUSTMENTS

1. Adjustable lighting units shall be aimed, focused, and locked, etc., by the Contractor under the supervision of the Architect.

2. Aiming and adjusting shall be carried out after installation is complete. Ladders and scaffolding, etc., required shall be furnished by the Contractor at the direction of the Architect. As aiming and adjusting is completed, locking setscrews, bolts, and nuts shall be tightened securely.

3. Where possible, units shall be focused during normal working daytime hours. However, where daylighting interferes with aiming and focusing, the aiming shall be performed at night.

3.3 FIELD QUALITY CONTROL

1. Operate each luminaire after installation and connection, inspect for proper connection, operation and lamp type.

3.4 CLEANING

1. Luminaires shall be thoroughly cleaned of all dust, dirt, oil, debris and fingerprints. Visible components that are scratched, marked, dented or deformed shall be replaced.

3.5 MAINTENANCE MANUALS

1. The Contractor shall be responsible for obtaining from supplying lighting manufacturers, for each type of luminaire, a recommended maintenance manual including tools required, types of cleaners to be used, replacement parts identification lists and final, as built shop drawings, warranty information. These manuals shall be produced and delivered to the owner as specified.
3.6 WARRANTY

1. Manufacturer shall warrant products under normal use and service to be free from defects in materials and workmanship for a period of two years from date of delivery.

2. Warranty shall cover repair or replacement of such parts determined defective upon inspection.

3. Warranty does not cover any product or part of a product subject to accident, negligence, alteration, abuse or misuse. Warranty does not cover any accessories or parts not supplied by the manufacturer.

4. Warranty shall not cover any labor expended or materials used to repair any equipment without manufacturer’s prior written authorization.
<table>
<thead>
<tr>
<th>Fixture Type</th>
<th>Description</th>
<th>Manufacturer's catalog reference</th>
<th>Source quantity</th>
<th>Source wattage</th>
<th>Source type</th>
<th>Source reference</th>
<th>Comments</th>
<th>Extended wattage</th>
<th>Units</th>
<th>Voltage</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Surface mounted extruded aluminum lensed, Linear LED lightstrip having a 60° distribution suitable for exterior use. Finish to be hard anodized black. Luminaire to be supplied with factory standard adjustable &amp; lockable mounting brackets mounting brackets. Mounting bracket to be modified to ensures no vertical displacement over time. LEDs to have a Cool White 4500K color temperature. Luminaire to be mounted inside a continuous bracket for shielding. Remote factory provided power supply(s) / driver(s) to be accessible and located in an appropriate enclosure. Contractor to coordinate quantity of drivers and coordinate locations.</td>
<td>NA</td>
<td>8.6</td>
<td>LED</td>
<td>INCLUDED</td>
<td>LIGHTWILD LUMEN POWER PLUS LW-LUMILIN-M-CW-24-ADJ MOUNT MOD: Bracket to be modified for no vertical displacement. SERIES A</td>
<td>Contractor to coordinate quantity of drivers and coordinate locations with LGACC maintenance.</td>
<td>8.6</td>
<td>LF</td>
<td>24/120</td>
<td>2</td>
</tr>
<tr>
<td>AB</td>
<td>Low voltage, surface mounted continuous array of outdoor rated LED modules mounted on fixed on center spacing of no more than 5&quot; &amp; having a nominal 120° distribution. LEDs to be warm white (3000 - 3500K) and have an output of approximately 30 lumens per foot. System power consumption not to exceed 2W per foot. Array to be back light and be mounted with a regular spacing behind colored push through colored acrylic letter forms. Any and all control gear to be easily accessible, in a clean &amp; well ventilated location and to be listed for use in temperatures of -20°F to +120°F. Control gear to be supplied by LED fabricator as an integral and fully compatible 5year warranted system.</td>
<td>NA</td>
<td>1.2</td>
<td>LED</td>
<td>INCLUDED</td>
<td>GE Lighting TETRA MAX GEWWMX56 POWER SUPPLY, END CAPS, SUPPLY WIRE, IN LINE CONNECTORS ... AS REQUIRED</td>
<td>SIGN FABRICATOR TO PROVIDE WORKING EXAMPLE FOR APPROVAL</td>
<td>1.2</td>
<td>LF</td>
<td>12/120</td>
<td>1</td>
</tr>
</tbody>
</table>
### POWER AND CONTROL UNIT

