

# **SPECIAL SPECIFICATIONS FOR THE CONSTRUCTION OF STREET LIGHTING SYSTEMS**



**CITY OF LOS ANGELES**

**DEPARTMENT OF PUBLIC WORKS**

ISSUED JULY - 2009

# INTRODUCTION

Street Lighting work to be performed in the City of Los Angeles shall be constructed in accordance with the Bureau of Street Lighting's "Special Specifications for the Construction of Street Lighting Systems". These "Special Specifications" supplement the latest edition of the "Standard Specifications for Public Works Construction (Green Book)" and the current edition of the "Additions and Amendments to the 2003 Edition and the 2005 (Brown Book)".

The "Special Specifications" include special provisions, standard drawings, approved equipment, and other requirements that must be adhered to by all contractors. No deviations from the "Special Specifications", "Standard Specification", or "Standard Plans" are authorized for street lighting construction within the City of Los Angeles without prior approval from the Bureau of Street Lighting. If there is a conflict between documents, precedence of documents shall be controlled by Section 2-5.2 of the "Standard Specifications for Public Works Construction".

Approved By: \_\_\_\_\_  
Director, Bureau of Street Lighting

Date: \_\_\_\_\_

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### STANDARD

#### DRAWINGS

•	ELECTOLIERS TYPE	STD DWG. NO
	CD 814	
	CD 851	
	CD 954	
	CD 951	
	CD 953	
	40' DAVIT POLE	
	CD 803	
•	OTHER EQUIPMENT	
	Pullbox L 201-0	
•	CONSTRUCTION DETAILS	
	Typical Wiring Details L 301-1	
	Catch Basin Construction Clearance Detail L 304-0	
•	Summary of Version 2 Changes	
•	Summary of Version 3 Changes	

## **DIVISION 1 GENERAL REQUIREMENTS**

### **1060 - REGULATORY REQUIREMENTS**

#### **GENERAL CONDUCT AT JOBSITE**

- A. Contractor shall conduct Work in a manner that will not jeopardize any other public work that is in the area, and shall cause minimum inconvenience to the flow of traffic on roads. Contractor shall obey all City, County and all other public authority regulations. All work proposed in this contract shall conform to Traffic Lane requirements specified in General Note No. 19, applicable Supplemental Note(s) on Sheet 1 of the street lighting plans, and/or applicable Street Lighting Special Specifications in the back of the bid documents.
- B. Contractor shall install all material in accordance with the manufacturer's instructions, unless otherwise specified.

#### **STREET LIGHTING CREW COMPOSITION REQUIREMENTS**

The Contractor shall designate a Foreman who shall be on the jobsite continuously while any work is being performed and who shall have the authority to act for the contractor in all matters.

The contractor shall adhere to all crew composition requirements specified in the bid documents.

For the purposes of determining prevailing wage, the Journey Level Electrician shall be paid at the rate specified for "Inside Wireman" in the general prevailing wage determination made by the Director of Industrial Relations pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773, and 1773.1.

### **1070 - IDENTIFICATION SYSTEMS - LAMP SIZE AND TYPE IDENTIFICATION (TARGETS)**

All luminaires installed must have a target affixed to it. The dimensions and location of the markers shall adhere to ANSI C136-15. If there is a conflict with this document and the ANSI C 136-15, the ANSI section shall prevail.

#### **A. HORIZONTAL AND MODERN UPRIGHT GLOBE LUMINAIRES**

- 1. Each lamp shall be identified with a target affixed to the underside of the horizontal luminaire oriented left to right or on the body facing oncoming traffic for upright globe luminaires. Existing tape targets shall be removed and disposed of without damage to fixture. Contractor shall be responsible to repair or replace any damage to the fixture.

2. The target shall be made of non-corrosive material to provide a durable and legible surface, which is designed to endure for the life of the luminaire. The target shall have a stable color background and black block numerals in accordance with the following table and figure:

\*For targets that cannot be installed in the above manner, the BSL Construction Engineering Section, shall approve all modifications to the target.

<b><u>IDENTIFYING NUMERAL</u></b>	<b><u>LAMP WATTAGE</u></b>	<b><u>IDENTIFYING NUMERAL</u></b>	<b><u>LAMP WATTAGE</u></b>
1	18	20	200
3	35	21	215
5	50, 55	25	250
7	70	25B	250 Position Oriented
9	90	30	300
10	100	31	310
13	135	36	360
15	150-55V	40	400
15H	150-100V	40B	400 Position Oriented
17	175	70	700
17B	175 Position Oriented	XI	1000
18	180		

3. The target shall adhere to the dimensions specified in ANSI C136.15.

<b><u>BACKGROUND COLOR</u></b>	<b><u>LAMP TYPE</u></b>
GOLD	HIGH PRESSURE SODIUM
GREEN	HPS (MERCURY BALLAST)
LIGHT BLUE	MERCURY
RED	METAL HALIDE
TAN	LOW PRESSURE SODIUM
PURPLE	INCANDESCENT
AQUA	FLOURESCENT

## **B. EXISTING UPRIGHT LUMINAIRES (OLD TYPE)**

1. Each lamp shall be identified with a target affixed to the globe holder or near the bottom of the lantern base at the time the lamp is installed.
2. Targets shall be 2" long strips of approved pressure sensitive, flat top, wide angle reflective tape of the width specified below. The tape shall be affixed to the globe holder or lantern base with the 2" side in the horizontal direction. Where two or more tapes are specified, each additional tape shall be applied in the same horizontal line with a 1" gap between tapes. All targets shall be installed on the traffic side (streetside) of the fixture. Color, width and number of tapes are as follows:

### **MERCURY VAPOR**

<u>Wattage</u>	<u>No., Width &amp; Color</u>
100	1-1/2" Blue
175	2-1/2" Blue
250	1-1/2" Blue
	1-1" Blue
400	2-1" Blue
700	1-1" Blue
Yellow	
	1-1/2" Blue
	1-1" Blue
1000	3-1" Blue

### **HIGH PRESSURE SODIUM**

<u>Wattage</u>	<u>No., Width &amp; Color</u>
50	1-1/2" Yellow
	1-1/2" White
70	1-1" Yellow
	1-1/2" White
100	1-1/2" Yellow
	2-1/2" Yellow
150/Mercury	3-1/2"
200	3-1" Yellow
250	1-1" Yellow
400	2-1" Yellow

### **LOW PRESSURE SODIUM**

<u>Wattage</u>	<u>No., Width &amp; Color</u>
35	1-1/2" White
55	2-1/2" White
90	1-1" White
	1-1/2" White
135	2-1" White
180	2-1" White
	1-1/2" White

## **DIVISION 2**

### **SITEWORK**

#### **2010 - SUBSTRUCTURE CONFLICT**

Contractor shall locate and protect substructure(s) shown on the plans and those identified by Underground Service Alert (USA). The contractor shall provide for minimum 12" clearance between edge of foundation and substructures unless otherwise directed by the Inspector/Engineer. In the event a 12" clearance cannot be achieved, the contractor shall make arrangements for relocation of substructures at no cost to the city.

#### **UNDERGROUND SERVICE ALERT**

The contractor shall obtain an underground service alert inquiry I.D. number by calling 1-800-422-4133 before commencing any excavation or installing ground rods. Two working days shall be allowed after the I.D. number is obtained and before the excavation work is started so that utility owners can be notified. The I.D. number must be reported to the Bureau of Contract Administration when calling for inspection. All inspections must be arranged by noon the day before by calling BCA dispatcher at (213) 485-5080. I.D. numbers will not be given more than ten days prior to starting excavation work.

#### **2100 - SITE PREPARATION**

##### **CONSTRUCTION IN PROXIMITY OF ELECTRIC OVERHEAD LINES**

All new and existing electroliers shall conform to clearances with overhead electric power lines and communication lines per State of California Industrial Safety Orders General Order 95.

Construction in close proximity of high-voltage overhead lines shall be performed in accordance with the provisions of California Code of Regulations Title 8 and Article 86, State of California High Voltage Electric Safety Orders per the latest revision. The contractor shall be responsible for all necessary coordination with responsible utility company and shall assume all costs incurred in complying with these requirements.

In accordance with Section 2-5.1 of the Standard Specifications, each bidder prior to submitting his bid shall inspect the job site and include in his bid any charges by the Department of Water and Power (DWP) or other serving electric utility for de-energizing, grounding or placing effective barriers or sleeves to prevent physical contact with the lines. The bidder shall also assume all costs for temporary relocation of power lines. In addition, Contractor shall not be responsible for costs incurred by the utility for any permanent relocation of lines to accommodate required clearances from street lighting equipment after construction.

Contractor(s), within 15 days of contract execution, shall be responsible for inspecting all electrolier locations for safety clearance requirements and advising the Inspector/Engineer, in writing, of all locations where safety clearances are required. This information shall be included on the construction schedule.



Requests for safety clearance shall be made to the Superintendent of Streetlight Maintenance (DWP) at (213) 367-9908 at least three weeks in advance of the date the contractor will be working at locations requiring safety clearance services by the utility.

The contractor shall make necessary arrangements with the Dept. of Water and Power at (213) 367-3002 to raise their overhead facilities in order to provide for the clearances specified with any proposed or existing electroliers that is within the contractor's scope of work. The contractor shall make all these arrangements and shall take DWP's timelines into account for their construction schedule.

## **2300 - BACKFILLING, RESTORATION OF EXCAVATIONS, AND REMOVAL OF EQUIPMENT AND MATERIAL**

Subsection 307-2.1 "Excavation and Backfill" of the Standard Specifications for Public Works Construction is modified by the addition of the following:

All excavations for the installation of foundations, conduits and pullboxes, and removal of old systems shall be backfilled, compacted per section 301-1.3 and restored to **match** adjacent areas including sidewalk texture and color. Excess material shall be removed from the jobsite as prescribed in the following Table I. The number of days allowed commences with the start of excavation unless otherwise permitted by the Inspector/Engineer.

**TABLE I**  
**BACKFILLING, RESTORATION OF EXCAVATIONS & REMOVAL OF EQUIPMENT & MATERIAL, MAXIMUM CALENDAR DAYS ALLOWED**

	BACKFILLED & COMPACTED OR COVERED	EXCESS EQUIPMENT AND/OR MATERIAL REMOVAL FROM JOB SITE	PERMANENT RESURFACING	CONCRETE PLACED
1. PARKWAY: PILOT HOLES AND JACKING PITS ①②	Daily	3	7	-
2. ROADWAY EXCAVATIONS ①②③	Daily	3	-	-
3. EXISTING FOUNDATION AND PULLBOX REMOVALS	Daily	3	7	-
4. EXISTING STANDARD (POLES) AND MISC. EQUIPMENT	-	3	-	-
5. NEW FOUNDATION INSTALLATIONS (EXCLUDING CAPS)	-	3	-	-
6. NEW PULLBOXES: EXCAVATION AND PLACEMENT	5	5	7	-

- ❶ Excavation for jacking pits and excavations within roadways shall be backfilled and compacted in accordance with Subsection 301-1.3 of the Standard Specifications for Public Works Construction.
- ❷ Approved protective plates/covers shall be installed at the end of each day until excavations are no longer needed.
- ❸ Temporary asphalt concrete (cold mix) shall be placed immediately after the backfill is compacted in accordance with subsection 306-1.5.1 of the Standard Specifications for Public Works Construction.

The above requirements do not relieve the contractor of his obligation to properly place warning signs and barricades as well as maintain the job site in accordance with Subsections 7-9 and 7-10 of the Standard Specifications for Public Works Construction and the "Work Area Traffic Control Handbook" and/or LADOT Worksite Traffic Control plans.

If the times specified in Table I are exceeded, the contractor (as directed by the Inspector/Engineer) shall stop all other work until the restoration work is brought into compliance. Contract time will continue to be charged during such periods.

## **DIVISION 3**

### **MANUFACTURE OF CONCRETE ELECTROLIER STANDARDS**

#### **3000 - GENERAL**

Concrete electrolier standards (herein referred to as "Standard") shall be pre-stressed, with centrifugally spun exposed aggregate, as detailed on applicable standard drawings, and/or the approved shop drawings, the latest approved edition of the "Standard Specifications for Public Works Construction", the latest approved standard plan "Brown Book", and as specified herein.

All poles shall be labeled or marked in a permanent fashion to indicate manufacturer, month and year of fabrication. This marking shall be located within 2 feet from the bottom of the pole but not on the hand-hole cover.

All screws shall be stainless steel.

#### **3005 – INSPECTION REQUIREMENTS DURING MANUFACTURING**

If pole inspection is required, the following procedures shall be adhered to. The contractor/manufacture is directed to call the Bureau of Contract Administration Dispatcher, (213) 485-5080, two (2) working days in advance of the date that inspection will be required. Standards that are not inspected and approved by a Contract Administration INSPECTOR or by the Street Lighting Engineer will not be acceptable for use on any City of Los Angeles Project.

#### **Inspection of the Work**

- A. Fabrication activity of City of Los Angeles street lighting standards shall occur within normal working hours of the Bureau of Contract Administration, (Monday through Friday, 7:00 AM to 3:30 PM). Any inspection required outside of normal working hours shall require notification seven working days in advance, to arrange inspection. Notification can be made by calling (213) 485-5080.
- B. The work shall be conducted under the general observation of the Inspector and shall be subject to inspection by the Bureau of Contract Administration acting on behalf of the City to ensure strict compliance with the requirements of the Contract Documents, the approved shop drawings, and the approved color and finish samples, as applicable. Such inspection may include mill, plant, shop or field inspection, as required. The Inspector shall be permitted access to all stages of the work, including plants where materials or equipment are manufactured or fabricated.
- C. Inspection and approval of all materials and equipment submitted by the manufacturer is required by the Bureau of Contract Administration acting on behalf of the Bureau of Street Lighting. Mill certifications and test data from approved testing labs may be requested for all materials used.
- D. Inspection at Locations Within 50 Miles (80 Km) from City limits:

When a CONTRACTOR intends to purchase materials, fabricated products, or manufactured equipment from sources located within 50 miles (80 km) of the geographical limits of the City, the CONTRACTOR shall notify the Inspection dispatcher at (213) 485-5080 at least two (2) working days prior to the scheduled date of tests at all stages of manufacture to allow for arrangements specified herein.

- E. Inspection at Locations More than 50 Miles (80 km) from City limits:  
When materials, fabricated products or equipment that are from sources located more than 50 miles (80 km) outside of the geographical limits of the City of Los Angeles, a third party inspector or accredited testing laboratories, approved by the INSPECTOR, shall be engaged by the CONTRACTOR, at the contractor's expense, to inspect the materials, equipment, and/or process.

The third party inspection company shall have been in business with experience in the field of inspection for at least five years and be approved by the Bureau of Contract Administration Materials Control Section. The approval process is initiated by the manufacturer or contractor with a request letter to the Bureau of Contract Administration which includes the following:

- a. Indicate the inspection company to perform the required inspection.
- b. Submit resumes for individual inspectors from the inspection company. It is recommended that at least three inspectors be submitted to allow for scheduling, illness, etc.
- c. Submit a list of the various electroliers to be inspected.

Approval of the third party shall be obtained before producing any material or equipment. Upon Materials Control acceptance of the inspection company and the individual inspectors, the manufacturer will be notified in an approval letter to advise the inspection company to draft an inspection plan for the various types of electroliers that will be inspected. If the inspection plan is acceptable to Materials Control Section of BCA, the manufacturer will be advised to schedule a telephone conference call or face to face prefabrication meeting for the purpose of informing the third party inspection and fabrication quality control personnel of the inspection requirements.

The third party inspector or representative of the testing laboratory shall judge the materials by the requirements of the Plans and Specifications. The approved third party inspector or laboratory shall forward all required reports to the INSPECTOR. No materials or equipment shall be shipped nor shall any processing, fabrication, and/or treatment of such materials, be done without the required inspection and approval by the approved inspection agent.

Approval by said agent shall not relieve the CONTRACTOR of its responsibility to comply with the Contract requirements. The CITY retains the right to perform inspection or testing at such remote sites with CITY personnel in lieu of a third party inspector. In the event that the CITY exercises this right, the CONTRACTOR shall be responsible for all costs associated with this inspection and testing, including the INSPECTOR's wages.

### **Approval of Quality Control Procedure**

Prior to the fabrication of concrete poles, the fabricator shall submit the plant's Quality Control Procedure to the Bureau of Street Lighting and Material Control Section of Contract Administration for review and approval.

Bureau of Street Lighting and/or Bureau of Contract Administration may request periodic visits to monitor Quality Control Department of manufacturer at any time for approval of equipment and/or to allow manufacture to remain on BSL approved manufacturer list.

### **Material and Manufacturer Requirements**

All material shall conform to the provisions of Sections 201-1 and 201-2 of the current edition of the "Standard Specifications for Public Works Construction" Brown Book and its supplement(s) unless otherwise specified.

## **3060 – AGGREGATE FOR CONCRETE**

Approximately equal portions of black and white aggregate graded to produce the required concrete compressive strength and surface appearance shall be used unless otherwise specified. Aggregate shall be free of foreign material which may impair the structural strength or detract from the appearance of the Standard. Material shall be certified to be non-reactive and sound. Contractor/Manufacturer shall submit one sample of aggregate from each source to the Bureau of Street Lighting and Material Control Section of Contract Administration for approval.

## **3070 – CEMENT FOR CONCRETE**

Cement used shall conform to standard specifications for Type I, Type II or Type III Portland Cement, ASTM Designation C-150.

### **Water**

All water shall conform to the provisions set forth in Section 201-1.2.3 of the current edition of the "Standards Specifications for Public Works Construction" Brown Book and its supplement(s).

## **3230 – PRESTRESSED CONCRETE**

The concrete shall exhibit a minimum compressive strength of 3500 P.S.I. (24 Mpa) at time stress is transferred from the steel to the concrete, and 5,000 P.S.I. (34.5 Mpa) at 28 days (6" x 12" cylinder)(152 x 305 mm).

### **A. Steel**

Prestressing steel shall consist of uncoated seven-wire stress relieved strand. The strand shall be mechanically anchored to the base plate or base reinforcing cage depending on type of base supplied.

Standards shall be reinforced with at least four prestressing strands. Unprestressed deformed bars may be used in addition to prestressing strands depending on Standard size and loading of the Standard. The strands shall be pretensioned to develop the design strength of the Standard, but in no case shall the stress in the strand, immediately after transfer, exceed 70 percent of the minimum specified ultimate strength of the strand.

All longitudinal reinforcing shall be spirally wrapped with No. 11 gauge (3.175 mm) or larger steel wire on a variable pitch, dependent upon loading of the Standard. Maximum pitch shall not exceed 6 inches (152.4 mm).

Four galvanized deformed bar studs at least 12" (635 mm) long shall extend a minimum of 2 inches (50.8 mm), but not more than 2-1/2 inches (63.5 mm), above the top of the Standard for attachment of bracket arm or tenon, unless otherwise required by the approved shop drawings.

ASTM Designations:

Prestressing Steel	A 416
Deformed Bar	A615 Grade 60 / A706
Base Plate	A 36
Base Anchor Lugs	A 36

## **B. Manufacture**

All Standards shall be cast in rigid steel molds per approved design. The longitudinal steel reinforcement shall be securely anchored to the top and bottom of mold plates and shall be placed to provide 3/4" (19.04 mm) minimum concrete cover except within 2 feet (60.96 cm) of the Standard top where 5/8" (15.87 mm) minimum concrete cover is acceptable. Concrete shall be placed in mold as rapidly as possible after mixing. When filled, mold shall be placed on spinning machine in a horizontal position and rotated at a gradually increased speed until maximum rotation is attained. Time and speed of rotation shall be sufficient to produce a dense concrete. Excess water and laitance forced to the center of the mass shall be drained in a suitable manner, and the pole shall be respun to provide a smooth hole. A central opening or duct shall be formed throughout the length of the Standard a minimum of 1-1/4" (31.75 mm) in diameter or as shown on the approved shop drawings or as approved by the Bureau of Street Lighting and/or Bureau of Contract Administration. It shall be free from sharp projections, rock pockets or edges of a character which might injure the wire or cable. The base shall be cored to dimensions shown on the approved shop drawings.

## **3370 – CONCRETE CURING**

Curing of Standards shall be in accordance with the phases outlined below:

- A. Mold Cure - Standards shall be cured in their molds until the concrete has attained a set sufficiently hard to prevent deformation or slipping of cable strands.
- B. Curing procedures as described in the currently approved edition of the "Standard Specifications for Public Works Construction", Section 207-2.7 must be followed.

## **3380 – CONCRETE FINISH**

After the Standards have been sufficiently cured, the entire outside surface of the Standards shall be blasted to remove cement laitance and develop the surface texture; care being taken that the true lines of the Standards are maintained. The Standards, when finished, shall be without cracks or crazing, or any discoloration or ridges, and shall have a uniform surface and texture throughout the entire length. The Standards shall have the same color and surface texture as the sample approved by the Bureau of Street Lighting.

### **Approved Sample (Portion of Finished Pole)**

Three sets, showing the range of color, finish and aggregate shall be submitted for approval by the Bureau of Street Lighting. A set will consist of four matching samples. Samples shall be clearly labeled with its mix number. One sample of each set shall be maintained by the following parties:

1. Bureau of Street Lighting - Engineering Efficiency Division
2. Bureau of Street Lighting - Field Operations Division
3. Bureau of Contract Administration - Materials Control Group
4. The Manufacturer

### **Approved Shop Drawings**

Approved shop drawings, as approved by the Bureau of Street Lighting, shall be maintained by the City and the Pole Manufacturer, as follows:

1. Bureau of Street Lighting - Engineering Efficiency Division
2. Bureau of Contract Administration - Materials Control Group
3. Pole Manufacturer

## **3390 – TESTING REQUIREMENTS**

### **Uniform Practice for Acceptance of Concrete Electrolier Standards**

The manufacturer shall furnish test Standards without charge and shall provide adequate equipment and facilities for conducting tests, and shall bear all expense in connection therewith. All testing equipment shall be calibrated by an acceptable testing agency at intervals not to exceed one year.

The Standard cross section shall not deviate more than 3/16" (4.76 mm) from the shape and dimensions shown on the standard drawing. The Standard length shall not deviate more than 1% or 3" (76.2 mm) from dimensions shown on the approved shop drawing, whichever is less.

### **General**

- A. Product Availability - Standards manufactured, which may be used in Los Angeles, shall be available for inspection and testing at the point of manufacture.
- B. Product Identification - The manufacturer shall identify each Standard by lot and day of manufacture in a manner approved by the Engineer/Inspector and shall maintain records indicating concrete composition and other materials used in each lot.

A lot is defined as 100 Standards or less of the same design, bearing proper identification. A new lot number shall be assigned if there is any change in the size, type, or spacing of reinforcing or prestressing steel, concrete mix, or curing method.

- C. Notification of Intent to Manufacture - The Bureau of Contract Administration shall be notified two (2) working days in advance of the beginning of production of Standards which may be used in Los Angeles, at (213) 485-5080.

### **Testing Requirements**

Two levels of testing shall be applied to Standards manufactured for the City of Los Angeles.

**LEVEL 1** Level 1 shall apply to the manufacture of all Standards immediately following approval for use in the City of Los Angeles as well as to the manufacture of Standards (which do not consistently meet specifications), and not on the Bureau of Street Lighting's approved manufactures list. Normally, Level 1 testing will not exceed six months provided Standards manufactured for use in Los Angeles do consistently meet specifications.

**LEVEL 2** Application of Level 2 testing will be at the discretion of the Engineer/Inspector.

- A. Materials - All materials and miscellaneous hardware used in the manufacture of Standards shall be subject to testing by the City prior to use. The frequency of sampling for such testing shall be determined by the Inspector.

The manufacturer shall notify the Inspector in writing at least five working days prior to any contemplated change in sources of raw materials, and shall obtain approval of any changes in sources prior to use in City Standards. The manufacturer shall cooperate with, and assist the Inspector in obtaining samples for testing.

