

**GENERAL DESCRIPTION**

WALL MOUNTED SOLID STATE LED FIXTURE WITH CLEAR DIFFUSER FOR USE IN TUNNEL SECTIONS.

**LED REQUIREMENTS:**

EACH SOLID STATE LED TUNNEL LIGHT FIXTURE SHALL MEET THE FOLLOWING REQUIREMENTS:

- INPUT VOLTAGE = 277 VOLTS
- TOTAL FIXTURE WATTAGE = LESS THAN 36 WATTS
- INITIAL MINIMUM LUMENS PER FIXTURE = 1250
- LUMEN EFFICIENCY = MINIMUM OF 70
- LED TEMPERATURE = 5,000 DEGREES KELVIN +/-200 DEGREES KELVIN
- COLOR RENDERING INDEX = MINIMUM OF 75
- POWER FACTOR = 0.90 OR GREATER
- TOTAL HARMONIC DISTORTION = NO GREATER THAN 25%
- IESNA LM-79 THIRD PARTY TESTING PROVIDED BY DOE LISTED LAB
- IESNA LM-80 REPORT PROVIDED BY CHIP MANUFACTURER

**PHOTOMETRIC OPTIONS:**

1. CLEAR LENS

**MOUNTING OPTIONS:**

1. SURFACE MOUNTING UNISTRUT WITH HARDWARE
2. PENDANT MOUNTING HARDWARE

**ACCESSORIES OPTIONS:**

0. NOT APPLICABLE
1. BLUE LIGHT T12 SLEEVE (T12-SL-BL)

**FINISH MATERIALS:**

HOLOPHANE PRISMATITE EXTRUDED ALUMINUM HOUSING AND DURABLE PRISMATIC ACRYLIC LENS, CORROSION-RESISTANT, SEALED BY NEOPRENE GASKET, SUITABLE FOR WET LOCATIONS AND CAPABLE TO WITHSTAND HIGH PRESSURE WASHING (MODEL #7200412JP1LB)

**SAFETY LISTINGS:**

EACH SOLID STATE LED TUNNEL LIGHT FIXTURE SHALL MEET THE FOLLOWING LISTING REQUIREMENTS:

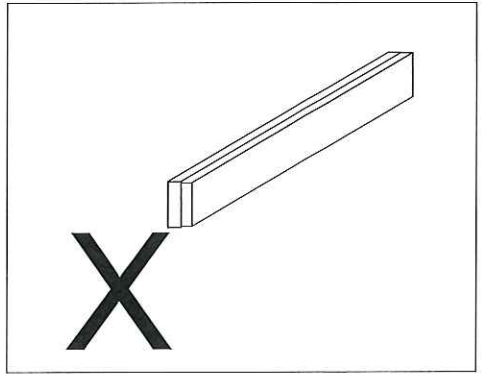
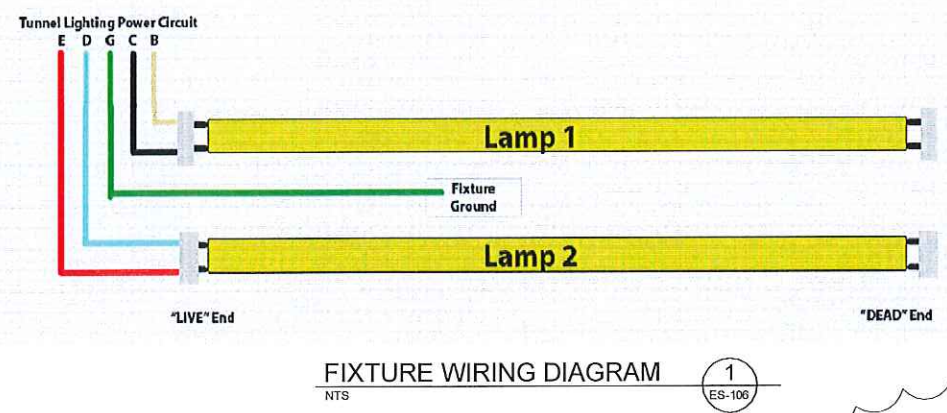
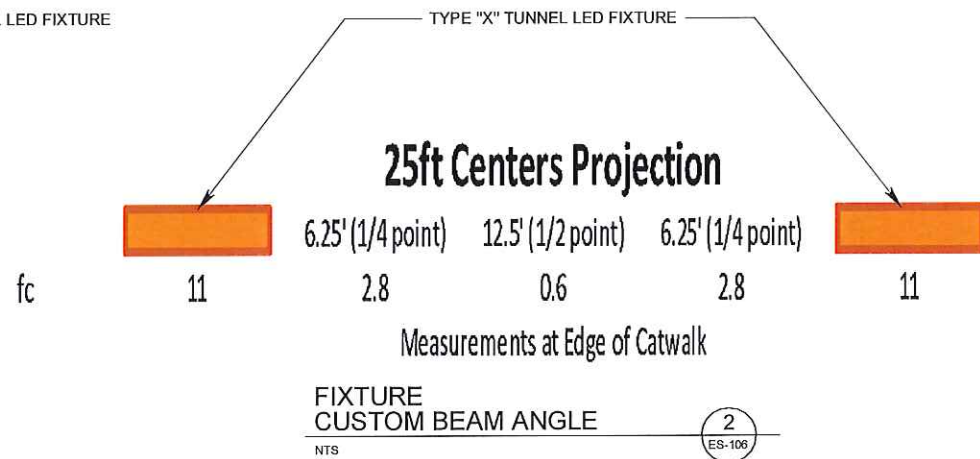
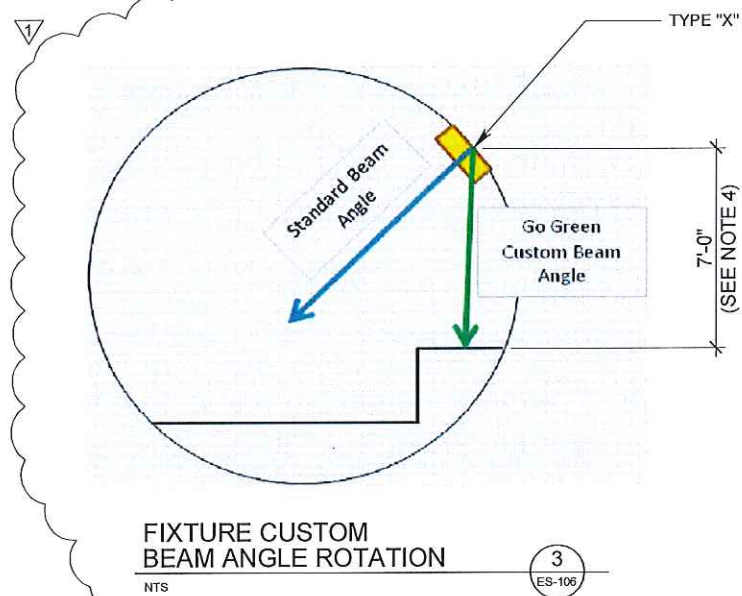
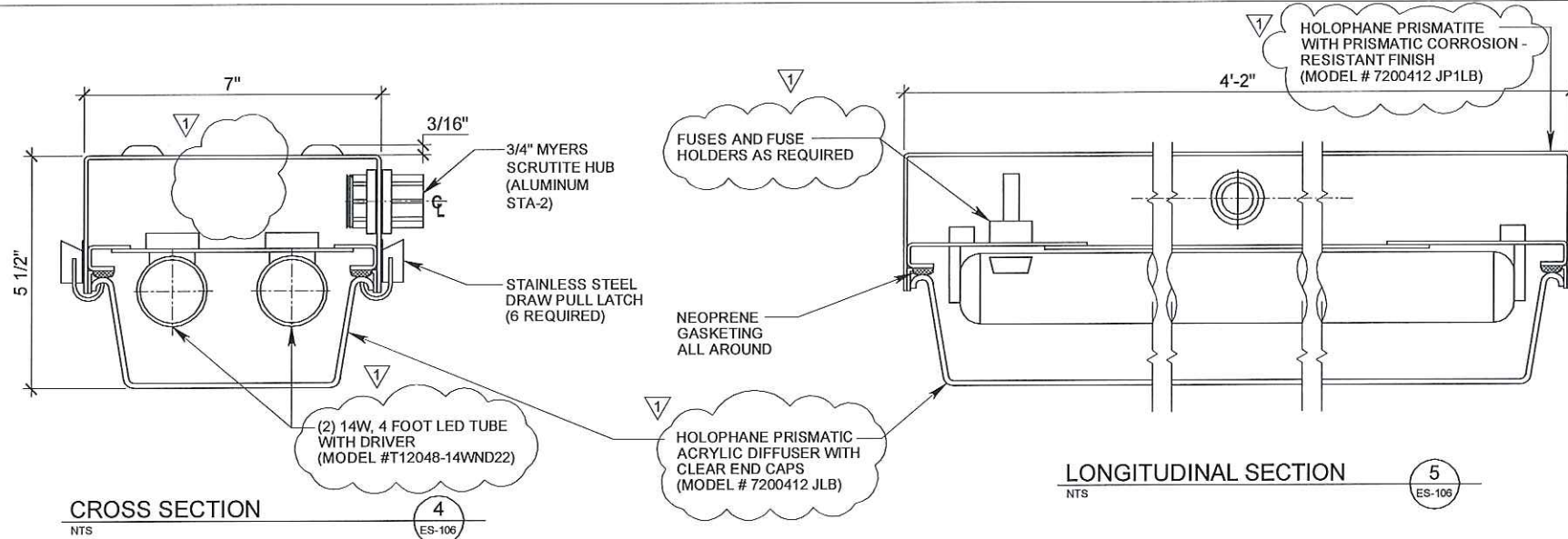
- NFPA 130 AND 101
- NEC ARTICLE 310
- NEMA APPLICABLE STANDARDS
- ASTM 162 AND 1662
- IEEE 383
- METRO REDLINE LED (LIGHT EMITTING DIODE) TUNNEL LIGHTING CONTRACT NO. OP 39602864
- ALL APPLICABLE CODES AND STANDARDS

**REMARKS:**

FIXTURE & MOUNTING SHALL WITHSTAND AIR PRESSURE WAVE RANGING FROM +80 PSF TO -80 PSF REPETITIVELY WITH EACH PASSING TRAIN. REFERENCE SPECIFICATIONS 26 50 00.

**MANUFACTURERS OR APPROVED EQUAL UPON TESTING AND ACCEPTANCE BY FIRE, LIFE & SAFETY:**

- GO GREEN SOLUTIONS



**NOTES:**

1. THE TUNNEL LIGHTS THAT ARE NEAREST TO THE CROSS PASSAGES OR CORRIDOR SHALL BE DEDICATED AS A BLUE LIGHT.
2. PROVIDE UL CERTIFICATION FOR THE COMPLETE FIXTURE (MODIFIED OR NEW) WITH ASSOCIATED DOCUMENTATION INCLUDING UL CERTIFIED COMPONENTS ASSOCIATED WITH FIXTURE.
3. EACH MODIFIED OR REPLACED LED FIXTURE UNITS SHALL BE ACCOMPANIED BY A STATED TEN (10) YEAR WARRANTY THAT WILL STAY UPON INSTALLATION FOR THE SPECIFIED TIME AND INCLUDE A METRO COST ALLOWANCE OF \$300 PER FAILED UNIT DURING THE WARRANTY PERIOD LISTED FOR RECOVERY AND REPLACEMENT OF THE FAILED UNIT.
4. WHEN MOUNTED 7 FEET ABOVE THE WALKWAY, THE FIXTURES WILL PROVIDE APPROXIMATELY 11 FC DIRECTLY BELOW THE FIXTURE. AT THE NODAL POINT (12.5 FEET) BETWEEN TWO FIXTURES SPACED AT 25 FOOT ON CENTERS, ILLUMINATION SHALL BE 0.6 FC AND AT THE QUARTER POINTS (6.25 FEET AND 18.75 FEET BETWEEN FIXTURES, ILLUMINATION ON THE WALKWAY IS ESTIMATED TO BE ±2.8 FC.
5. EACH FIXTURE SHALL CONTAIN TWO (2) SOLID STATE LED LAMPS. ONE LAMP SHALL BE POWERED ON CIRCUIT #1 WHILE THE OTHER LAMP SHALL BE POWERED BY CIRCUIT #2 TO ENSURE RELIABILITY AND REDUNDANCY PER NFPA 130.

ES-106 REV 10/10 LAST PLOTTED ON Wed 07/31/13 11:30AM BY rbrn

|                           |  |
|---------------------------|--|
| DESIGNED BY<br>R. BICARME | A SIGNED & SEALED ORIGINAL OF REV 0 OF THIS DRAWING IS MAINTAINED BY METRO |
| DRAWN BY<br>A. RUBIN      |  |
| CHECKED BY<br>F. CASTRO   |  |
| IN CHARGE<br>F. CASTRO    |  |
| DATE<br>MAY 10, 2010      |  |

| 07/31/13 | MR   | SM | E17227 | 06/30/14 | M. DEL ROSARIO | REVISED PER SBCN 2013-28 |
|----------|------|----|--------|----------|----------------|--------------------------|
| 05/10/10 |      |    |        |          |                | RE-BASELINED             |
| REV      | DATE | BY | APP    | REG. NO. | EXPIRES        | DESCRIPTION              |

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

**Metro**

METRO RAIL ELECTRICAL STANDARD

TUNNEL / SUBWAY TYPE "X" LED TUNNEL LIGHT FIXTURE

|              |          |     |   |
|--------------|----------|-----|---|
| CONTRACT NO. | ES-106   | REV | 1 |
| DRAWING NO.  |          |     |   |
| SCALE        | NO SCALE |     |   |
| SHEET NO.    |          |     |   |

**GENERAL DESCRIPTION**

LED EXIT LIGHT WITH STENCIL FACE(S) FOR STATION AND TUNNEL INTERIORS

**FIXTURE OPTIONS**

Y1  
 LAMP: LED  
 LUMENS: NA  
 BALLAST: INTEGRAL  
 INPUT WATTS: APPROX 3  
 DIMENSIONS: APPROX. 12" W, 9" H, 2" D  
 EFFICIENCY: NA

**PHOTOMETRIC OPTIONS**

- 1. RED LED
- 2. GREEN LED

**MOUNTING OPTIONS**

- 1. TRIANGULAR MOUNTING FRAME

**ACCESSORIES OPTION**

- 0 NO ACCESSORIES

**FINISH MATERIALS**

BRUSHED ALUMINUM OR ELECTROSTATICALLY APPLIED, THERMAL CURED POLYESTER POWDERCOAT TRIM.

