

AUSTIN ENERGY

PURCHASE SPECIFICATION

AUSTIN ENERGY

FOR

LUMINAIRE AND POLE, LED, DECORATIVE, 100W EQUIV, 120V

<u>DATE</u>	<u>PREPARED BY</u>	<u>ISSUANCE /REVISION</u>	<u>BRIEF DESCRIPTION OF CHANGE</u>	<u>APPROVAL</u>
4/3/15	Lee Emmick	Issuance		Michael Pittman
9/8/17	Dennis Patrick	Revision	Changed Sunset Valley and Town Lake back to previous style light.	Michael Pittman
02/13/20	Brantley Gosey	Revision	Updated to require barcoding	Michael Pittman

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein.
Retain for future reference.

1.0 SCOPE

This specification shall define the minimum physical and electrical characteristics required by Austin Energy (AE) for poles and Light Emitting Diode (LED) Decorative luminaires of the enclosed, pendant, or post top style lights which have integral drivers and photoelectric control receptacles. The Decorative LED luminaires shall be used for street lighting within select neighborhoods.

2.0 CLASSIFICATION

The requirements herein shall apply to LED luminaires of the following wattages, style, and voltage.

- 2.1 100-watt equivalent LED, U0 dark sky compliant 120/208/240/277-volt "pendant" style with ROAM compatible photo control receptacles and photometrics in compliance with section 7.1 of this specification. Acuity Street Lights: Sunset Valley LED Kits AE 23829-RAL9004, AE 23831-RAL8014, AE 23827-RAL6009, or AE standards engineering approved equal.
- 2.2 100-watt equivalent, LED, U0 dark sky compliant 120/208/240/277-volt "post top" style with ROAM compatible photo control receptacles and photometrics in compliance with section 7.2 of this specification. Acuity Street Lights: Town Lake LED Kits AE 23826-RAL9004, AE 23830-RAL8014, and AE 23828-RAL6009, or AE standards engineering approved equal.

3.0 APPLICABLE STANDARDS

All characteristics, definitions, and terminology, except as specifically covered in this specification shall be in accordance with the latest revision of the following ANSI standards:

- 3.1 ANSI C136.2 - Roadway lighting luminaires - voltage classification.
- 3.2 ANSI C136.3 - Roadway lighting equipment luminaire attachments.
- 3.3 ANSI C136.10 - Roadway lighting equipment locking-type photo-control devices and mating receptacles physical and electrical interchangeability and testing.
- 3.4 ANSI C136.16 – Enclosed, post top mounted luminaires
- 3.5 ANSI C136.21 – Vertical tenons used with post top mounted luminaires
- 3.6 ANSI C136.25 - Roadway lighting equipment – ingress protection (IP 66)
- 3.7 ANSI C136.31 - Roadway lighting vibration – 3G vibration test
- 3.8 ANSI C136.36A– Aluminum Lighting Poles
- 3.9 ANSI C136.36C – Steel roadway and area lighting poles
- 3.10 ANSI C136.37 - Roadway lighting equipment – solid-state light sources
- 3.11 ANSI C136.41 - Roadway and area lighting equipment – dimming control between an external locking type photo-control and driver
- 3.12 ANSI C136.1110 - Roadway lighting equipment - multiple sockets.
- 3.13 ANSI/IES RP-8 - Practice for roadway lighting.
- 3.14 ANSI/IES LM-79 - Electrical and Photometric Measurements of Solid-State Lighting Products.
- 3.15 ANSI/IES TM-15-11 - Luminaire Classification System for Outdoor Luminaires (B-U-G).
- 3.16 ANSI/IES LM-63 - Standard File Format for Electronic Transfer of Photometric Data and Related Information.