B. Appearance

1. Color and Surface Finish - All Standards manufactured for use in Los Angeles shall be uniform in color and surface appearance consistent with the approved sample as required by Section 3380. Inspection for appearance shall be conducted at the place of manufacture.
2. Surface Defects
  - a) Non-Structural - Surface defects extending less than 5/8" (15.87 mm) into the shell may be repaired without prior approval of the Inspector. The repair must be made by a method that will produce a permanent bond and a surface that blends with the color and surface appearance of the Standard.
  - b) Structural - The manufacturer shall not repair surface defects extending greater than 5/8" (15.87 mm) into the shell without prior inspection by the Inspector. Standards containing voids or insufficient cover over prestressing cables or reinforcing steel will be rejected.

C. Structural Tests

1. Concrete Cylinders - The manufacturer shall take and prepare concrete test cylinders at the direction of and in a manner satisfactory to the Inspector, and bear all expenses in connection therewith. Records of concrete compressive strengths for each lot shall be maintained by the manufacturer in a manner satisfactory to the



Inspector/Engineer. The Inspector/Engineer reserves the right to sample and test concrete for compressive strength. Test results reported by the Engineer shall govern in case of conflict with results reported by the manufacturer.

2. Concrete Cores - When and as directed by the Engineer, core samples shall be taken by the manufacturer to determine the thickness and uniformity of concrete. Such sampling will generally not exceed four per lot. The manufacturer shall bear all expenses in connection therewith.
3. Straightness - At a frequency determined by the Engineer, Standards will be tested for straightness. Standards shall be sufficiently straight when in a vertical position such that the maximum deviation from a string line on the face of the Standard in a plane passing through the longitudinal axis shall not exceed the tolerance listed in Table II. At the discretion of the Inspector/Engineer, such tests may be conducted at the place of manufacture, or at the project site following erection.
4. Design Working Load
  - (1) Selection - Standards to be tested at the point of manufacture will be selected at random in accordance with Table II herein.
  - (2) Bending - The test specimen shall have a load applied equal to design working load for a period of one hour. Any test specimen with any crack while under load will be rejected.
  - (3) Permanent Deformation - Standards shall be loaded to 1.7 times the design working load, deflection of the top of the Standard recorded, and the load released after one hour. Evident residual cracking or spalling after release of the load, or failure to recover at least 90% of the maximum deflection under load (measured immediately after release of the load) shall be cause for rejection.
    - a. Ultimate Strength
      - (1) Selection - Standard to be tested at the point of manufacture will be selected at random in accordance with Table II herein.
      - (2) Loading - The specimen shall be loaded to failure and all required data recorded. The manufacturer shall conduct the test and the inspector shall witness and record the results.
      - (3) Cross-Sections - Cross-sections shall be taken at third points on specimens loaded to failure in the loading test. Steel placement, concrete density, and corrosion control not within tolerances specified on shop fabrication drawings or in the specifications shall be cause for rejection. The three specimens taken at third points and the report shall be delivered to the Bureau of Street Lighting, Field Operations Division, via the CITY INSPECTOR.

## **Acceptance Standard**

- A. Acceptance - If the tested specimen of a designated lot meets all test requirements, all of the Standards of that lot shall be considered as complying with the requirements.
- B. Rejection - In the event of failure to meet all test requirements, two additional specimens from the lot shall be tested. Both of these specimens shall meet the test requirement, otherwise the entire lot shall be rejected. The manufacturer may submit individual Standards from a rejected lot for testing. Those Standards which meet the requirements of the tests specified by the Engineer will be accepted.
- C. Identification of Standards - The CITY INSPECTOR will mark the base as follows:
1. The Lot Number and the Sequence Number within the Lot (L.A.P. No.) with a black felt pen.
  2. On all Standards that are in compliance with Shop Drawings and Table II and Table III shall be stamped with the words "L.A. City Approved" with black ink.

Testing levels are established as shown in Table II, as follows:

**TABLE II  
TESTING REQUIREMENTS**

TEST	TESTING LEVELS	
	Level 1	Level 2
Materials	D	D
Appearance		
1. Color and Surface	D	D
2. Structural Defects	All	All
Concrete Cylinders	D	D
Concrete Cores	D Maximum of 4 per lot	D Maximum of 4 per lot
Straightness	Table 3	Table 3
Design Working Load (for each style of standard)	One test per lot	One test every six months
Ultimate Strength (for each style of standard)	One test per each 300 standards (or portion thereof if less than 300 per year).	One test per year of standards exceeding 500 or "D" if less than 500 standards.

D = At the discretion of the Engineer/Inspector

**TABLE III**  
**STRAIGHTNESS REQUIREMENTS**

A. BOW OR CURVATURE

Length of Standard Excluding Base (Feet) (cm)		MAXIMUM ALLOWABLE DEVIATION FROM STRINGLINE
Over	Equal to or Under	
--	21 (640 cm)	1/2" (12.7 mm)
21 (640 cm)	26 (792 cm)	3/4" (19.04 mm)
26 (792 cm)	35 (1067 cm)	1" (25.40 mm)
35 (1067 cm)	40 (1219 cm)	1-1/4" (31.75 mm)
40 (1219 cm)	---	As Specified by Engineer

B. MISALIGNMENT

Short crooks in the Standard shall not exceed 1/4" (6.35 mm) deviation from centerline of the Standard per 5 feet (152.4 cm) of length.

C. UNIFORMITY OF SURFACE

Offsets or jogs due to mold extensions or joints shall not exceed 1/16" (1.587 mm) on the surface of the Standard.

## **DIVISION 5**

### **MANUFACTURE OF STEEL / ALUMINUM ELECTROLIER STANDARDS**

#### **5000 - GENERAL**

Electrolier standards (herein referred to as "Standard") shall be fabricated with, dimensions materials, welding, and finish in accordance with the approved shop drawings, the latest approved edition of the "Standard Specifications for Public Works Construction", the latest approved standard plan "Brown Book", and as specified herein.

The Standard cross section shall not deviate more than 3/16" (4.76 mm) from the shape and dimensions shown on the standard drawing. The Standard length shall not deviate more than 1% or 3" (76.2 mm) from dimensions shown on the approved shop drawing, whichever is less.

If the project is part of a construction and bid document, the contractor shall be responsible for all submittals and all costs.

All screws shall be stainless steel.

All poles shall be labeled or marked in a permanent fashion to indicate manufacturer and month and year of fabrication within 2 feet from the bottom of the pole. This marking shall not be on the hand hole.

#### **5005.1 - METAL POLE EQUIPMENT APPROVAL PROCEDURES**

All street lighting metal poles installed within the City of Los Angeles must be approved by the Bureau of Street Lighting by one of the following procedures.

Manufacturers are required to obtain approval for:

1. New street lighting pole designs.
2. "Or Equal" metal pole submittals. (Submittal must have interchangeable parts with unit specified on the plan)
3. Metal poles with approved Bureau of Street Lighting Standard Plans.

Manufacturers who are approved by the Bureau of Street Lighting for a specific pole type shall be exempt from steps 2 and 3 below.

#### **APPROVAL PROCEDURES:**

1. (Not required for poles with approved Bureau of Street Lighting Standard Plans)  
Contractor/Manufacturer shall submit Shop Drawings and Structural Calculations as specified on the plans. Shop drawings and calculations shall be stamped by a registered Structural or Civil Engineer licensed by the State of California. Drawings shall include but not be limited to the following: material specifications, manufacturing processes, finish coating specifications, pole dimensions, welding and connection details, catalog and shop drawing numbers with revision notes. The shop drawings should also state that the pole

structure and hardware comply with the “specifications for structural supports of highway signs, luminaires and traffic signals” portion of AASHTO 1994 and that all welds are in accordance with the latest editions of the AWS D1.1 welding code. Forward documents to City of Los Angeles Bureau of Street Lighting – 2<sup>nd</sup> Floor, Technical Services Division, 1149 South Broadway, LA CA 90015. Written notification of approval or required changes will be sent within 30 days after documents are received.

2. Contractor/Manufacturer shall submit pole “Proto-Type.” One complete electrolier, including luminaire arm and anchor bolts shall be submitted to the Bureau of Street Lighting Field Operations Division at 4550 Santa Monica Boulevard, Los Angeles, CA 90029. Notify the engineer 10 days prior to delivery at (213) 847-6383. All deliveries to F.O.D. shall be labeled with pole type (design number or reference number), project title, paint color (if any). F.O.D. shall be notified 48 hours prior to delivery (323) 913-4717. Written notification of approval or required changes will be sent within 30 days after pole is received. Pole inspection by the Bureau of Contract Administration may be required.
3. Pole inspection shall be in compliance with all specifications herein.

#### NON-COMPLIANCE

The manufacturer shall be responsible for submitting required items as outlined in the above procedures. Failure to complete each step will result in one of the following:

1. Notification to repeat the required procedure step.
2. Disapproval of the proposed equipment.
3. Notification of manufacturer non-compliance, prohibiting manufacturing of product(s) for the City of Los Angeles.

The Bureau of Street Lighting has the right to request adherence to steps 1, 2 and 3 for any pole on the approved manufacture list at any time.

### **5005.2 – INSPECTION REQUIREMENTS DURING MANUFACTURE**

If pole inspection is required per 5005.1, the following procedures shall be adhered to.

The contractor/manufacture shall call the Bureau of Contract Administration Dispatcher, (213) 485-5080, two (2) working days in advance of the date that inspection will be required unless otherwise specified. Standards that are not inspected and approved by a Contract Administration INSPECTOR or by the Bureau of Street Lighting Engineer will not be acceptable for use on any City of Los Angeles Project.

#### **Inspection of the Work**

- A. Fabrication activity of City of Los Angeles street lighting standards shall occur within normal working hours of the Bureau of Contract Administration, (Monday through Friday, 7:00 AM to 3:30 PM). Any inspection required outside of normal working hours shall require notification seven working days in advance, to arrange inspection. Notification can be made by calling (213) 485-5080.

- B. The work shall be subject to inspection by the Bureau of Contract Administration acting on behalf of the City to ensure strict compliance with the requirements of the Contract Documents, the approved shop drawings, and the approved color and finish samples, as applicable. Such inspection may include mill, plant, shop or field inspection, as required. The Inspector shall be permitted access to all parts of the work, including plants where materials or equipment are manufactured or fabricated.
- C. Inspection and approval of all materials and equipment submitted by the manufacturer is required by the Bureau of Contract Administration and the Bureau of Street Lighting. Mill certifications and test data from approved testing labs may be requested for all materials used.
- D. Inspection at Locations Within 50 Miles (80 Km) from City:

When the CONTRACTOR intends to purchase materials, fabricated products, or manufactured equipment from sources located within 50 miles (80 km) of the geographical limits of the City, the CONTRACTOR shall notify the Inspection dispatcher at (213) 485-5080 at least two (2) working days prior to the scheduled date of tests at all stages of manufacture to allow for arrangements specified herein.

- E. Inspection at Locations More than 50 Miles (80 Km) from City:

When materials, fabricated products or equipment that are from sources located more than 50 miles (80 km) outside of the geographical limits of the City of Los Angeles, two third party inspectors or accredited testing laboratories, approved by the INSPECTOR, shall be engaged by the CONTRACTOR, at the contractor's expense, to inspect the materials, equipment, and/or process.

The third party inspection company shall have been in business with experience in the field of inspection for at least five years and be approved by the Bureau of Contract Administration Materials Control Section. The approval process, is initiated by the manufacturer or contractor with a request letter to the Bureau of Contract Administration which includes the following:

- a. Indicate the inspection company to perform the required inspection.
- b. Submit resumes for individual inspectors from the inspection company. It is recommended that at least three inspectors be submitted to allow for scheduling, illness, etc.
- c. Submit a list of the various electroliers to be inspected.

Approval of the third party shall be obtained before producing any material or equipment. Upon Materials Control acceptance of the inspection company and the individual inspectors, the manufacturer will be notified in an approval letter to advise the inspection company to draft an inspection plan for the various types of electroliers that will be inspected. If the inspection plan is acceptable to Materials Control Section of BCA, the manufacturer will be advised to schedule a telephone conference call or face to face prefabrication meeting for the purpose of informing the third party inspection and fabrication quality control personnel of the inspection requirements.

The third party inspector or representative of the testing laboratory shall judge the materials by the requirements of the Plans and Specifications. The approved third

party inspector or laboratory shall forward all required reports to the INSPECTOR. No materials or equipment shall be shipped nor shall any processing, fabrication, and/or treatment of such materials, be done without the required inspection and approval by the approved inspection agent.

Approval by said agent shall not relieve the CONTRACTOR of its responsibility to comply with the Contract requirements. The CITY retains the right to perform inspection or testing at such remote sites with CITY personnel in lieu of a third party inspector. In the event that the CITY exercises this right, the CONTRACTOR shall be responsible for all costs associated with this inspection and testing, including the INSPECTOR's wages.

### **Approval of Quality Control Procedure**

Prior to the fabrication of steel poles, the Pole Manufacturer shall submit the plant's Quality Control Procedure to the Bureau of Street Lighting and Material Control Section of Contract Administration for review and approval.

Bureau of Street Lighting and/or Bureau of Contract Administration may request periodic visits to monitor Quality Control Department of manufacture at any time for approval of equipment and or to allow manufacture to remain on BSL approved manufacture list.

## **5010 – MATERIAL AND FABRICATION REQUIREMENTS**

All material and fabrication shall conform to the approved shop drawings and also be in compliance with the contents of this provision.

### **5010.1 – STEEL GENERAL REQUIREMENTS**

Steel used shall conform to the following ASTM designations:

Shaft (sheet steel)	<u>A..... (min. 40,000 psi)</u> <u>A570 Grade C (50 - 80,000 psi range)</u> <u>A611 Grade C (65 - 90,000 psi range)</u>
Base Plate	A36 (slot tolerances shall be 0" to +1/8")
Castings	A27 Grade 65-35
Luminaire Arm	A53 Grade B or A120 (standard pipe)
Bolts	A449
Base Anchor Lugs	

## **5010.2 – ALUMINUM GENERAL REQUIREMENTS**

Aluminum used shall conform to the following ASTM designations:

Shaft (aluminum)	B209M
Castings	B26/B26M
Luminaire Arm	B429-90a
Spun Shaft	B241/B241M
Square Extruded Shaft	B429

## **5030.1 - METAL FINISHING (GALVANIZING/PAINTING)**

### **Galvanizing**

Steel poles shall be galvanized in conformance with section 210-3 of the Standard Specifications for Public Works Construction. The contractor must exercise proper caution after galvanizing, during transportation and storage to protect against wet storage staining.

### **Painting (New pole)**

For painting of existing poles, please refer to Section 5600.

All steel poles requiring painting shall be hot-dip galvanized in conformance with section 210-3 and then painted in conformance with section 310-1 through 310-5.3 of the Standard Specifications for Public Works Construction as applicable. Painted poles shall be free of bubbles

### **Painting Requirements**

All painting shall be accomplished using a two-part epoxy / polyurethane system consisting of equivalent High solids epoxy primer and **"SPECIFIED COLOR"** Polyurethane top coat (or approved equal). Coating system used must meet a minimum level of testing criteria. The testing criteria are as follows:

- Abrasion: < 60.5 mg after 1000 cycles (per ASTM D4060)
- Accelerated Weathering: No blistering, cracking or delamination. 72% gloss retention after 4 weeks of exposure (per ASTM G53 4/8 cycle)
- Adhesion: Rated 5B (per ASTM D3359 Method B)
- Humidity (Cleveland): No blistering, cracking or delamination of film (per ASTM D2247 at 1000 hours of exposure).
- Salt Fog Exposure: No face corrosion, face blistering or loss of adhesion. Less than 1/16" creepage from scribe (per ASTM B 117 at 2000 hours exposure.)
- Impact Resistance: Direct – 140 in-lbs, Reverse – 50 in-lbs (per ASTM D2794)
- VOC compliant
- Paint Thickness: Minimum topcoat thickness of 3 MILS DFT (Dry Film Thickness), Minimum primer thickness of 3 MILS DFT.

All coatings must be submitted to the BSL for approval. Evidence of compliance to the outlined criteria will be necessary and must be submitted after award of contract and prior to beginning work.



Specifications shall include the name of the manufacturer, brand, catalog/product number(s), ASTM Test results and other information sufficient to show that the coating system meets or exceeds the requirements. Call 213 847-6383 for additional paint information.

Paint materials shall meet VOC requirements of the South Coast Air Quality Management District's Rule 1113.

Surface preparation for painting shall conform to the requirements of Standards Specifications for Public Works Construction, 2000 Edition (or latest), Section 310 Painting.

Paint shall be applied according to the manufacture's application procedures. The painted surfaces shall be free from irregularities such as "RUNS" and "SAGS".

The standard of measurement for minimum thickness shall be any 4 square inch area on a flat surface.

Brush or roller may be used for touch up only. The painter shall supply a touch-up-kit composed of both primer and top coat for field touch up.

#### Approved Samples

Three approved paint samples will be provided by BSL during the preconstruction meeting. One shall be for the contractor, inspector and manufacturer. Additional samples will be provided upon request.

### **5030.2 – ALUMINUM FINISHING, SURFACE TREATMENT, (ANODIZING /DURANODIC)**

#### Reference Specifications and Standards:

The anodic finish coatings specified herein are identified by the Aluminum Association Designation System for Aluminum Finishes which utilizes designation numbers preceded by the letters "AA". All cleaning, preparing anodizing and sealing of aluminum items shall conform to the requirements of the Aluminum Association Standards for Anodized Architectural Aluminum, Class I Anodic Coating, and these Specifications.

#### Anodizing Processes

##### General:

- A. Aluminum components shall not be anodized until all forming and fabricating operations, including welding, have been completed.
- B. The interior of tubular sections need not be anodized.
- C. The contractor shall protect the anodized finish on the aluminum components from any damage through all erection operations to the final acceptance of the work.
- D. Upon completion of installation, all protective coverings shall be removed from the anodized aluminum components and all exposed surfaces shall be thoroughly cleaned and left free from scratches, water stains or any other blemish.
- E. Prior to final acceptance of the work, the Contractor shall remove and replace all anodized aluminum components that might have become damaged by any cause or that do not conform to the limitations of the process control color samples. Replacement components acceptable to the Engineer shall be provided by the Contractor at no extra cost to the City.

## Requirements:

### A. Finish Designations

1. Type I Finish shall be Aluminum Association designation AA-M10c21-A41 clear color.
2. The minimum coating thickness shall be 0.7 mils measured according to ASTM B 244-68.
3. The minimum coating weight shall be 32 mg/sq. in. measured according to ASTM B 137-45 (1967).
4. The coating seal shall be tested according to ASTM B 136-72 (Dye Stain Test).
5. Color variations of anodized aluminum components shall be limited to the range established by the approved process control samples. Components shall be subject to visual comparison during production finishing and at the time of final acceptance of the work. Each component shall be marked for field installation so as to minimize color variation of adjacent components in the same plane.
6. One sample from each rack of production lots of finished components shall be tested for thickness and seal. One sample from each production shift shall be tested for weight.

- B. Anodic coatings shall conform to military Specified Designation MIL-A-8625-C, Type III, Class I. Coating thickness shall be .002 +/- .0002, unless otherwise specified.

### Approved Samples

Three approved paint samples will be provided by BSL during the preconstruction meeting. One shall be for the contractor, inspector and manufacturer. Additional samples will be provided upon request.

## **5050.1 – STEEL SHOP WELDING**

AWS D1.1 shall govern all steel welding. Welding and related operations shall conform to applicable provisions of the Structural Welding Code, AWS D1.1, of the American Welding Society. All welding shall be performed in accordance with the written procedures using only those joint details which have pre-qualified status when performed in accordance with AWS D1.1. Use of electroslag or electrogas welding processes or the short circuiting transfer mode of the gas metal arc process will not be acceptable.

Welding shall be performed only by welders or operators who have been qualified in accordance with AWS D1.1. The qualification test records shall be made available to the inspector on request.

### **BUTT – WELDING OF SECTIONS**

When sections are butt-welded together, the welded seams on adjacent sections shall be placed to form continuous straight seams from base to top of standard in accordance with this section.

The butt-welded transverse joints shall be strengthened by inserting a welded sleeve at each joint. The sleeve shall be 0.135 inch (3.429 mm) nominal thickness or thicker steel having the same chemical composition as the steel in the standard. The sleeve shall have a minimum length of one inch. The sleeve shall be centered at the joint and have the same taper as the standard so that the outside of the sleeve is in full contact throughout its length and circumference.

All welds shall be continuous. The weld metal at the transverse joint shall extend to the sleeve, making the sleeve an integral part of the joint. No transverse weld shall occur within three inches of mast arm fittings. All longitudinal welds shall be performed by the submerged arc process and tested in accordance with Test Method No. California 664. All exposed welds, except fillet welds and welds on top of mast arms shall be ground flush with the base metal.

## **5050.2 – ALUMINUM SHOP WELDING**

AWS D1.2 shall govern all aluminum welding. Welding and related operations shall conform to applicable provisions of the Structural Welding Code, AWS D1.2, of the American Welding Society. All welding shall be performed in accordance with the written procedures, using only those joint details which have been qualified in accordance with AWS D1.2.

Welding shall be performed only by welders or operators who have been qualified in accordance with AWS D1.2. The qualification test records shall be made available to the inspector on request.

## **5500.1 – STEEL FABRICATION**

### **STANDARDS**

Standards shall be fabricated from full length sheets, or from sections not to exceed two in number for standards exceeding 30-foot (9.15 m) in length. Steel pole shafts shall be fabricated as shown in the Standard Plans and the following requirements:

All pole shafts less than 32 feet in length and all luminaire arms less than or equal to 8 feet in length, shall be fabricated from sheet steel conforming to ASTM A570, Grade C, or from 0.120-inch (3.048 mm), or thicker sheet steel of weldable grade having a minimum yield strength of 50 – 80,000 psi after fabrication.

All pole shafts exceeding 32 feet in length and all luminaire arms exceeding 8 foot in length shall be fabricated using grades of steel as required by engineering calculations and the approved shop drawings. See section 5050.1 for Butt Welding of Sections.

Other components shall be of steel conforming to the ASTM requirements listed in Section 5010.1.

Small voids (those no larger or deeper and 0.125") may be repaired using foundry putty, automotive body filler or an approved equal. Voids on edges, corners and decorative designs shall be ground smooth to maintain the original design surface.

Standards shall be straight, with a permissive variation not to exceed those listed in Table V, Straightness Requirements (pg. 30). A maximum static deflection of 4 inches (10.16 cm), without wind load, will be permitted for standards and shall be measured with all signal heads, mast arms, street name signs and luminaires in place.

### **BASE PLATES**

All exposed edges of the plates which make up the base assembly shall be finished smooth, and all exposed corners of such plates shall be neatly rounded to 1/8-inch (3.175 mm) minimum radius. Tolerances for slots on the base plates of steel poles shall be from 0" to +1/8".

### **BOLTS AND WASHERS**

Bolts - High-strength bolts, nuts and flat washers used to connect base plates shall conform to ASTM Designation: A 325 and shall be galvanized as specified in section 210-3 of the Standard Specifications for Public Works Construction.

Plate washers shall be fabricated by saw cutting and drilling steel plate conforming to ANSI Designation: 1018, and be galvanized as specified in section 210-3 of the Standard Specifications for Public Works Construction. Prior to galvanizing, all burrs and sharp edges shall be removed and holes shall be chamfered sufficiently on each side to allow the bolt head to make full contact with the washer without tension on the bolt.

High-strength cap screws shown on the plans for attaching luminaire arms to standards shall conform to ASTM Designation: A 325 or ASTM Designation: A 449 and shall comply with the mechanical requirements of ASTM Designation: A 325 after galvanizing. Said cap screws shall be galvanized as specified in section 210-3 of the Standard Specifications for Public Works Construction. The threads of the cap screws shall be coated with a lubricant which is clean and dry to the touch.