**SAFETY LISTING**

- DAMP/WET

**REMARKS**

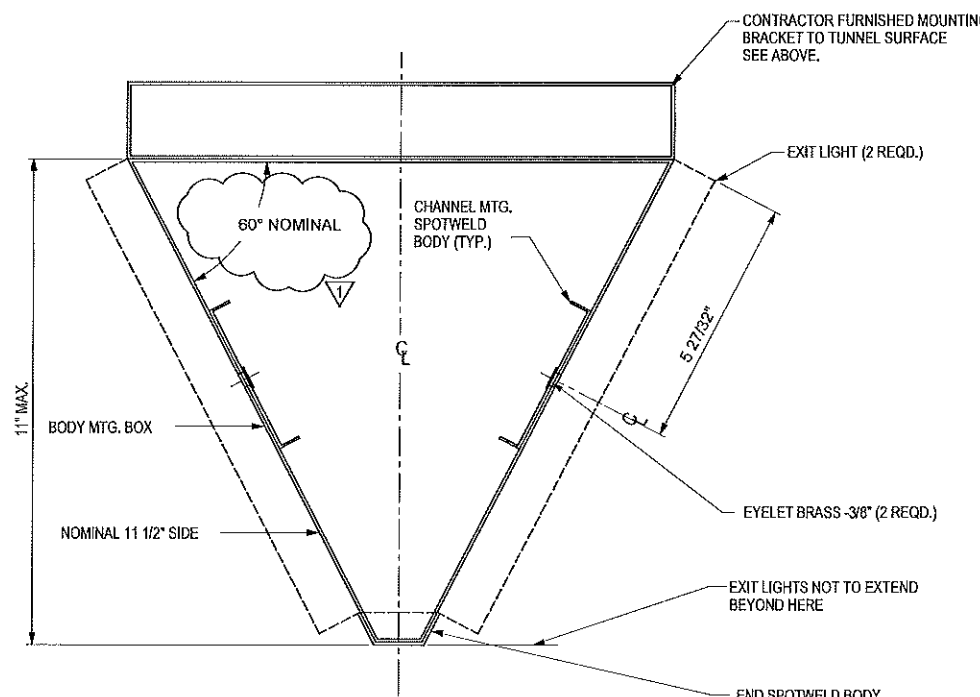
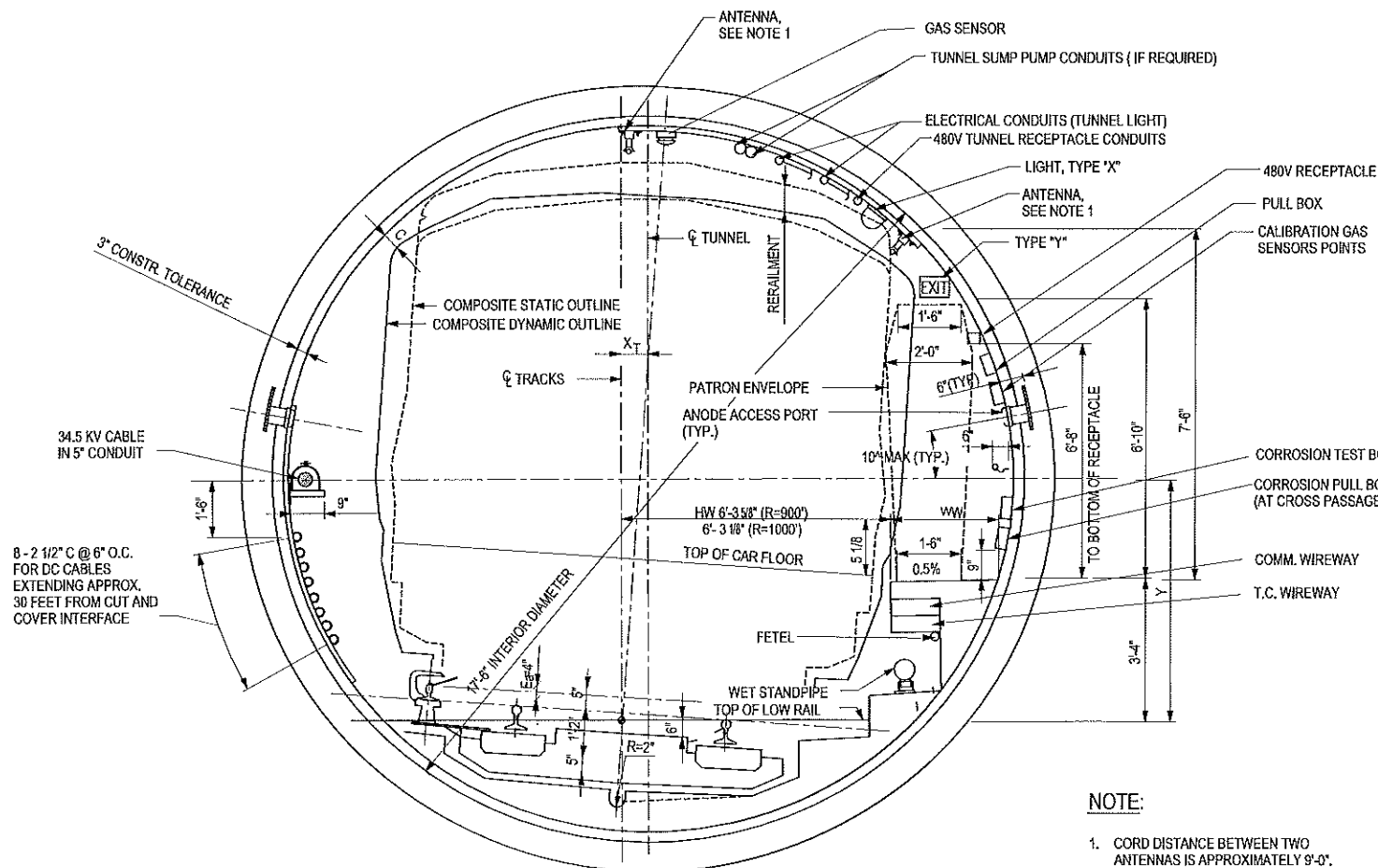
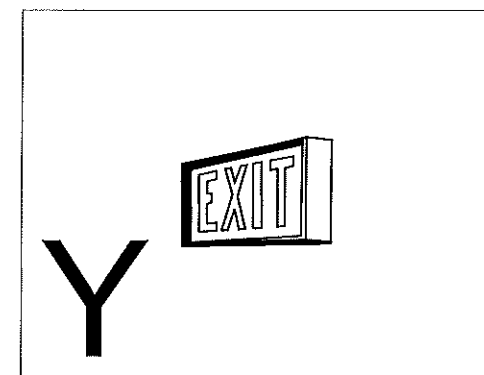
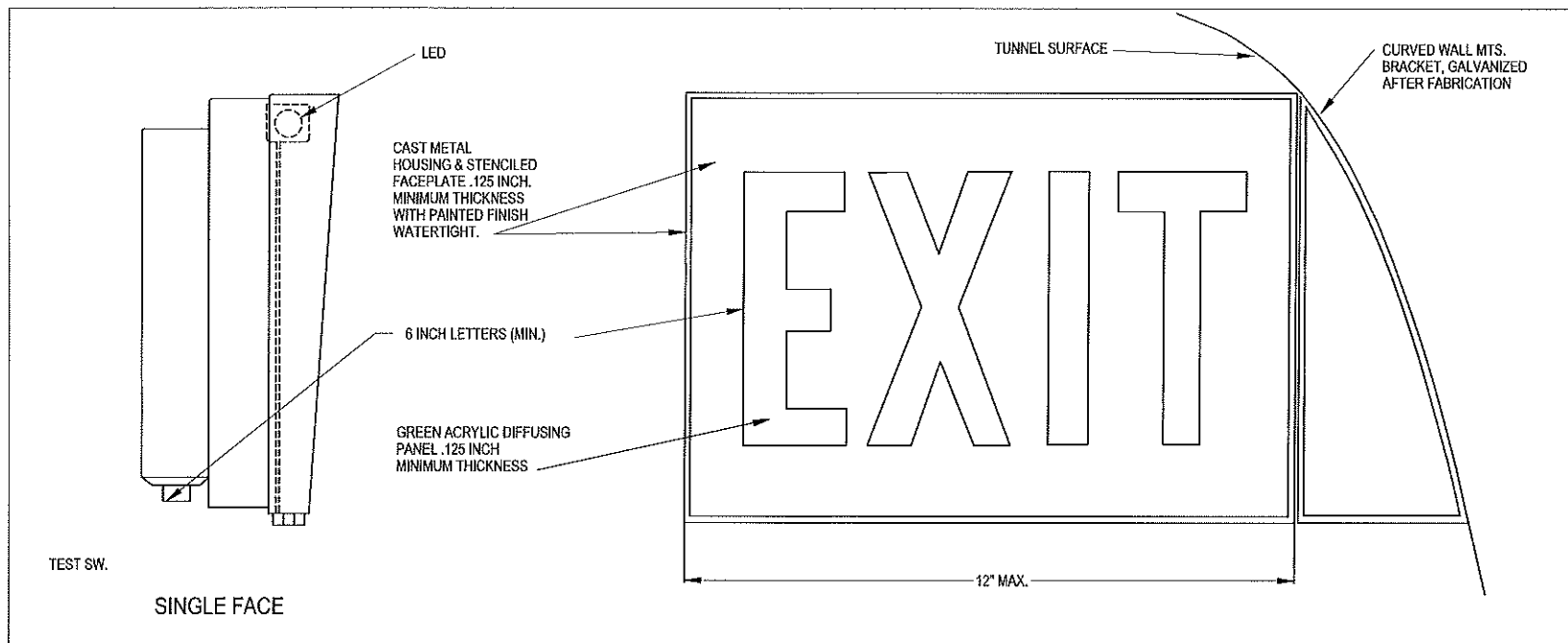
FIXTURE AS INDICATED WITH 2 SINGLE FACED EXIT LIGHTS WITH TRIANGULAR MOUNTING FRAME

**MANUFACTURER OPTIONS**

- DUAL LITE
- PRESCOLITE
- LITHONIA

**NOTE:**

EXIST SIGNS IN STATIONS SHALL BE GREEN. EXIT SIGNS IN THE TUNNEL (AT CROSSPASSES, OR TUNNEL ROOMS WHICH LEAD TO THE OPPOSITE TRACK) SHALL BE RED, UNLESS THE EXIT LEADS TO AN EMERGENCY HATCH ON THE SURFACE. IN THIS CASE THE SIGN SHALL BE GREEN.



**NOTE:**  
 1. CORD DISTANCE BETWEEN TWO ANTENNAS IS APPROXIMATELY 9'-0".

**FIXTURE MOUNTING DETAIL**

**TRIANGULAR FRAME - PLAN VIEW**

P:\WIN PROGRESS Standard C:\ES-107 REV 1.dwg - LAST PLOTTED ON Tue 08/05/13 - 10:56AM BY rdhna

| REV | DATE     | BY | APP. | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION                              |
|-----|----------|----|------|----------|---------|-------------|--|
| 0   | 05/10/10 |    |      |          |         |             | REVISED PER SBCN 2013-35<br>RE-BASELINED |

DESIGNED BY  
R. BICARME  
 DRAWN BY  
A. RUBIN  
 CHECKED BY  
M. RATNASINGHAM  
 IN CHARGE  
S. MAYMAN  
 DATE  
MAY 10, 2010

A SIGNED & SEALED ORIGINAL OF REV 0 OF THIS DRAWING IS MAINTAINED BY METRO

**M Metro** LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

**METRO RAIL ELECTRICAL STANDARD**  
 TUNNEL SUBWAY  
 TYPE Y  
 TUNNEL EXIT LIGHT

|              |          |
|--------------|----------|
| CONTRACT NO. |          |
| DRAWING NO.  | ES-107   |
| REV          | 1        |
| SCALE        | NO SCALE |
| SHEET NO.    |          |

**GENERAL DESCRIPTION**

SURFACE AND CANTILEVER MOUNTED ADJUSTABLE ACCENT LIGHT FOR INTERIOR AND EXTERIOR USE.

**FIXTURE OPTIONS**

**AA1**  
 LAMP: (1) 70W, DOUBLE END MH, 3,000°K  
 INITIAL LUMENS: 5,000  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 95  
 DIMENSIONS: 5" H, 5" W, 12" L  
 EFFICIENCY: 57%

**PHOTOMETRIC OPTIONS**

- 1. ASSYMMETRIC

**MOUNTING OPTIONS**

- 1. WALL BRACKET MOUNTING HARDWARE
- 2. CEILING PENDANT MOUNTING HARDWARE

**ACCESSORIES OPTIONS**

- 1. CUTOFF VISOR

**FINISH MATERIALS**

- ALUMINUM HOUSING, SEMI SPECULAR ALUMINUM REFLECTOR

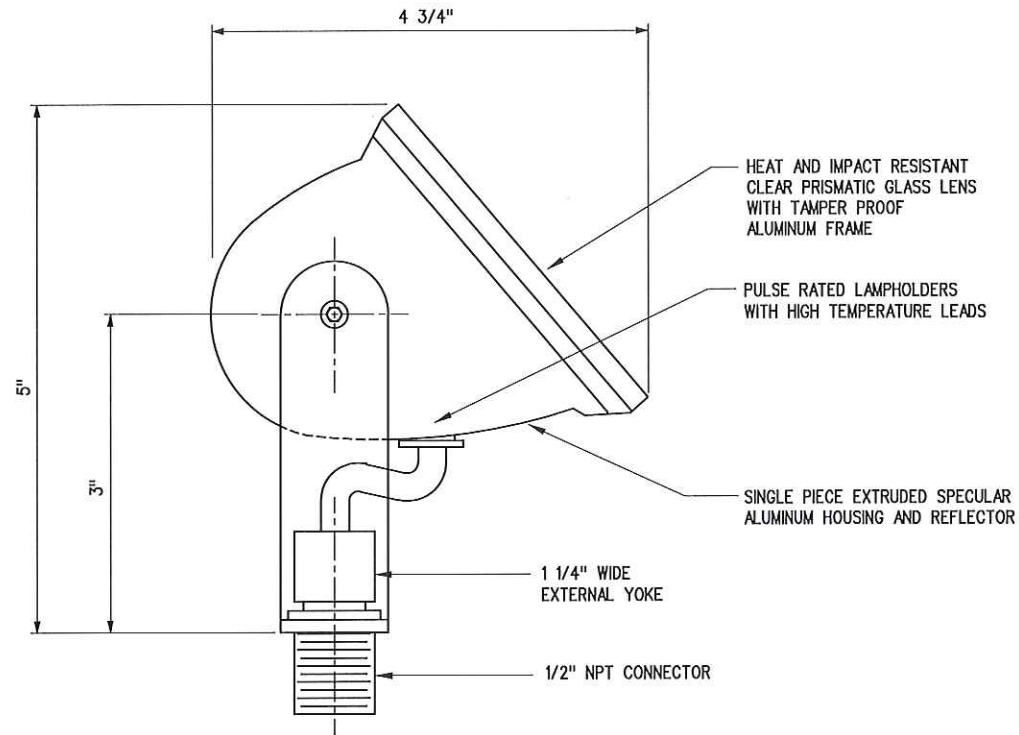
**SAFETY LISTING**

- WET

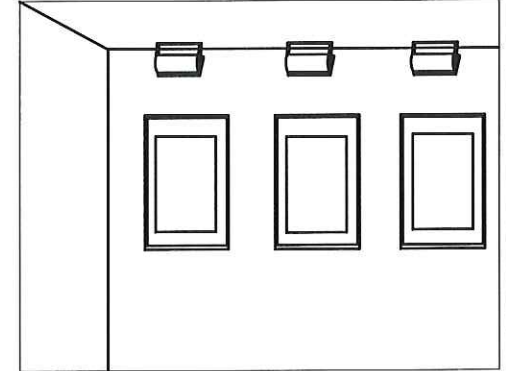
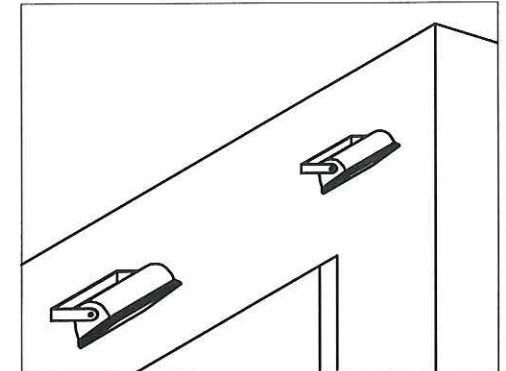
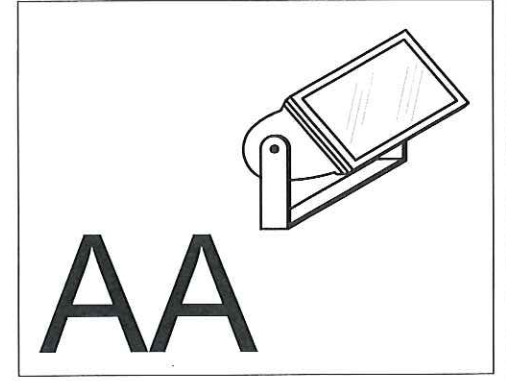
**REMARKS**

**MANUFACTURERS**

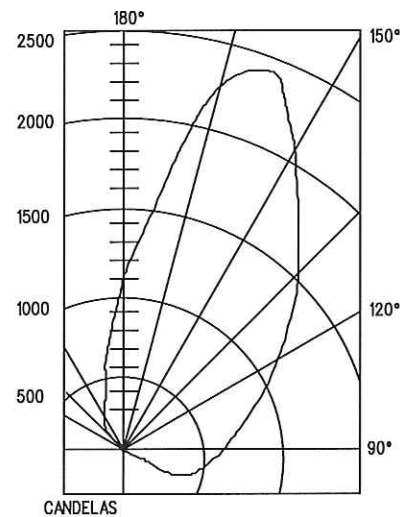
- ELLIPTIPAR
- RAMBUSCH
- OR APPROVED EQUAL



**SURFACE MOUNTED**



**CANDLEPOWER DISTRIBUTION-0° PLANE (PERPENDICULAR TO REFLECTOR)**



**COEFFICIENT OF UTILIZATION**

| ROOM CAVITY RATIO | CEILING REFLECTANCE |    |    |    | WALL REFLECTANCE |    |    |   |
|-------------------|---------------------|----|----|----|------------------|----|----|---|
|                   | 70                  | 50 | 10 | 0  | 50               | 30 | 10 | 0 |
| 1                 | 60                  | 57 | 57 | 55 | 53               | 52 | 49 |   |
| 2                 | 53                  | 50 | 51 | 48 | 47               | 45 | 42 |   |
| 3                 | 47                  | 43 | 46 | 42 | 43               | 40 | 37 |   |
| 4                 | 43                  | 38 | 41 | 37 | 39               | 36 | 32 |   |
| 5                 | 39                  | 34 | 38 | 34 | 35               | 32 | 29 |   |
| 6                 | 35                  | 31 | 34 | 30 | 33               | 29 | 26 |   |
| 7                 | 32                  | 28 | 32 | 28 | 30               | 27 | 23 |   |
| 8                 | 30                  | 26 | 29 | 25 | 28               | 25 | 21 |   |
| 9                 | 28                  | 24 | 27 | 23 | 26               | 23 | 19 |   |
| 10                | 26                  | 22 | 25 | 22 | 24               | 21 | 18 |   |

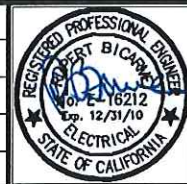
BASED ON A 20% FLOOR CAVITY REFLECTANCE

**NOTE:**  
 LUMINAIRE IS ADJUSTABLE  
 MAXIMUM CANDLEPOWER SHOWN  
 AIMED 70° ABOVE HORIZONTAL FOR  
 WASHING LIGHT UP A WALL.