4.0 GENERAL

- 4.1 The light shall be commercially available. Prototypes will not be accepted unless approved by Engineering Standards.
- 4.2 The fixture shall use at least 55% less energy compared to its commercially available High-Pressure Sodium counterpart. Maximum wattage acceptable would be 58W for HPS 100W equivalent.
- 4.3 A full sheet of product specifications shall be submitted prior to the award of contract. IES files must be available on the manufacturer's website. Warranty information shall be submitted prior to award of contract, and warranty shall cover all parts including the driver and have a minimum 10-year warranty.
- 4.4 Fixture shall be designed to meet IESNA lighting standards per RP-8. Types III and V distribution patterns should be readily available. The fixture shall also meet IES TM-15 for B-U-G rating, with U0 rating. Electronic IES Files shall be submitted prior to the award of contract. The fixture shall also meet Design lights Consortium Qualified Products List (DLC QPL) specifications and requirements.
- 4.5 Fixture shall be tested by a third party or NVLAP lab in accordance with the latest revision of LM-79 and LM-80. Documentation shall be submitted electronically to Standards Engineering after a request from Austin Energy.

5.0 FIXTURES

- 5.1 The luminaire fixtures shall be constructed of precision die-cast aluminum with an extruded aluminum heat-sink element. The fixture shall enclose the slip fitter, LED's, surge protective device (SPD), and driver components. These components shall be mounted to the fixture by means of a quick disconnect for ease of maintenance.
- 5.2 The fixture shall be adequately enclosed with a metal wildlife guard to prevent the entrance of birds in the electrical connection area and insects in the lamp area.
- 5.3 The upper and lower sections of the fixture shall be joined by an integrally cast hinge pin at the mounting end with a positive spring-loaded latch or a stainless steel bail at the latch end.
 - 5.3.1 The hinge shall hold the lower section firmly in place when closed and shall be designed so that the lower section, when free-swinging, will not accidentally disengage.
 - 5.3.2 The latch shall secure the lower section of the fixture to the upper one, permit access to the lamp and electrical connection compartment, and be operable with protective gloves but without tools.
- 5.4 Provisions shall be made within the luminaire to permit leveling of the unit.
 - 5.4.1 A leveling bubble device shall be mounted so as to be viewable from ground level.
- 5.5 The luminaire fixture shall be sufficiently sized to allow the operation of all components within their designed operating temperatures.
- 5.6 The complete luminaire shall have an effective projected area (EPA) not to exceed 1.5 sq. ft. and weight (including lamp) of less than 45 lbs.
- 5.7 Color of the luminaire shall be as specified, Green/GRN (RAL 6009), Black/BLK (RAL 9004), or Bronze/CLB/Brown (RAL 8014) polyester powder coat finish.
- 5.8 Materials and protective coatings used for the luminaire assembly, including but not limited to screws, bolts, latches, hinges and mounting assembly shall individually and as a system be resistant to atmospheric conditions, including the corrosive and erosive action of conditions of service encountered in industrial and seaboard areas. All screws, bolts, latches, and hinges shall be made of stainless steel.
- 5.9 The optics enclosure of the fixture, driver, and SPD shall be rated IP 66 or better.

5.10 US, UL, DLC QPL, Outdoor, and Wet Listed.

6.0 SLIPFITTER

- 6.1 The slip fitter shall be capable of accepting a 1-1/2 in. NPS pendant tenon for pendant-style fixture and a 3" Dia. Tenon for post top style tenon. in accordance with ANSI C136.16 and ANSI C136.21 latest revision thereof.
- 6.2 The slip fitter shall provide a shoulder or stop to limit the depth of insertion of the pipe tenon during installation.
- 6.3 The slip fitter shall have provisions for clamping the luminaire securely to the tenon and for leveling through no less than three (3) degrees from the axis of the attachment with respect to the horizontal.
- 6.4 The slip fitter shall be equipped with a fixed-in-place metal wildlife guard.
- 6.5 Slipfitter shall be secured to the mast arm by a minimum of two (2) bolts or threaded studs for secure mounting.