The galvanized faying surfaces of the connections between signal or lighting mast arms and poles shall be free of surface imperfections, such as lumps, runs, and scum, which would prevent intimate, uniform contact between the faying surfaces.

## **5500.2 – ALUMINUM FABRICATION**

All material for standards shall be supplied in the mill finish and shall be uniform and commercially sound as described by ASTM B 209M. All poles shall be labeled to indicate manufacturer.

## **5590 – TESTING REQUIREMENTS**

### **Uniform Practice for Acceptance of Steel Electrolier Standards**

When Inspection is required the following testing requirement shall be adhered to.

General - The contractor/manufacturer shall furnish test Standards without charge and shall provide adequate equipment and facilities for conducting tests, and shall bear all expense in connection therewith. All testing equipment shall be calibrated by an acceptable testing agency at intervals not to exceed one year.

All samples for testing shall be selected by the Inspector unless otherwise arranged.

## General

- A. Product Availability - Standards manufactured, which may be used in Los Angeles, shall be available for inspection and testing.
- B. Product Certification and Test - The CONTRACTOR shall supply mill certificates or affidavits and manufactures' certification for verification of steel materials. Steel shall be identified by heat or melt number. The CONTRACTOR shall provide notification and supply necessary reports at least two working days in advance of domestic fabrication and ten working days in advance of foreign fabrication, so that a shop inspection of the steel can be made. The CONTRACTOR shall provide the following testing and certification for each type of steel:
  - 1. Mill Order Steel. When steel is directly from the steel mill and is readily identifiable by heat and melt numbers, the CONTRACTOR shall furnish mill certificates.
  - 2. Local Stock Steel. When steel is from a steel service center and can be identified by heat or melt numbers, the CONTRACTOR shall provide mill certificates and one tension and one bend test for each 50 tons or fractional part thereof for each size of steel used in the work.
  - 3. Unidentifiable Steel. When steel cannot be identified by heat or melt numbers or the source of steel is questionable, the CONTRACTOR shall provide one tension and one bend test for each 5 tons or fractional part thereof for each size of steel used in the work.

Identification test specimens shall be taken under the direction of the City of Los Angeles INSPECTOR or approved third party inspector, and shall be machined by the CONTRACTOR to dimensions as required by the related ASTM Specifications. These tests shall be in addition to the normal testing required under this specification, and all costs for same shall be borne by the CONTRACTOR.

## Testing Requirements

Two levels of testing shall be applied to Standards manufactured for the City of Los Angeles.

Level 1 shall apply to the manufacture of all Standards immediately following approval for use in the City of Los Angeles as well as to the manufacture of Standards (which do not consistently meet specifications) and not on the Bureau of Street Lighting's approved manufactures list. Normally, Level 1 testing will not exceed six months provided Standards manufactured for use in Los Angeles do consistently meet specifications.

Application of Level 2 testing will be at the discretion of the Engineer. Testing levels are established as shown in Table IV.

- A. Materials - All materials and miscellaneous hardware used in the manufacture of standards shall be subject to testing by the City prior to use. The frequency of sampling for such testing shall be determined by the Engineer.
- B. Casting - One casting from each lot of 50 castings or less shall be subject to radiographic inspection, in accordance with provisions in ASTM Designation: E 94. The castings shall comply with the acceptance criteria severity level 3 or better for all types and categories of discontinuities as specified in ASTM Designations: E 186 and E 445. If the one casting fails to pass the inspection, 2 additional castings shall be radiographed. Both of these

castings shall pass the inspection or the entire lot of 50 will be rejected. Material certifications consisting of physical and chemical properties and radiographic films of the castings shall be filed at the manufacturer's office. These certifications and films shall be available for inspection upon request.

C. Surface Defects

D. Structural Tests

1. Tensile Strength - The manufacturer shall take and prepare samples at the direction of and in a manner satisfactory to the Inspector/Engineer, and bear all expenses in connection therewith. Records of tensile strengths for each lot shall be maintained by the manufacturer in a manner satisfactory to the Inspector/Engineer. The Inspector/Engineer reserves the right to sample and test steel for tensile strength. Test results reported by the Engineer shall govern in case of conflict with results reported by the manufacturer.

2. Straightness - At a frequency determined by the Inspector/Engineer, Standards will be tested for straightness. Standards shall be sufficiently straight when in vertical position such that the maximum deviation from a string line on the face of the Standard in a plane passing through the longitudinal axis shall not exceed the tolerance listed in Table V. At the discretion of the Inspector/Engineer, such tests may be conducted at the place of manufacture, or at the project site following erection.

3. Standards

a. Design Working Load

Selection - Standards to be tested at the point of manufacture will be selected at random in accordance with Table IV herein.

(1) Bending - The test specimen shall have a load applied equal to design working load for a period of one hour. Any test specimen with any crack while under load will be rejected.

(2) Permanent Deformation - Standards shall be loaded to 1.7 times the design working load, deflection of the top of the Standard recorded, and the load released after one hour. Evident residual cracking or permanent deformation after release of the load, or failure to recover at least 90% of the maximum deflection under load (measured immediately after release of the load) shall be cause for rejection.

b. Ultimate Strength

Selection - Standard to be tested at the point of manufacture will be selected at random in accordance with Table IV herein.

(1) Loading - The specimen shall be loaded to failure and all required data recorded. The manufacturer shall conduct the test and the inspector shall witness and record the results.

- (2) Cross-Sections - Cross-sections shall be taken at third points on specimens loaded to failure in the loading test. Steel thickness, and galvanizing or painting not within tolerances specified on shop fabrication drawings or in the specifications shall be cause for rejection. The three specimens taken at third points and the report shall be delivered to the Bureau of Street Lighting, Field Operations Division, via the CITY INSPECTOR.

### Acceptance Standard

- A. Acceptance - If the tested specimen of a designated lot meets all test requirements, all of the Standards of that lot shall be considered as complying with the requirements.
- B. Rejection - In the event of failure to meet all test requirements, two additional specimens from the lot shall be tested. Both of these specimens shall meet the test requirement otherwise the entire lot shall be rejected. The manufacturer may submit individual Standards from a rejected lot for testing. Those Standards which meet the requirements of the tests specified by the Inspector/Engineer will be accepted.
- C. Identification of Standards - The CITY INSPECTOR will mark the base as follows:
  1. The Lot Number and the Sequence Number within the Lot (L.A.P. No.) with a black felt pen.
  2. On all Standards that are in compliance with Shop Drawings and Table IV and Table V shall be stamped with the words "L.A. City Approved" with black ink.

**TABLE IV  
TESTING REQUIREMENTS**

TEST	TESTING LEVELS	
	Level 1	Level 2
Materials	D	D
Casting	One casting from each lot of 50	D
Tensile Strength	D	D
Straightness	D	D
Design Working Load (for each style of standard)	One test per lot	One test every six months
Ultimate Strength (for each style of standard)	One test per each 300 standards (or portion thereof if less than 300 per year).	One test per year

D = At the discretion of the Inspector/Engineer.

**TABLE V  
STRAIGHTNESS REQUIREMENTS**

**A. BOW OR CURVATURE**

Length of Standard Excluding Base, in Feet (cm)		MAXIMUM ALLOWABLE DEVIATION FROM STRINGLINE
Over	Equal to or Under	
--	21 (640 cm)	1/2" (12.7 mm)
21 (640 cm)	26 (792 cm)	3/4" (19.04 mm)
26 (792 cm)	35 (1067 cm)	1" (25.40 mm)
35 (1067 cm)	40 (1219 cm)	1-1/4" (31.75 mm)
40 (1219 cm)	--	As Specified by Engineer

**B. MISALIGNMENT**

Short crooks in the Standard shall not exceed 1/4" (6.35 mm) deviation from centerline of the Standard per 5 feet (152.4 cm) of length.

**C. UNIFORMITY OF SURFACE**

Offsets or jogs due to joints shall not exceed 1/16" (1.587 mm) on the surface of the Standard.

**5600 – STEEL ELECTROLIER RESTORATION**



The pole and all other previously painted metal surfaces shall be prepared for painting in conformance with the requirements of Standard Specifications for Public Works Construction (latest edition) Section 310-2.5 Blast cleaning method.

If the electroliers need to be removed, the contractor shall provide alternate roadway lighting during the removal, surface preparation and painting of the pole in accordance to General Note NO. 5 on the street lighting plan front sheet and Section 16510 of this document.

The contractor is hereby notified that paint scrapings may contain lead. All local State and Federal laws must be adhered to in the removal and disposal of lead paint.

Painting of existing galvanized streetlights

Existing galvanized streetlights must have proper surface preparation to avoid future peeling of applied paint. This preparation shall include etching the existing streetlights. This may be done by hand sanding the poles or other BSL approved method. After completion of that process the entire surface shall be solvent cleaned to remove any grease, wax, stickers, tape, remaining stabilizers or other surface contaminants. Luminaires shall remain galvanized unless otherwise specified.

Paint shall be applied in accordance to the manufacture's application instructions and Section 5030.1 of this document.

- A. All surfaces shall be stripped to manufactures recommendations. All surface preparation shall conform to the Standard Specifications for Public Works Construction, "Greenbook", (SSPWC Section 310-2.2 and 310-2.3) and coating manufacturer's data, (which the Contractor must retain at each job-site), unless otherwise specified by the Construction Inspector and approved by the Bureau of Street Lighting. ***The Contractor's bid should be based on this level of surface preparation.***

The Contractor is advised that the level of surface preparation may vary (as approved by the Inspector) depending on pole/pedestal condition. Extreme corrosion may require Power Tool Cleaning (per section 310-2.4 of the Greenbook) and/or Blast Cleaning (per section 310-2.5 of the Greenbook).

Spot priming of bare substrate may be necessary in some cases. This shall be accomplished by using a two-part epoxy/polyurethane system consisting of equivalent High Solids epoxy primer and "SPECIFIED COLOR" Polyurethane top coat (or approved equal. See Section 5030.1.

- B. Coatings shall be applied only to clean, dry, and properly prepared (per manufacturers data) electroliers. All loose paint, concrete, dirt, oil, grease, posters, and handbills shall be removed. Minor cleanup, removal, and disposal of incidental bush and tree trimmings and debris may also be necessary and should be considered when preparing a bid.

Whether spraying, brushing, rolling, or preparing the surface, the contractor shall be responsible for protecting all property and persons during the painting process. Refer to section 310-1.1 of the Greenbook regarding Weather Conditions. No painting shall be done in rain, fog, when precipitation is imminent or when the temperature is below 45°F or above 100°F including surface temperatures. All glassware shall be masked before

applying paint to the electrolier. The base of the electrolier shall be masked to prevent runs and drips to the sidewalk.

Workmanship: Coating shall be applied in thickness' not to exceed manufacturers printed instructions. All coats shall be evenly spread and free of defects. All coats shall have no ridges, sags, variations in texture, color, or finish. Any finish showing dust, deposits, or impurities shall be removed and/or refinished.

- C. Any broken, cracked, punctured or indented electrolier parts, cast iron and/or copper shaft, shall be either filled with a pre-approved material similar to the product called Dyna-Glass (Dynatron product manufactured by BONDO Corporation) or welded and ground to a smooth finish to the satisfaction of the City Inspector. Thirty (30) days prior to the start of construction, the Contractor shall submit for approval by the Director of the Bureau of Street Lighting a sample of the proposed filler material with its specifications.

All exterior surfaces shall be primed and painted in accordance with Section 310-5.1 of the latest Edition of the Standard Specifications for Public Works Construction, and any special specifications of the project.

When refurbishing, the Contractor shall arrange to have one prototype electrolier, completely modified, assembled and refurbished, ready for inspection and approval by BSL engineering staff before completing work on the remaining electroliers.

#### 1. Miscellaneous Reporting

The Contractor shall notify the project manager and/or the construction engineer in writing (1149 South Broadway, Suite 200, LA CA 90015, 213-847-1300) of any electrolier or pedestal which is in a state of disrepair or hazardous condition. Repairs and hazardous conditions must be corrected prior to starting any painting on the equipment in question. A state of disrepair or hazardous condition shall include, but not be limited to, the following:

- (1) Electrolier(s) missing base covers.
- (2) Broken glassware.
- (3) Missing Glassware.
- (4) Leaning electrolier(s).
- (5) Electrolier(s) loose at the base.
- (6) Overhead conductor wire(s) resting on electrolier.
- (7) Overhead conductor wire(s) within 10 feet of electrolier.
- (8) Electrolier(s) on during daylight hours.
- (9) Broken, bad order or missing handhole/access covers.

##### a. Banners

Poles that have been specified to be painted and have banners installed on them shall be identified prior to painting by the contractor. No poles are to be painted prior to banner removal; banner removal will be performed by the banner company. To coordinate banner removals please call Bureau of Street Services at 213 473-4502.

##### b. Traffic and Parking Signs

In those instances where the level of Surface Preparation requires temporary removal of traffic and/or parking signs, the Contractor shall contact the Department of Transportation. The Contractor may be required to provide temporary traffic and/or parking signs at these locations. If the required level of Surface Preparation can be attained without removal of traffic and/or parking signs, the Contractor shall mask all signs to prevent any overspray.

c. Inspection

The Bureau of Contract Administration will perform inspection of Contractor work. The assigned Inspector will ensure that the label information on the paint container matches the paint that has been specified in these Special Specifications. The Contractor will also be required to inform the Inspector whenever a new paint container is being opened so that the Inspector can verify the paint type. Paint from unlabeled cans and batched or thinned paint that has not been identified cannot be used.

The Inspector will verify the actual number of poles/pedestals that have been painted.

If the Contractor ceases pole painting for more than 24 hours, the Inspector must be informed 24 hours prior to resuming pole painting activities. The Contractor shall call the Metropolitan Dispatcher at (213) 485-5080, Valley Dispatch at (818) 756-8355 before 12:00 noon the day before inspection will be required.

The Contractor must get approval from the Inspector for the Surface Preparation. No coating shall be applied until this approval is granted.

Any incidental damage to the finish coating shall be field repaired. The repair method shall be in accordance with manufacturer's published recommendations. Acceptability of the repair shall consider corrosion protection and aesthetics.

The field inspector is responsible for approving the repair procedures and final acceptance of the work. Significant amount of coating damage, either in size of areas or quantity of areas, shall, at the discretion of the field inspector, require a second blasting and coating to the original specifications contained herein.

d. Damage to City Street Lighting Equipment

- 1) All costs for replacing parts and/or repairing damages attributed to the Contractor while removing, installing, refurbishing or handling any street lighting equipment shall be born by the Contractor. Any street lighting equipment damaged as a result of Contractor operations shall be repaired and/or replaced in kind to the satisfaction of the Bureau of Street Lighting and at the Contractor's expense.
- 2) The contractor shall inspect street lighting equipment for damage in the presence of the City Inspector and shall notify the Bureau of Street Lighting of any existing damage before the start of the street lighting work.
- 3) The contractor shall be responsible for any damage to street lighting equipment not identified as pre-existing.
- 4) In the event that any street lighting standards, luminaires, lanterns or any other designated components listed in the specifications for removal, refurbishment and/or delivery to the Bureau of Street Lighting has been

damaged by the Contractor, and the repairs and/or replacement proposed by the Contractor are not to the satisfaction of BSL, then those damaged parts shall have a replacement value as determined solely by BSL and a corresponding amount shall be deducted from any outstanding or future payment due to the Contractor.

## **5700 – ELECTROLIER METAL BASES**

### **A. LEVELING DEVICE**

All metal bases installed below the grade are required to have a compatible non- corroding metal leveling device to ensure proper installation of the base on the anchor bolts. Contractor shall submit a shop drawing of the proposed device for BSL review and approval.

### **B. JOINT SEALANT**

All metal bases installed below the grade shall have a gap no less than  $\frac{1}{2}$ " and no more than  $\frac{3}{4}$ " wide around the bottom of the base. A bead of approved by BSL joint sealant shall be then applied to prevent any contact between base and concrete cap and to provide a waterproof seal.

Similarly, a bead of approved joint sealant shall be applied between the top of the base and the electrolier shaft to create a waterproof seal.

## **DIVISION 16 ELECTRICAL**

### **16000 - GENERAL**

The street lighting systems within the City of LA operate on a series (constant current) or multiple (constant voltage) system. This section will specify luminaire, ballast and lamp specifications, special lighting considerations and testing requirements.

### **16050 - BASIC MATERIALS AND METHODS**

All material used shall meet all applicable regulations and codes per Section 209-1 of the Standard Specifications for Public Works Construction. (Latest Edition)

All screws used shall be stainless steel.

#### **16050.1 - SERIES CIRCUITS**

##### **A. SERIES HIGH VOLTAGE EQUIPMENT**

All equipment shall be capable of operating on a 5,000 Volt rated circuit served from a "moving coil", 6.6 amp, constant current transformer. Refer to ANSI C 136.4 for information regarding the requirements for the series socket and receptacle.

##### **B. SERIES WIRE REQUIREMENTS**

Series circuit wire shall be no. 8 AWG solid copper conductor, insulated with 0.110" approved polyethylene compound rated for 5000 Volt operation.

Two or more turns of self adhesive colored tape with a minimum width of ½ inch shall be applied to each cable in all series circuits where work is being done and where two or more circuits exist in a common pullbox or post base. The tape shall be applied on the cable between the splices and the conduit, using one color for each circuit. The colors, white, gray, green and orange shall not be used.

##### **C. SERIES BALLASTS - HIGH POTENTIAL REQUIREMENTS**

The ballast shall be insulated to withstand the following continuously applied voltages under standard conditions:

1. 10,500 volts RMS AC between primary and core.
2. 10,500 volts RMS AC between primary and secondary.
3. 2,500 volts RMS AC between secondary and core.

##### **D. HIGH VOLTAGE DISCONNECTING SPLICE - SERIES CIRCUITS**

## **CABLE CONNECTOR CASE**

The case or shell of the connector shall be formed of a neoprene or plastic composition having a volume resistivity not less than  $10^{13}$  ohms per cm. It shall withstand a load of 200 pounds applied normal to the axis without rupture, cracking, or permanent deformation.

The two halves of the case shall lock together with screw threads forming a watertight joint and be separated by a neoprene "o" ring under compression when the connector is assembled. The cable shall attach to the connector by a self threading lug designed for a #6 AWG solid copper conductor. This connecting lug shall be slotted at 90 degrees to provide a pressure fit between the male and female parts. All metal parts shall be cadmium plated.

The diameter of the case shall not exceed 2-1/2" and the length shall not exceed 10". The two halves shall be completely filled with sealing compound complying with the following specifications and held in place with a cable entrance plug designed to accommodate any cable having an overall diameter of between 0.346" and 0.600".

## **SEALING COMPOUND**

The sealing compound for cable connectors shall be a viscous paste composed of oil and an inert mineral filler.

The compound shall be waterproof and shall be resistant to oxidation and weathering and to biological attack. The volume resistivity shall not be less than  $10^{12}$  ohms per cm.

When exposed to air for 18 hours in a film 1/8" thick at a temperature of 70 F ( $\pm 2$  F) absorption of water shall not exceed 3 mg. per sq. Cm. of surface in contact with water.

When allowed to dry in contact with air, the lineal shrinkage of the exposed surface shall not exceed 0.2%.

## **ELECTRICAL CHARACTERISTICS**

When the connector is used to join two cable ends and sealed with sealing compound, it shall sustain an electrical stress of 11,000 volts at 70 F ( $\pm 2$  F), without breakdown after immersion in water for 18 hours.

## **16050.2 MULTIPLE CIRCUITS**

### **A. MULTIPLE CIRCUIT SYSTEM WIRING**

Multiple circuit wire shall be no. 6 AWG stranded copper conductor, type THWN/THHN insulation, UL approved for 600 Volt operation unless otherwise noted.

Three wires (color code - 1- red, 1-black, 1-white) shall be installed in all multiple circuit conduit unless others specified. Even numbered conductors shall be connected to red and white and odd numbered conductors shall be connected to black and white wires. Blue shall be used when a switch wire is needed.

### **B. WIRE CONNECTORS - SERIES AND MULTIPLE**

Wire connectors shall bear the Underwriters Laboratory seal of approval. The installation procedure, including connector size and crimping tools shall conform to the manufacturer's recommendations. Generally, bulky or odd shape connectors, narrow connectors which may damage the wire, or twist-on and split-bolt type connectors will not be allowed. The mechanical performance of the connector shall be such that no free play can be observed after the connector is subjected to a combination of hand-applied twists and pulls. A solid cross section will also be required when the connector is subjected to saw cutting. All wire connectors shall have a nominal cross sectional area equivalent to the area of the largest conductor connected.

#### **C. MULTIPLE CIRCUIT ELECTROLIER WIRING**

All #10 AWG wires used for Multiple Circuit Electrolier Wiring referenced in Standard Drawing No. L-301-1 shall be #10 THWN AWG **SOLID** copper conductors.

#### **D. REMOTE MONITORING SYSTEM**

All newly installed luminaires shall have a BSL approved remote monitoring system unless specified otherwise.

#### **E. FUSES**

Fuses located at the pole pullbox (for wires going up the pole) are to be 10 amps unless otherwise specified.

### **16060 - GALVANIZED CONDUIT**

All new conduit shall be 1 ½ " (minimum) rigid galvanized steel type unless otherwise specified. The conduit shall conform to Section 307-2.5 and 210-3 of the Standard Specifications for Public Works Construction. The galvanization shall be continuous, and the inside surface of the conduit shall be smooth and seamless.

Any clamps required shall be hot-dipped galvanized.

#### **A. ABANDONING CONDUIT**

Conduit that is to be abandoned shall have all wires removed. The conduit shall then be removed to a depth of at least 12" below the surface and have both ends crimped.

#### **B. INSTALLATION OF OAKUM IN CONDUIT ENDS**

At least a one foot length of continuous oakum shall be securely packed into all uncapped conduit ends in pullboxes, electrolier bases, etc., immediately after the installation of conductors in the conduit.

The oakum shall be packed around the conductors in such a manner that visible gaps will not remain between the conductors and conduit, and with sufficient care to avoid damage to conductors, bushings or conduit.

The type of oakum to be used shall be string oakum which is tar or oil saturated to be water resistant.

**This special provision supersedes all notes referring to oakum installation on standard drawings.**

## **C. PIPE LUBRICANT**

As stated in section 307-2.5 of the Standard Specifications for Public Works Construction (Greenbook) "All threads shall be treated with approved joint compound before fittings are replaced thereon."

## **16400 - SERVICE POINTS**

Streetlighting systems in the City are serviced by overhead or underground services from the Department of Water and Power. Contractor shall give the Department of Water and Power Streetlight Maintenance at (213) 367-9966 five days advance notice of the required service date. Contractor must submit a M21 form to request service.

### **A. VAULT SERVICE LOCATIONS**

To determine and confirm the exact service location of stub outs for vault service points, the contractor shall contact the Department of Water and Power Street Lighting Engineering Section at (213) 367-3002

Thirty feet of slack in each conductor entering the vault shall be provided to "rack" the conductor on the walls of the vault.

### **B. SERVICE PULLBOX**

In the Service pull-box, the contractor shall furnish and install two disconnecting splices for each circuit. The disconnects shall be so installed that the two service wires may be connected together.

All service pullboxes shall be Type 3 and meet all specification per detail L-201-0.

When specified on the plans services not in a pullbox must be in a service cabinet. Service cabinets shall be UL listed, rated for a minimum of 10,000 AIC or otherwise specified on the plans. Service cabinets shall be installed per manufactures specifications and adhere to all requirements of the NEC. The breakers, meter and disconnecting device shall be in one enclosure as required by the NEC.

When breakers are used on a street lighting circuit, the neutral wire shall only be grounded at the service point and a green ground wire shall be used for equipment grounding of all streetlighting poles and current carrying equipment.