F:\N\_PROGRESS\Standar... ES-111.dwg - LAST PLOTTED ON Tue 05/11/10 - 07:47AM BY rubino

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
R. BICARME  
 DRAWN BY  
A. RUBIN  
 CHECKED BY  
F. CASTRO  
 IN CHARGE  
F. CASTRO  
 DATE  
MAY 10, 2010



**Metro** LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

METRO RAIL ELECTRICAL STANDARD  
 TYPE AA  
 ACCENT LIGHT

|             |          |
|-------------|----------|
| CONTRACT NO |          |
| DRAWING NO  | ES-111   |
| REV         | 0        |
| SCALE       | NO SCALE |
| SHEET NO    |          |

**GENERAL DESCRIPTION**  
 ROUND LINEAR FLUORESCENT UP/DOWN  
 LIGHT FOR INDOOR USE.

**FIXTURE OPTIONS**

**BB1**  
**LAMP:** (3) 32W, T8, 3500 K  
**INITIAL LUMENS:** 2850 EACH LAMP  
**BALLAST:** HPF, ELECTRONIC, RAPID START  
**INPUT WATTS:** 112 PER 4 FOOT SECTION  
**DIMENSIONS:** APPROX. 8" DIA HOUSING  
**EFFICIENCY:** 62%

**PHOTOMETRIC OPTIONS**

1. SYMMETRICAL DOWN
2. SYMMETRICAL UP
3. SYMMETRICAL UP/DOWN

**MOUNTING OPTIONS**

1. PENDANT MOUNTING HARDWARE
2. WALL MOUNTING HARDWARE

**ACCESSORIES OPTIONS**

1. LOUVER BOTTOM
2. LENS BOTTOM

**FINISH MATERIALS**

- ANODIZED ALUMINUM WITH HIGH REFLECTANCE WHITE PAINT

**SAFETY LISTING**

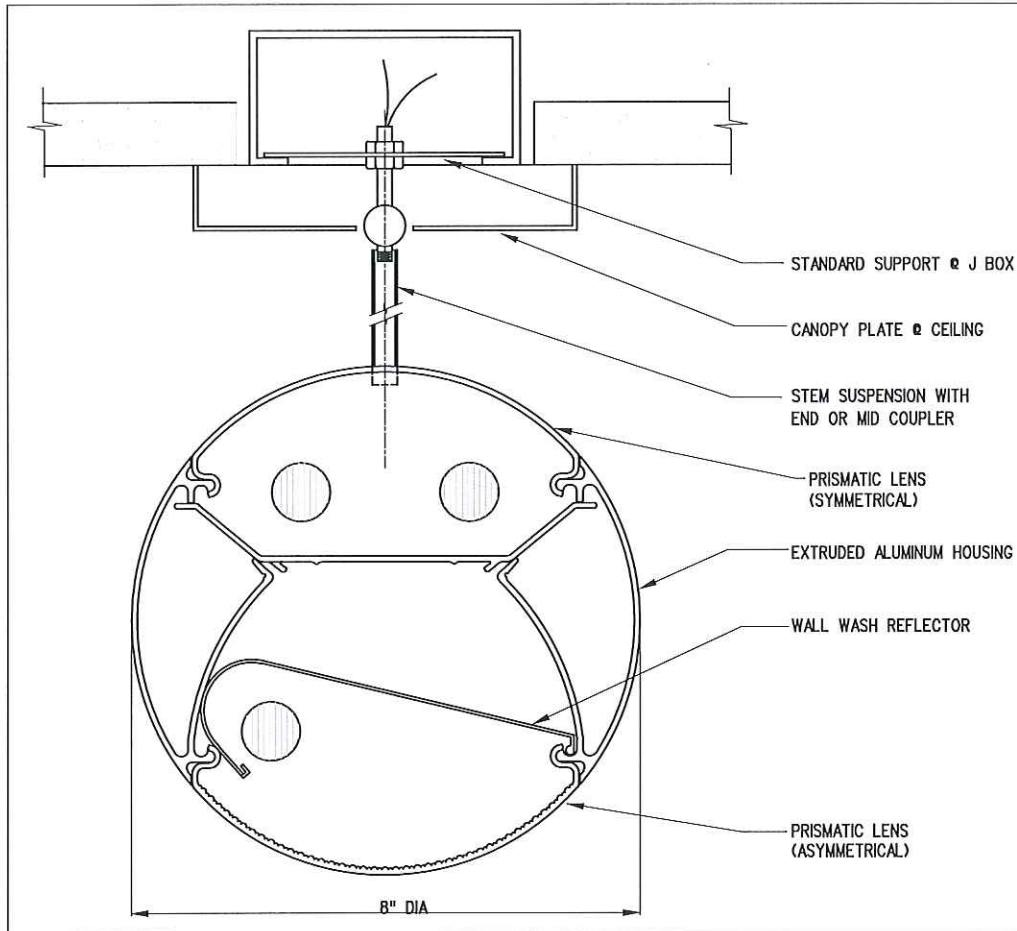
- DAMP

**REMARKS**

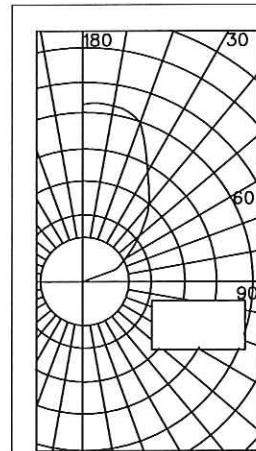
- FIXTURE TO BE MOUNTED NO CLOSER THAN 18" FROM SURFACE TO BE ILLUMINATED

**MANUFACTURERS**

- STAFF
- PEERLESS LIGHTING
- LINEAR



**FIXTURE OPTION:**

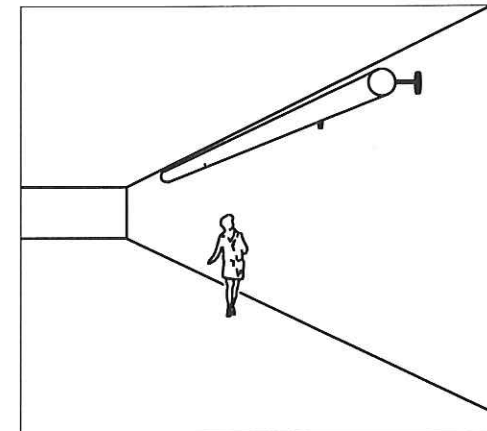
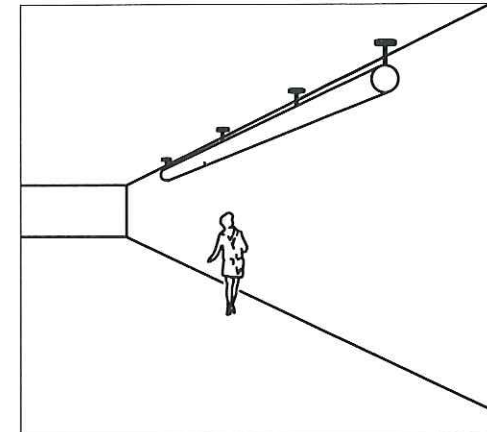
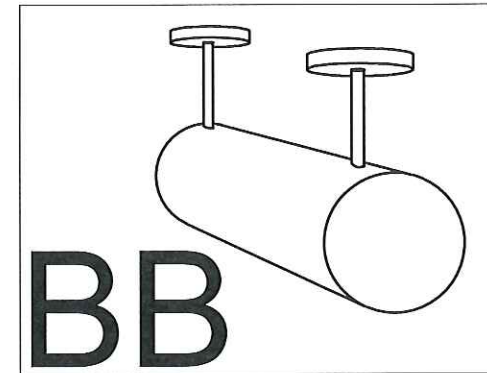


**LAMP:**

| ANGLE | CANDLEPOWER SUMMARY |       |
|-------|---------------------|-------|
|       | ACROSS              | ALONG |
| 90    | 165                 | 0     |
| 95    | 156                 | 30    |
| 105   | 252                 | 264   |
| 115   | 584                 | 535   |
| 125   | 838                 | 803   |
| 135   | 1149                | 1046  |
| 145   | 1356                | 1252  |
| 155   | 1505                | 1416  |
| 165   | 1580                | 1525  |
| 175   | 1591                | 1582  |
| 180   | 1592                | 1582  |

| COEFFICIENT OF UTILIZATION             |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |
|--|--------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|--|--|--|
| % EFFECTIVE CEILING CAVITY REFLECTANCE |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |
| PCC                                    | 80                 |    |    |    | 70 |    |    |    | 50 |    |    |    | 30 |    |    |    | 10 |    |    |    | 0 |  |  |  |
|  | % WALL REFLECTANCE |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |
| PW                                     | 70                 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0 |  |  |  |
| RCR                                    |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |
| 0                                      | 68                 | 68 | 68 | 68 | 62 | 62 | 62 | 62 | 52 | 52 | 52 | 49 | 49 | 49 | 33 | 33 | 33 | 31 |    |    |   |  |  |  |
| 1                                      | 62                 | 59 | 57 | 55 | 57 | 55 | 53 | 51 | 46 | 43 | 43 | 39 | 37 | 36 | 31 | 30 | 30 | 26 |    |    |   |  |  |  |
| 2                                      | 57                 | 52 | 48 | 45 | 52 | 48 | 45 | 42 | 41 | 38 | 36 | 34 | 32 | 31 | 28 | 26 | 23 | 22 |    |    |   |  |  |  |
| 3                                      | 52                 | 46 | 42 | 33 | 48 | 43 | 39 | 36 | 36 | 33 | 31 | 30 | 29 | 26 | 25 | 23 | 22 | 19 |    |    |   |  |  |  |
| 4                                      | 47                 | 41 | 36 | 32 | 44 | 38 | 34 | 30 | 32 | 29 | 24 | 27 | 23 | 23 | 22 | 20 | 19 | 17 |    |    |   |  |  |  |
| 5                                      | 43                 | 36 | 31 | 27 | 40 | 34 | 29 | 26 | 29 | 25 | 23 | 24 | 21 | 19 | 20 | 18 | 16 | 14 |    |    |   |  |  |  |
| 6                                      | 40                 | 32 | 27 | 28 | 37 | 30 | 25 | 22 | 26 | 22 | 19 | 22 | 19 | 17 | 18 | 16 | 14 | 12 |    |    |   |  |  |  |
| 7                                      | 36                 | 29 | 24 | 20 | 34 | 27 | 22 | 19 | 23 | 19 | 17 | 19 | 17 | 14 | 16 | 14 | 12 | 11 |    |    |   |  |  |  |
| 8                                      | 34                 | 26 | 21 | 17 | 31 | 24 | 19 | 16 | 20 | 17 | 14 | 17 | 14 | 12 | 14 | 12 | 11 | 09 |    |    |   |  |  |  |
| 9                                      | 31                 | 23 | 18 | 15 | 28 | 21 | 17 | 14 | 18 | 15 | 12 | 15 | 12 | 11 | 12 | 11 | 09 | 08 |    |    |   |  |  |  |
| 10                                     | 29                 | 21 | 16 | 13 | 26 | 19 | 13 | 12 | 17 | 13 | 11 | 14 | 11 | 09 | 11 | 09 | 08 | 07 |    |    |   |  |  |  |

20% FLOOR CAVITY REFLECTANCE



P:\N\_PROGRESS\Standards\... ES-112.dwg - LAST PLOTTED ON Tue 05/11/10 - 07:47AM By rubin

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
**R. BICARME**  
 DRAWN BY  
**A. RUBIN**  
 CHECKED BY  
**F. CASTRO**  
 IN CHARGE  
**F. CASTRO**  
 DATE  
**MAY 10, 2010**



**LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY**

**METRO RAIL ELECTRICAL STANDARD**  
**TYPE BB**  
**AREA LIGHT**

|             |          |
|-------------|----------|
| CONTRACT NO |          |
| DRAWING NO  | ES-112   |
| REV         | 0        |
| SCALE       | NO SCALE |
| SHEET NO    |          |

**GENERAL DESCRIPTION**  
 CEILING AND WALL MOUNTED METAL HALIDE UPLIGHT FOR INTERIOR OR EXTERIOR USE.

**FIXTURE OPTIONS**

**CC1**  
 LAMP: 175W, M.H., R CLEAR, 4000°K  
 INITIAL LUMENS: 12,000  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 210  
 DIMENSIONS: 14" - 16" L, 9"-11" H, 7" D (MAX)  
 EFFICIENCY: 60%

**PHOTOMETRIC OPTIONS**

- HORIZONTAL FLOOD
- VERTICAL FLOOD
- HORIZONTAL SPOT

**MOUNTING OPTIONS**

- WALL/CEILING CANOPY MOUNTED
- WALL MOUNTED
- WALL ARM MOUNTED

**ACCESSORIES OPTIONS**

- GLARE HOOD
- GLARE LOUVER
- BARN DOORS

**FINISH MATERIALS**

- ELECTROSTATICALLY APPLIED DARK BRONZE, BAKED ENAMEL STANDARD
- REFER TO INDIVIDUAL MANUFACTURERS INFORMATION FOR ADDITIONAL INFORMATION.

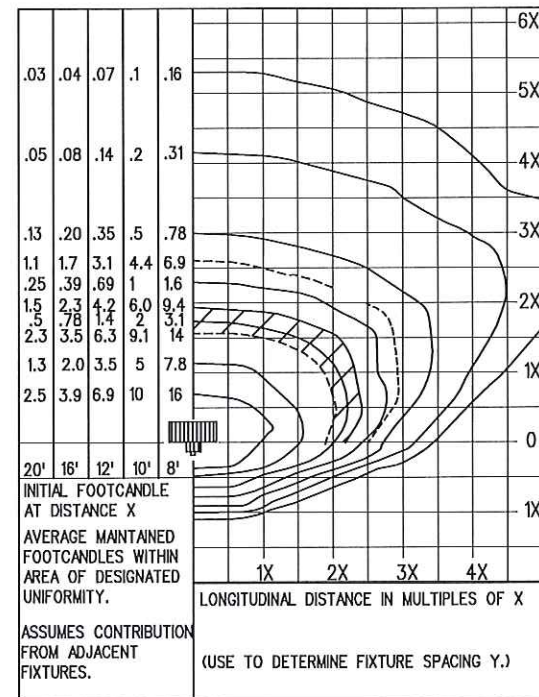
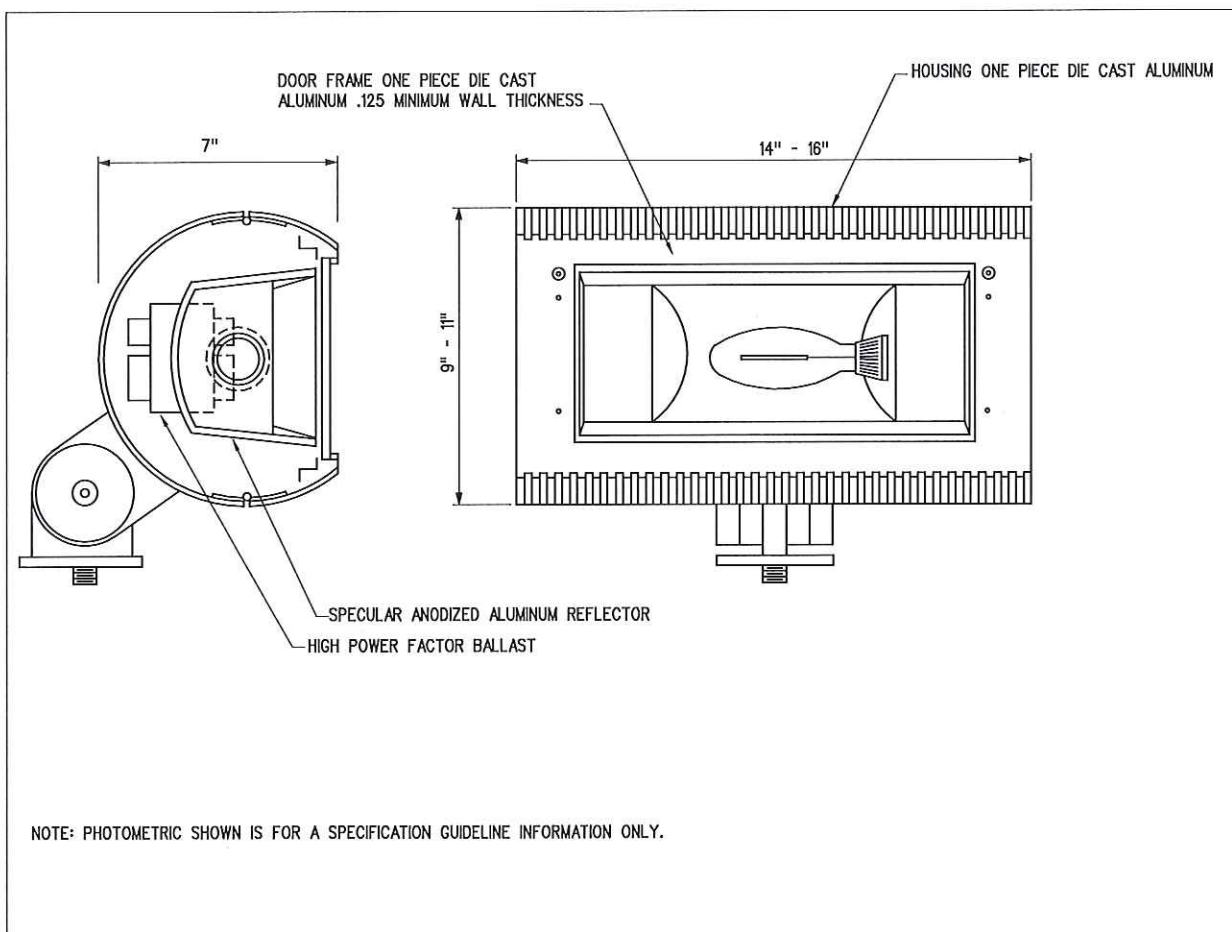
**SAFETY LISTING**