7.0 PHOTOMETRICS

7.1 100 Watt Equivalent LED Pendant type Luminaires

- 7.1.1 The 100-watt equivalent LED mast arm mounted luminaire shall be IES upright rating U0 and, when mounted 25 feet above the midpoint of either long side of a rectangular area 80 feet by 30 feet, shall provide a measured minimum intensity of 0.2 foot-candle at any point on the surface of the area. The roadway width shall be thirty (30) feet wide with a mounting height of 25 feet when calculating photometrics. Luminaire location shall have a minimum spacing of 150 feet apart and maintain a minimum average of 0.5 foot-candles. Gridpoint spaced according to IESNA RP-8 for a roadway with two 15 foot lanes.
- 7.1.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 12:1 within the above mentioned rectangular area.
- 7.1.3 The average to minimum ratio shall not exceed 6.0:1 within the above-mentioned roadway area.
- 7.1.4 The luminaries shall meet the photometric requirements shown above when energized at 100 percent of rated line voltage. Tests shall be run with the fixture in the level position.
- 7.1.5 Certified test reports shall be submitted, by the bidder, prior to the award of contract for the 100-watt equivalent LED fixture, showing compliance to the specifications described herein. These test reports shall include, but not be limited to IES files and ISO ft.-candle contours with numeric points of light expressed in ft.-candles associated with each contour. The ISO ft.-candle contour shall be mapped on the horizontal planes with the location of the fixture clearly marked.
- 7.1.6 The luminaries shall have a power factor > 0.90.
- 7.1.7 The luminaries shall have a color temperature of 4000k, plus or minus 275k.
- 7.1.8 The luminaries shall have a nominal CRI > 70 and a minimum CRI > 65.
- 7.1.9 The luminaries shall have an efficacy of 92 lm/W or better.
- 7.1.10 Fixture shall have > 92% lumen maintenance at 60,000 hours of minimum operational life at an average operating time of 11.5 hours per night at an ambient of 40 degrees Celsius.
- 7.1.11 LLF as calculated in Section 8.

7.2 100 Watt Equivalent LED Post Top Type Luminaires

- 7.2.1 The 100-watt equivalent LED mast arm mounted luminaire shall be IES upright rating U0 and, when mounted 16 feet above the midpoint of either long side of a rectangular area 80 feet by 30 feet, shall provide a measured minimum intensity of 0.2 foot-candle at any point on the surface of the area. The roadway width shall be thirty (30) feet wide with a mounting height of 16 feet when calculating photometrics. Luminaire location shall have a minimum spacing of 150 feet apart and maintain a minimum average of 0.5 foot-candles. Gridpoint spaced according to IESNA RP-8 for a roadway with two 15 foot lanes.
- 7.2.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 12:1 within the above mentioned rectangular area.
- 7.2.3 The average to minimum ratio shall not exceed 4.0:1 within the above-mentioned roadway area.
- 7.2.4 The luminaries shall meet the photometric requirements shown above when energized at 100 percent of rated line voltage. Tests shall be run with the fixture in the level position.
- 7.2.5 Certified test reports shall be submitted, by the bidder, prior to the award of contract for the 100-watt equivalent LED fixture, showing compliance to the specifications described herein. These test reports shall include, but not be limited to IES files and ISO ft.-candle contours with numeric points of light expressed in ft.-candles associated with each contour. The ISO ft.-candle contour shall be mapped on the horizontal planes with the location of the fixture clearly marked.
- 7.2.6 The luminaries shall have a power factor > 0.90.
- 7.2.7 The luminaries shall have a color temperature of 4000k, plus or minus 275k.
- 7.2.8 The luminaries shall have a nominal CRI > 70 and a minimum CRI > 65.
- 7.2.9 The luminaries shall have an efficacy of 92 lm/W or better.
- 7.2.10 Fixture shall have > 92% lumen maintenance at 60,000 hours of minimum operational life at an average operating time of 11.5 hours per night at an ambient of 40 degrees Celsius.
- 7.2.11 LLF as calculated in Section 8.