### **C. JUNCTION BOXES**

Junction boxes shall be used only when specified on the plans or otherwise approved by the engineer.

Any junction boxes used must be NEMA 3 or 4X with a hinged-based latch or approved equal.

### **D. FUSES FOR SERVICE PULLBOXES**

Fuses at the service pullbox shall be 30 amp unless otherwise noted.

## **16430 - CIRCUIT CLEARANCE**



Prior to any work being done on any existing street lighting circuit, the contractor shall obtain daily circuit clearance from the Department of Water and Power Streetlight Maintenance at (213) 367-9966. Deadline to request clearance is noon of the day before clearance is to be given.

The contractor can obtain two types of authorization to work on street lighting circuits. "Clearance Authorization" - this type of authorization is required when the contractor needs to work on an existing circuit and the work will not involve permanent circuit load changes to the circuit. "Service Authorization" - this type of authorization is required when the contractor needs to work on an existing circuit that involves a permanent load change or needs a new service point.

The Department of Water and Power (DWP) will de-energize and re-energize circuits between the hours of 8:30 a.m. and 2:30 p.m. Monday thru Friday. In the event DWP crews are required by the contractor to "stand-by" during the course of work or the contractor fails to complete his work sufficiently in time for the Department of Water and Power to re-energize the circuit within the prescribed time, the contractor shall be liable for any and all "stand-by" and overtime charges accrued by Department of Water and Power's crews.

An "Emergency Clearance" service is also available for an additional charge. Deadline to request Emergency Clearance is noon of the day the clearance is to be given.

## **16460 – FIELD ACCEPTANCE**

All requests for Field Acceptance Tests will be directed to the Bureau of Street Lighting's Field Operations Division (323-913-4720).

## **16500 - LIGHTING**

Any luminaire may be subject to photometric testing. Luminaires will be tested for average footcandles and uniformity ratio and adherence to the IES data provided.

### **LIGHT DISTRIBUTION**

Light distribution shall be as defined in the Appendix of the latest ANSI/IES RP8 latest adopted by the City of Los Angeles.

## **16510 - TEMPORARY STREET LIGHTING SYSTEM**

Temporary lighting systems are required for public right-of ways (roadways, sidewalks, walkways, underpasses, overpasses, detour roads, etc.), when existing street lighting systems are impacted during construction.

The contractor shall provide alternative roadway lighting during construction. The temporary street lighting system must be in operation prior to removing the existing street lighting system.

1. The contractor shall submit a temporary lighting plan including photometrics to the BSL Engineering and Technical Services Division for approval 30 days prior to the start of

construction. Written approval from BSL is required prior to installing the temporary lighting system.

2. Contractor shall install a temporary street lighting system by installing a temporary pole adjacent to an existing street lighting pole. The temporary street lighting system must provide an average illumination and uniformity ratio (avg/min) to match existing lighting levels utilizing standard roadway lighting optics. (No floodlights). Temporary poles shall have minimum mounting height of 30 feet. Lamp sizes shall be a minimum of 200 watts. Luminaires shall be cutoff type 3 light distribution pattern.
3. Contractor shall make arrangements with the Department of Water and Power for service or shall provide an alternate power supply.
4. The temporary street lighting system must be in operation from dusk to dawn.

The contractor shall provide nightly patrol and daily written reports to the Bureau of Street Lighting of all street light outages within one block surrounding the construction sites.

The contractor shall repair all street light outages related to the construction within 48 hours.

Installation and operation of the temporary lighting system shall be in accordance with all federal, state and local codes including but not limited to Section 209 of the latest edition of the Standard Specifications for Public Works Construction.

The Contractor shall be both liable and responsible for the installation, operation, maintenance, and removal of the temporary street lighting system.

Street lights installed on temporary traffic signal poles shall be in accordance with the latest edition of the LADOT special provisions and standard drawings for the installation and modification of traffic signals.

## **16520 - DATE CODING OF STREET LIGHTING EQUIPMENT**

### **SCOPE**

This specification includes all high intensity discharge (HID) and low pressure sodium internal or external ballast luminaires, ballast door assemblies, lamps, and other lighting fixtures or equipment intended for the lighting of streets bikeways and walkways. Each separate electrical component as identified herein shall be identified with the month and year of installation at the time of installation. All dating shall be marked clearly and neatly with numerals 2" (two inches) high. Yellow traffic paint shall be used on all ballasts. A "permanent" black felt tip marker shall be used on all other equipment unless otherwise specified.

### **A. LUMINAIRES**

The date of installation shall be marked inside the luminaire housing near the service wire entry or lamp socket on both internal and external ballast units.

### **B. BALLAST DOOR ASSEMBLIES**

The date of installation shall be marked on the inside face of the ballast door. If no space is available, the date shall be placed upon the ballast using yellow traffic paint as specified in Section 16520 Section A.

### **C. BALLASTS**

All external ballasts, series or multiple, shall be marked as indicated.

### **D. LAMPS**

A series of numbers representing the last numeral of the year and letters representing the first letter of the month are imprinted on the screw base of each lamp. A dot shall be placed to obscure the appropriate letter and number using a "permanent" black felt tip marker.

### **E. OTHER EQUIPMENT**

Special lighting fixtures, timers, switching devices, and other equipment associated with lighting shall also be dated in a manner consistent with this specification and as approved by the Engineer. Photoelectric cells shall not be dated.

### **F. ALTERNATE METHODS**

Alternate methods of dating shall have prior approval of the Engineer.

## **16950 - TESTING - LIGHTING EQUIPMENT**

All streetlighting equipment used in the City of Los Angeles must be approved by the Bureau of Street Lighting. The contractor shall furnish all test equipment without charge and shall take test timelines into account.

### **16950.1 - PROCEDURES (LUMINAIRE AND LAMP TESTING)**

#### **A. TESTING FOR QUALITY ASSURANCE OF LUMINAIRES AND LAMPS ON THE APPROVED EQUIPMENT LIST**

Quality assurance testing is required for projects that have more than 24 units of a given size. The contractor shall submit 2 samples for 25 to 100 units and 1 additional sample within each 100 units thereafter.

Test samples shall be submitted after the M40 form has been approved. The Engineering and Technical Services Division will respond within 30 days of submittal. The sample luminaires and lamps must be new and shall be delivered to the BSL Field Operations Division located at 4550 W Santa Monica Blvd., Los Angeles. Deliveries and retrievals of lamps and luminaires shall be scheduled with the BSL Warehouse Section Head at (323) 913-4726, two working days prior to delivery or retrieval date. All deliveries to FOD shall be labeled with project title applicable work order and paint color (if any). If deliveries are not scheduled, or if approved M40 forms are not submitted with the deliveries, the equipment will not be accepted. The samples must be in their original packaging with no signs of tampering.

Tests will be performed to determine if the luminaires/lamps comply with Section 16950.2 of these Special Specifications. Upon completion of the approval process, one of the following actions shall result:

- No failures in meeting the specifications - The entire delivery lot will be accepted.
- One sample fails, - Additional samples will be randomly selected and tested. The quantity of additional samples will equal that of the first submittal for testing. If there are no additional failures in the additional samples submitted, the entire lot will be accepted. If there is one failure in the additional samples, the entire delivery lot will be rejected.
- Two samples fail - The entire delivery lot will be rejected.

## **B. TESTING FOR LUMINAIRES NOT ON THE APPROVED EQUIPMENT LIST**

All new conventional luminaires (not on the approved equipment list) that are seeking approval must be submitted to the Testing Equipment and Evaluation Section of the Bureau. These luminaires must pass the testing procedure in Section A in addition to the following. The vendor shall submit a sample luminaire accompanied by all specifications regarding electrical and photometric (IES format) characteristics. The Engineering and Technical Services Division will respond within 30 days of submittal. For all non-conventional (LED, Induction, etc..) luminaires please refer to the special procedures detailed at the BSL website – <http://www.lacity.org/bsl/>)

The luminaires will be tested for the following:

- Electrical characteristics as defined by Section 16950
- Conformance to the Photometric Data as submitted by the vendor.
- Adherence to the BSL specified mechanical requirements.
- Unit must be interchangeable with luminaire specified on the plan.

When the luminaire meets all BSL requirements it will be approved for the specified project only.

## **C. MECHANICAL REQUIREMENTS**

These requirements are specified to ensure the longevity of the fixture and safe, easy maintenance. The requirements are additional to any/all requirements specified in these Special Specifications.

1. Luminaire must be clearly labeled with the full catalog number.
2. There shall be no sharp edges or corners near serviceable parts.
3. A safety chain is required to keep a hood opening upwards in an open position between 90 and 95 degrees, and a lid opening downwards in an open position between 80 and 90 degrees, or air craft cable – opening to a position between 80 and 90 degrees.
4. Ballasts assembly components shall be mounted on an untied (one piece) ballast tray and must be easily accessible and removable for ease of maintenance.
5. External (remote) ballasts shall be waterproof.
6. Disconnects for the starter and the ballast assembly are required for easy removal.
7. All capacitors must have a minimum temperature rating of 90 degrees Celsius.
8. Glass panels are required unless polycarbonate or acrylic is otherwise approved. Panels must be gasketed. Gasket should be part of the unit; not the glass.
9. Doors or lids on the luminaire housing shall be fully gasketed.
10. Rubber gaskets shall be used; foam gaskets are not allowed. Gaskets shall be securely attached.
11. Any adhesive compound used must not degrade under heat generated by the operation of the fixture and must withstand pulls by bare hand.
12. Glass refractors that can be installed in different positions must be marked “House-side”, “Street-side” and “Distribution type”.

13. Internal wiring must be rated for 105 C and routed away from heat generating components of the ballast assembly and must not interfere with the lighting distribution of the unit.
14. All luminaire components must be securely fastened.
15. The reflector shall be sturdy and not easily bent.
16. Any covers provided for access to serviceable parts shall be securely attached but easily removable.
17. Screws on the luminaire housing shall be captive and all the same type.

#### **D. CONTAINER IDENTIFICATION**

Each shipping container shall be clearly marked to indicate contents, the manufacturer, make, model, operating lamp type and wattage, ballast operating voltage, and City purchase order number (where applicable).

### **16950.2 SPECIFICATIONS (LUMINAIRES, BALLASTS AND LAMPS)**

This section covers the parameters for the testing of luminaires, ballasts and lamps.

#### **BALLASTS**

This section will cover the essential design features and operating characteristics of ballasts and starting aides for high intensity discharge lamps and procedures for inspection and testing. Unless otherwise specified, this specification applies to ballasts installed internally within the luminaire and to ballasts designed for external operation.

#### **General Requirements**

All ballast used shall comply with the general requirements of ANSI C82.5.

Each ballast for a high-intensity-discharge lamp shall be designed for the type, characteristics, and wattage of the lamp it is to operate and shall provide the proper starting and operating wave-forms, voltage, and current, within the limits specified herein.

- Ballasts shall be designed for continuous operation and provide reliable lamp starting conditions at ambient temperatures between -5 C to +65 C. Internal ballasts shall be tested within the luminaire and shall be rated at the temperature normally found during normal operation within the luminaire.
- Ballasts shall be designed to operate continuously for 6 months without significant reduction in life, over the specified temperature range, with the lamp operating normally or with the lamp circuit in an open or short-circuited condition.
- The ballasts shall operate from multiple supply sources of 600 volts maximum, at a frequency of 60 Hz. and shall be designed for operation under outdoor conditions, either mounted internally within a luminaire or lighting fixture or mounted externally (remote) to the luminaire.
- The ballast shall be plainly marked as to its operating voltage and wattage characteristics. Unless otherwise specified on the contract plans or Invitation for Bids, the input voltage shall be 120 volts.
- A Certificate of Compliance shall be submitted by the manufacturer with each lot of internal ballast luminaires and with each lot of ballasts designed for use outside of

luminaires. The certificate shall state that the lot of ballasts meets in every respect, the above requirements and the lamp-ballast specifications available at time of bidding.

- Starting aids, if necessary, for ballasts of a given lamp wattage shall be interchangeable between ballasts of the same wattage and manufacturer without adjustment.
- Heat-generating components shall be mounted so as to use the portion of the luminaire upon which they are mounted as a heat sink.
- The Ballast shall also provide a minimum transient impulse level of 7.5 KV for the 250 volt classification and 10KV for the 600 volt classification.
- All current carrying components shall be insulated or have a 1" minimum clearance.
- Transformers and inductors shall be resin-impregnated for protection against moisture. Capacitors, except those in starting aids, shall be metal cased and sealed. Capacitors shall be located as far as practicable from heat-generating components or shall be thermally shielded to limit the case temperature to 75 C.
- Noise generated by the ballast or in combination with the starting aid shall be minimized.
- Power factor shall not fall below .9
- Ballast shall compensate for nominal line voltage variance of  $\pm 10\%$ .

### **High Pressure Sodium Ballasts**

This section is specific to High Pressure Sodium Ballasts and is in addition to the General Requirements.

#### **a. General**

Unless otherwise specified in the bid documents or on the contract plans magnetic regulating ballasts are required in all cobra-head luminaires.

The ballast shall be capable of starting and operating one high pressure sodium lamp from a nominal 120 volt 60 Hz power source within the limits specified herein. The ballast, including starting aid, must protect itself against normal lamp failure modes. The ballast shall be capable of operation with the lamp in an open or short circuit condition for six months without significant loss of ballast life.

#### **b. Wattage Design**

The ballast design center will not vary more than  $7\frac{1}{2}\%$  from the rated lamp watts.

#### **c. Wattage Regulation**

Wattage regulation spread shall not exceed 20% for  $\pm 10\%$  line voltage variation from nominal.

The ballast shall have a load characteristic (volt-watt trace) such that the characteristic curve passes through the trapezoidal diagram. The curves at 120 volts nominal line voltage and at  $\pm$

10% of nominal shall intersect both of the lamp- voltage limit lines between the lamp - wattage limit lines and shall remain between the wattage limit lines throughout the rated life of the lamp. The luminaire manufacturer will supply ballast electrical data and lamp operating volt-watt traces for nominal and ( $\pm 10\%$ ) rated line voltage to verify ballast performance and compliance with lamp specifications, for the rated life of the lamp.

d. Capacitor Variance

The ballast design shall be such that the nominal manufacturing tolerance for capacitors of  $\pm 6\%$  will not cause more than a  $\pm 8\%$  variation in regulation throughout rated lamp life for nominal line voltage.

e. Maximum Line Watts

Line watts (input to ballast) shall not exceed the values shown below for the various lamp sizes at nominal line voltage (120 volts) and nominal lamp wattage. Ballast is tested independent from a luminaire and not encapsulated.

<u>LAMP WATTS</u>	<u>LINE WATTS</u>
70	99
100	137
150	197
200	252
250	324
310	388
400	481
1000	1102

f. Open Circuit Voltage (RMS) minimum

The following requirements must be met throughout the full range of ballast input voltages.

<u>LAMP WATTS</u>	<u>OPEN CIRCUIT VOLTAGE-RMS (MINIMUM)</u>
50	110
70	110
100	110
150	110
200	195
250	198
310	190
400	198
1000	456

g. Starting Pulse Requirements

The ballast/starting aid combination shall have the following characteristics for any wattage high pressure sodium lamp.

Measured across the socket terminals using a high frequency scope of high impedance probe.

1. Pulse peak voltage: Minimum -- 2500 volts

- Maximum - 4000 volts
2. Pulse width measured at 2250 volts: Minimum -- 1 microsecond  
Maximum - 15 microseconds
  3. Pulse repetition rate: Minimum -- 1 per cycle
  4. Pulse peak current: Minimum -- 0.2 amperes
  5. The pulse shall be applied to the center terminal of the lamp base.
  6. The pulse circuit shall be de-energized during the normal lamp operation.
  7. Pulse position

h. Load Characteristics (Trapezoidal Limits)

The ballast shall have a load characteristic (voltage-watt trace) such that the characteristic curve passes through the trapezoidal diagram (See Figure 1 and Table VI)

The curves at 120 volts nominal line voltage and at  $\pm 10\%$  of nominal shall intersect both of the lamp-voltage limit lines between the lamp-wattage limit lines and shall remain between the wattage limit lines throughout the rated life of the lamp. (See Figure 2)

Table VI Trapezoidal Diagram (See Figure 1)

Rated Lamp Watts	50	70	100	150	200	250	310	400	1000
Minimum Watts	35	50	72	110	140	175	210	280	750
Maximum Watts	65	90	124	180	260	350	390	475	1200

Lamp Voltage Limits at Trapezoidal Corners

At Max. Watt A,B	55,94	50,104	50.5,95.5	54.97	105,200	109,194	106,187	95,151	237,390
At Min. Watt C,D	37,62	38,64	38,71	40,69	75,120	67,134	72,129	67,122	177,300

**Metal Halide Ballasts**

All metal halide luminaries shall have a constant wattage auto transformer ballast unless otherwise approved.

Regulated CW or CWA (lead) ballasts - symmetrical pulses shall occur: (1) within 20 electrical degrees before the center of each half cycle (70 degrees and 250 degrees), and (2) not after 15 electrical degrees beyond the center of each half cycle (105 degrees and 285 degrees).

**LAMPS**

**1. HIGH INTENSITY DISCHARGE LAMPS, SPECIFICATIONS**

**A. SCOPE**

This specification describes the essential operating characteristics of High Pressure Sodium (including Ignitron), Metal Halide, and Mercury Vapor Lamps to be used in the Los Angeles Street Lighting systems and procedures for inspection and testing.



## B. SPECIFICATIONS AND STANDARDS

The following specifications, test methods, and standards form a part of this specification. If there is conflicting information, this Section shall prevail:

American National Standards Institute (ANSI) C78.1350-1976.

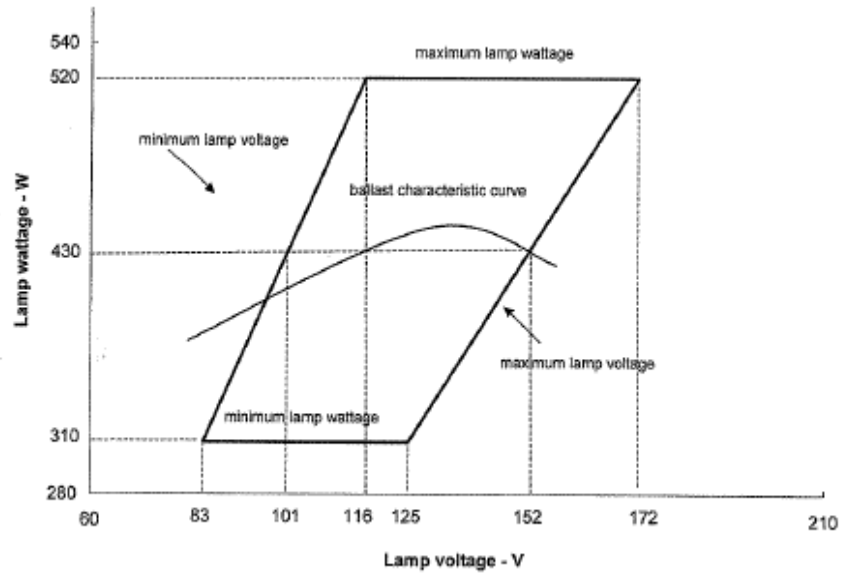
C78.1351-1981, C78.1352-1981, C78.1353, C78.1354, C78.1355-1981, C78.1356.

## C. ELECTRICAL CHARACTERISTICS

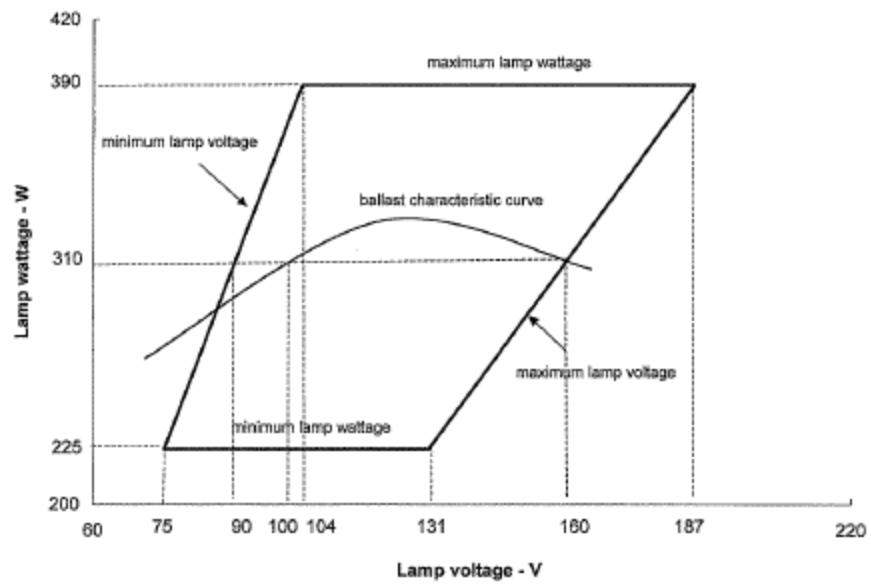
Lamps shall start and operate under the following electrical parameters:

Rated Lamp Watts	50	70	100	150	200	250	310	400	1000
Permitted Operating Range MIN	38	50	72	110	140	175	210	300	750
For Rated Lamp life(watts) MAX	65	90	124	180	260	370	390	475	1200
Design Center (nominal)	52	52	55	55	100	100	100	101	250
Voltage Range @ 100hrs	46-62	44-60	45-62	48-62	85-115	85-115	90-115	84-115	210-275
Max lamp voltage	84	84	84	88	160	160	160	140	350
Average voltage	57	57	59	59	110	110	110	110	265
Operating current(RMS)**	1.18	1.6	2.1	3.2	2.4	3.0	3.6	4.7	4.7
Current During Warm MIN	1.18	1.6	2.1	3.2	2.4	3.0	3.6	4.6	4.7
UP (RMS) MAX	1.85	2.4	3.2	4.8	3.5	4.5	5.5	7.5	8.0
Lamp current crest factor MAX	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8