- DAMP/WET

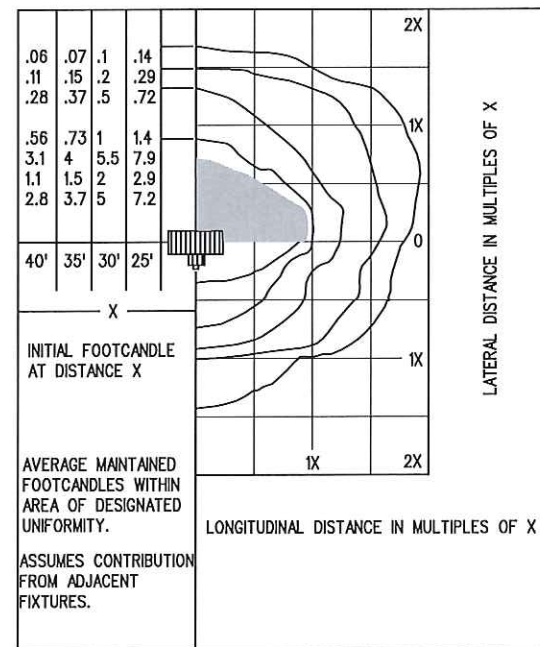
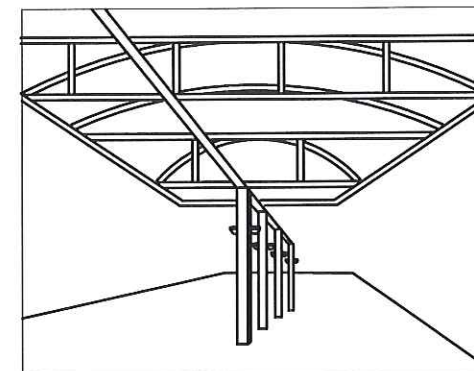
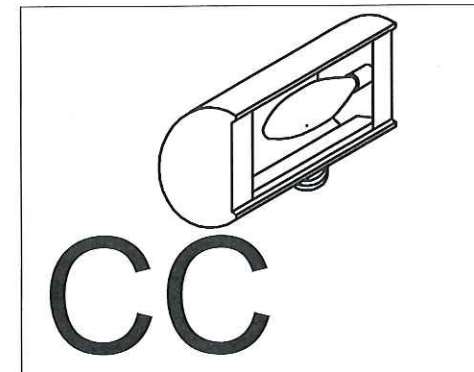
**REMARKS**

**MANUFACTURERS**

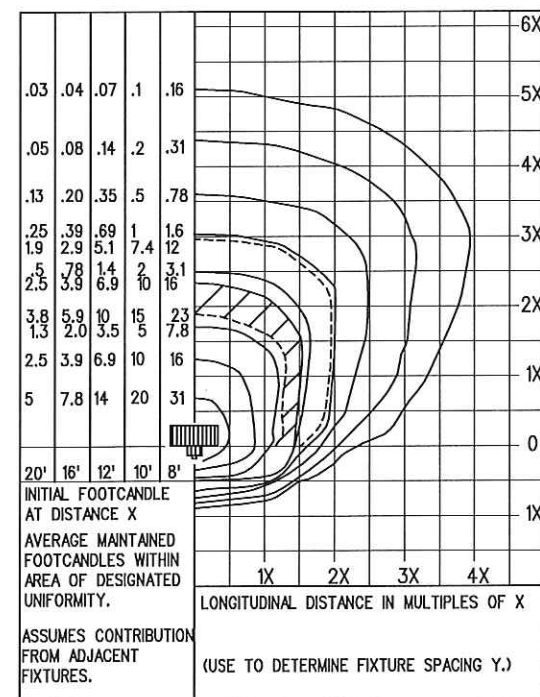
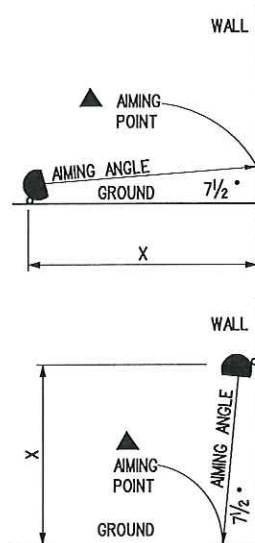
- KIM "AFL"
- GARCO "DF7" SERIES
- STERNER INFRANOR SERIES
- OR APPROVED EQUAL



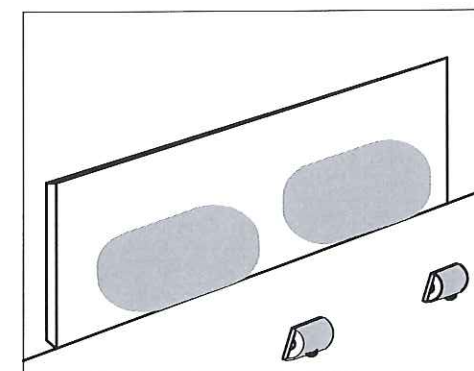
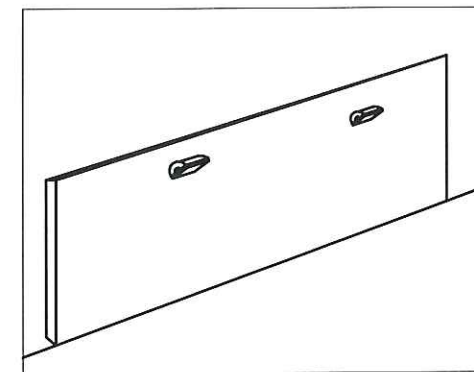
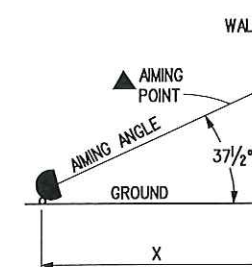
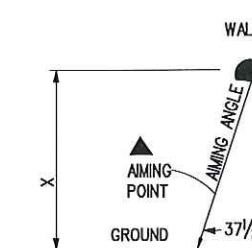
**HORIZONTAL FLOOD**



**HORIZONTAL SPOT**



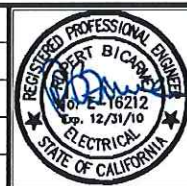
**VERTICAL FLOOD**



F:\N\_PROGRESS\Standards... LAST PLOTTED ON Tue 05/11/10 - 07:47AM BY rubine

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
R. BICARME  
 DRAWN BY  
A. RUBIN  
 CHECKED BY  
F. CASTRO  
 IN CHARGE  
F. CASTRO  
 DATE  
MAY 10, 2010



**M Metro** LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

METRO RAIL ELECTRICAL STANDARD  
 TYPE CC  
 METAL HALIDE UPLIGHT

|              |          |
|--------------|----------|
| CONTRACT NO. |          |
| DRAWING NO.  | ES-113   |
| REV          | 0        |
| SCALE        | NO SCALE |
| SHEET NO.    |          |

**GENERAL DESCRIPTION**

ROUND CYLINDER ARM MOUNTED METAL HALIDE AREA LIGHT WITH GLOW TOP FOR INTERIOR AND EXTERIOR USE.

**FIXTURE OPTIONS**

DD1

LAMP: 175W, M.H., CL, HORIZ, 4400°K  
 INITIAL LUMENS: 15,000  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 210  
 DIMENSIONS: 17" - 18" HOUSING DIA., 8" - 9 3/16" HIGH  
 EFFICIENCY: 70%

**PHOTOMETRIC OPTIONS**

1. TYPE I DISTRIBUTION
2. TYPE II DISTRIBUTION
3. TYPE III DISTRIBUTION
4. TYPE IV DISTRIBUTION
5. TYPE V DISTRIBUTION

**MOUNTING OPTIONS**

1. WALL MOUNTING HARDWARE

**ACCESSORIES OPTIONS**

1. HOUSEHOLD SHIELD
2. PHOTOCCELL
2. TAMPER RESISTANT LATCH

**FINISH MATERIALS**

- HARDCOAT, FADE RESISTANT ELECTROSTATICALLY APPLIED POLYURETHANE PAINT.
- SEE ARCHITECTURAL SPECIFICATIONS FOR COLOR.

**SAFETY LISTING**

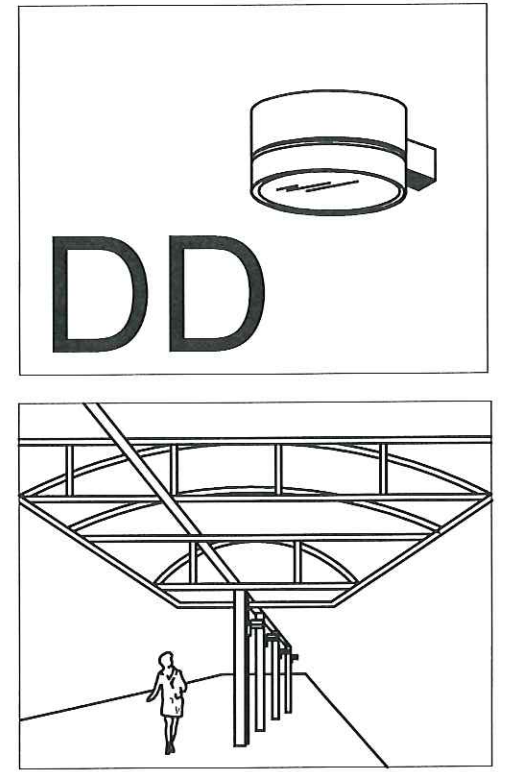
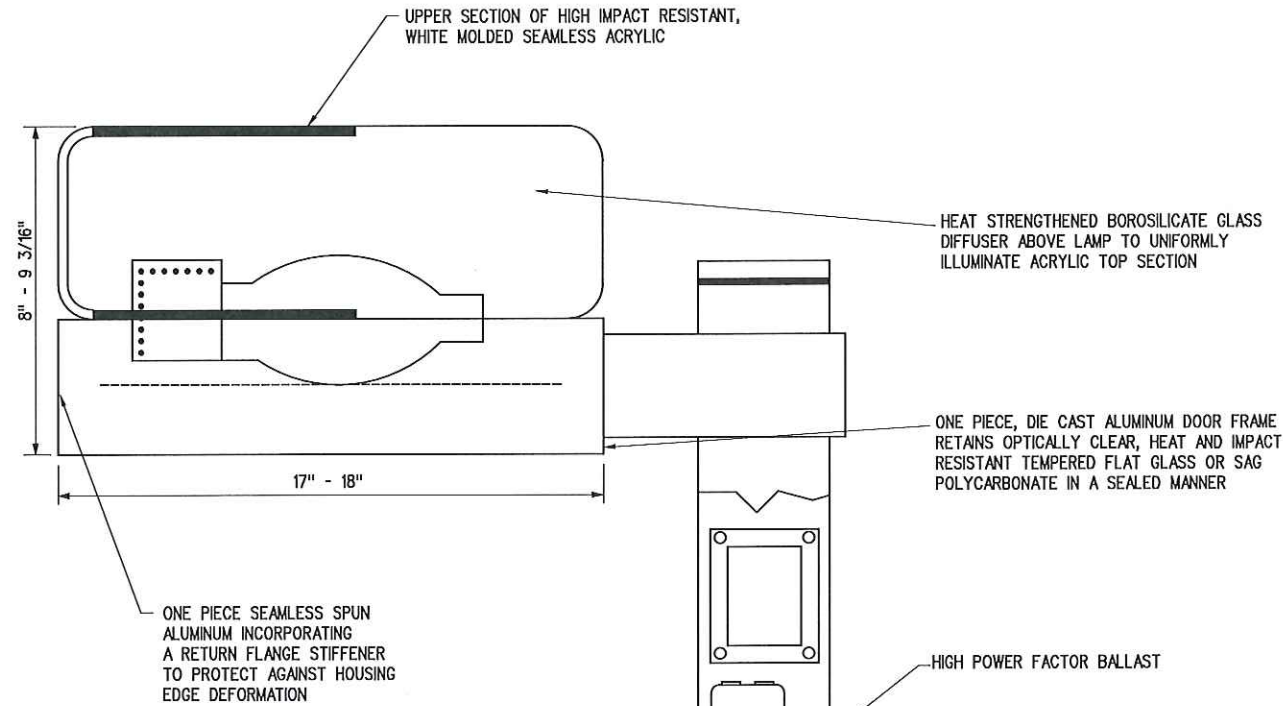
- WET

**REMARKS**

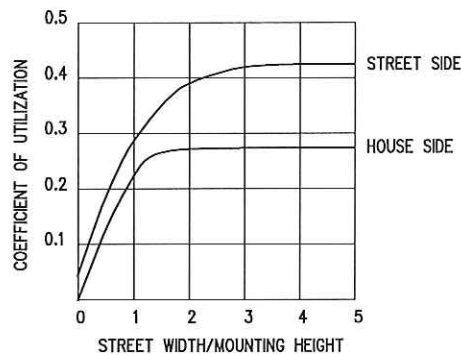
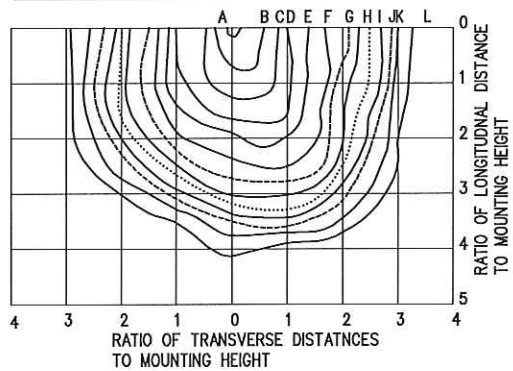
- ALL PHOTOMETRIC TYPES III, IV, AND V TO BE USED. SPECIFICATION SHEET INDICATES ONLY TYPES III AND V. REFER TO MANUFACTURER'S INFORMATION FOR OTHER TYPES.

**MANUFACTURERS**

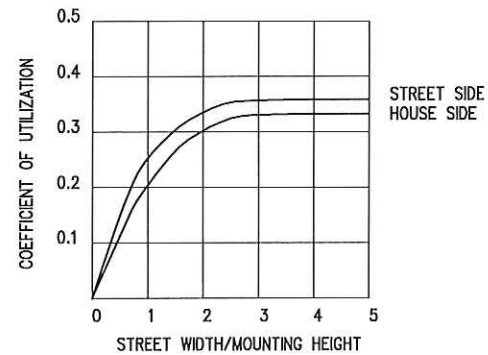
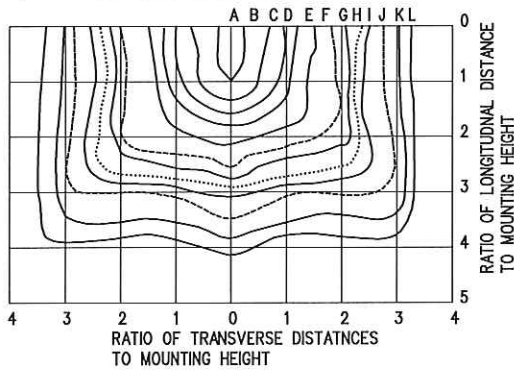
- GARDCO FORM TEN "CAG" OR "CW"
- STERNER "ELEMENTS" SERIES
- OR APPROVED EQUAL



**TYPE III PHOTOMETRY**



**TYPE V PHOTOMETRY**



**FOOTCANDLE VALUES**

| MOUNTING HEIGHT | CONFIGURATION | FOOTCANDLE PER 1000 LAMP LUMENS |    |      |      |      |      |      |       |       |       |       |       |       |
|-----------------|---------------|---------------------------------|----|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
|                 |               | A                               | B  | C    | D    | E    | F    | G    | H     | H/I   | I     | J     | K     | L     |
| 30              | 1             | .14                             | .1 | .064 | .040 | .025 | .016 | .010 | .0064 | .0052 | .0040 | .0025 | .0016 | .0010 |

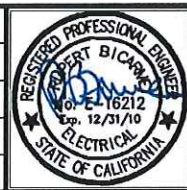
**NOTE:**

FOOTCANDLE VALUES SHOWN ABOVE ARE FOR 30' POLE MOUNTING HEIGHT. PHOTOMETRY SHOWN IS FOR A SPECIFICATION GUIDELINE INFORMATION ONLY.