7.3 Luminaire up Light

- 7.3.1 All Luminaires shall be U0 with no light above 90 degrees per the photometric requirements listed above. Luminaire shall have a B-U-G rating with an Uplight value of U0.
- 7.4 Individual LED's shall be constructed such that a catastrophic loss or failure of one LED will not result in the loss of the entire fixture.

8.0 LIGHT LOSS FACTOR CALCULATION

- 8.1 Calculations shall be for maintained values, i.e. Light Loss Factor (LLF) < 1.0, where $LLF = LLD \times LDD \times LATF$, and
 - 8.1.1 Lamp Lumen Depreciation (LLD) factor shall be provided in the manufacturer's documentation per TM-21 calculations.
 - 8.1.2 Luminaire Dirt Depreciation (LDD) = 0.90, as per IES DG-4 for an enclosed and gasketed roadway luminaire installed in an environment with less than 150 $\mu\text{g}/\text{m}^3$ airborne particulate matter and cleaned every four years.

8.1.3 Luminaire Ambient Temperature Factor (LATF) = 1.00

9.0 TERMINAL BOARD

- 9.1 The terminal board shall be a three (3) position type molded plastic; porcelain or buyer approved equivalent material with protective barriers between each contact the terminal board shall be mounted to the upper fixture section of the luminaire.
- 9.2 All contact on the terminal board shall be captive type corrosion resistant with slotted head screws and equipped with wire grips and capable of accepting number 6 to number 14 AWG stranded or solid aluminum or copper conductors.
- 9.3 The terminal board shall be located so that there is adequate accessibility to it for connecting the supply leads when wearing rubber protective gloves and without the removal or replacement of internal components.
- 9.4 Components shall be pre-wired to the terminal board requiring only a power connection to clearly identified terminals. A green insulated #12 stranded wire shall be prewired from the housing ground terminal to the ground terminal on the terminal board. Ring terminals shall be used for the connecting of the wire. The wiring diagram shall be permanent, apparent, legible, and affixed inside the luminaire. The diagram shall indicate the photoelectric receptacle, SPD and driver circuit, the LED board, and coded terminal block connections.
- 9.5 All wire shall be insulated at a minimum to operate at 125 degrees centigrade.
- 9.6 All wire connectors shall be made with an "amp type" push on terminal connectors. Wire nuts are unacceptable.

10.0 PHOTOELECTRIC CONTROL RECEPTACLE

- 10.1 Photoelectric control receptacle shall be molded plastic and shall be capable of securely positioning the photoelectric control in any necessary direction.
- 10.2 Electric contacts of the photoelectric control receptacle shall be tin-plated bronze. Plated steel contacts are not acceptable.
- 10.3 Photoelectric control receptacle shall meet all applicable provisions of ANSI C136.10 and ANSI C136.41, latest revision.
- 10.4 Receptacle shall be 7-pole, 7-wire locking type, and shall be pre-wired to the terminal board.
- 10.5 Receptacle shall be ROAM compatible with integral dimming control capabilities.

11.0 DRIVER/SURGE PROTECTOR DEVICE (SPD)

- 11.1 Fixture driver shall be dimmable and compatible with the ROAM lighting control system.
- 11.2 The 120V, 10kA surge protection device (SPD) shall meet or exceed ANSI C136.2 10kV BIL, UL 1449, and ANSI/IEEE C62.41-2002 Category C High Exposure; MVOLT surge protection shall meet or exceed Category C. Surge protection shall be separate from the driver. If the SPD should fail in such a way, the luminaries will no longer operate and the SPD shall be field replaceable.

12.0 BARCODE / IDENTIFICATION

- 12.1 The nameplate shall contain a permanent bar code that meets the following requirements:

Information: The bar code shall display the Manufacturer's Identification Code and manufacturer's serial number.