**Series B Specification Sheet**

- DIMMING OR SHOW CONTROL BY A THIRD PARTY DMX CONTROL DEVICE OR 0-10 VDC WALL DIMMER.
- LIGHTWILD DIMMER CAN BE ORDERED TO DIM 1 OR MORE CIRCUITS. REFER TO LIGHTWILD DIMMER SPECIFICATION SHEET.
- DOWNLOAD CAD-BASED DIMENSIONAL DRAWINGS OF ENCLOSURES AND POWER SUPPLIES AT WWW.LIGHTWILD.COM

#### POWER SUPPLY LOCATION

- **PSI**
  - POWER SUPPLIES INSIDE ENCLOSURE

- **PSO1**
  - POWER SUPPLIES OUTSIDE ENCLOSURE
    - SINGLE OUTPUT
    - EXTERIOR RATED
    - INTEGRAL JUNCTION BOXES ON ENDS
    - USES LW-PS-M24V-1 POWER SUPPLY (80 W)

- **PS03**
  - POWER SUPPLIES OUTSIDE ENCLOSURE
    - THREE OUTPUTS
    - EXTERIOR RATED
    - INTEGRAL JUNCTION BOXES ON ENDS
    - USES LW-PS-M24V-3 POWER SUPPLY (3x72 W)

#### ENCLOSURE

- **N1**
  - NEMA 1 STEEL SURFACE MOUNT INDOOR ENCLOSURE THAT USES LW-PS-L24V POWER SUPPLY

- **N4**
  - NEMA 4X PVC SURFACE MOUNT OUTDOOR ENCLOSURE THAT USES LW-PS-L24V POWER SUPPLY

- **UP TO 2 CIRCUITS CAN BE FED FROM AN N1 ENCLOSURE WITH INTEGRAL POWER SUPPLIES**

- **UP TO 2 CIRCUITS CAN BE FED FROM AN N4 ENCLOSURE WITH INTEGRAL POWER SUPPLIES**

- **UP TO 8 CIRCUITS CAN BE FED FROM AN N1 OR N4 ENCLOSURE WITH POWER SUPPLIES OUTSIDE THE ENCLOSURE**

### EXAMPLE PART NUMBERS AND DIAGRAMS

#### POWER SUPPLY LOCATION - ENCLOSURE - NUMBER OF CIRCUITS

**LW - SERIESB**

- PSI
- N1 - 2

**LW - SERIESB**

- PSI
- N4 - 8

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### TEMPERATURE RATINGS

- **N1 ENCLOSURE**: 1/2" F to 158°F (-25°C to 70°C)
- **N4 ENCLOSURE**: 1/2" F to 122°F (-25°C to 50°C)
- **LW-PS-M24V-1 POWER SUPPLY**: 1/2" F to 158°F (-25°C to 70°C)
- **LW-PS-M24V-3 POWER SUPPLY**: 1/2" F to 158°F (-25°C to 70°C)

### ENCLOSURE DIMENSIONS

- **N1 ENCLOSURE**: 8 ins (203 mm) H x 14 ins (355 mm) W x 6 ins (152 mm)
- **N4 ENCLOSURE**: 16 ins (406 mm) H x 12 ins (305 mm) W x 6 ins (152 mm)