F:\N\PROGRESS\Star-Jd... ES-114.dwg - LAST PLOTTED ON Tue 05/11/10 - 07:47AM BY rubino

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
R. BICARME  
DRAWN BY  
A. RUBIN  
CHECKED BY  
F. CASTRO  
IN CHARGE  
F. CASTRO  
DATE  
MAY 10, 2010



|             |     |
|-------------|-----|
| CONTRACT NO |     |
| DRAWING NO  | REV |
| ES-114      | 0   |
| SCALE       |     |
| NO SCALE    |     |
| SHEET NO    |     |

METRO RAIL ELECTRICAL STANDARD  
 TYPE DD  
 METAL HALIDE AREA LIGHT

**GENERAL DESCRIPTION**  
 SPHERICAL ARM MOUNTED METAL HALIDE AREA LIGHT WITH GLOWING TOP FOR INTERIOR AND EXTERIOR USE.

**FIXTURE OPTIONS**

EE1  
 LAMP: 175W, M.H., CL, HORIZ, 4400°K  
 INITIAL LUMENS: 15,000  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 210  
 DIMENSIONS: 17" - 22" HOUSING DIA., 8" - 11" HIGH  
 EFFICIENCY: 70%

**PHOTOMETRIC OPTIONS**

- TYPE I DISTRIBUTION
- TYPE II DISTRIBUTION
- TYPE III DISTRIBUTION
- TYPE IV DISTRIBUTION
- TYPE V DISTRIBUTION

**MOUNTING OPTIONS**

- WALL MOUNTING HARDWARE

**ACCESSORIES OPTIONS**

- TAMPER RESISTANT LATCH

**FINISH MATERIALS**

- HARDCOAT, FADE RESISTANT ELECTROSTATICALLY APPLIED POLYURETHANE PAINT.
- SEE ARCHITECTURAL SPECIFICATIONS FOR COLOR.

**SAFETY LISTING**

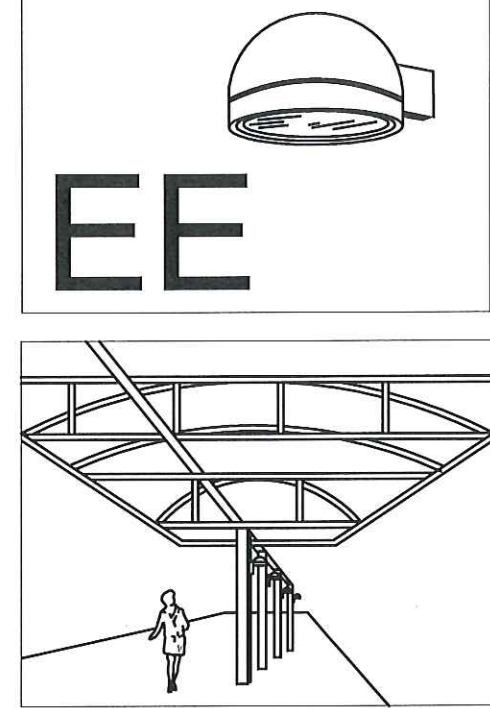
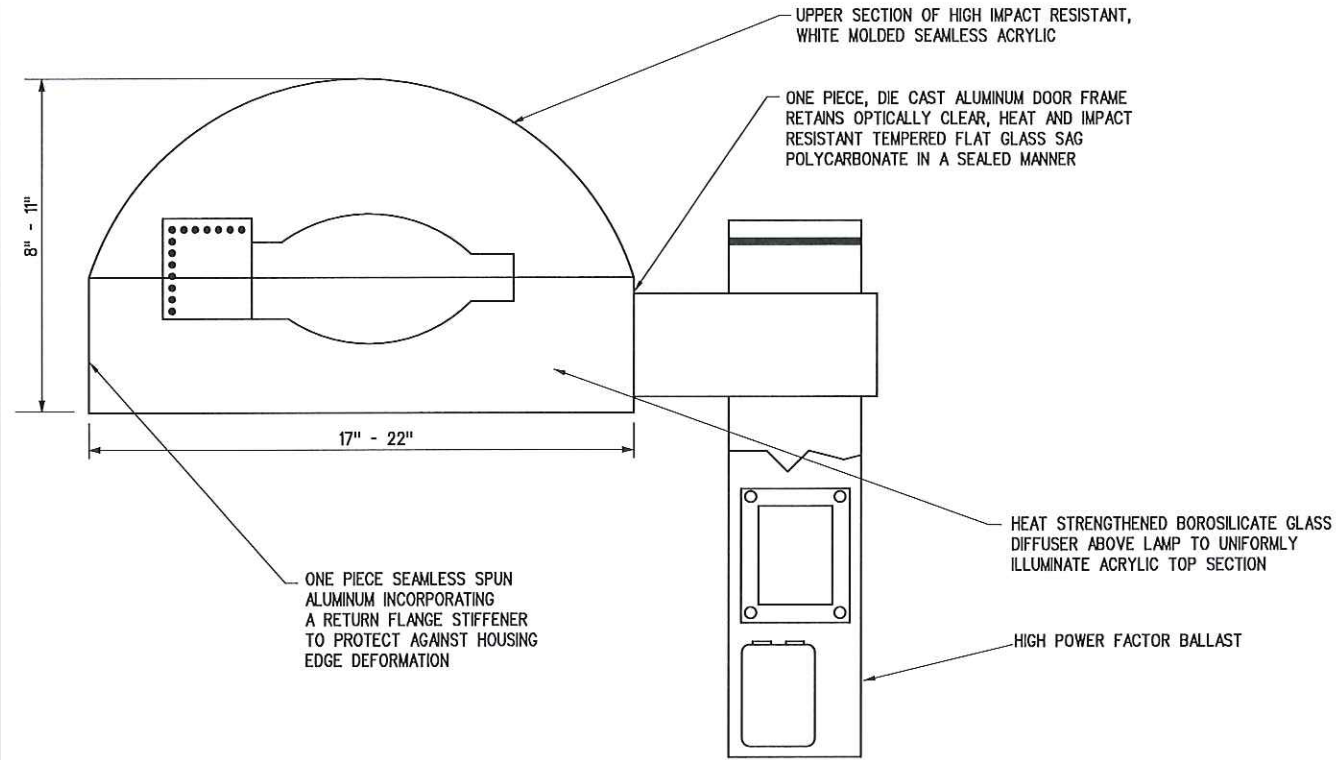
- WET

**REMARKS**

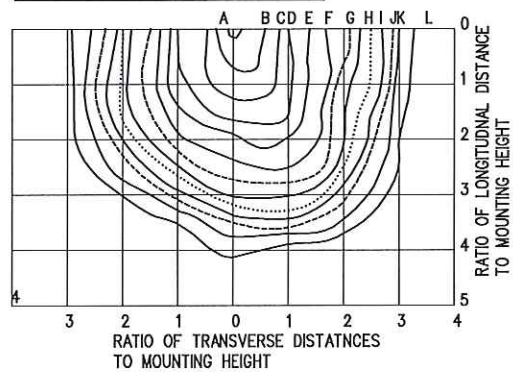
- ALL PHOTOMETRIC TYPES III, IV, AND V TO BE USED. SPECIFICATION SHEET INDICATES ONLY TYPES III AND V. REFER TO MANUFACTURER'S INFORMATION FOR OTHER TYPES.

**MANUFACTURERS**

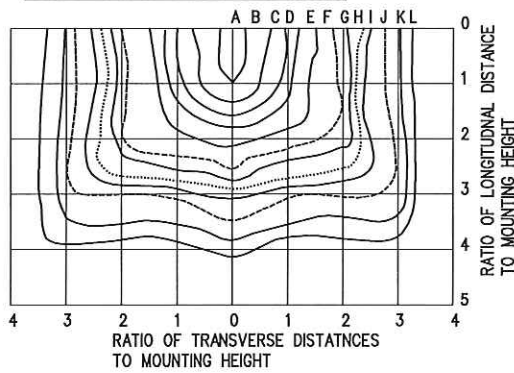
- GARDCO FORM TEN "MW"
- STERNER "ELEMENTS" SERIES
- OR APPROVED EQUAL



**TYPE III PHOTOMETRY**



**TYPE V PHOTOMETRY**

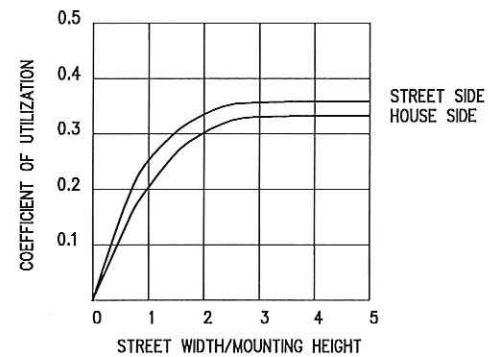
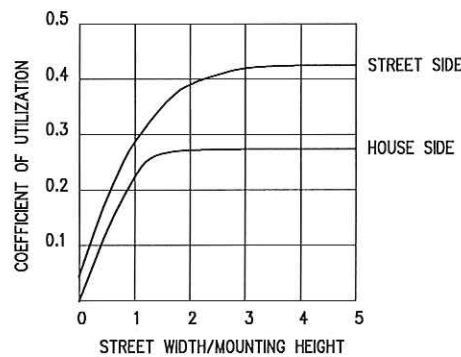


**FOOTCANDLE VALUES**

| MOUNTING HEIGHT CONFIGURATION | FOOTCANDLE PER 1000 LAMP LUMENS |    |      |      |      |      |      |       |       |       |       |       |       |
|-------------------------------|---------------------------------|----|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
|                               | A                               | B  | C    | D    | E    | F    | G    | H     | H/I   | J     | K     | L     |       |
| 30 1                          | .14                             | .1 | .064 | .040 | .025 | .016 | .010 | .0064 | .0052 | .0040 | .0025 | .0016 | .0010 |

**NOTE:**

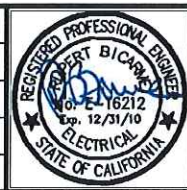
FOOTCANDLE VALUES SHOWN ABOVE ARE FOR 30' POLE MOUNTING HEIGHT. PHOTOMETRY SHOWN IS FOR A SPECIFICATION GUIDELINE INFORMATION ONLY.



F:\N\_PROGRESS\Standards... ES-115.dwg - LAST PLOTTED ON Tue 05/11/10 - 07:47AM BY rubine

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
R. BICARME  
 DRAWN BY  
A. RUBIN  
 CHECKED BY  
F. CASTRO  
 IN CHARGE  
F. CASTRO  
 DATE  
MAY 10, 2010



LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

METRO RAIL ELECTRICAL STANDARD

TYPE EE  
METAL HALIDE AREA LIGHT

|             |          |
|-------------|----------|
| CONTRACT NO |          |
| DRAWING NO  | ES-115   |
| REV         | 0        |
| SCALE       | NO SCALE |
| SHEET NO    |          |

**GENERAL DESCRIPTION**

BURIAL TYPE METAL HALIDE UPLIGHT FOR INTERIOR AND EXTERIOR USE.

**FIXTURE OPTIONS**

**FF1**

LAMP: 70W, M.H., PAR38, 3200°K  
 INITIAL LUMENS: 3,200  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 95  
 DIMENSIONS: APPROX. 18" H, 12" DIA  
 EFFICIENCY: 93%

**FF2**

LAMP: 100W, M.H., PAR38, 3200°K  
 INITIAL LUMENS: 5600  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 135  
 DIMENSIONS: APPROX. 18" H, 12" DIA  
 EFFICIENCY: 93%

**PHOTOMETRIC OPTIONS**

1. SPOT DISTRIBUTION
2. FLOOD DISTRIBUTION
3. VERY WIDE FLOOD DISTRIBUTION

**MOUNTING OPTIONS**

1. BURIAL MOUNTED

**ACCESSORIES OPTIONS**

1. ROCK GUARD
2. GLARE SHIELD
3. LOUVER

**FINISH MATERIALS**

- CAST BRONZE TRIM RING
- ALUMINUM TRIM RING

**SAFETY LISTING**

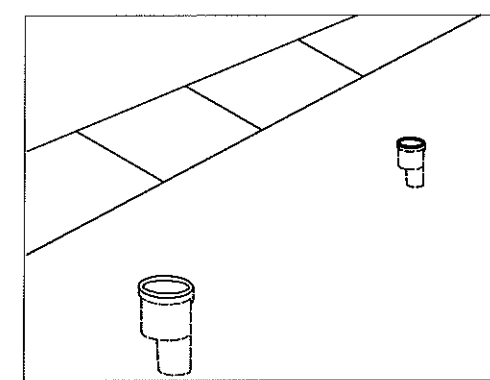
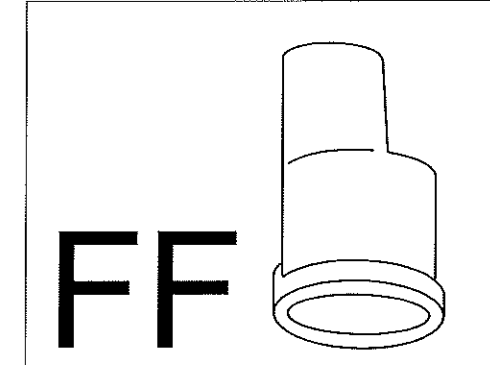
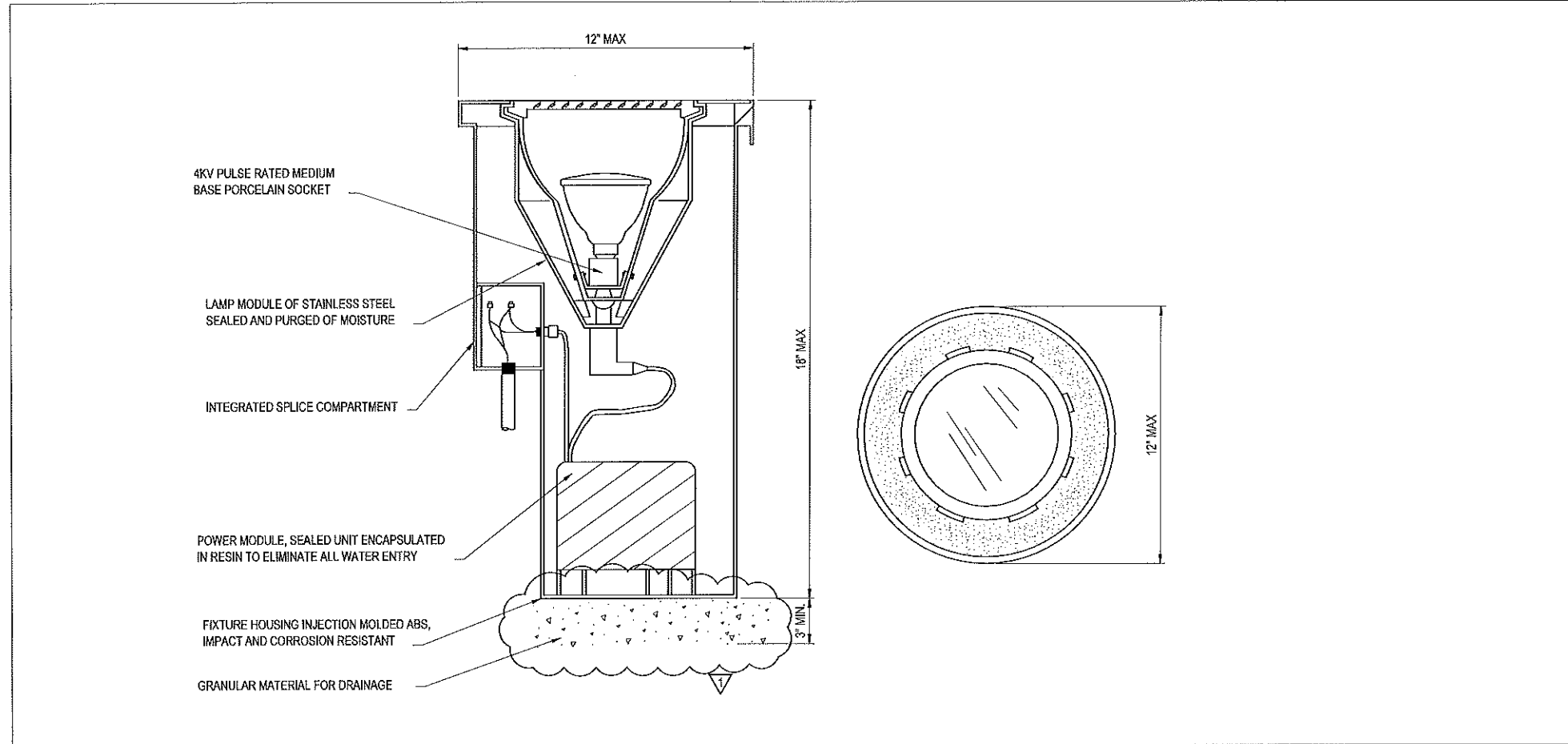
WET