Durability: The bar code shall last the lifetime of the lighting fixture. The bar code shall be constructed such that, when using a contact-type bar code reader, the bar code shall be capable of a minimum of

thirty successful scans. Dimensions: The height of the bar code shall be either 0.24 inches or 15% of the barcode length (L); whichever is greater.

Character Size: The bar code print quality shall be in accordance with ANSI X3.182. The permanent bar code shall be of medium density.

Bar Code Symbology: The bar code symbology shall be Code 39, also referred to as 3-of-9 bar code, using the 43- character ASCII set, in accordance with ANSI X3.4.

Orientation of the Bar Code Characters: The bar code characters shall be arranged in one line.).

Quiet Zones: A minimum quiet zone of 0.25" shall immediately precede and follow the bar codes.

Human-Readable Interpretation: A human-readable interpretation line shall be provided directly beneath the bar code, in accordance with ANSI MH10.8M. The interpretation of the 3-of-9 bar code shall be clearly identifiable with the bar-code symbol above. The preferred shapes of the human-readable interpretation shall conform to either ANSI X3.17 or ANSI X3.49. As an alternative, any human-readable font with characters no less than 3/32" in height is acceptable

Manufacturers shall permanently attach the following information to the inside wall of the upper or main housing and in the barcode:

- 12.1.1 Manufacturers name
- 12.1.2 Manufacturers catalog number and type
- 12.1.3 Date of the manufacturer (Codes are not accepted)
- 12.1.4 Lamp Wattage
- 12.1.5 Lamp IES designation and type
- 12.1.6 Primary voltage
- 12.1.7 Primary current
- 12.1.8 Wiring diagram corresponding to the components installed.
- 12.1.9 Lamp Lux Level
- 12.1.10 Lamp efficacy
- 12.2 Fixture wattage decal shall be specified as in ANSI C136.15, latest revision. The decal shall resist cracking, peeling, and fading for a period of ten (10) years.
- 12.3 Luminaire wattage marking location shall be secured to the underside of the luminaire, approximately five (5) inches toward the pole from the edge of the glassware.

13.0 MATERIAL REQUIREMENTS

- 13.1 The Manufacturer shall only use approved materials.
- 13.2 The approved materials shall include the following:
 - 13.2.1 Paint
 - 13.2.1.1 Bidders shall use the following powder coat finishes and colors (or equal) as a guideline. Color samples shall be submitted after a request from Austin Energy: RAL 6009 (Green, GRN); RAL 9004 (Black, BLK) or RAL 8014 (Bronze, CLB, Brown, BRN).
 - 13.2.1.2 All poles shall be coated with solid colors and lead-free. The paint color will be specified at the time of order.

13.2.1.3 Warranty on Paint Finish

The Vendor shall warranty the paint finish for a minimum period of five (5) years.

13.2.1.4 Touch-Up Paint Kit

Upon Bid award, the Vendor shall provide for every twenty-five (25) decorative lights shipped to Austin Energy, a can of spray touch-up paint to be used to touch up any scratches.

13.2.2 Pole and Base

13.2.2.1 Pole and base shall be one-piece solidly welded per ANSI/AWS standards. Pole and Base shall be Acuity/Town Lake/ NYA14 F5J 17 P07 LAB – (BLK/GRN/BRN) for post top Style fixture and Acuity Sunset Valley PX MO16 10-9 T4 BP4/11 L/AB 3-1/2T9- (BLK/GRN/BRN) for the pendant-style fixture, or Standards Engineer approved equal.

13.2.2.2 Materials

13.2.2.2.1 The base shall be a heavy wall, cast aluminum from A319 Alloy (Town Lake & Sunset Valley). The non-tapered shaft shall be extruded from ASTM 6005-T5 aluminum (Sunset Valley). The fluted shaft shall be made from ASTM 6005-T5 aluminum (Town Lake).