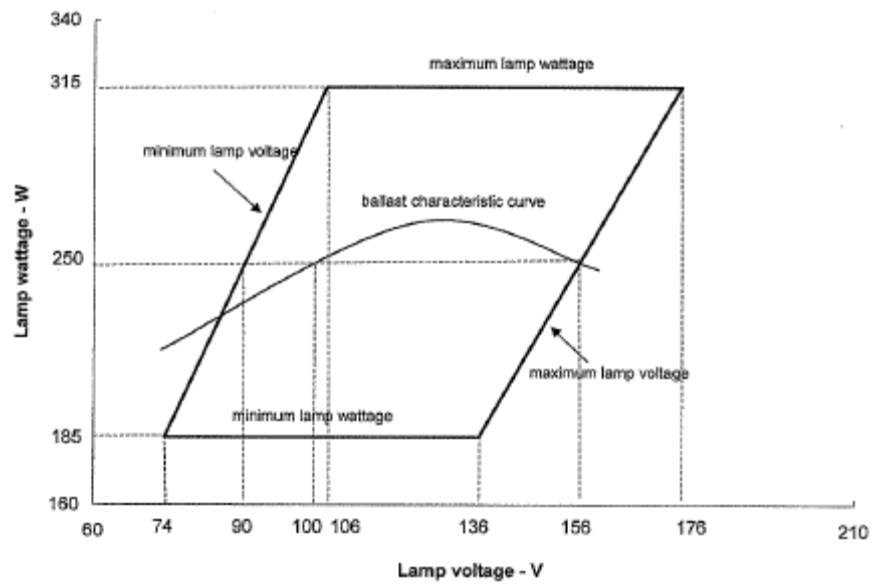
\*\*Measured at Nominal Wattage



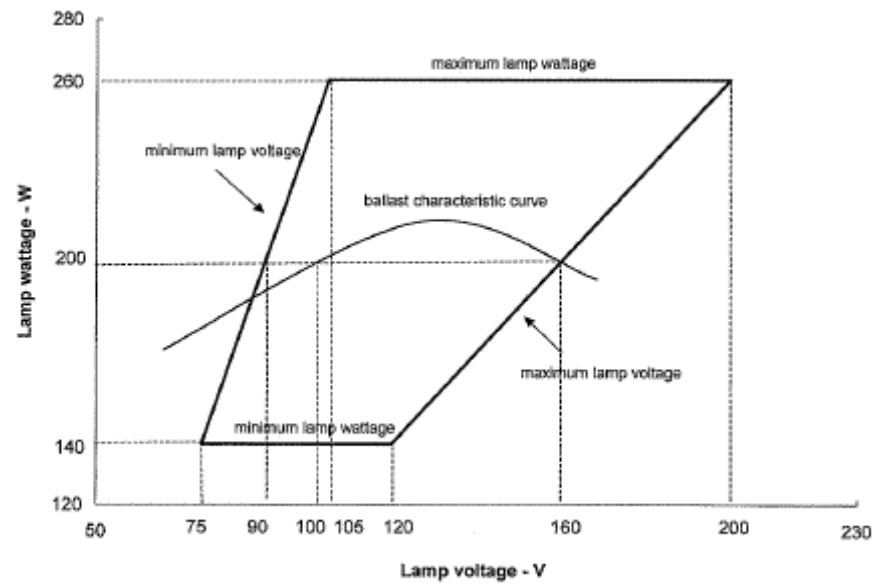
400WHPS



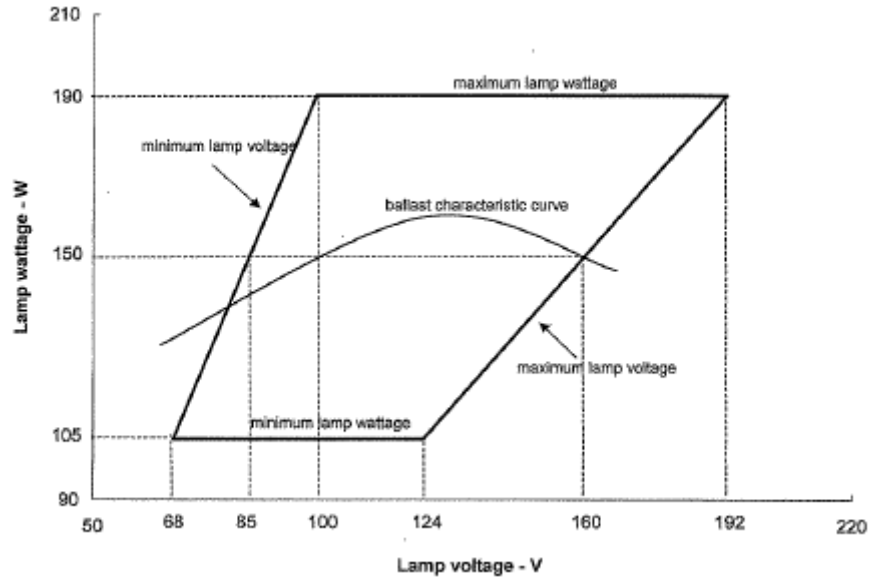
310 WHPS



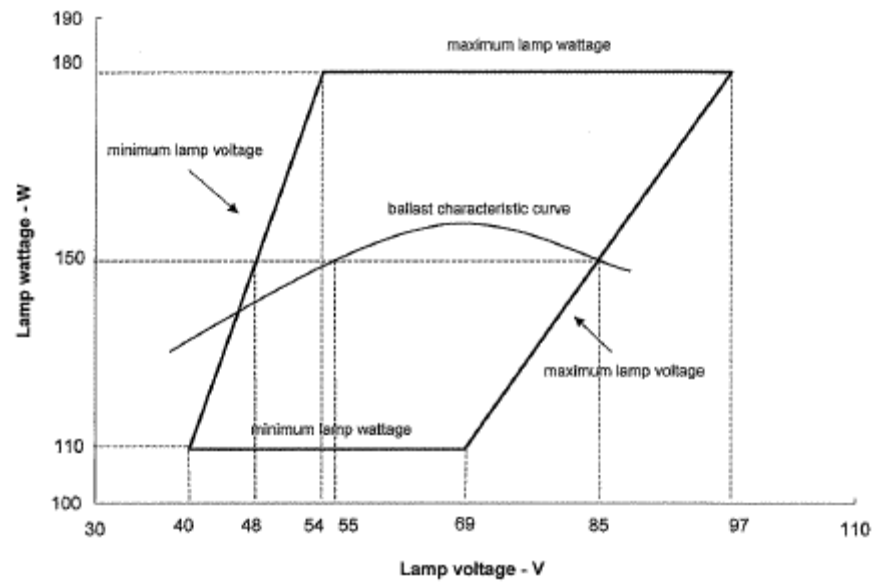
250WHPS



200WHPS



150WHPS



100HPS

#### D. LAMP CURRENT CREST FACTOR

The lamp current crest factor shall not exceed 1.8 for  $\pm 10\%$  line voltage variation at any lamp voltage, from nominal through life. (Lamp current crest factor = lamp peak current/lamp RMS current.)

## 2. INDUCTION

Phillips QL induction lamp temperature limits			
Lamp Wattage	55 W	85 W	165 W
Tmounting Temperature °C	≤ 100	≤ 90	≤ 100
HF generator Temperature °C	≤ 62	≤ 62	≤ 62

Phillips QL induction lamp Power characteristics	QL 55W 100-120V	QL 85W 100-120V	QL 165W 100-120V
AC supply voltage nom.	120 V	120 V	120 V
AC supply voltage min.	90 V	90 V	90 V
AC supply voltage max.	140 V	140 V	140 V
Supply frequency nom.	60 Hz	60 Hz	60 Hz
Supply frequency min.	47 Hz	47 Hz	47Hz
Supply frequency max.	67 Hz	67Hz	67Hz
Supply current nom.	460 mA	730 mA	1420 mA
Power factor nom.	>0.92	>0.92	>0.92
HF output frequency nom.	2.65 MHz	2.65 MHz	2.65 MHz
HF output frequency min.	2.3 MHz	2.3 MHz	2.3 MHz
HF output frequency max.	3 MHz	3 MHz	3 MHz
HF output voltage max.	1.5 kV	1.5 kV	1.5 kV
Ignition time	< 0.5 s	< 0.5 s	< 0.5 s

# **BUREAU OF STREET LIGHTING**

## **APPROVED EQUIPMENT LIST**

Approved By: Original signed by Phil Reed on 2/13/04  
DIRECTOR, BUREAU OF STREET LIGHTING

Date: \_\_\_\_\_

## **INTRODUCTION**

Construction plans prepared by or approved by the Bureau of Street Lighting currently specify street lighting equipment by categories or groups of approved equipment to be used in the construction project. The following list shows the make and model of equipment which is permitted to be used within each of the categories which have been specified on plans.

Unless otherwise provided, the equipment used on each project shall conform to the list of Street Lighting Equipment approved for use in the City of Los Angeles which was in effect on the date that the construction contract was awarded by the Board of Public Works. Equipment specified on project plans for which a construction contract is not awarded by the Board of Public Works shall conform to the list of Street Lighting Equipment approved for use in the City of Los Angeles which was in effect on the date that the project plans were signed by the Director, Bureau of Street Lighting. Each equipment item supplied in accordance with the list of approved equipment shall be identical to the approved sample model of that item on file with the Bureau of Street Lighting. Deviations from the approved sample item shall be cause for immediate rejection upon discovery of the deviation whether or not the item has been delivered or installed in the field. All costs related to equipment rejection, removal and replacement shall be borne by the contractor.

The list will be revised periodically as technological improvements occur and improved equipment becomes available. It is anticipated that as such equipment becomes available, previously approved equipment with lower efficiency or other less desirable characteristics may be deleted from the list. However, requests for use of previously authorized equipment or models may be submitted to the Director, Bureau of Street Lighting. Other deviations may be granted by the Director, Bureau of Street Lighting, in cases where strict adherence to the list would incur an unusual hardship.

Requests for equipment to be considered for inclusion in the following list may be submitted to the Director, Bureau of Street Lighting, at any time. Upon submittal of a sample, the equipment will be tested and the submitter informed of the results. Upon approval for use in Los Angeles, the City will, unless otherwise provided, usually purchase the sample evaluated and retain it for purposes of comparison with later manufactured equipment as described above. Samples of disapproved equipment will be returned forthwith to the submitter.

# Appendix

## Approved Equipment List

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## **COBRAHEAD HORIZONTAL MOUNTED/BURNING**

### **HIGH PRESSURE SODIUM**

#### **50 WHPS:**

<b>GENERAL ELECTRIC</b>	(MULTIPLE)	M2AR 05 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> <u>1/2</u> (semicutoff)
		M2RR 05 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> (semicutoff)
		M2AC 05 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> <u>1/2</u> (cutoff)
		M2RC 05 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> (cutoff)
	(SERIES)	M2AR 05 SXS <u>1</u> G M S <u>2/3</u> <u>1</u> 035 (semicutoff, low load)
		M2AC 05 SXS <u>1</u> G M C <u>2/3</u> <u>1</u> 035 (cutoff, low load)
	(MULTIPLE OR SERIES)	M2RR 94 SXT <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff)
		M2AR 94 SXT <u>1</u> G M S <u>2/3</u> <u>1/2</u> (remote ballast, semicutoff)
		M2RC 94 SXT <u>1</u> G M S <u>2/3</u> (remote ballast, cutoff)
		M2AC 94 SXT <u>1</u> G M S <u>2/3</u> <u>1/2</u> (remote ballast, cutoff)
<b>SEQUOIA LIGHTING</b>	(SERIES)	UCS-A66-50 - <u>"C/X/CX"</u>
		UCS-A66-50-NB - <u>"C/CX"</u> (remote ballast)

#### **70 WHPS:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	113-8 62 E <u>2/3</u> (semicutoff)
		113-8 62 E <u>2/3</u> - AJ (cutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	M2AR 07 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> <u>1/2</u> (semicutoff)
		M2RR 07 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> (semicutoff)
		M2AC 07 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> <u>1/2</u> (cutoff)
		M2RC 07 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> (cutoff)
	(SERIES)	M2AR 07 SXS <u>1</u> G M S <u>2/3</u> <u>1</u> 035 (cutoff, low load)
		M2AC 07 SXS <u>1</u> G M C <u>2/3</u> <u>1</u> 035 (cutoff, low load)
	(MULTIPLE OR SERIES)	M2RR 94 SXT <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff)
		M2AR 94 SXT <u>1</u> G M S <u>2/3</u> <u>1/2</u> (remote ballast, semicutoff)
		M2RC 94 SXT <u>1</u> G M C <u>2/3</u> (remote ballast, cutoff)
		M2AC 94 SXT <u>1</u> G M C <u>2/3</u> <u>1/2</u> (remote ballast, cutoff)
<b>SEQUOIA LIGHTING</b>	(SERIES)	UCS-A66-70 - <u>"C/X/CX"</u>
		UCS-A66-70-NB <u>"C/CX"</u> (remote ballast)
<b>HUBBEL</b>	(MULTIPLE)	RM-GT-07 S71-061-034-FO (semicutoff)
		RM-CT-07 S71-031-034-FO (cutoff)
	(SERIES)	RM-GT-07 SS6-061-024-FO (semicutoff)
		RM-CT-07 SS6-031-024-FO (cutoff)

\*NB-remote ballast  
C-cutoff  
X-low load starter

## **COBRAHEAD HORIZONTAL MOUNTED/BURNING**

### **HIGH PRESSURE SODIUM**

#### **100 WHPS:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	115 10S 120 R3 DG 4B SN (semicutoff) 115 10S 120 R3 FG 4B SN (cutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	M2AR 10 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> <u>1/2</u> (semicutoff) ** M2RR 10 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> (semicutoff) ** M2AC 10 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> <u>1/2</u> (cutoff) ** M2RC 10 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> (cutoff) **
	(SERIES)	M2AR 10 SXS <u>1</u> G M S <u>2/3</u> 1 035 (semicutoff, low load) M2AC 10 SXS <u>1</u> G M C <u>2/3</u> 1 035 (cutoff, low load)
	(MULTIPLE OR SERIES)	M2RR 94 SXT <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff) M2AR 94 SXT <u>1</u> G M S <u>2/3</u> <u>1/2</u> (remote ballast, semicutoff) M2RC 94 SXT <u>1</u> G M C <u>2/3</u> (remote ballast, cutoff) M2AC 94 SXT <u>1</u> G M C <u>2/3</u> <u>1/2</u> (remote ballast, cutoff)
<b>SEQUOIA LIGHTING</b>	(SERIES)	UCS-A66-100 - <u>"/C/X/CX"</u> UCS-A66-100-NB - <u>"/C/CX"</u> (remote ballast)
<b>HUBBEL</b>	(MULTIPLE)	RM-GT-10 S71-061-034-FO (semicutoff) RM-CT-10 S71-031-034-FO (cutoff)
	(SERIES)	RM-GT-10 SS6-061-024-FO (semicutoff) RM-CT-10 SS6-031-024-FO (cutoff)

#### **150 WHPS:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	115 15S CA 120 R3 DG 4B SN (semicutoff) 115 15S CA 120 R3 FG 4B SN (cutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	M2AR 15 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> <u>1/2</u> (semicutoff) M2RR 15 S <u>0/1/3/7</u> M 2 G MS <u>2/3</u> (semicutoff) M2AC 15 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> <u>1/2</u> (cutoff) M2RC 15 S <u>0/1/3/7</u> M 2 G MC <u>2/3</u> (cutoff)
	(SERIES)	M2AR 15 SXS <u>1</u> G M S <u>2/3</u> 1 035 (semicutoff, low load) M2RC 15 SXS <u>1</u> G M C <u>2/3</u> 1 035 (cutoff, low load)
	(MULTIPLE OR SERIES)	M2RR 94 SXT <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff) M2AR 94 SXT <u>1</u> G M S <u>2/3</u> <u>1/2</u> (remote ballast, semicutoff) M2RC 94 SXT <u>1</u> G M C <u>2/3</u> (remote ballast, cutoff) M2AC 94 SXT <u>1</u> G M C <u>2/3</u> <u>1/2</u> (remote ballast, cutoff)
<b>SEQUOIA LIGHTING</b>	(SERIES)	UCS-A66-150 - <u>"/C/X/CX"</u> UCS-A66-150-NB - <u>"/C/CX"</u> (remote ballast)
<b>HUBBEL</b>	(MULTIPLE)	RM-GT-15 S71-061-034-FO (semicutoff) RM-CT-15 S71-031-034-FO (cutoff)
	(SERIES)	RM-GT-15 SS6-061-024-FO (semicutoff) RM-CT-15 SS6-031-024-FO (cutoff)

\*\*269 – less ignitor

## **COBRAHEAD HORIZONTAL MOUNTED/BURNING**

### **HIGH PRESSURE SODIUM**

#### **200 WHPS:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	125 20S CA 120 R3 DG SN (semicutoff) 125 20S CA 120 R3 FG SN (cutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	MSRL 20 S <u>0/1/3/7</u> M 22R MS <u>2/3</u> <u>1/2</u> (semicutoff) *** MDRL 20 S <u>0/1/3/7</u> M 22R MS <u>2/3</u> (semicutoff) *** MDCL 20 S <u>0/1/3/7</u> M 22F MC <u>2/3</u> <u>1/2</u> (cutoff) *** MSCL 20 S <u>0/1/3/7</u> M 22F MC <u>2/3</u> <u>1/2</u> (cutoff) ***
	(SERIES)	MSRL 20 SXS <u>12</u> R M S 2 043 (semicutoff, low load) MSCL 20 SXS <u>12</u> F M C 3 043 (cutoff, low load)
	(MULTIPLE OR SERIES)	MSRL91SXT11RMS <u>2/3</u> (remote ballast, semicutoff) MSCL91SXT11FMC <u>2/3</u> <u>1/2</u> (remote ballast, semicutoff) MDCL91SXT11RMS <u>3</u> (remote ballast, cutoff) MDCL91SXT11FMC <u>2/3</u> <u>1/2</u> <u>1/2</u> (remote ballast, cutoff)
<b>SEQUOIA LIGHTING</b>	(SERIES)	UCS-A66-200 - <u>"/C/X/CX"</u> UCS-A66-200-NB - <u>"/C/CX"</u> (remote ballast)
<b>HUBBELL</b>	(MULTIPLE)	RL-GT-20 S71-061-034-FO (semicutoff) RL-CT-20 S71-031-034-FO (cutoff)
	(SERIES)	RL-GX-20 SS6-061-024-FO (semicutoff) RL-CX-20 SS6-031-024-FO (cutoff)

#### **250 WHPS:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	125-7 62 3 <u>2/3</u> (semicutoff) 125 25S 120 R3 FG SN- DJ (cutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	MDRL 25 S <u>0/1/3/7</u> M 22R MS <u>2/3</u> <u>1/2</u> (semicutoff) *** MSRL 25 S <u>0/1/3/7</u> M 22R MS <u>2/3</u> (semicutoff) *** MDCL 25 S <u>0/1/3/7</u> M 22F MC <u>2/3</u> <u>1/2</u> (cutoff) *** MSCL 25 S <u>0/1/3/7</u> M 22F MC <u>2/3</u> (cutoff) ***
	(SERIES)	MSRL 25 SXS <u>12</u> R M S <u>2/3</u> 1 043 (semicutoff, low load) MSCL 25 SXS <u>12</u> F M C <u>2/3</u> 1 035 (cutoff, low load)
	(MULTIPLE OR SERIES)	MSRL91SXT11RMS <u>2/3</u> (remote ballast, semicutoff) MSCL91SXT11FMC <u>2/3</u> <u>1/2</u> (remote ballast, semicutoff) MDCL91SXT11RMS <u>3</u> (remote ballast, cutoff) MDCL91SXT11FMC <u>2/3</u> <u>1/2</u> (remote ballast, cutoff)
<b>SEQUOIA LIGHTING</b>	(SERIES)	UCS-A66-250 - <u>"/C/X/CX"</u> UCS-A66-250-NB - <u>"/C/CX"</u> (remote ballast)
<b>HUBBELL</b>	(MULTIPLE)	RL-GT-25 S71-061-034-FO (semicutoff) RL-CT-25 S71-031-034-FO (cutoff)
	(SERIES)	RL-GX-25 SS6-061-024-FO (semicutoff) RL-CX-25 SS6-031-024-FO (cutoff)

\*\*\* 283-less ignitor

## **COBRAHEAD HORIZONTAL MOUNTED/BURNING**

### **HIGH PRESSURE SODIUM**

#### **310 WHPS:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	125-7 62 L <u>2/3</u> (Semicutoff) 125 31S 120 R3 FG SN (Cutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	MDRL 31 S <u>0/1/3/7</u> M 22 RMS <u>2/3</u> <u>1/2</u> *** MSRL 31 S <u>0/1/3/7</u> M 22 RMS <u>2/3</u> *** MDCL 31 S <u>0/1/3/7</u> M 22 FMC <u>2/3</u> <u>1/2</u> *** MSCL 31 S <u>0/1/3/7</u> M 22 FMC <u>2/3</u> ***
<b>MILBANK WEST</b>	(SERIES)	UCS - A66- 310 - NB <u>"/C/CX</u> * (Remote Ballast)

#### **400 WHPS:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	125 40S 120 R3 DG SN (Semicutoff) 125 40S 120 R3 DG SN (Cutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	MDRL 40 S <u>0/1/3/7</u> M 22 RMS <u>2/3</u> <u>1/2</u> *** MSRL 40 S <u>0/1/3/7</u> M 22 RMS <u>2/3</u> *** MDCL 40 S <u>0/1/3/7</u> M 22 FMS <u>2/3</u> <u>1/2</u> *** MSCL 40 S <u>0/1/3/7</u> M 22 FMC <u>2/3</u> ***
<b>MILBANK WEST</b>	(SERIES)	UCS - A66 - 400 - <u>"/C/X/CX</u> UCS - A66- 400 - NB <u>"/C/CX</u> (Remote Ballast)
<b>HUBBELL</b>	(MULTIPLE)  (SERIES)	RL - GT - 40 S71 - 061 - 034 - FO (Semicutoff) RL - CT - 40 S71 - 031 - 034 - FO (Cutoff) RL - GX - 40 SS6 - 061 - 024 - FO (Semicutoff) RL - CX - 40 SS6 - 031 - 024 - FO (cutoff)

\*\*\* 283-less ignitor

## **COBRAHEAD HORIZONTAL MOUNTED/BURNING**

### **MERCURY VAPOR (MV)**

#### **100WMV:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	113-0021 <u>2/3</u> (semicutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	M2AR 10 C <u>0/1/3/7/7</u> C 2 G M S <u>2/3</u> <u>1/2</u> (semicutoff) M2RR 10 C <u>0/1/3/7/7</u> C 2 G M S <u>2/3</u> (semicutoff) M2AC 10 C <u>0/1/3/7/7</u> C 2 G M C <u>2/3</u> <u>1/2</u> (cutoff) M2RC 10 C <u>0/1/3/7/7</u> C 2 G M C <u>2/3</u> (cutoff)
	(SERIES)	M2AR 10 CXS <u>1</u> G M S <u>2/3</u> 1 036(semicutoff, low load) M2AC 10 CXS <u>1</u> G M C <u>2/3</u> 1 036(cutoff, low load)
	(MULTIPLE OR SERIES)	M2AR 97 FXX <u>1</u> G M S <u>2/3</u> <u>1/2</u> 002 (remote ballast, semicutoff) M2RR 97 FXX <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff) M2RC 97 FXX <u>1</u> G M C <u>2/3</u> (remote ballast, cutoff) M2AC 97 FXX <u>1</u> G M C <u>2/3</u> <u>1/2</u> 002 (remote ballast, cutoff)
<b>MCGRAW - EDISON</b>	(MULTIPLE)	UNIDOR 250

#### **175WMV:**

<b>AMERICAN ELECTRIC</b>	(MULTIPLE)	113-0022 <u>2/3</u> (semicutoff)
<b>GENERAL ELECTRIC</b>	(MULTIPLE)	M2AR 17 C <u>0/1/3/7/7</u> C 2 G M S <u>2/3</u> <u>1/2</u> (semicutoff) M2RR 17 C <u>0/1/3/7/7</u> C 2 G M S <u>2/3</u> (semicutoff) M2AC 17 C <u>0/1/3/7/7</u> C 2 G M C <u>2/3</u> <u>1/2</u> (cutoff) M2RC 17 C <u>0/1/3/7/7</u> C 2 G M C <u>2/3</u> (cutoff)
	(SERIES)	M2AR 17 CXS <u>1</u> G M S <u>2/3</u> 1 036(semicutoff, low load) M2AC 17 CXS <u>1</u> G M C <u>2/3</u> 1 036(cutoff, low load)
	(MULTIPLE OR SERIES)	M2AR 97 FXX <u>1</u> G M S <u>2/3</u> <u>1/2</u> 002 (remote ballast, semicutoff) M2RR 97 FXX <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff) M2RC 97 FXX <u>1</u> G M C <u>2/3</u> (remote ballast, cutoff) M2AC 97 FXX <u>1</u> G M C <u>2/3</u> <u>1/2</u> 002 (remote ballast, cutoff)
<b>MCGRAW - EDISON</b>	(MULTIPLE)	UNIDOR 250