### LISTINGS

- UL (2108 and 1638)
Tetra® MAX
LED Lighting System
for Channel Letters

Maximum reliability
is easier than ever
Components

<table>
<thead>
<tr>
<th>SKU</th>
<th>Description</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>GERDMKS6</td>
<td>Tetro® MAX Red 2 LED Module, 6 LEDs/ft (+20 LEDs/m)</td>
<td>100 ft (30.48 m) / box</td>
</tr>
<tr>
<td>GEGLMS6</td>
<td>Tetro® MAX Green 2 LED Module, 6 LEDs/ft (+20 LEDs/m)</td>
<td>100 ft (30.48 m) / box</td>
</tr>
<tr>
<td>GEBLMKS6</td>
<td>Tetro® MAX Blue 2 LED Module, 6 LEDs/ft (+20 LEDs/m)</td>
<td>100 ft (30.48 m) / box</td>
</tr>
<tr>
<td>GEWHMXS6</td>
<td>Tetro® MAX White 2 LED Module, 6500K, 6 LEDs/ft (+20 LEDs/m)</td>
<td>100 ft (30.48 m) / box</td>
</tr>
<tr>
<td>GEVWWMXS6</td>
<td>Tetro® MAX Warm White 2 LED Module, 3200K, 6 LEDs/ft (+20 LEDs/m)</td>
<td>100 ft (30.48 m) / box</td>
</tr>
<tr>
<td>GERDMXL6</td>
<td>Tetro® MAX Red 3 LED Module, 6 LEDs/ft (+20 LEDs/m)</td>
<td>100 ft (30.48 m) / box</td>
</tr>
<tr>
<td>GEPS12-20</td>
<td>Power Supply Input: 90-264VAC Output: 12VDC/20W</td>
<td>10 / box</td>
</tr>
<tr>
<td>GEPS12-60</td>
<td>Power Supply Input: 90-240VAC Output: 12VDC/60W</td>
<td>10 / box</td>
</tr>
<tr>
<td>GETMEC1</td>
<td>18 AWG Wire End Caps (0.82 mm²)</td>
<td>100 / bag</td>
</tr>
<tr>
<td>9409</td>
<td>18 AWG Supply Wire (0.82 mm²)</td>
<td>500 ft (152.40 m) / spool</td>
</tr>
<tr>
<td>191600041</td>
<td>22-14 AWG Twist-on Wire Connector (0.33-2.08 mm²)</td>
<td>500 / bag</td>
</tr>
<tr>
<td>192160004</td>
<td>18-14 AWG In-line Splice Connector (0.82-2.08 mm²)</td>
<td>500 / bag</td>
</tr>
</tbody>
</table>

Product samples are available in each color. Contact your sales rep for further details.

Technical Specifications

<table>
<thead>
<tr>
<th>Specification Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Brightness (lumens/linear unit)</td>
<td>Red (2 &amp; 3 LED Modules): 21 lm/ft (68.90 lm/m), Green: 42 lm/ft (137.80 lm/m), Blue: 12 lm/ft (39.37 lm/m), White: 42 lm/ft (137.80 lm/m), Warm White: 36 lm/ft (118.11 lm/m)</td>
</tr>
<tr>
<td>Viewing Angle</td>
<td>Red, Green, Blue: 106°, White: 105°, Warm White: 110°</td>
</tr>
<tr>
<td>Cutting Resolution</td>
<td>Cut-in-between any two modules: 2 inches (51 mm) for 2 LED Module, 3 inches (76 mm) for 3 LED Module</td>
</tr>
<tr>
<td>Operating Environment</td>
<td>–40°C to +60°C</td>
</tr>
<tr>
<td>Loading per Power Supply</td>
<td>GEPS12-20: 51 modules/17 ft (5.18 m) for 2 LED Module, 52 modules/26 ft (7.92 m) for 3 LED Module GEPS12-60 &amp; GEPS12-60U: 162 modules/54 ft (16.46 m) for 2 LED Module, 240 modules/80 ft (24.38 m) for 3 LED Module</td>
</tr>
<tr>
<td>Supply Wire Limits</td>
<td>1-30 ft (0.30-9.14 m)</td>
</tr>
<tr>
<td>Sign Dimensions</td>
<td>For best results, recommended sign depth is 5-8 inches (127-203 mm)</td>
</tr>
<tr>
<td>Energy Consumption</td>
<td>2 LED Module - Strip: 0.99 W/fl (3.25 W/m), System: 1.20 W/fl (3.94 W/m) 3 LED Module - Strip: 0.66 W/fl (2.17 W/m), System: 0.80 W/fl (2.62 W/m)</td>
</tr>
<tr>
<td>Warranty</td>
<td>GE offers a limited system warranty of up to five (5) years</td>
</tr>
<tr>
<td>System Certifications</td>
<td>UL Recognized #E219167, UL Listed #E229508, CSA Approved #216319, CE, RoHS, IP66 rated: separate enclosure required, damp location rated</td>
</tr>
</tbody>
</table>

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