13.2.2.2.2 All hardware shall be tamper-resistant stainless steel.

13.2.2.2.3 Anchor bolts shall be completely hot-dipped galvanized.

13.2.2.3 Construction

13.2.2.3.1 Shafts shall be double welded to the base casting and shipped as one piece. The shaft shall be welded to the base inside at the top of the door opening and outside where the shaft leaves the base.

13.2.3 Pole Arms (Pendant Type Only)

Polearms shall be all-aluminum of the type Acuity CASV27/1 QSM PER RFD253592-Color as specified (BLK, BRN, or GRN), or Standards Engineer approved equal.

15.0 PACKAGING

15.1 Fixture shall be packaged in one (1) box with cushion support protection to prevent damage to the fixture and any of its components' parts during shipping and handling.

15.2 AE commodity stock number will be two (2) in. block numerals on each box as follows:

15.2.1 Luminaire LED 100-watt equivalent Post Top Black, Town Lake LED Stock number #23627

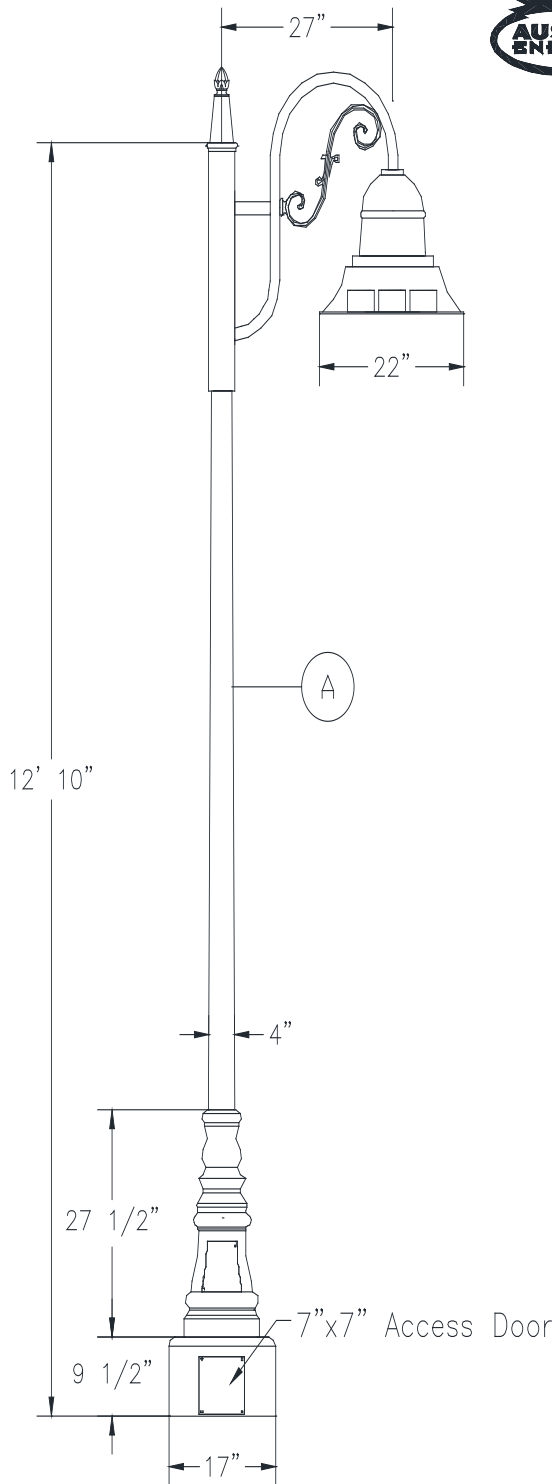
15.2.2 Luminaire LED 100-watt equivalent Post Top Green, Town Lake LED stock number # 23629