## **COBRAHEAD HORIZONTAL MOUNTED/BURNING**

### **MERCURY VAPOR (MV)**

#### **250WMV:**

AMERICAN ELECTRIC	(MULTIPLE)	113-0023 <u>2/3</u> (semicutoff)
GENERAL ELECTRIC	(MULTIPLE)	M2AR 25 C M <u>0/1/3/7/7</u> C 2 G M S <u>2/3</u> <u>1/2</u> (semicutoff) M2RR 25 C M <u>0/1/3/7/7</u> C 2 G M S <u>2/3</u> (semicutoff) M2AC 25 C M <u>0/1/3/7/7</u> C 2 G M C <u>2/3</u> <u>1/2</u> (cutoff) M2RC 25 C M <u>0/1/3/7/7</u> C 2 G M C <u>2/3</u> (cutoff)
	(SERIES)	M2AR 25 CXS <u>1</u> G M S <u>2/3</u> 1 036(semicutoff, low load) M2AC 25 CXS <u>1</u> G M C <u>2/3</u> 1 036(cutoff, low load)
	(MULTIPLE OR SERIES)	M2AR 97 FXX <u>1</u> G M S <u>2/3</u> <u>1/2</u> 002 (remote ballast, semicutoff) M2RR 97 FXX <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff) M2RC 97 FXX <u>1</u> G M C <u>2/3</u> (remote ballast, cutoff) M2AC 97 FXX <u>1</u> G M C <u>2/3</u> <u>1/2</u> 002 (remote ballast, cutoff)

MCGRAW - EDISON (MULTIPLE) UNIDOR 250

#### **400WMV:**

AMERICAN ELECTRIC	(MULTIPLE)	125-0024 <u>2/3</u> (semicutoff) 126-0024 <u>2/3</u> (semicutoff)
GENERAL ELECTRIC	(MULTIPLE)	M4AR 40 C <u>0/1/3/7/7</u> C 2 G M N <u>2/3</u> <u>1/2</u> (semicutoff) M4RR 40 C <u>0/1/3/7/7</u> C 2 G M N <u>2/3</u> (semicutoff) M4AC 40 C <u>0/1/3/7/7</u> C 2 G M C <u>2/3</u> <u>1/2</u> (cutoff)
	(SERIES)	M4AR 40 CXS <u>1</u> G M S <u>2/3</u> 1 044 (semicutoff, low load) M4AC 40 CXS <u>1</u> G M C <u>2/3</u> 1 044 (cutoff, low load)
	(MULTIPLE OR SERIES)	M4AR 99 FXX <u>1</u> G M S <u>2/3</u> <u>1/2</u> 002 (remote ballast, semicutoff) M4RR 99 FXX <u>1</u> G M S <u>2/3</u> (remote ballast, semicutoff) M4RC 99 FXX <u>1</u> G M C <u>2/3</u> (remote ballast, cutoff) M4AC 99 FXX <u>1</u> G M C <u>2/3</u> <u>1/2</u> 002 (remote ballast, cutoff)

## **COBRAHEAD HORIZONTAL MOUNTED/BURNING**

### **METAL HALIDE (MH)**

#### **250WMH:**

GENERAL ELECTRIC (MULTIPLE) MDCL 25 M 1 A 2 1 FMC 3 1

#### **400WMH:**

GENERAL ELECTRIC (MULTIPLE) MDRL 40 M 0/1/3/7/7 A 21R M S 2/3 1/2(semicutoff)  
MDCL 40 M 1 A 2 G M C 3 1 146 (reduced jacketed)  
MSRL 40 M 0/1/3/7 A 21 RMS 2/3 (semicutoff)  
MDCL 40 M 0/1/3/7 A 21 FMC 2/3 1/2 (cutoff)

(SERIES) MSRL 40 CXS 11 R M S 2/3 (semicutoff, low load)  
MSCL 40 CSX 11 FMC 22 (cutoff, low load)

MCGRW - EDISON UNIDOR 400

## **POST TOP MOUNTED - VERTICAL BURNING**

### **HIGH PRESSURE SODIUM (HPS)**

#### **70 WHPS:**

AMERICAN ELECTRIC (MULTIPLE) 245 - 8 62 E 5 - 1A

GENERAL ELECTRIC (MULTIPLE) P17M 07 S 1/3/7 M 2 L MN 2/3/5  
(SERIES) P17M 07 SXS 1/3/7 L MN 2/3/5 043

MCGRW - EDISON (MULTIPLE) STYLEKING A

RESTORATION (MULTIPLE) HPLA - 07 S1BAT 3 G12  
RESOURCES (w/int. Refractor & Raylite #12 Glass Globe)

#### **100 WHPS :**

AMERICAN ELECTRIC (MULTIPLE) 245 - 8 62 1 5 - 1A

GENERAL ELECTRIC (MULTIPLE) P17M 10 S 1/3/7 M 2 L MN 2/3/5  
(SERIES) P17M 10 SXS 1/3/7 L MN 2/3/5 043

MCGRW - EDISON (MULTIPLE) STYLEKING A

## **POST TOP MOUNTED - VERTICAL BURNING**

### **HIGH PRESSURE SODIUM (HPS)**

#### **150 WHPS :**

AMERICAN ELECTRIC	(MULTIPLE)	245 - 8 62 6 5 - 1A
GENERAL ELECTRIC	(MULTIPLE)	P17M 15 S <u>1/3/7</u> M 2 L MN <u>2/3/5</u>
	(SERIES)	P17M 15 SXS <u>1/3/7</u> L MN <u>2/3/5</u> 043
MCGRW - EDISON	(MULTIPLE)	STYLEKING A

### **MERCURY VAPOR (MV)**

#### **100 WMV POLE - TOP:**

GENERAL ELECTRIC	(MULTIPLE)	P17M 10 C <u>1/3/7</u> C 2 L MN <u>2/3/5</u>
MCGRW - EDISON	(MULTIPLE)	STYLEKING A

#### **175 WMV POLE - TOP:**

GENERAL ELECTRIC	(MULTIPLE)	P17M 17 C <u>1/3/7</u> C 2 L MN <u>2/3/5</u>
MCGRW - EDISON	(MULTIPLE)	STYLEKING A

#### **250 WMV POLE - TOP:**

GENERAL ELECTRIC	(MULTIPLE)	P17M 25 C <u>1/3/7</u> C 2 L MN <u>2/3/5</u>
MCGRW - EDISON	(MULTIPLE)	STYLEKING A



## **DECORATIVE LUMINAIRES**

The following equipment has been approved for installation in the City. The requirement for shop drawings and/or cut sheets *has been waived* for the following luminaire catalog numbers. If the catalog numbers vary in any way, cut sheets and/or shop drawings will be required.

### **Tear-Drop Style**

#### **70WMH**

KING

CLA K204 EGP III 70 MOG MH 120 DT – (KPL10)

#### **250WMH**

KING

CLA-K804-EGD-III-250(MOG)-MH-120-KPL30-PE-KP

#### **400WMH**

KING

CLA-K804-EGD-III-400(MOG)-MH-120-KPL30-PE-KP

#### **100WHPS**

LUMEC

RNS20 100 HPS THA3 GL QTA/120 PH8 **CWI/CWA [(SM1\*) -(SMA\*) (OTA\*) (HS\*) (GRD\*) (CR1\*) (CR2\*) (DC\*1)]**

\*optional depending on application

KING

CLA K204 EGP III 100 MOG HPS 120 DT – (KPL10)

KING

CLA-K804-EGD-III-100(MOG)-HPS-120-KPL30-PE-KP

SEQUOIA

LP406A-20-6-1-1-1-GC-CC-0-C-0-2-0-0 ('Sombrero Style')

#### **150WHPS**

LUMEC

**RNS20/RN 150 HPS THA3 GL QTA/120 PH8 CWI/CWA [(SM1\*) (SMA\*) (OTA\*) (HS\*) (GRD\*) (CR1\*) (CR2\*) (DC1\*)]**

\*optional depending on application

KING

CLA-K804-EGD-III-150(MOG)-HPS-120-KPL30-PE-KP

#### **200WHPS**

LUMEC

RN20 200 HPS THA3 GL QTA/120 PH8 **CWI/CWA [(SM1\*) (SMA\*) (OTA\*) (HS\*) (GRD\*) (CR1\*) (CR2\*) (DC1\*)]**

\*optional depending on application

KING

CLA-K804-EGD-III-200(MOG)-HPS-120-KPL30-PE-KP

#### **250WHPS**

LUMEC

RN20 250 HPS THA3 GL QTA/120 PH8 **CWI/CWA [(SM1\*) (SMA\*) (OTA\*) (HS\*) (GRD\*) (CR1\*) (CR2\*) (DC1\*)]**

\*optional depending on application

KING

CLA-K804-EGD-III-250(MOG)-HPS-120-KPL30-PE-KP

#### **310WHPS**

LUMEC

RN20 310 HPS THA3 GL QTA/120 PH8 **CWI/CWA [(SM1\*) (SMA\*) (OTA\*) (HS\*) (GRD\*) (CR1\*) (CR2\*) (DC1\*)]**

\*optional depending on application

### Acorn-Style

#### 70 MH (MEDIUM BASE)

KING CLA K56 S/C T/R/P SGR/IGC III 70W (MED) MH 120 [(HSS\*) (PR\*) (K5\*)]  
\*optional depending on application

#### 100WMH (MOGUL BASE)

KING CLA K56 S/C T/R/P SGR/IGC III 100W (MOG) MH 120 [(HSS\*) (PR\*) (K5\*)]  
\*optional depending on application

#### 100WHPS

KING CLA K56 S/C T/R/P SGR/IGC III 100W (MOG) HPS 120 [(HSS\*) (PR\*) (K5\*)]  
\*optional depending on application

#### 200WHPS

KING CLA K56 S/C T/R/P SGR/IGC III 200W (MOG) HPS 120 [(HSS\*) (PR\*) (K5\*)]  
\*optional depending on application

### Semi-Spherical

#### 70WHPS

GARDCO MA17 -1- 1/3/FM 70HPS 120 LAMOD PC

#### 100WHPS

GARDCO MA17 -1- 1/3/FM 100HPS 120 LAMOD PC

#### 150WHPS

GARDCO MA17 -1- 1/3/FM 150HPS 120 LAMOD PC

### Lantern-Style

#### 100WHPS

LUMEC L70-100HPS-GLC-SE3-QTA/120-PH8-LAMOD-SF70-SC1 [(HK16\*), (HS\*)]  
\*optional depending on application

### Cylindrical

#### 100WHPS

KIM ENG 1A/2B-CCS 17A2/17A3-100HPS-A25

#### 150WHPS

KIM ENG 1A/2B-CCS 17A2/17A3/25A3-150HPS-A25

#### 200WHPS

KIM ENG 1A/2B-CCS25A3-200HPS-A25

#### 250WHPS

KIM ENG 1A/2B-CCS25A3-250HPS-A25

#### 400WHPS

KIM ENG 1A/2B-CCS25A3-400HPS-A25

#### 100WMH

KIM ENG 1A/2B-CCS17A2/17A3-100MH-A25

#### 400WMH

KIM ENG 1A/2B-CCS25A3-400MH-A25

## **SOFFIT & CONVERSION KITS**

### **HIGH PRESSURE SODIUM**

#### **50 WHPS:**

<b>GENERAL ELECTRIC</b>	(MULTIPLE) (SERIES)	KIT S 05 S1N 050 (MULTIPLE) no refractor – type V KIT S 05 SXS 104 (BAYONET) KIT S 05 SXS 045 (PLATE - MOUNTED)
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<b>UNICORN</b>	(SERIES)	UKS - PT - A66 - 50 - <u>"/X</u> (BAYONET MOUNT) S - 90600 - 50 - <u>"/X</u> (SOFFIT, MV BALLAST) S - 29601 - 50 - <u>"/X</u> (SOFFIT, INCAND. BASE)
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#### **70 WHPS:**

<b>GENERAL ELECTRIC</b>	(MULTIPLE) (SERIES)	KIT S 07 S1N 017 KIT S 07 S1N 044 (SOFFIT) KIT S 07 SXS 105 (BAYONET) KIT S 07 SXS 033 (PLATE-MOUNTED) KIT S 07 SXS 061 (SOFFIT)
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<b>GENERAL ELECTRIC SUPPLY</b>		F155-45-70 (SOFFIT, SERIES)
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<b>UNICORN</b>	(MULTIPLE) (SERIES)	UKR-PT-VX-70 (CONVERSION KIT) UKR-S-VX-70 (SOFFIT) UKS-PT-A66-70- <u>"/X</u> (BAYONET MOUNT) S-90600-70- <u>"/X</u> (SOFFIT, MV BALLAST) S-29601-70- <u>"/X</u> (SOFFIT, INCAND. CASE)
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<b>RESTORATION RESOURCES</b>	(MULTIPLE)	HPLA 07 S1 BAT3G12 <b>(HS*)</b> *optional depending on application
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#### **100 WHPS:**

<b>GENERAL ELECTRIC</b>	(MULTIPLE) (SERIES)	KIT S 10 S1M 004 KIT S 10 S1N 063 (SOFFIT) KIT S 10 SXS 106 (BAYONET) KIT S 10 SXS 049 (PLATE-MOUNTED) KIT S 10 SXS 112 (SOFFIT)
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<b>GENERAL ELECTRIC SUPPLY</b>		F155-45-100 (SOFFIT SERIES)
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<b>UNICORN</b>	(MULTIPLE) (SERIES)	UKR-PT-VX-100 (CONVERSION KIT) UKR-S-VX-100 (SOFFIT) UKS-PT-A66-100- <u>"/X</u> (BAYONET MOUNT) S-90600-100- <u>"/X</u> (SOFFIT, MV BALLAST) S-29601-100- <u>"/X</u> (SOFFIT, INCAND. CASE)
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<b>RESTORATION RESOURCES</b>	(MULTIPLE)	HPLA 10 S1 BAT3G12 <b>(HS*)</b> *optional depending on application LAK 10 S1 BAT3 - <b>[(1192*), (18B-UM1193*), (MARB 1900*)]</b> *depending on application
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### **150 WHPS:**

GENERAL ELECTRIC	(MULTIPLE) (SERIES)	KIT S 15 S1N 003 KIT S 15 SXS 107 (BAYONET) KIT S 15 SXS 046 (PLATE MOUNTED)
UNICORN	(SERIES)	UKS-PT-A66-150- <del>"X</del> (BAYONET MOUNT)

### **INDUCTION**

AMERICAN NAIL PLATE LIGHTING, INC	IK55K
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### **EXTERNAL BALLASTS**

#### **HIGH PRESSURE SODIUM (HPS)**

##### **50, 70, 100, 150, 200 & 250 WHPS SERIES 6.6 AMP**

GENERAL ELECTRIC (LOW LOAD)-	ENC <u>05/07/10/15/20/25</u> SXS 6 027 (W/ GND WIRE)
UNICORN	- SHP-A66- <u>50/70/100/150/200/250</u> R G (W/ GND WIRE)

##### **310, 400 WHPS SERIES 6.6 AMP**

UNICORN	- SHP-A66 <u>310/400</u> R G (W/GND WIRE)
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### **METAL HALIDE (MH)**

#### **400 WMH AUTO-REGULATOR SINGLE LAMP**

GENERAL ELECTRIC	-ENC 40 M0A6
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#### **400 WMH AUTO-REGULATOR TWO LAMP**

GENERAL ELECTRIC	-ENC 80 M7A6
JEFFERSON ELECTRIC	336-2781

### **MERCURY VAPOR (MV)**

#### **100WMV 120/240 REGULATOR**

GENERAL ELECTRIC	ENC 10 C7C6
JEFFERSON ELECTRIC CO.	
WESTINGHOUSE	

## **EXTERNAL BALLASTS**

### **400 WMV 120/240 REGULATOR**

GENERAL ELECTRIC                      ENC 40 C7C6

### **400 WMV SERIES 6.6 AMP**

GENERAL ELECTRIC                      ENC 40 CXS 6027  
SMV-A66-400RG

### **1000 WMV SERIES 6.6 AMP**

GENERAL ELECTRIC                      ENC 01 CXS 6027

## **WALLMOUNTED HORIZONTAL BURNING**

### **HIGH PRESSURE SODIUM (HPS)**

#### **70 WHPS WALL MOUNTED:**

GENERAL ELECTRIC (MULTIPLE)      W4L 07 S 7 M 1 S N 4 DBL

KENALL (MULTIPLE)                      MOD. NO. 5760

#### **100 WHPS WALL MOUNTED:**

GENERAL ELECTRIC (MULTIPLE)      W4L 10 S 0/1/3 M/A 1 S N 4 DBL

#### **150 WHPS WALL MOUNTED:**

GENERAL ELECTRIC (MULTIPLE)      W4L 15 S 0/1/3 M/A 1 S N 4 DB "/L

## **OTHER EQUIPMENT**

### **FUSE HOLDERS (LOW VOLTAGE)**

BUSSMAN                      STYLE HEB  
(TRON)                      STYLE HEF - 60 AMP

ESNA                      STYLE 64

LITTLEFUSE                      LEB - AA/ AB/BA/BB - "/S

## **FUSES (LOW VOLTAGE)**

BUSSMAN	(5-15 AMP) (15-30 AMP) (60 AMP)	STYLE FNM (125 V) STYLE KTK (600 V, 200,000 AIC) STYLE SC (300V, 100,000 AIC)	(TIME DELAY) (FAST ACTING) (TIME DELAY)
LITTLEFUSE	(5-15 AMP) (30 AMP) (60 AMP)	FLM - 15 KLK - 30 SLC - 60	

## **SERVICE JUNCTION CONNECTORS (LOW VOLTAGE)**

BURNDY MOLE	RDM <u>4/6</u> - 28 RYA <u>4/2</u> - UC RA <u>6/8</u> UC - SL
PENN-UNION ELECTRIC	DBA - <u>4L/6L</u>
ITT-BLACKBURN SQUID	UPC - <u>40/60</u>
HOMAC	FS95 - <u>4/6</u> OR SH - 6

## **TIMER - PE CELL ADAPTER**

AREA LIGHTING RESEARCH	ALR-WATT-IV (SELF ADJUSTING) ALR W - 120 (OPTIONS CMO-5 OR 6)
FISHER - PIERCE	281 SERIES OLC (FIXED TIME)

## **SOCKET EXTENDER**

GENERAL ELECTRIC	35 - 100095 - 31 (2 1/2")
CROUSE HINDS (MULTIPLE) (SERIES)	348 - 715 (2 7/16") 348 - 738 (2 7/16")

## **POP - ON BUSHING**

THOMAS & BETTS	TRIB - 50 THRU 200
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## **HPS STARTING AID**

MILBANK WEST	SS1 (70-400 WHPS)
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## **CONCRETE PULLBOXES**

CHRISTY CONCRETE PRODUCTS	TYPE 2 W/ REINFORCED LID
EISEL BROOKS	TYPE 2 & TYPE 3

## **COMPOSITE PULLBOXES**

### ARMORCAST PRODUCTS

Standard Type 2	A6001859APCX12
Standard Type 3 (18"x30"x12")	A6001407APCX12
Special Type 3 (Alley)	A6001407TAPCX12

### HUBBELL PRODUCTS

Type 2 Pullbox Lid rated for Tier 15	PG1120HA005M1J
Type 2 Pullbox rated for Tier 22	PG1120B500

### OLDCASTLE PRODUCTS

Composite Type 2 Pullbox	1121-12-BODY PC GRAY LA#2
Composite Type 3 Pullbox	1830-12-BODY PC GRAY LA#3

## **5000V SERIES CABLE CONNECTOR**

CROUSE HINDS	8173 QT5587-001
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## **PIPE LUBRICANT**

LOCTITE	Part Number 34517 (White Hi-Temp Anti-Sieze)
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## **ELECTROLIER STANDARDS**

Listed below are electrolier standards which are approved for use in the City of Los Angeles. They are identified by the manufacturer's catalog or design numbers and correspond with the City Design (CD) Numbers shown. This list is only applicable to those electrolier standards which are most commonly specified on current street lighting installation plans.

<b>CD803 (UPRIGHT)</b>	AMERON 20 CT - 12 (#37 MIX)
<b>CD807 (B, C)</b>	NOT CURRENTLY MANUFACTURED
<b>CD808X</b>	AMERON 4-B1-19- F4
<b>CD808Y</b>	AMERON 4-B1-22- F4
<b>CD808Z</b>	AMERON 4-B1-24- F4
<b>CD813</b>	AMERON 8-B2-18
<b>CD814A</b>	AMERON 5-B1-21*
<b>CD814B</b>	AMERON 5-B1-22*
<b>CD814C</b>	AMERON 5-B1-24*
<b>CD814D</b>	AMERON 5-B1-26*
<b>CD814E</b>	AMERON 5-B1-29*
	*F <del>4</del> <u>6/8</u> (arm length)
	CENTRECON MBR-7.0B-AP4
<b>CD814DT</b>	AMERON 5-CT1-23
<b>CD814ET</b>	AMERON 5-CT1-25
<b>CD851A</b>	AMERON 2 - B2 - 24 - A4
<b>CD851B</b>	AMERON 2 - B2 - 24 - A6
	CENTRECON MBR-7.0B-P6
<b>CD852A</b>	AMERON 7-B2-10
<b>CD852B</b>	AMERON 7-B2-12
<b>CD852C</b>	AMERON 7-B2-14
<b>CD855</b>	AMERON 2-B2-26 A <del>4</del> <u>6/8</u>
	CENTRECON MBR-7.5B - <del>AP4</del> <u>P6</u>
<b>CD856</b>	AMERON 3-B3-30 E <del>4</del> <u>6/8</u>
	(STEEL ARM)
<b>CD857</b>	AMERON 3-CT3-28-R- <del>4</del> <u>6/8</u>
<b>CD929(A,B,C)</b>	Union Metal 70189
<b>CD951A (5' ARM)</b>	AMERON CD951A-5
	IMPERIAL IMP25
	Union Metal FB-1125 B1-5
	VALMONT - DS30 – 7A25 - S-GV-19
<b>CD951B (5' ARM)</b>	UNION METAL LM-10010BG w/ MOD 2C
<b>CD951C (4' ARM)</b>	AMERON CD951C
	IMPERIAL IMP15-C
	LM-10010-C



## **ELECTROLIER STANDARDS CONT.**

<b>CD951D (4' ARM)</b>	PUMCO 5789-D AMERON CD951D
<b>CD953A</b>	AMERON CD953A IMPERIAL IMP30A PUMCO - 5425-A VALMONT - DS30 - 7.5 -A26
<b>CD953B</b>	AMERON CD953B JUST ARM A6/APL8 IMPERIAL IMP30B PUMCO - 5425-B VALMONT - DS30 -8 A 28
<b>CD953C</b>	AMERON CD953C <u>4/6/8</u> IMPERIAL IMP30 <u>0/4/6/8</u> PUMCO 5425-C VALMONT - DS30 - 8 A 30
<b>CD953 C7</b>	AMERON CD953 C7 PUMCO 5425-CTT IMPERIAL IMP30-C7T VALMONT DS40-8E30
<b>CD954</b> (standard 15' MA 4' LMA)	AMERON CD954 <u>4/6/8</u> IMPERIAL LAS30 <u>4/6/8</u> PUMCO TC-10203 A <u>LMA LENGTH</u> Y <u>MA LENGTH</u> Galvanized VALMONT - CB46 - 8 E 30
<b>CD958</b>	AMERON GF-140-10X PUMCO LE - 10080
<b>CD960</b>	PUMCO 71024 - Y - <u>23/24/25</u>
<b>40' DAVIT</b>	AMERON JS40 <u>6/8</u> VALMONT VI40 <u>6/8</u>

### **AMERON CATALOG NO. LOGIC:**

**ARMS:** C 4/6/8 ROUND CONCRETE  
F 4/6/8 OCTAGONAL CONCRETE  
A 4/6 1-BOLT SIMPLEX – 4' to 6' LMA  
APL 8 2-BOLT SIMPLEX – 8' LMA

### **UNION METAL CATALOG NO. LOGIC**

**ARMS:** 1831-4/6/8 – 4'LMA

## **ELECTROLIER STANDARDS CONT.**

The following equipment has been approved for installation in the City only where the Director, Bureau of Street Lighting, has given authorization for particular application prior to submittal of plans for his approval.