**REMARKS**

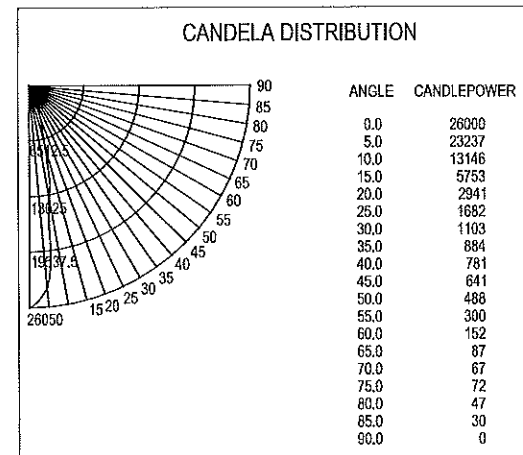
PROVIDE DRAINAGE ACCORDING TO MANUFACTURERS RECOMMENDATION

**MANUFACTURERS**

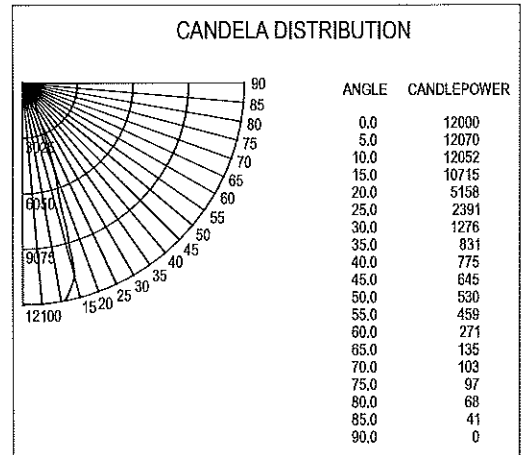
HYDREL "9100" SERIES  
 IMPERIAL BRONZELITE "GMA 6000"  
 OR APPROVED EQUAL



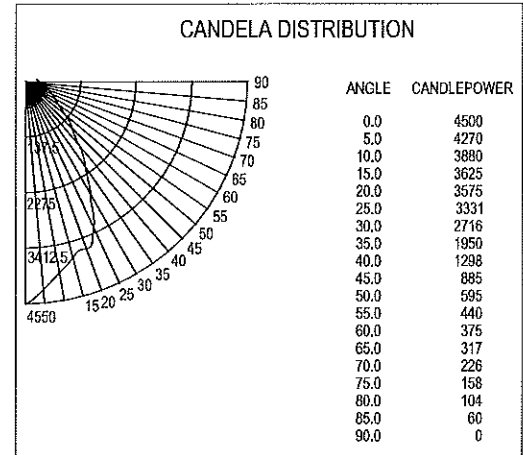
LAMP: 100 PAR38 M.H. SPOT (20 )



LAMP: 100 PAR38 M.H. FLOOD (35 )



LAMP: 100 PAR38 VERY WIDE FLOOD (65 )



P:\IN PROGRESS\Standard D... ES-116 REV 01.dwg - LAST PLOTTED ON Tue 08/05/13 - 10:57AM BY jahn

|  |  |  |                                |          |              |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
|--|--|--|--------------------------------|----------|--------------|-------------|-------------|--|--|---------------------------|--|--|--------------------------------|--|--------------|----------------------|-------------|-----|-------------------------------|--------|---|------------------------|----------|--|----------------------|-----------|--|------------------------------|--|--|--|--|--|--|--|--|--|
| <table border="1"> <tr> <td>DESIGNED BY<br/>R. BICARME</td> <td rowspan="5">                 A SIGNED &amp; SEALED ORIGINAL OF REV 0 OF THIS DRAWING IS MAINTAINED BY METRO             </td> <td rowspan="5">                  LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY             </td> <td colspan="2">                 METRO RAIL ELECTRICAL STANDARD             </td> <td>CONTRACT NO.</td> </tr> <tr> <td>DRAWN BY<br/>A. RUBIN</td> <td>DRAWING NO.</td> <td>REV</td> </tr> <tr> <td>CHECKED BY<br/>M. RATNASINGHAM</td> <td>ES-116</td> <td>1</td> </tr> <tr> <td>IN CHARGE<br/>S. MAYMAN</td> <td colspan="2">NO SCALE</td> </tr> <tr> <td>DATE<br/>MAY 10, 2010</td> <td colspan="2">SHEET 710</td> </tr> </table> |  |  |                                |          |              |             |             |  |  | DESIGNED BY<br>R. BICARME | A SIGNED & SEALED ORIGINAL OF REV 0 OF THIS DRAWING IS MAINTAINED BY METRO | LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY | METRO RAIL ELECTRICAL STANDARD |  | CONTRACT NO. | DRAWN BY<br>A. RUBIN | DRAWING NO. | REV | CHECKED BY<br>M. RATNASINGHAM | ES-116 | 1 | IN CHARGE<br>S. MAYMAN | NO SCALE |  | DATE<br>MAY 10, 2010 | SHEET 710 |  | TYPE FF METAL HALIDE UPLIGHT |  |  |  |  |  |  |  |  |  |
| DESIGNED BY<br>R. BICARME  | A SIGNED & SEALED ORIGINAL OF REV 0 OF THIS DRAWING IS MAINTAINED BY METRO | LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY | METRO RAIL ELECTRICAL STANDARD |          | CONTRACT NO. |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
| DRAWN BY<br>A. RUBIN   |  |  | DRAWING NO.                    | REV      |              |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
| CHECKED BY<br>M. RATNASINGHAM  |  |  | ES-116                         | 1        |              |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
| IN CHARGE<br>S. MAYMAN   |  |  | NO SCALE                       |          |              |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
| DATE<br>MAY 10, 2010   |  |  | SHEET 710                      |          |              |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
| REVISED PER SBCN 2013-35<br>RE-BASELINED   |  |  |                                |          |              |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
| REV  | DATE   | BY   | APP                            | REG. NO. | EXPIRES      | SEAL HOLDER | DESCRIPTION |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |
| 0  | 05/10/10   |  |                                |          |              |             |             |  |  |                           |  |  |                                |  |              |                      |             |     |                               |        |   |                        |          |  |                      |           |  |                              |  |  |  |  |  |  |  |  |  |



**GENERAL DESCRIPTION**

METAL HALIDE DOWNLIGHT WITH REMOTE BALLAST FOR INTERIOR AND EXTERIOR USE.

**FIXTURE OPTIONS**

**GG1**

LAMP: 100W, M.H., PAR38, 3200°K  
 INITIAL LUMENS: 5600  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 135  
 DIMENSIONS: 11 7/8" HEIGHT, 8 3/4" DIA  
 EFFICIENCY: 80%

**GG2**

LAMP: 150W, M.H., PAR38, 3200°K  
 INITIAL LUMENS: 9000  
 BALLAST: HPF, -20°F STARTING  
 INPUT WATTS: 185  
 DIMENSIONS: 11" HEIGHT, 10" DIA  
 EFFICIENCY: 80%

**PHOTOMETRIC OPTIONS**

- REFLECTOR ONLY
- GROOVED BAFFLE

**MOUNTING OPTIONS**

- RECESSED

**ACCESSORIES OPTIONS**

- REMOTE BALLAST
- INTERGRAL BALLAST

**FINISH MATERIALS**

**SAFETY LISTING**

- DAMP/WET

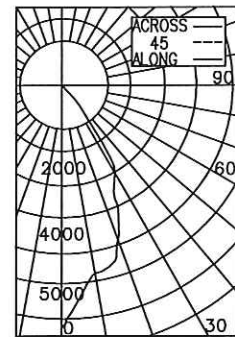
**REMARKS**

- MAXIMUM REMOTE BALLAST DISTANCE IS 5'
- BLACK BAFFLE DECREASES EFFICIENCY BY 30%

**MANUFACTURERS**

- STERNER
- KURT VERSEN
- MCPHILBEN
- DEVINE E600

**FIXTURE OPTION:**



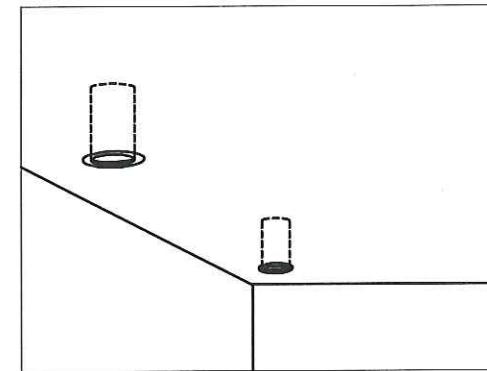
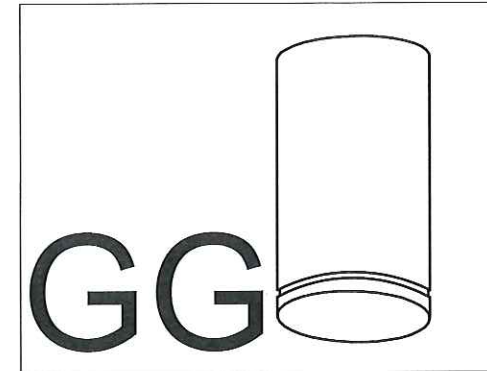
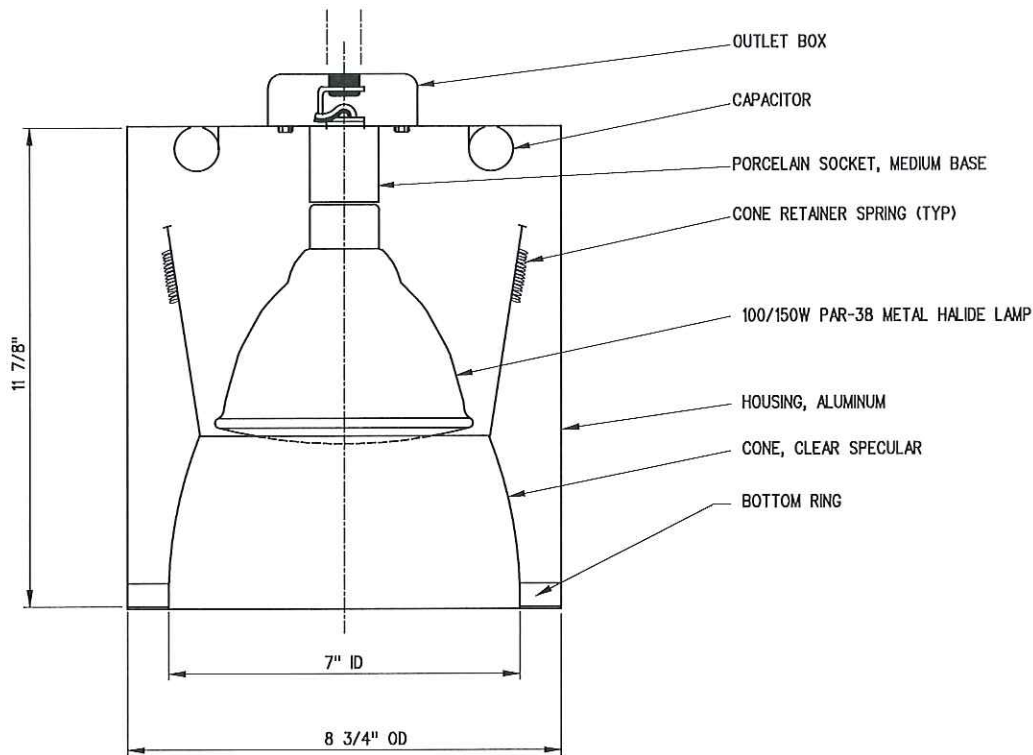
**LAMP:**

**CANDLEPOWER SUMMARY**

| ANGLE | MEAN CP |
|-------|---------|
| 0     | 7248    |
| 5     | 6549    |
| 10    | 5782    |
| 15    | 5523    |
| 20    | 4760    |
| 25    | 3661    |
| 30    | 2939    |
| 35    | 1325    |
| 40    | 207     |
| 45    | 29      |
| 50    | 0       |
| 55    | 0       |
| 60    | 0       |
| 65    | 0       |
| 70    | 0       |
| 75    | 0       |
| 80    | 0       |
| 85    | 0       |
| 90    | 0       |

**CANDLEPOWER NOTES:**

- CANDLEPOWER VALUES BASED ON SPECULAR CONE.
- FOR TYPE GG2, MULTIPLY VALUES BY 1.6 TO ADJUST FOR 150W PAR38 LAMP.



| COEFFICIENT OF UTILIZATION             |    |                    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--|----|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| % EFFECTIVE CEILING CAVITY REFLECTANCE |    |                    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|  |    | 80                 |     |     | 70  |     |     | 50  |     |     | 30  |     |     | 10  |     | 0   |
|  |    | % WALL REFLECTANCE |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|  |    | 50                 | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  |
| ROOM CAVITY RATIO                      | 1  | .98                | .96 | .94 | .96 | .94 | .93 | .92 | .91 | .90 | .89 | .88 | .87 | .86 | .85 | .85 |
|  | 2  | .93                | .90 | .88 | .91 | .89 | .87 | .89 | .87 | .85 | .86 | .85 | .83 | .84 | .83 | .82 |
|  | 3  | .88                | .85 | .83 | .87 | .85 | .82 | .85 | .83 | .81 | .83 | .81 | .80 | .82 | .80 | .78 |
|  | 4  | .85                | .81 | .78 | .84 | .81 | .78 | .82 | .79 | .77 | .80 | .78 | .76 | .79 | .77 | .75 |
|  | 5  | .81                | .77 | .74 | .80 | .76 | .74 | .79 | .76 | .73 | .77 | .75 | .73 | .76 | .74 | .72 |
|  | 6  | .78                | .74 | .71 | .77 | .73 | .71 | .76 | .73 | .70 | .75 | .72 | .70 | .74 | .71 | .69 |
|  | 7  | .74                | .70 | .67 | .74 | .70 | .67 | .73 | .69 | .67 | .72 | .69 | .66 | .71 | .68 | .65 |
|  | 8  | .71                | .67 | .64 | .70 | .67 | .64 | .70 | .66 | .64 | .69 | .66 | .64 | .68 | .65 | .63 |
|  | 9  | .68                | .64 | .61 | .67 | .64 | .61 | .67 | .63 | .61 | .65 | .63 | .60 | .65 | .62 | .59 |
|  | 10 | .65                | .61 | .58 | .65 | .61 | .58 | .64 | .60 | .58 | .63 | .60 | .58 | .63 | .60 | .57 |

20% FLOOR CAVITY REFLECTANCE

**C.U. TABLE NOTE:**

- C.U. VALUES BASED ON SPECULAR CLEAR REFLECTOR CONE.
- MULTIPLY VALUES BY .85 TO ADJUST FOR BLACK GROOVED BAFFLE.