15.2.3 Luminaire LED 100-watt equivalent Post Top Bronze, Town Lake LED stock number # 23628

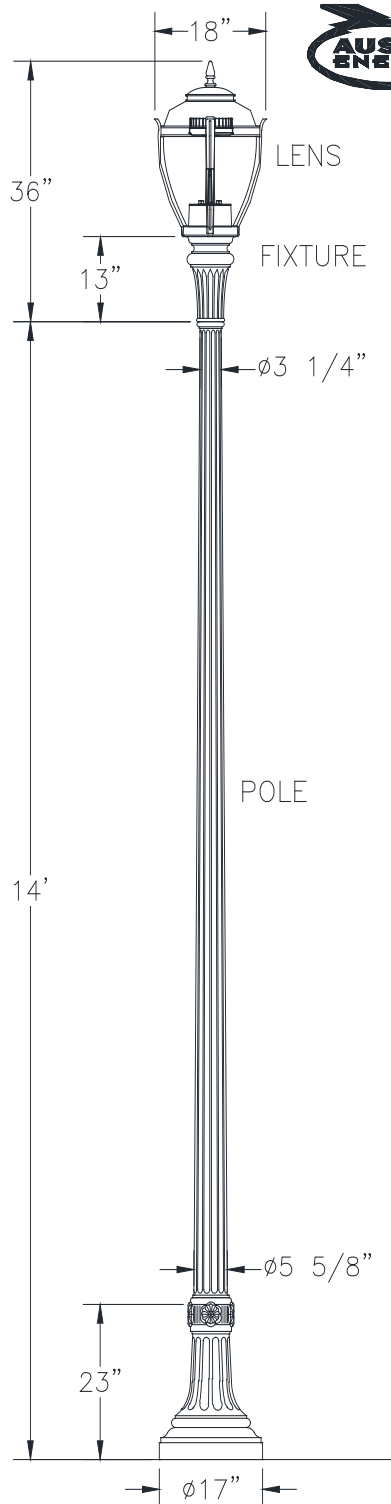
15.2.4 Luminaire LED 100-watt equivalent Pendant Black, Sunset Valley LED stock number # 23624

- 15.2.5 Luminaire LED 100-watt equivalent Pendant Green, Sunset Valley LED stock number # 23626
 - 15.2.6 Luminaire LED 100-watt equivalent Pendant Bronze, Sunset Valley LED stock number # 23625
 - 15.2.7 Pole Decorative for LED Post Top Black, Town Lake LED stock number # 23633
 - 15.2.8 Pole Decorative for LED Post Top Green, Town Lake LED stock number # 23635
 - 15.2.9 Pole Decorative for LED Post Top Bronze, Town Lake LED stock number # 23634
 - 15.2.10 Pole Decorative for LED Pendant Black, Sunset Valley LED stock number #23630
 - 15.2.11 Pole Decorative for LED Pendant Green, Sunset Valley LED stock number #23632
 - 15.2.12 Pole Decorative for LED Pendant Bronze, Sunset Valley LED stock number #23631
 - 15.2.13 Arm Decorative for LED Pendant Black, Sunset Valley LED stock number #22830
 - 15.2.14 Arm Decorative for LED Pendant Green, Sunset Valley LED stock number #22831
 - 15.2.15 Arm Decorative for LED Pendant Bronze, Sunset Valley LED stock number #22828
- 15.3 Boxes shall be palletized on 48-in. x 40-in. 4-way entry hardware pallets.