			<b>Gardco KING KING SELUX</b>	<b>RA5-15-AF-DI-SC CLA-AKCC15' CLA-KA72-T-1'- 3' A35-SV</b>
<b>5" ROUND ALUMINUM CLASSIC POLE CLASSIC ARM MODERN HAT POLE</b>				
<b><u>LAMPS</u></b>				
70WHPS	S62	PHILIPS SYLVANIA GE	CERAMALUX LUMALUX LUCALUX	C70S62 LU70 LU70
100WHPS	S54	PHILIPS SYLVANIA GE	CERAMALUX LUMALUX LUCALUX	C7100S54 LU100 LU100
150WHPS	S55	EYE LIGHTING PHILIPS SYLVANIA GE	IGNITRON CERAMALUX LUMALUX LUCALUX	LU100/I/EN C150S55 LU150 LU150
200WHPS	S66	EYE LIGHTING PHILIPS SYLVANIA GE	IGNITRON CERAMALUX LUMALUX LUCALUX	LU150/I/EN C200S66 LU200 LU200
250WHPS	S50	EYE LIGHTING PHILIPS SYLVANIA GE	IGNITRON CERAMALUX LUMALUX LUCALUX	LU200/I/EN C250S50 LU250 LU250
310WHPS	S67	EYE LIGHTING PHILIPS SYLVANIA GE	IGNITRON CERAMALUX LUMALUX LUCALUX	LU250/I/EN C310S67 LU310 LU310
400WHPS	S51	EYE LIGHTING PHILIPS SYLVANIA GE	IGNITRON CERAMALUX LUMALUX LUCALUX	LU310/I/EN C400S62 LU400 LU400
1000WHPS	S52	EYE LIGHTING PHILIPS SYLVANIA GE	IGNITRON CERAMALUX LUMALUX LUCALUX	LU400/I/EN C1000S52 LU1000 LU1000
175WMH	M57	PHILIPS SYLVANIA GE	METALARC MULTI-VAPOR	C70S62 MH175/U MH175/U
250WMH	M58	PHILIPS SYLVANIA GE		MH250/U MH250/U MVR250/U
400WMH	M59	PHILIPS SYLVANIA GE	METALARC MULTI-VAPOR	MH400/U MH400/U MVR400/U
1000WMH	M47	PHILIPS SYLVANIA GE		MH1000/U MH1000/U MVR1000/U

# STANDARD PLANS

## ELECTROLIERS

Included are commonly used Electroliers for quick reference. All other standard plans may be reviewed at the BSL Records counter.

40' Davit	ESRD962.0
CD 851	B-3655
CD814	B3279
CD951	D-12491
CD 953	B-3685
CD 954	L-103-0

## OTHER EQUIPMENT

Pullbox	L-201-0
Wiring Details	L-301-0
Catch Basin Clearance	L-304-0

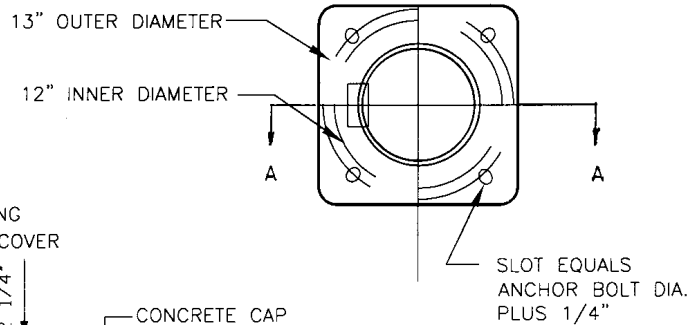
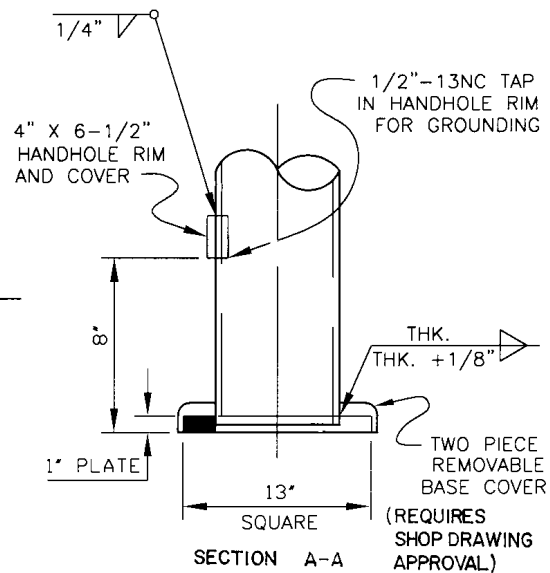
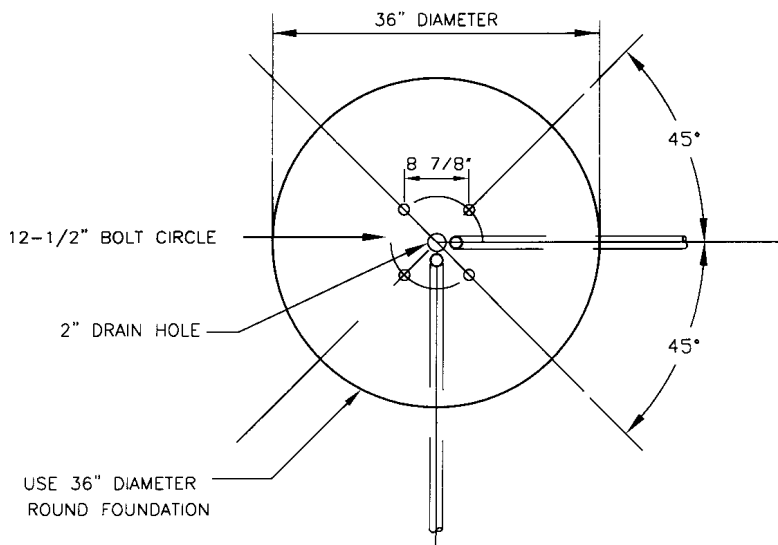
## Version 2 Changes:

- (1) Table of Contents – Changed Standard Drawing from CD855 to CD954
- (2) Section 2010 – Removed phone number for Valley Dispatcher
- (3) Section 5005.1 – Removed sentence referring to the contractor
- (4) Section 5005.1 – Modified approval procedure 1, revised and added requirements for pole shop drawings and calculations.
- (5) Section 5005.1 – Modified approval procedure 3, removed requirement that pole inspection must be mentioned in the letter.
- (6) Section 5030.1 – Under Galvanizing: removed "...requiring galvanizing..."
- (7) Section 5030.1 – Under Painting (New pole): added "steel"
- (8) Section 5600 – Under Painting of existing galvanized streetlights: Added section C which covers cast iron and copper shafts
- (9) Section 5600 – Under Miscellaneous Reporting: added section d which covers damage to City Street Lighting Equipment
- (10) Section 16400 – Under Junction Boxes: changed from NEMA "3R" to "3"
- (11) Page A-1 – Added NB, C, X explanation
- (12) Page A-2 – Added " \*\*269-less ignitor "
- (13) Page A-3 – Revised catalog numbers for the GE multiple or series 200WHPS & 250WHPS luminaires
- (14) Page A-3 – Added " \*\* 283-less ignitor"
- (15) Page A-4 - Added " \*\* 283-less ignitor"
- (16) Page A-7 – Revised catalog numbers for the GE 250W & 400W MH luminaires
- (17) Page A-14 – revised the Ameron catalog numbers
- (18) Page A-15 – Added Valmont to approved 40'Davit manufacturers
- (19) Page A-15 – Under Arms: added arm lengths and octagonal concrete
- (20) Page A-16 – Added approved lamps

## 2009 Changes:

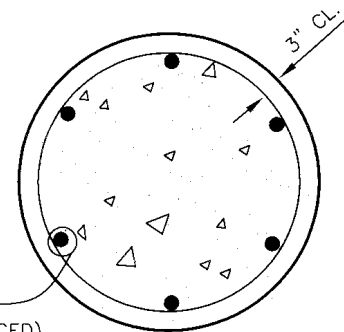
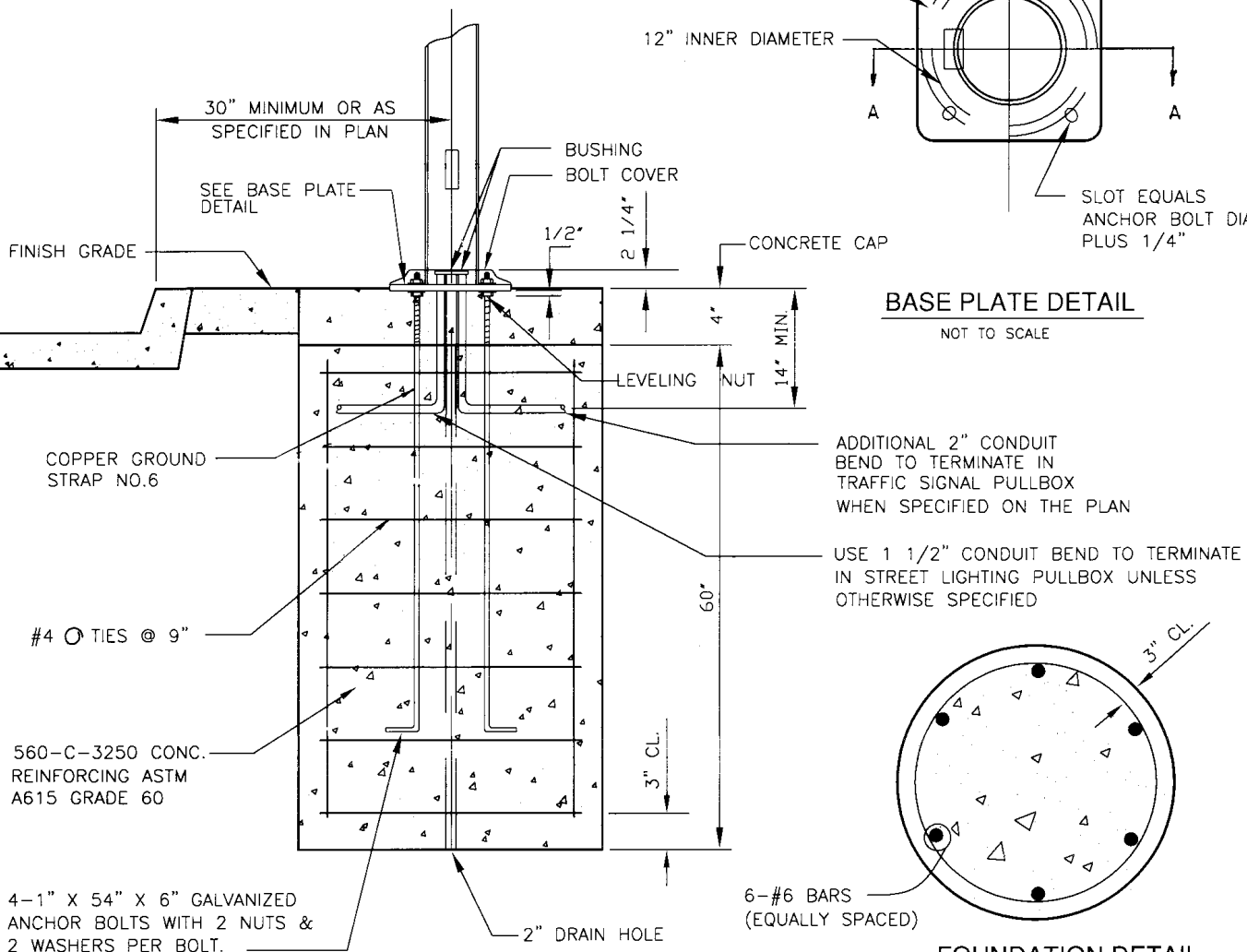
- (21) Added Field Acceptance (Section 16460)
- (22) Added 5700 – Electrolier Metal Bases
- (23) Added Street Lighting Specifications to Section 1060
- (24) Added ASTM standard for bolts to A449 (Section 5010.1)
- (25) Changed minimum topcoat thickness to 3 MILS DFT and minimum primer thickness to 3 MILS DFT(Section 5030.1)
- (26) Changed the paint approval process. BSL will provide approved paint chip samples upon request (Section 5030.1)
- (27) Changed the reporting procedure from Construction Section to Project Manager/Construction Engineer (Section 5600)
- (28) Added Remote Monitoring System (Section 16050.2)
- (29) Added Fuses (Section 16050.2)
- (30) Added reference to Section 210-3 and clarified conduit requirements (Section 16060)
- (31) Added Pipe Lubricant (Section 16060)
- (32) Clarified the testing procedure for conventional vs non-conventional (LED, Induction, etc) luminaires (Section 16950.1)
- (33) Added Induction Section 2 (Section 16950.2)
- (34) Added Pipe Lubricant (Section A-13)
- (35) Revised American Electric catalog numbers
- (36) Added Approved Composite Pullbox catalog numbers (Section A-13)
- (37) Changed UM catalog number for CD951B (Section A-16)
- (38) Added several approved catalog numbers for luminaires and conversion kits





**BASE PLATE DETAIL**

NOT TO SCALE



**FOUNDATION DETAIL**

NOT TO SCALE

BUREAU OF STREET LIGHTING  
DEPARTMENT OF PUBLIC WORKS  
CITY OF LOS ANGELES

APPROVED 8-11-01

*W. J. Ramirez*  
DIV. ENG., STRUCTURAL ENGINEERING DIVISION

APPROVED Sept 28, 2001

*Phil Reed*  
DIRECTOR BUREAU OF STREET LIGHTING

APPROVED 9/16 2001

*U. J. A. Delm*  
CITY ENGINEER

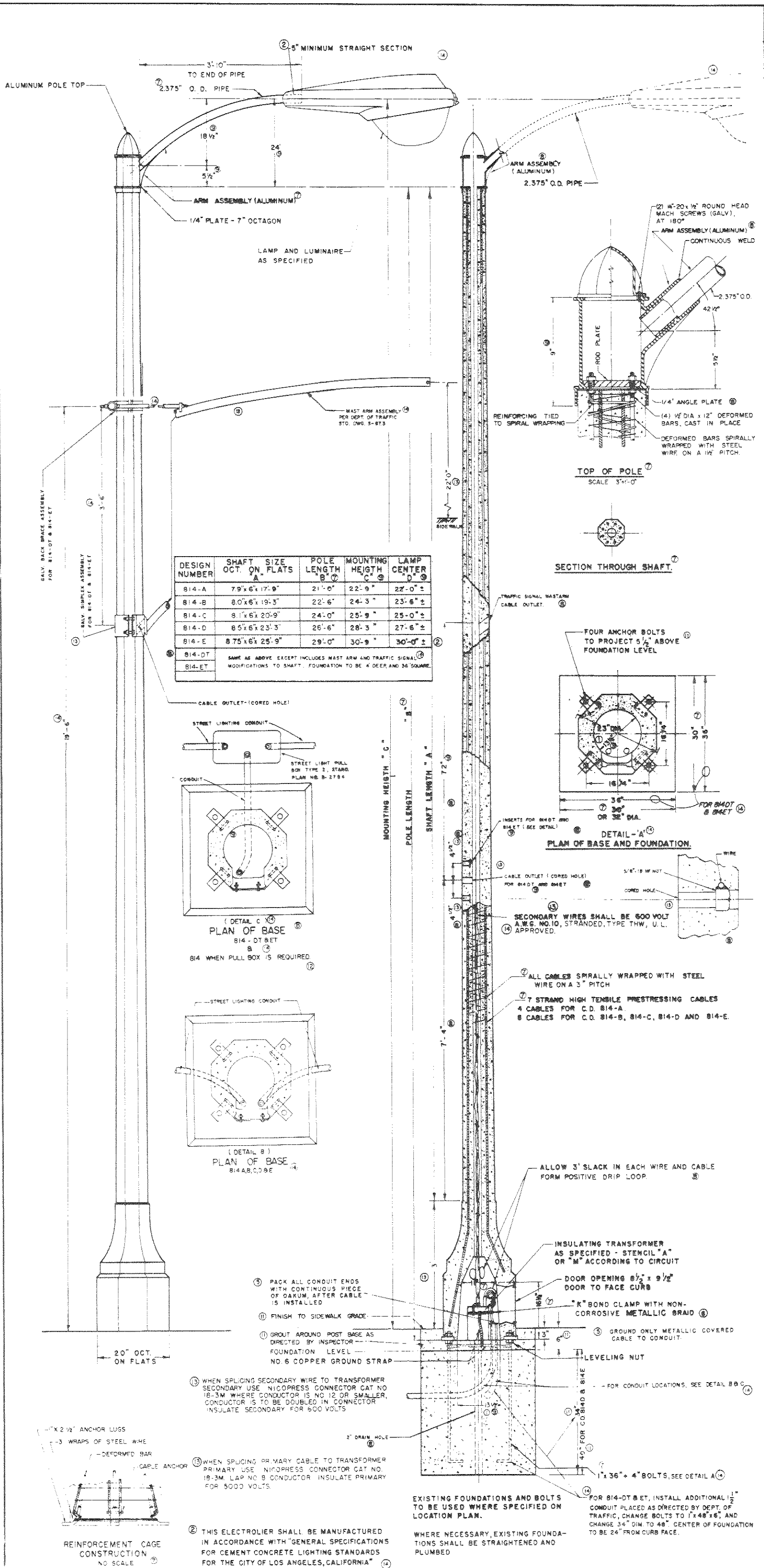
**40' STEEL  
DAVIT ELECTROLIER**

ESRD962.0

VAULT INDEX NUMBER: (NONE)