F:\N\PROGRESS\Standards\109\Area\ES-117.dwg - LAST PLOTTED ON Tue 05/11/10 - 07:47AM BY rubin

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
R. BICARME  
 DRAWN BY  
A. RUBIN  
 CHECKED BY  
F. CASTRO  
 IN CHARGE  
F. CASTRO  
 DATE  
MAY 10, 2010



**Metro** LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

METRO RAIL ELECTRICAL STANDARD  
 TYPE GG  
 METAL HALIDE DOWNLIGHT

|             |     |
|-------------|-----|
| CONTRACT NO |     |
| DRAWING NO  | REV |
| ES-117      | 0   |
| SCALE       |     |
| NO SCALE    |     |
| SHEET NO    |     |

**GENERAL DESCRIPTION**

ASYMMETRIC INDIRECT FLUORESCENT COVE LIGHT FOR INTERIOR AND EXTERIOR USE

**FIXTURE OPTIONS \***

**HH1**

LAMP: (2) 32W, T8, 3500°K  
 INITIAL LUMENS: 2850 EACH LAMP  
 BALLAST: HPF, ELECTRONIC, RAPID START  
 INPUT WATTS: 70 PER 4 FOOT SECTION  
 DIMENSIONS: APPROX. 9" W, 4" H  
 EFFICIENCY: 55%  
 REMARKS: FIXTURE IS REFLECTOR ASSEMBLY ONLY TO BE MOUNTED IN ARCHITECTURAL COVE

**HH2**

LAMP: (4) 32W, T8, IN TANDEM, 3500°K  
 INITIAL LUMENS: 2850 EACH LAMP  
 BALLAST: HPF, ELECTRONIC, INSTANT START  
 INPUT WATTS: 140 PER 8 FOOT SECTION  
 DIMENSIONS: APPROX. 9" W, 4" H  
 EFFICIENCY: 80%  
 REMARKS: FIXTURE IS FINISHED UNIT

\* OR LED EQUIVALENT

**PHOTOMETRIC OPTIONS**

- 1. INDIRECT UPLIGHT

**MOUNTING OPTIONS**

- 1. WALL MOUNTED

**ACCESSORIES OPTIONS**

- 0 NO ACCESSORIES

**FINISH MATERIALS**

- ANODIZED ALUMINUM WITH HIGH REFLECTANCE WHITE PAINT

**SAFETY LISTING**

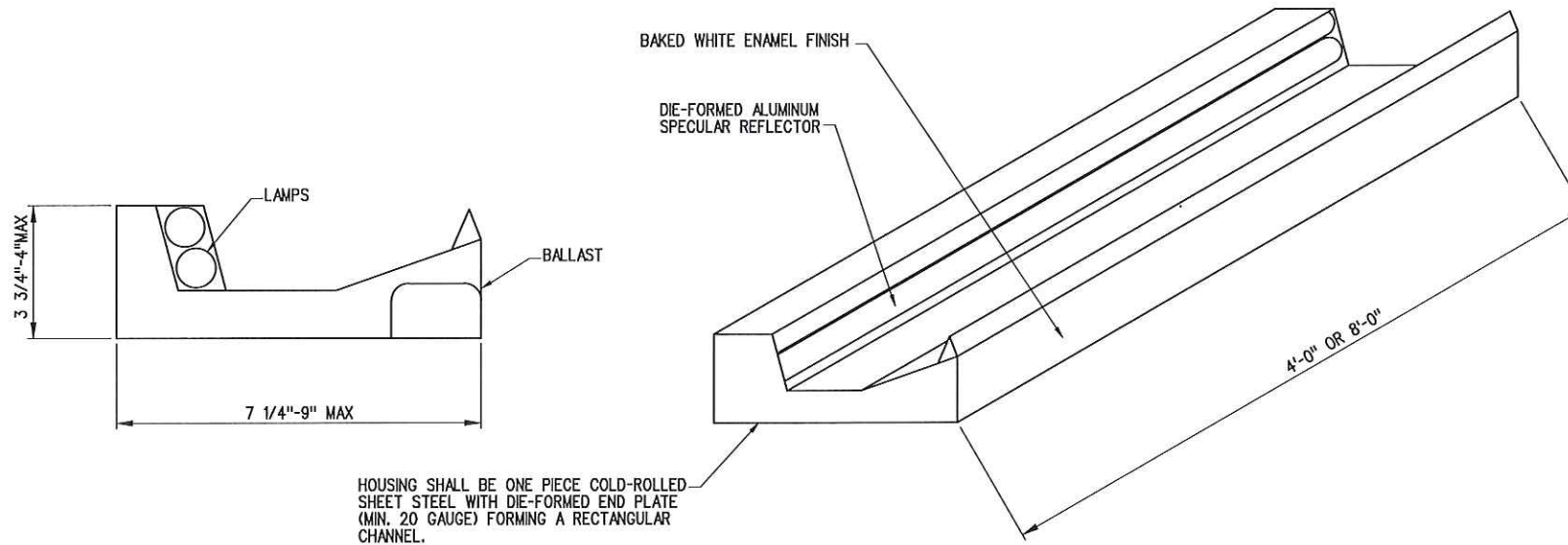
- DAMP

**REMARKS**

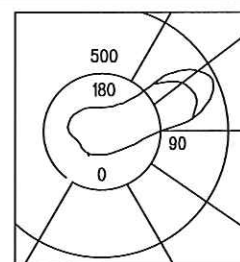
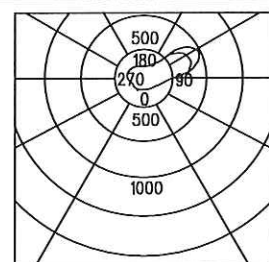
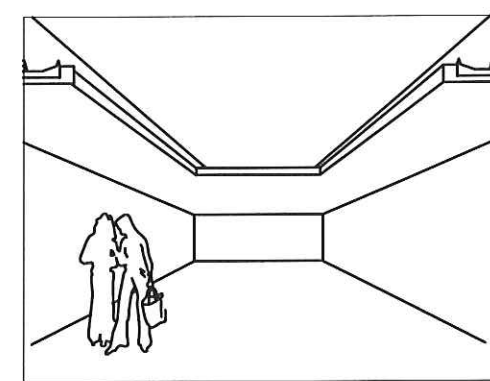
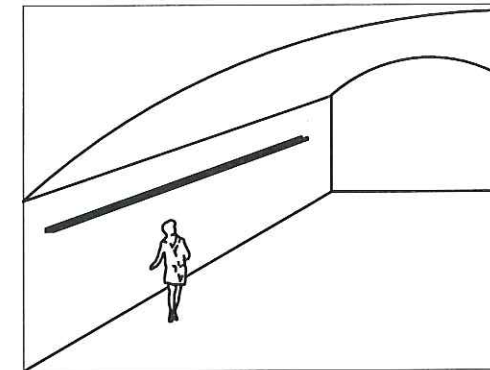
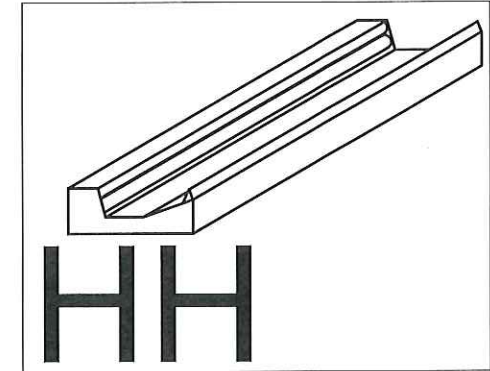
- FIXTURE TO BE MOUNTED NO CLOSER THAN 18" FROM SURFACE TO BE ILLUMINATED

**MANUFACTURERS**

- LINEAR "TRIMLIGHT"
- PEERLESS LIGHTING "ECX 0200 SERIES"
- PRUDENTIAL "P45 SERIES"



HOUSING SHALL BE ONE PIECE COLD-ROLLED SHEET STEEL WITH DIE-FORMED END PLATE (MIN. 20 GAUGE) FORMING A RECTANGULAR CHANNEL.



|     |     |      |      |       |       |
|-----|-----|------|------|-------|-------|
|     | 0.0 | 45.0 | 90.0 | 135.0 | 180.0 |
| 0   | 2   | 2    | 2    | 2     | 2     |
| 5   | 1   | 2    | 1    | 2     | 2     |
| 15  | 1   | 2    | 1    | 2     | 2     |
| 25  | 1   | 1    | 1    | 0     | 0     |
| 35  | 0   | 1    | 0    | 0     | 0     |
| 45  | 0   | 1    | 0    | 0     | 0     |
| 55  | 0   | 0    | 0    | 0     | 0     |
| 65  | 0   | 0    | 0    | 0     | 0     |
| 75  | 1   | 2    | 0    | 0     | 0     |
| 85  | 0   | 1    | 0    | 0     | 0     |
| 90  | 20  | 20   | 0    | 0     | 1     |
| 95  | 324 | 262  | 40   | 5     | 1     |
| 105 | 614 | 775  | 143  | 195   | 41    |
| 115 | 717 | 921  | 848  | 259   | 81    |
| 125 | 644 | 818  | 1214 | 259   | 146   |
| 135 | 558 | 689  | 908  | 276   | 171   |
| 145 | 474 | 548  | 645  | 334   | 178   |
| 155 | 415 | 448  | 480  | 358   | 270   |
| 165 | 381 | 392  | 396  | 354   | 323   |
| 175 | 364 | 365  | 362  | 354   | 349   |
| 180 | 358 | 358  | 358  | 358   | 358   |

|     |     |      |      |       |       |
|-----|-----|------|------|-------|-------|
|     | 0.0 | 45.0 | 90.0 | 135.0 | 180.0 |
| 0   | 2   | 2    | 2    | 2     | 2     |
| 5   | 1   | 2    | 2    | 1     | 2     |
| 15  | 1   | 2    | 1    | 2     | 2     |
| 25  | 1   | 1    | 1    | 0     | 0     |
| 35  | 0   | 1    | 0    | 0     | 0     |
| 45  | 0   | 1    | 0    | 0     | 0     |
| 55  | 0   | 0    | 0    | 0     | 0     |
| 65  | 0   | 0    | 0    | 0     | 0     |
| 75  | 1   | 2    | 0    | 0     | 0     |
| 85  | 0   | 1    | 0    | 0     | 0     |
| 90  | 20  | 20   | 0    | 0     | 1     |
| 95  | 324 | 262  | 40   | 5     | 1     |
| 105 | 657 | 760  | 143  | 195   | 41    |
| 115 | 893 | 963  | 503  | 259   | 81    |
| 125 | 802 | 915  | 786  | 239   | 146   |
| 135 | 715 | 815  | 829  | 276   | 171   |
| 145 | 650 | 715  | 711  | 285   | 178   |
| 155 | 597 | 623  | 600  | 398   | 253   |
| 165 | 549 | 553  | 524  | 436   | 388   |
| 175 | 504 | 502  | 488  | 465   | 454   |
| 180 | 482 | 482  | 482  | 482   | 482   |

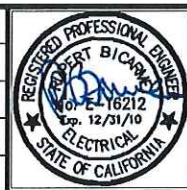
COEFFICIENT OF UTILIZATION  
EFFECTIVE FLOOR CAVITY REFLECTANCE-.20

| PCC | .80 |     |     |     | .70 |     |     |     | .50 |     |     |     | .30 |     |     |     | .10 |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
|     | .70 | .50 | .30 | .10 | .70 | .50 | .30 | .10 | .50 | .30 | .10 | .50 | .30 | .10 | .50 | .30 | .10 | .00 |  |  |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
| 0   | .52 | .52 | .52 | .52 | .45 | .45 | .45 | .45 | .30 | .30 | .30 | .17 | .17 | .17 | .05 | .05 | .05 | .00 |  |  |
| 1   | .47 | .45 | .43 | .41 | .40 | .39 | .37 | .36 | .26 | .25 | .24 | .15 | .14 | .14 | .04 | .04 | .04 | .00 |  |  |
| 2   | .43 | .39 | .36 | .34 | .37 | .34 | .31 | .29 | .23 | .21 | .20 | .13 | .12 | .12 | .04 | .04 | .03 | .00 |  |  |
| 3   | .39 | .34 | .31 | .28 | .33 | .29 | .27 | .24 | .20 | .18 | .17 | .11 | .10 | .10 | .03 | .03 | .03 | .00 |  |  |
| 4   | .36 | .30 | .26 | .23 | .30 | .26 | .23 | .20 | .18 | .16 | .14 | .10 | .09 | .08 | .03 | .03 | .02 | .00 |  |  |
| 5   | .32 | .27 | .23 | .20 | .28 | .23 | .20 | .17 | .16 | .13 | .12 | .09 | .08 | .07 | .03 | .02 | .02 | .00 |  |  |
| 6   | .30 | .24 | .20 | .17 | .25 | .20 | .17 | .14 | .14 | .12 | .10 | .08 | .07 | .06 | .02 | .02 | .02 | .00 |  |  |
| 7   | .27 | .21 | .17 | .14 | .23 | .18 | .15 | .12 | .12 | .10 | .09 | .07 | .06 | .05 | .02 | .02 | .01 | .00 |  |  |
| 8   | .25 | .19 | .15 | .12 | .21 | .16 | .13 | .11 | .11 | .09 | .07 | .06 | .05 | .04 | .02 | .01 | .01 | .00 |  |  |
| 9   | .23 | .17 | .13 | .11 | .20 | .15 | .11 | .09 | .10 | .08 | .06 | .06 | .04 | .04 | .01 | .01 | .01 | .00 |  |  |
| 10  | .22 | .16 | .12 | .09 | .18 | .13 | .10 | .08 | .09 | .07 | .06 | .05 | .04 | .03 | .01 | .01 | .01 | .00 |  |  |

F:\IN\_PROGRESS\Standards\ogal\Elec\ES-118.dwg - LAST PLOTTED ON Tue 05/11/10 - 07:47AM BY rubin

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
**R. BICARME**  
 DRAWN BY  
**A. RUBIN**  
 CHECKED BY  
**F. CASTRO**  
 IN CHARGE  
**F. CASTRO**  
 DATE  
**MAY 10, 2010**



**M Metro** LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

METRO RAIL ELECTRICAL STANDARD  
 TYPE HH  
 FLUORESCENT COVE LIGHT

|             |          |
|-------------|----------|
| CONTRACT NO |          |
| DRAWING NO  | ES-118   |
| REV         | 0        |
| SCALE       | NO SCALE |
| SHEET NO    |          |

**GENERAL DESCRIPTION**  
CONTINUOUS LINEAR FLUORESCENT "SIGN LIGHT" FOR INTERIOR AND EXTERIOR USE.

**FIXTURE OPTIONS \***

**II1**  
LAMP: (1) 32W, T8 3500°K  
INITIAL LUMENS: 2850  
BALLAST: HPF, ELECTRONIC, RAPID START  
INPUT WATTS: 38  
DIMENSIONS: APPROX. 6"-8" W, 4"-6" D, 48" LENGTH  
EFFICIENCY: 65%