ATTACHMENTS – SUNSET VALLEY AND TOWN LAKE REFERENCE DRAWINGS



<u>Sunset Valley</u>		
<u>Luminaire</u> Luminaire shall be cast aluminum ballast housing with an aluminum reflector shade. Multitap ballast shall be of a high power factor design with a 4kv pulse rated socket and twist lock photoelectric control receptacle. Lens shall be glass with a Type III or Type IV horizontal Reflector.		
<u>Post</u> Post shall be all aluminum construction with a smooth tapered shaft and a decoratively curved cast base with a tenon for arm mounting. A door will be located in the over size base for anchorage and wiring access.		
<u>Arm</u> Luminaire arm shall be all aluminum construction consisting of a smooth shaft with a curved decorative arm with a fitting for luminaire mounting and a tenon for finial mounting.		
<u>Finish</u> Post and luminaire shall be furnished with a custom select powder coat paint finish with color specified at time of order by Austin Energy.		
<u>General</u> All hardware shall be stainless steel. All exterior hardware shall be tamper resistant. Electrical components shall be ETL Listed "suitable for wet locations". AUSTIN ENERGY: THIS DRAWING TO ACCOMPANY SPECIFICATION E-1792 "LUMINAIRE, POLE, ARM, LED, DECORATIVE, 100W EQUIV, 120V" AS FIGURE 1 - SUNSET VALLEY		
<u>Anchorage Detail</u> (Top Section View)		
<u>LIGHT DISTRIBUTION</u>		
<input type="radio"/> TYPE III REFRACTOR <input type="radio"/> TYPE V REFRACTOR		
<u>FINISH</u>		
<input type="radio"/> 6591 IFP 6591 BLACK <input type="radio"/> 8014 RAL 8014 BROWN/BRONZE <input type="radio"/> 6009 RAL 6009 GREEN		
<u>VOLTAGE</u>		
<input type="radio"/> 120 <input type="radio"/> SPECIFY		
<u>LIGHT SOURCE</u>		
MH: METAL HALIDE LED: ● 100W EQUIV HPS: HIGH PRESSURE SODIUM <input type="radio"/> 100W MH <input type="radio"/> 100W HPS <input type="radio"/> MOGUL BASE <input type="radio"/> 250W MH <input type="radio"/> 250W HPS		
date: 05-11-15	scale: NTS	dwg. no: E-SLSV



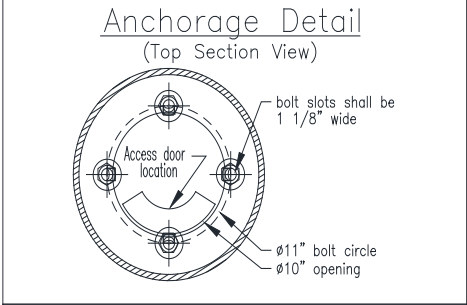
Town Lake

Luminaire
Luminaire base shall be cast aluminum. Globe gage, top, and Finial shall be aluminum. Multitap ballast shall be of a high power factor design with a 4kv pulse rated socket and twist lock photoelectric control receptacle. An IES Type III or Type V light distribution shall be used. Acorn globe shall be clear textured acrylic or glass.

Post
Post shall be cast aluminum construction with a tapered fluted base and a tapered fluted shaft. Tenon should be 3" for luminaire mounting. A door will be located in the base for anchorage and wiring access.

Finish
Post and luminaire shall be furnished with a custom select powder coat paint finish with color specified at time of order by Austin Energy.

General
All hardware shall be stainless steel. All exterior hardware shall be tamper resistant. Electrical components shall be ETL Listed "suitable for wet locations".
AUSTIN ENERGY This drawing to accompany Specification E-1492 "luminaire, and pole, LED, decorative, 100W Equiv, 120v as figure 2 - TOWN LAKE



LIGHT DISTRIBUTION

TYPE III REFRACTOR
 TYPE V REFRACTOR

FINISH

6591 IFP 6591 BLACK
 8014 RAL 8014 BROWN/BRONZE
 6009 RAL 6009 GREEN

VOLTAGE

120
 SPECIFY

LIGHT SOURCE

MH: METAL HALIDE LED: ● 100W EQUIV
HPS: HIGH PRESSURE SODIUM

100W MH 100W HPS MOGUL BASE
 250W MH 250W HPS

date: 05-11-15 scale: NTS dwg. no.: E-SLTL