\* OR LED EQUIVALENT

**PHOTOMETRIC OPTIONS**

1. ASYMMETRIC

**MOUNTING OPTIONS**

1. WALL BRACKET MOUNTING HARDWARE  
2. CEILING PENDANT MOUNTING HARDWARE

**ACCESSORIES OPTIONS**

0 NO ACCESSORIES

**FINISH MATERIALS**

• ALUMINUM HOUSING, SEMI SPECULAR ALUMINUM REFLECTOR

**SAFETY LISTING**

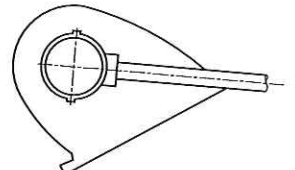
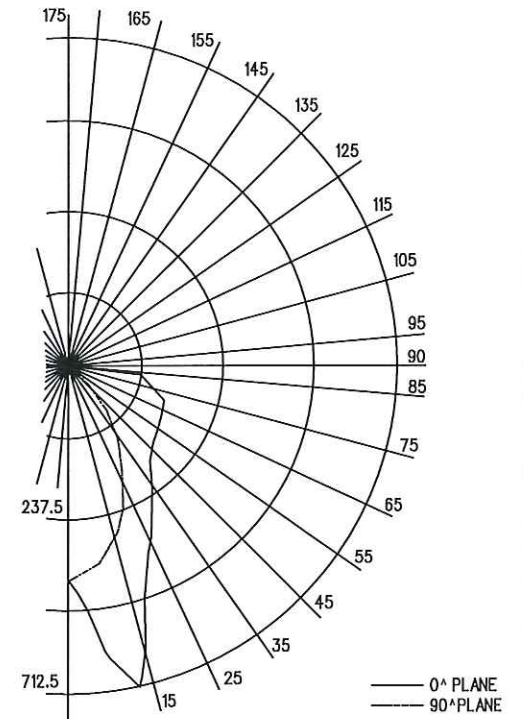
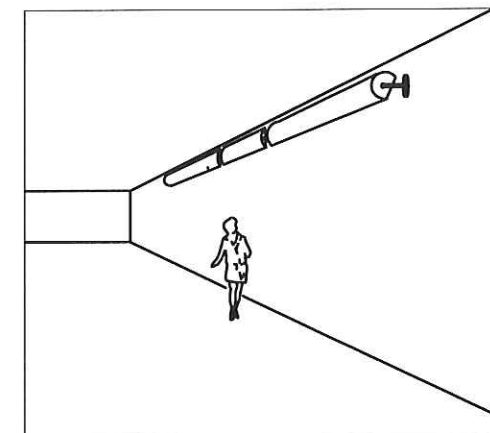
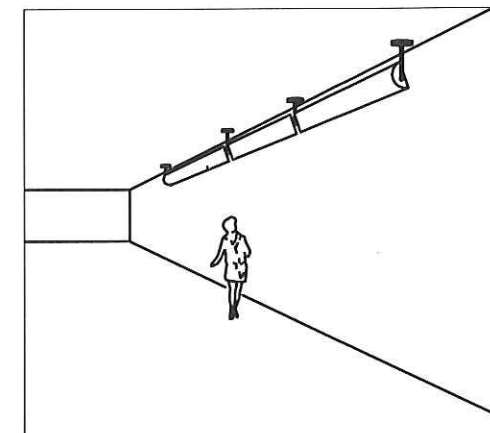
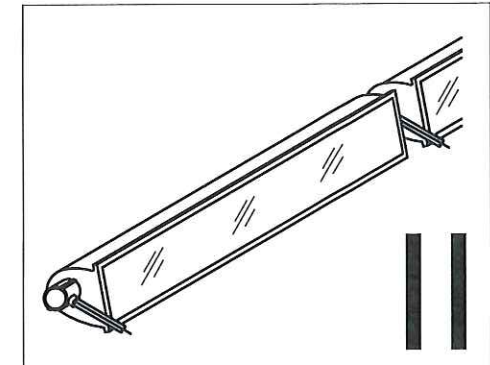
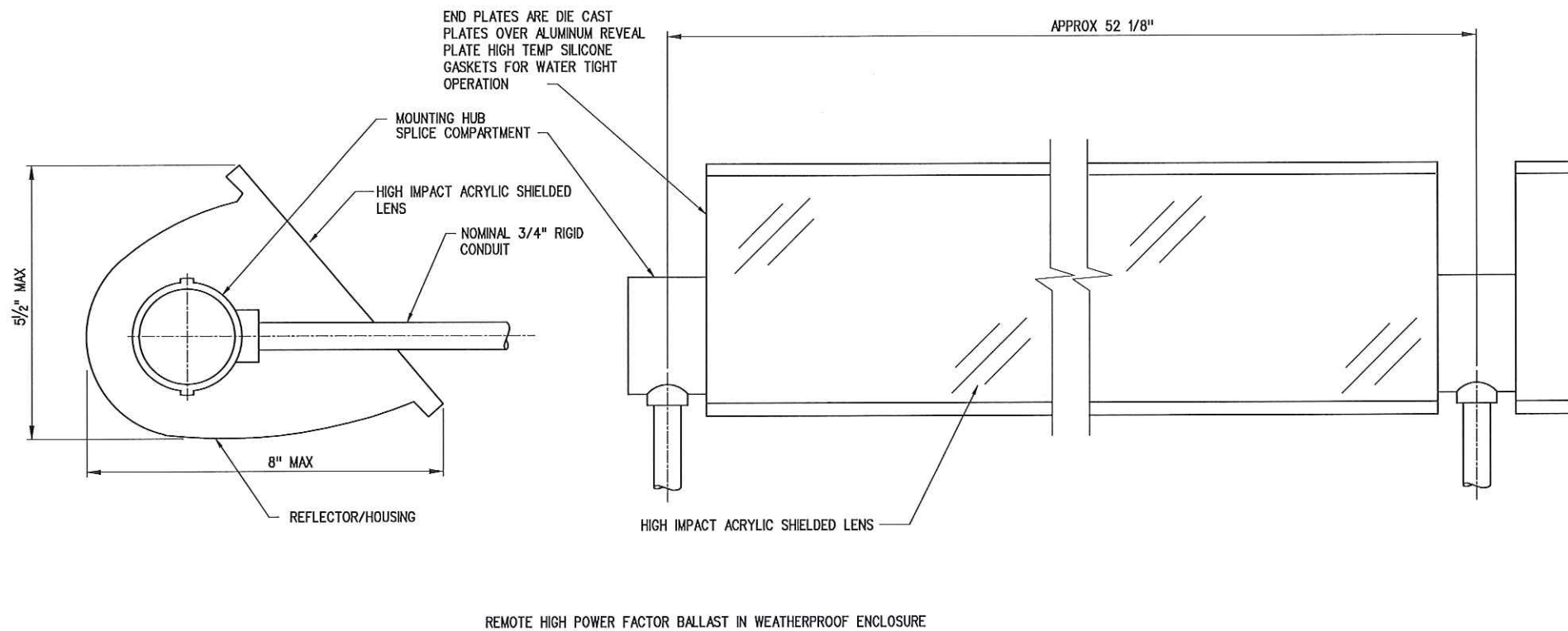
• WET OR DAMP

**REMARKS**

• MAXIMUM REMOTE BALLAST DISTANCE IS 15' FROM SOCKET

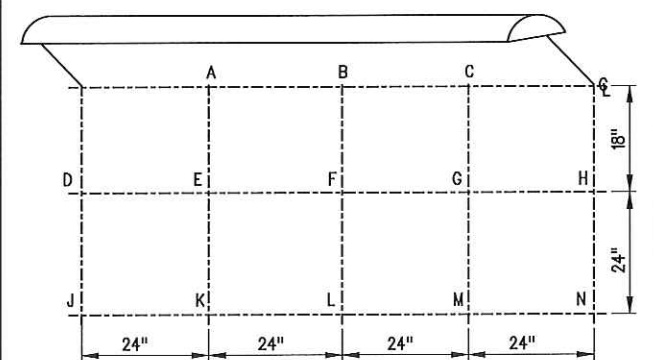
**MANUFACTURERS**

• COLUMBIA "SOD-M5"  
• ELLIPTIPAR "OUTDOOR LARGE FLUORESCENT"  
• OR APPROVED EQUAL



FIXTURE HEAD SHOWN ORIENTED CORRESPONDING TO PHOTOMETRIC DISTRIBUTION

| CANDELA DISTRIBUTION |       |       |
|----------------------|-------|-------|
| 0.0                  | 0.0   | 90.0  |
| 0.0                  | 614.0 | 614.0 |
| 5.0                  | 746.0 | 614.0 |
| 15.0                 | 923.0 | 590.0 |
| 25.0                 | 771.0 | 537.0 |
| 35.0                 | 603.0 | 456.0 |
| 45.0                 | 500.0 | 352.0 |
| 55.0                 | 409.0 | 236.0 |
| 65.0                 | 383.0 | 115.0 |
| 75.0                 | 389.0 | 35.0  |
| 85.0                 | 318.0 | 4.0   |
| 90.0                 | 232.0 | 1.0   |
| 95.0                 | 143.0 | 1.0   |
| 105.0                | 33.0  | 0.0   |
| 115.0                | 3.0   | 0.0   |
| 125.0                | 0.0   | 0.0   |
| 135.0                | 0.0   | 0.0   |
| 145.0                | 0.0   | 0.0   |
| 155.0                | 0.0   | 0.0   |
| 165.0                | 0.0   | 0.0   |
| 175.0                | 0.0   | 0.0   |
| 180.0                | 0.0   | 0.0   |



| MOUNTING DISTANCE FROM SIGN SURFACE | FOOTCANDLE VALUES |    |    |    |     |     |     |    |    |    |    |    |    |  |
|-------------------------------------|-------------------|----|----|----|-----|-----|-----|----|----|----|----|----|----|--|
|                                     | A                 | B  | C  | D  | E   | F   | G   | H  | J  | K  | L  | M  | N  |  |
| 12"                                 | 28                | 25 | 28 | 47 | 100 | 125 | 100 | 47 | 12 | 23 | 26 | 23 | 12 |  |
| 18"                                 | 14                | 16 | 14 | 44 | 98  | 110 | 98  | 44 | 18 | 33 | 38 | 33 | 18 |  |
| 24"                                 | 25                | 30 | 25 | 46 | 95  | 110 | 95  | 46 | 24 | 43 | 43 | 43 | 24 |  |
| 48"                                 | 10                | 11 | 10 | 18 | 30  | 33  | 30  | 18 | 18 | 29 | 33 | 29 | 18 |  |
| 60"                                 | 13                | 16 | 13 | 17 | 26  | 30  | 26  | 17 | 17 | 26 | 30 | 26 | 17 |  |

FOOTCANDLE VALUES ARE FOR HIGH OUTPUT LAMP MULTIPLY VALUES BY .70 TO ADJUST FOR T8 LAMP

F:\N\_PROGRESS\Standard... LAST PLOTTED ON Tue 05/11/10 - 07:49AM BY rubina

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
**R. BICARME**  
DRAWN BY  
**A. RUBIN**  
CHECKED BY  
**F. CASTRO**  
IN CHARGE  
**F. CASTRO**  
DATE  
**MAY 10, 2010**



**Metro** LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

METRO RAIL ELECTRICAL STANDARD  
TYPE II  
FLUORESCENT SIGN LIGHT

|              |          |
|--------------|----------|
| CONTRACT NO. |          |
| DRAWING NO.  | ES-119   |
| REV.         | 0        |
| SCALE        | NO SCALE |
| SHEET NO.    |          |

**GENERAL DESCRIPTION**

WALL BRACKET MOUNTED METAL HALIDE DOWNLIGHT FOR INTERIOR AND EXTERIOR USE

**FIXTURE OPTIONS**

JJ1  
 LAMP: 175W, MH, CLEAR, HORIZ, 4400°K  
 INITIAL LUMENS: 15,000  
 BALLAST: HPF, -20° F STARTING  
 INPUT WATTS: 210  
 DIMENSIONS: 8" DIA, 19" LONG  
 EFFICIENCY: 70%

**PHOTOMETRIC OPTIONS**

1. DOWNLIGHT

**MOUNTING OPTIONS**

1. WALL MOUNTED

**ACCESSORIES OPTIONS**

0. NO ACCESSORIES

**FINISH MATERIALS**

- EXTRUDED ALUMINUM WITH THERMOSET POLYESTER POWDERCOAT

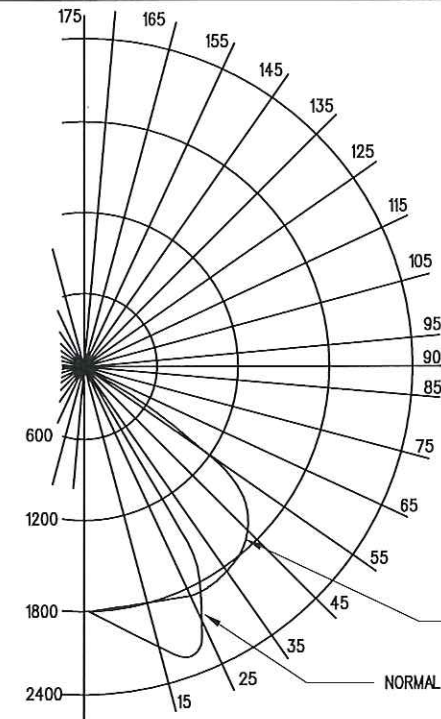
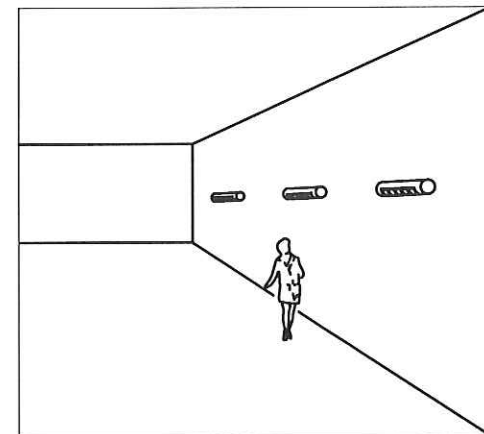
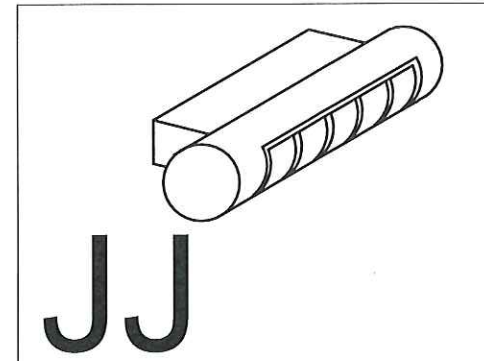
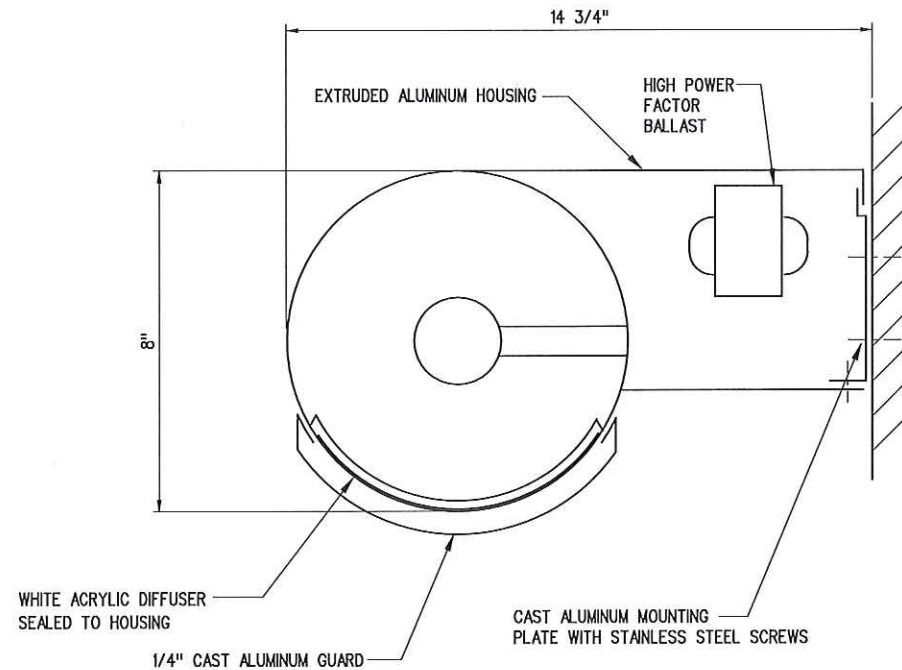
**SAFETY LISTING**

- WET

**REMARKS**

**MANUFACTURERS**

- ARCHITECTURAL AREA LIGHTING "ALR" SERIES
- COLE
- OR APPROVED EQUAL



**COEFFICIENT OF UTILIZATION**

| CEILING REFLECTANCE | 70 |    | 50 |    | 10 |    | 0  |
|---------------------|----|----|----|----|----|----|----|
| WALL REFLECTANCE    | 50 | 30 | 50 | 30 | 50 | 30 | 0  |
| ROOM CAVITY RATIO   | 1  | 36 | 34 | 34 | 33 | 31 | 29 |
|                     | 2  | 31 | 29 | 30 | 28 | 27 | 25 |
|                     | 3  | 28 | 25 | 27 | 25 | 23 | 21 |
|                     | 4  | 25 | 22 | 24 | 21 | 20 | 18 |
|                     | 5  | 22 | 19 | 21 | 19 | 20 | 18 |
|                     | 6  | 20 | 17 | 19 | 17 | 18 | 16 |
|                     | 7  | 18 | 15 | 17 | 15 | 16 | 14 |
|                     | 8  | 16 | 14 | 16 | 13 | 15 | 13 |
|                     | 9  | 15 | 12 | 15 | 12 | 14 | 12 |
|                     | 10 | 14 | 11 | 13 | 11 | 13 | 11 |

BASED ON A 20% FLOOR CAVITY REFLECTANCE

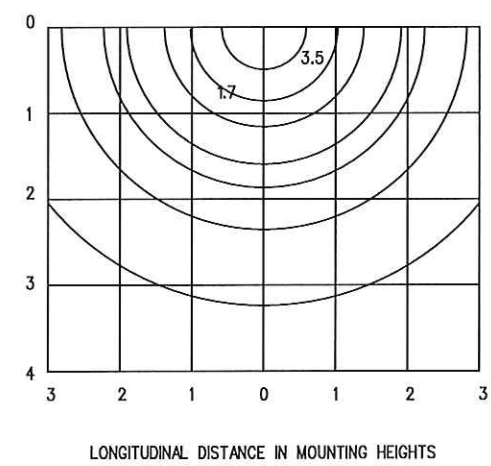
**CANDLEPOWER DISTRIBUTION**

| ANGLE  | CANDLEPOWER |
|--------|-------------|
| NORMAL | PAR         |

**CONVERSION FACTORS**

| LAMP TYPE      | LUMENS | MOUNTING HEIGHT |      |     |     |     |     |
|----------------|--------|-----------------|------|-----|-----|-----|-----|
|                |        | 8'              | 10'  | 12' | 14' | 16' | 18' |
| 175 w MH,CLEAR | 14000  | 1.97            | 1.26 | .88 | .64 | .49 | .39 |

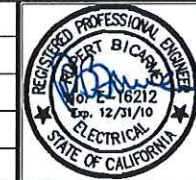
**HORIZONTAL FOOTCANDLES**



F:\N\_PROGRESS\Standards\... ES-120.dwg - LAST PLOTTED ON Tue 05/11/10 - 07:48AM BY rubina

| REV | DATE     | BY | APP | REG. NO. | EXPIRES | SEAL HOLDER | DESCRIPTION  |
|-----|----------|----|-----|----------|---------|-------------|--------------|
| 0   | 05/10/10 |    |     |          |         |             | RE-BASELINED |

DESIGNED BY  
R. BICARME  
 DRAWN BY  
A. RUBIN  
 CHECKED BY  
F. CASTRO  
 IN CHARGE  
F. CASTRO  
 DATE  
MAY 10, 2010



**Metro** LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

METRO RAIL ELECTRICAL STANDARD  
 TYPE JJ  
 METAL HALIDE DOWNLIGHT

|             |          |
|-------------|----------|
| CONTRACT NO |          |
| DRAWING NO  | ES-120   |
| REV         | 0        |
| SCALE       | NO SCALE |
| SHEET NO    |          |