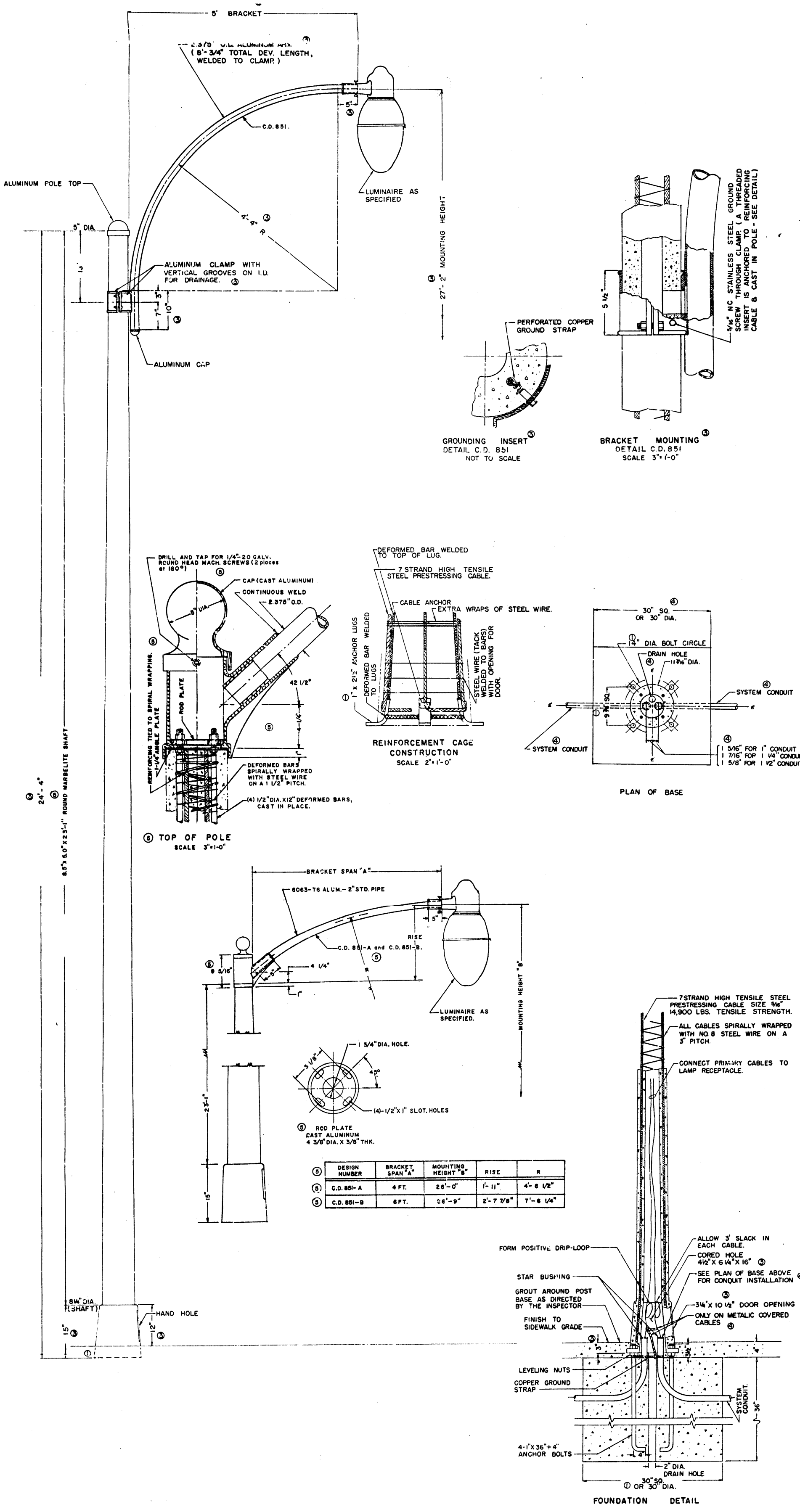
SHEET 2 OF 2 SHEETS





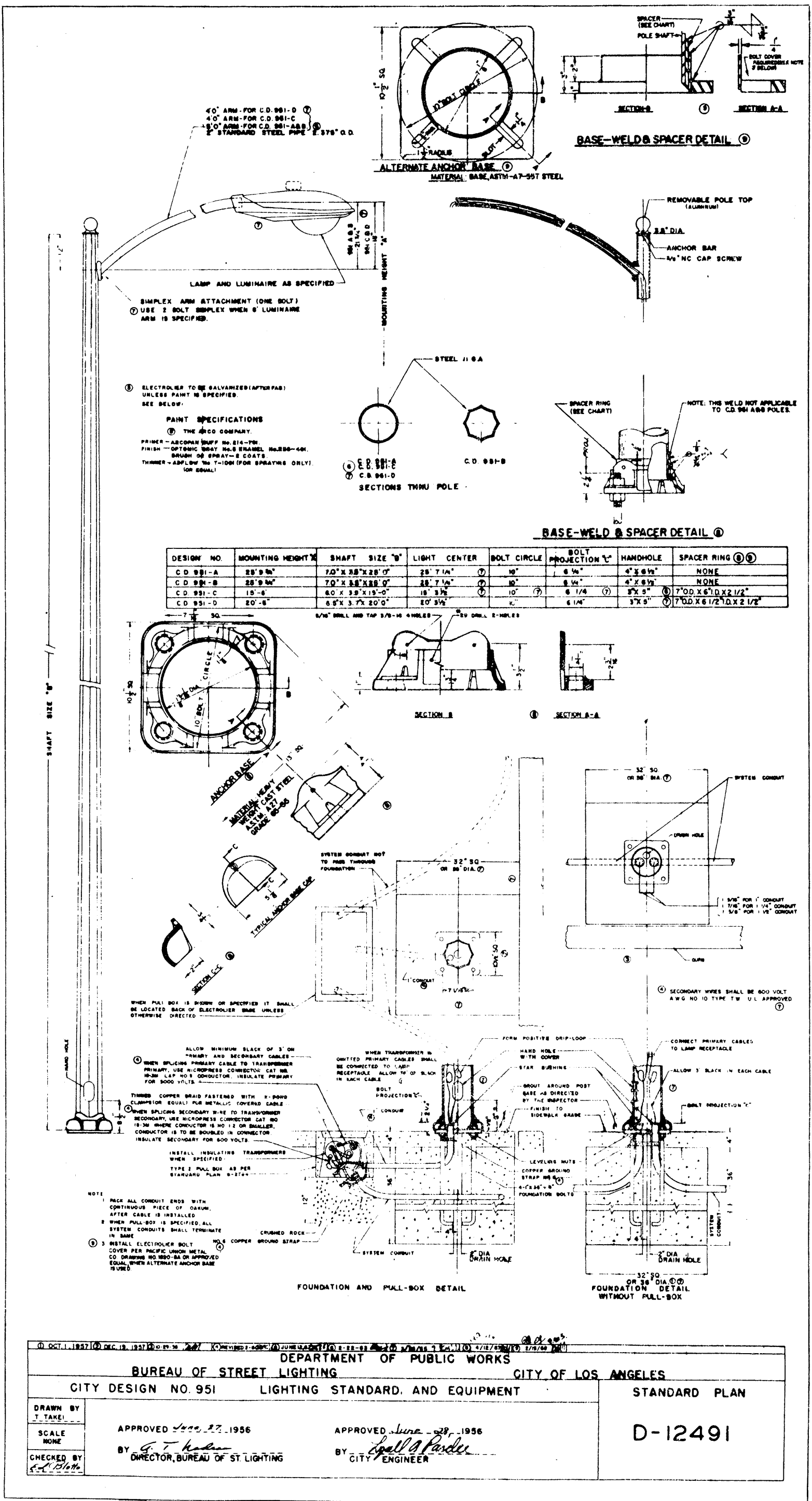
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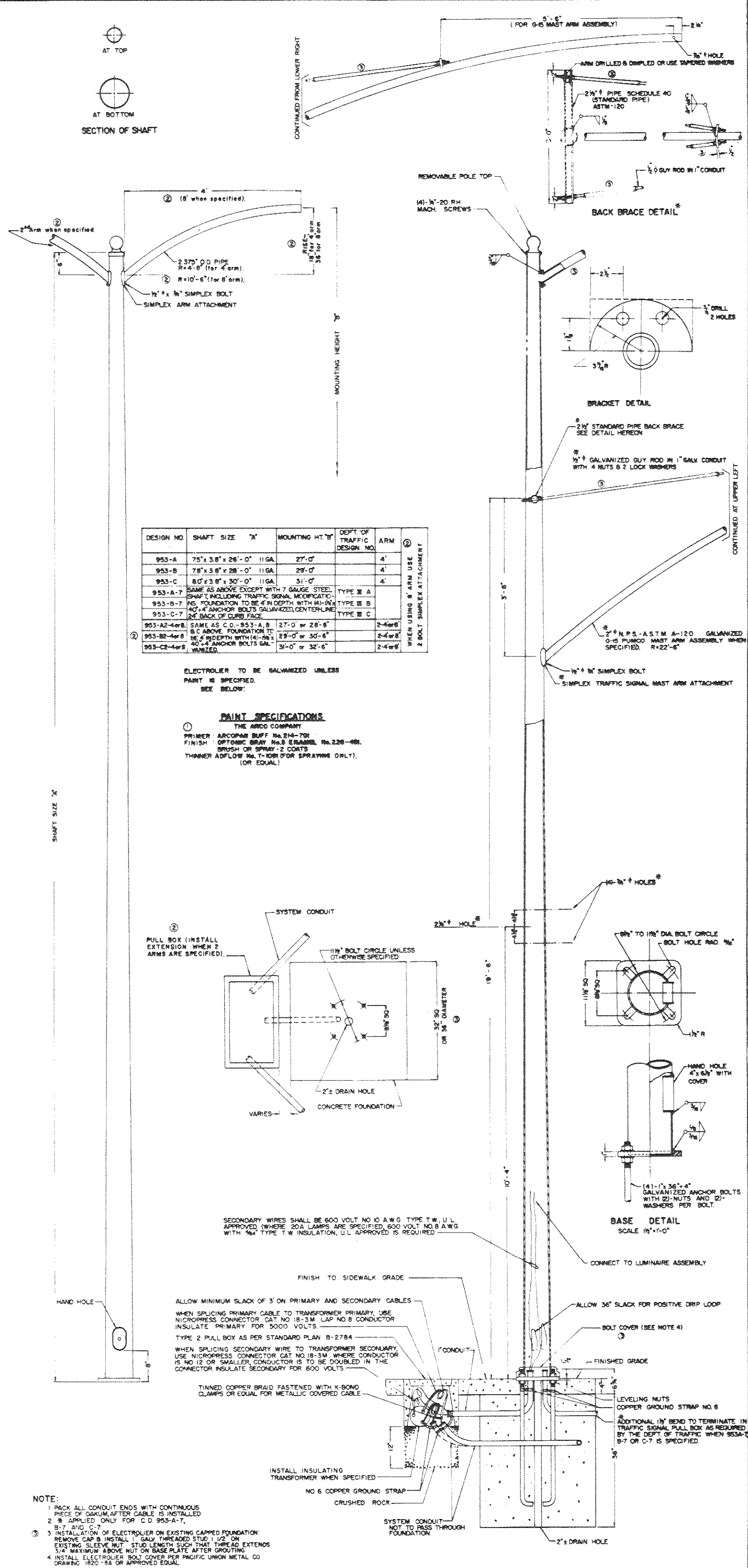




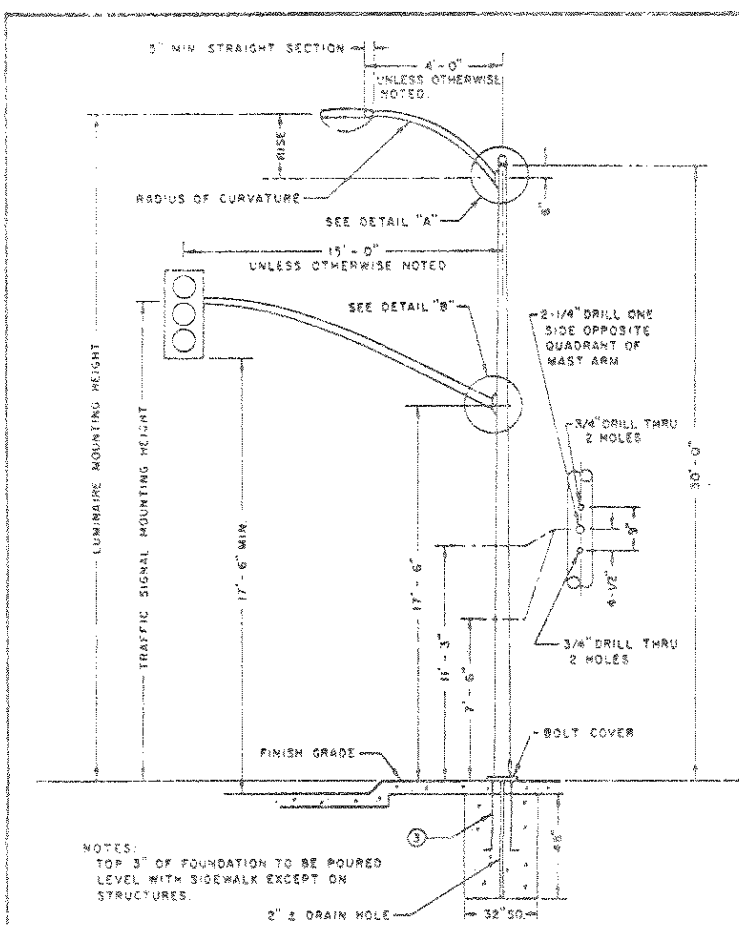
THIS ELECTROLIER SHALL BE MANUFACTURED IN ACCORDANCE WITH GENERAL SPECIFICATIONS FOR CEMENT CONCRETE LIGHTING STANDARDS FOR THE CITY OF LOS ANGELES, CALIFORNIA, ADOPTED BY THE BOARD OF PUBLIC WORKS, AUG. 9, 1946.

REVISED ① MAY 1957 ② OCT. 1957 ③ JUNE 1958 ④ 10-30-58 ⑤ 3-22-62		DEPARTMENT OF PUBLIC WORKS	
BUREAU OF STREET LIGHTING		CITY OF LOS ANGELES	
CITY DESIGN NO. 851		LIGHTING STANDARD AND EQUIPMENT	
STANDARD PLAN		B-3655	
DRAWN BY I. TAKEI	APPROVED <i>Lee L.</i> 1957	APPROVED <i>Lee L.</i> 1957	
SCALE 1"=1'-0"	BY <i>G. T. Hansen</i> DIRECTOR, BUREAU OF ST. LIGHTING	BY <i>Lyall A. Parker</i> CITY ENGINEER	
CHECKED BY <i>McGowan</i>			





REVISION	B.S.L. ① MAY 23, 1962	② APR. 20, 1964	③ 4-10-66	④	⑤	⑥	⑦	⑧	⑨	⑩
DEPT. TRAF.	① MAY 28, 1962	② APR. 25, 1964	③ 4-5-66	④	⑤	⑥	⑦	⑧	⑨	⑩
BUREAU OF STREET LIGHTING DEPARTMENT OF PUBLIC WORKS CITY OF LOS ANGELES										
CITY DESIGN NO. 953 LIGHTING STANDARD AND EQUIPMENT STANDARD PLAN										
DRAWN BY	APPROVED <u>2-2-1962</u>					APPROVED <u>10/22-1962</u>				
SCALE	BY <u>Director, Bureau of Street Lighting</u>					BY <u>City Engineer</u>				
CHECKED BY	BY <u>General Manager Dept. of Traffic</u>									
B-3685										



NOTES:  
TOP 3' OF FOUNDATION TO BE POURED LEVEL WITH SIDEWALK EXCEPT ON STRUCTURES.  
2" x 30" DRAIN HOLE

LUMINAIRE ARM DATA ④				
PROJECTED LENGTH	RISE	RADIUS OF CURVATURE	HEIGHT	
4'-0"	1'-6"	4'-9-1/2"	31'-0"	
6'-0"	2'-2-3/8"	7'-6-1/4"	31'-8"	
8'-0"	3'-0"	10'-6"	32'-6"	

SIGNAL ARM DATA ①				
PROJECTED LENGTH	GAGE	MINIMUM O.D. OF POLE	MINIMUM MOUNTING HEIGHT	
13'-0"	②	4.6"	22.31'	
18'-0"	10 GA	5.2"		
20'-0"	7 GA	5.0"	23.52'	

- NOTES:
- ROUND TAPERED STEEL TUBE WITH MAXIMUM TAPER OF 15 INCHES PER FOOT. END SECTION O.D. OF 2-3/8" FOR MOUNTING HARDWARE. STANDARD 2" PIPE EXTENSIONS OF 1'-0" MAX. ON 6'-10' SIZES AND 3'-0" MAX. ON 12'-20' SIZES MAY BE USED AT THE OPTION OF MANUFACTURER.
  - NO. 11 GAGE SHEET STEEL OF WELDABLE GRADE ACCEPTABLE IF THE STEEL AFTER FABRICATION HAS A MINIMUM YIELD STRENGTH OF 40,000 PSI.
  - FOUR ANCHOR BOLTS EACH BASE PLATE \*LENGTH INDICATED DOES NOT INCLUDE REQUIRED 4" - 90° BEND FOR THREADED 6" AND FURNISHED WITH 2 NUTS AND 2 WASHERS. ONE ANCHOR BOLT BONDED TO CONDUIT. ANCHOR BOLTS SHALL CONFORM TO THE SPECIFICATION OF ASTM A-307.
  - STANDARD STEEL PIPE 2.375" O.D. FOR LUMINAIRE ARM.

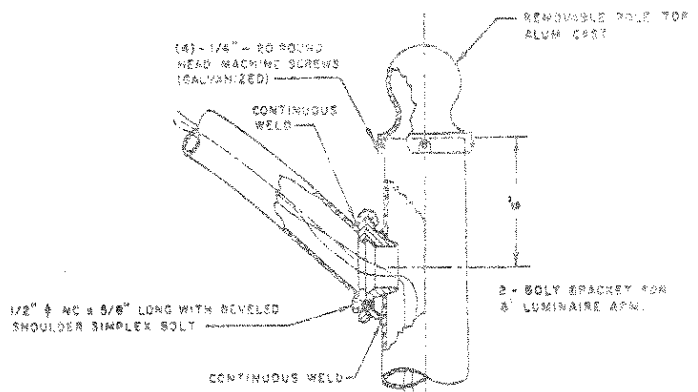
STANDARDS SHALL BE FABRICATED FROM (A) SHEET CONFORMING TO THE SPECIFICATIONS OF ASTM DESIGNATION: A 611, GRADE C, ASTM DESIGNATION: A 570, GRADE C, OR FROM (B) SHEET METAL OF WELDABLE GRADE. IF ALTERNATIVE (B) IS USED, THE STEEL, AFTER FABRICATION, SHALL HAVE A MINIMUM YIELD OF 40,000 POUNDS PER SQUARE INCH.

ALL WELDING SHALL CONFORM TO AWS D2.0, "SPECIFICATIONS FOR WELDED HIGHWAY AND RAILWAY BRIDGES."

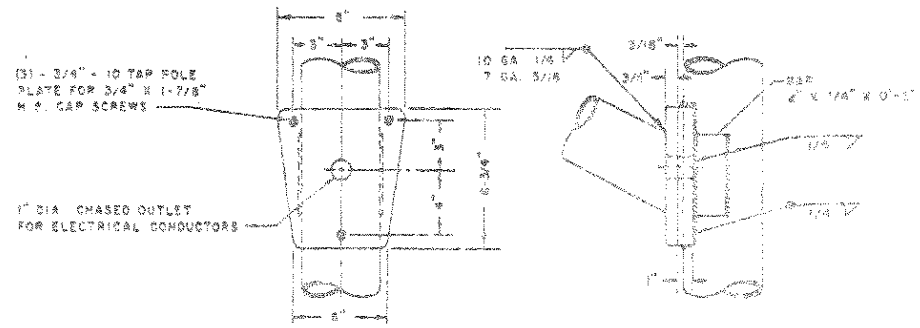
ALTERNATE: DETAILS APPROVED BY THE ENGINEER MAY BE SUBSTITUTED FOR THE ARM CONNECTIONS AND CONFIGURATIONS SHOWN. FABRICATORS ELECTING TO USE LARGER THAN MIN. ARM DIAMETERS MUST ADJUST THE DETAILS AS REQUIRED TO PERMIT SOLID SEATING OF CAP SCREWS. IN LIEU OF THE TORQUE REQUIREMENTS FOR H.S. BOLTS, CAP SCREWS SHALL BE TIGHTENED BY THE TURN-OF-NUT METHOD 1/8 TURN FROM SNUG TIGHT CONDITION IN ACCORDANCE WITH AISC MANUAL OF STEEL CONSTRUCTION SEC. 9. NO WASHER WILL BE REQUIRED.

INSTALL 1" CONDUIT BEND IN FOUNDATION AND TYPE 2 PULLBOX FOR STREET LIGHTING WITH ELECTROLIS.

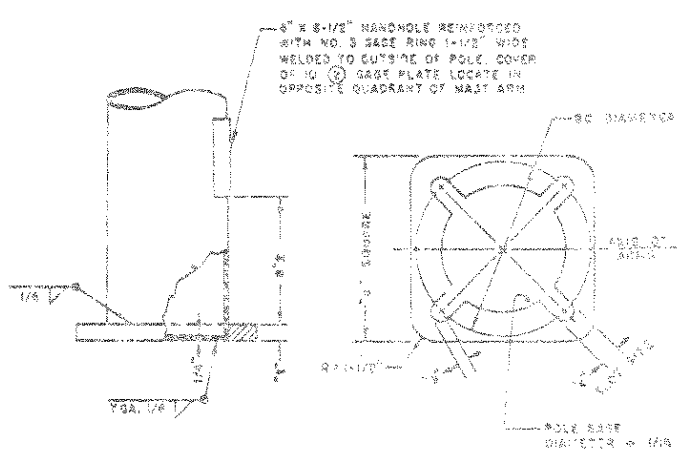
INSTALL 1-1/2" CONDUIT BEND IN FOUNDATION FOR TRAFFIC.



ONE BOLT BRACKET ATTACHMENT AND POLE TOP  
DETAIL "A"  
SCALE: 3" = 1'-0"



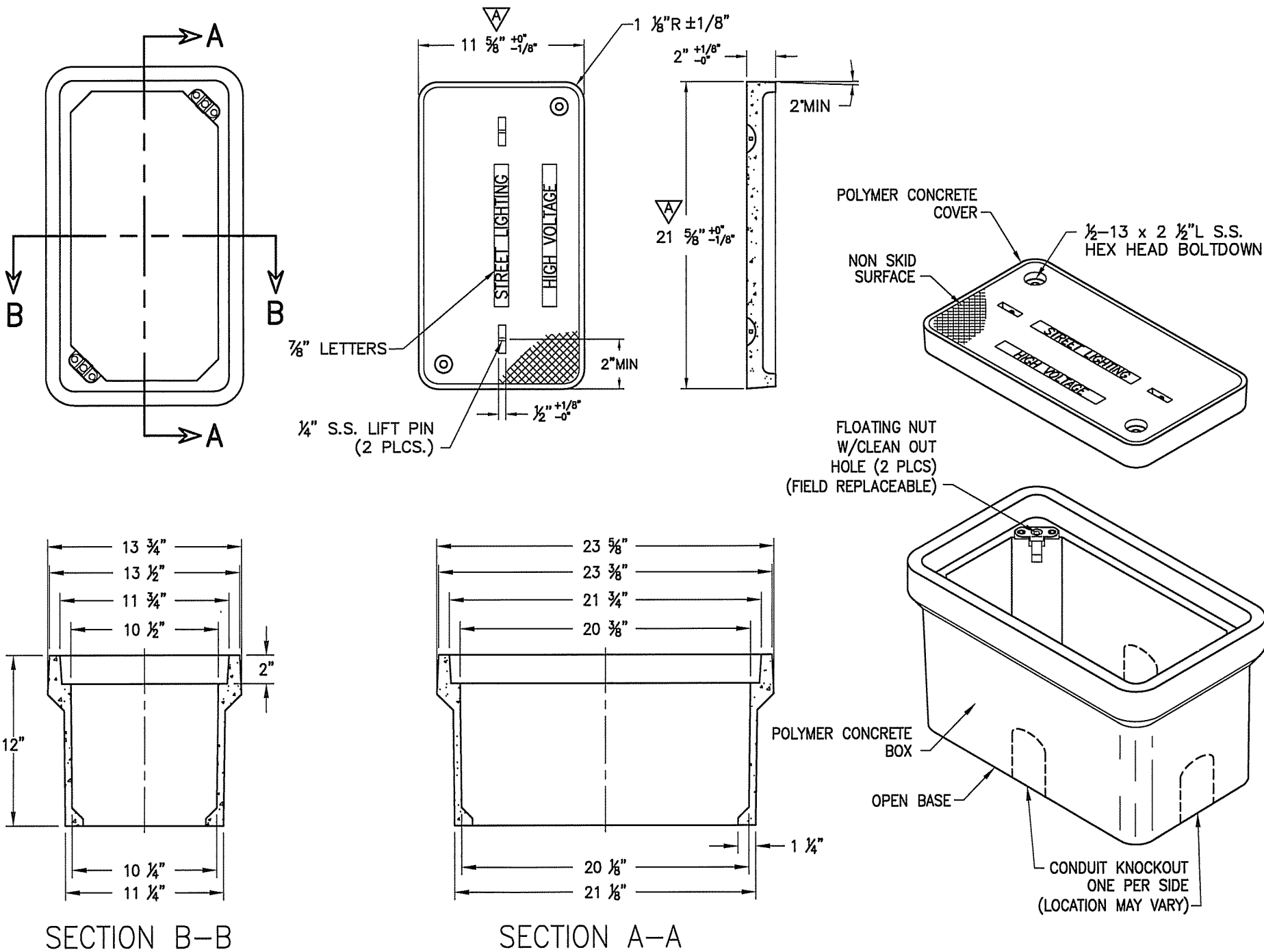
SIGNAL ARM CONNECTION  
DETAIL "B"  
NO SCALE



POLE BASE PLATE  
NO SCALE

ROUND TAPERED STEEL POLE		LUMINAIRE		SIGNAL		BASE PLATE		ANCHOR BOLTS	
HGT.	GAGE	MIN. O.D.	ARM LGT.	ARM LGT.	ARM LGT.	"a"	"b"	SIZE	NO.
30'-0"	7 GA	7-3/4"	3'-7/8"	4'-8"	18'	1-1/2"	3/4"	1-1/2"	40
				4'-8"	2'				

DEPARTMENT OF PUBLIC WORKS						CITY OF LOS ANGELES	
BUREAU OF STREET LIGHTING						STANDARD DRAWING NO.	
CITY DESIGN NO. 954						L-103-0	
SCALE: HEREON		DATE		REVISIONS		DATE	
DESIGNED BY		NO.	DESCRIPTION	SR. TRAFFIC ENGINEER	S.E.L. ENGINEER	DIRECTOR	DATE
DRAWN BY							
CHECKED BY							
						APPROVED	
						CITY TRAFFIC ENGINEER	
						APPROVED	
						DIRECTOR	



- WHERE "PULL-BOX" IS SPECIFIED IN THE PLANS, IT SHALL CONSIST OF A PULL-BOX AND LID, AND SHALL MEET THE REQUIREMENTS OF THIS PLAN.
- PULL-BOXES CAN BE MADE OF OTHER NON-CONCRETE, NON-CORROSIVE MATERIALS UPON APPROVAL BY THE ENGINEER.
- ALL EDGES AND CORNERS SHALL HAVE SMOOTH AND UNIFORM RADIUS OF 1/4" OR LESS UNLESS OTHERWISE SPECIFIED HEREON.
- VOIDS, BLEMISHES, OR IMPERFECTIONS EXCEEDING 3/8" IN MAXIMUM DIMENSION SHALL NOT EXIST IN ANY SURFACE.
- ALL SURFACES EXPOSED AFTER INSTALLATION SHALL BE SMOOTHLY FINISHED. CHIPS AND VOIDS THEREIN ARE NOT PERMITTED.
- MOLD, JOINT, OR SEAM LINES WITHIN 1" OF THE TOP OF THE BOX SHALL BE SMOOTHLY FINISHED.
- CONDUIT KNOCKOUTS SHALL BE REMOVABLE WITHOUT DAMAGE TO THE REMAINDER OF THE BOX.
- LIDS MADE OF POLYMER CONCRETE MUST HAVE A MINIMUM OF TWO LAYERS OF CONTINUOUS REINFORCEMENT, ONE AT THE TOP AND ONE AT THE BOTTOM. PULL BOXES MADE OF POLYMER CONCRETE MUST HAVE CONTINUOUS REINFORCEMENT ON THE INNER AND THE OUTER FACE OF THE BOX.
- WHERE REINFORCING INTERSECTS, IT SHALL BE SECURE.
- THE LIFT BAR IN THE PULL-BOX LID SHALL BE SECURELY ATTACHED TO THE REINFORCING MATERIAL OR MADE EQUALLY SECURE IN THE LID BY SOME OTHER METHOD.
- LETTERS SHOWN ON LID SHALL NOT BE DIFFERENT FROM OR OF A SIZE LESS THAN THAT INDICATED HEREON.
- LID SHALL SEAT EVENLY ON THE LID FLANGE AND SHALL NOT ROCK MORE THAN 1/8" INCH.
- ONE LID BOLT #1/2"-13 x 2 1/2" L. MINIMUM SHALL BE PROVIDED WHICH SHALL EXTEND THROUGH PULL-BOX AND LID. THEY SHALL SECURE THE LID WITH HEX HEAD NUT AND WASHER WHICH SHALL BE RECESSED BELOW THE TOP OF LID. BOLTS SHALL BE LOCATED SYMMETRICALLY WITH RESPECT TO THE TOP SURFACE OF THE LID AND SHALL HAVE A NON-CORROSIVE SURFACE.
- ALL PULLBOXES AND LIDS MUST COMPLY WITH ALL TEST PROVISIONS OF ANSI/SCTE 77 2007 "SPECIFICATIONS FOR UNDERGROUND ENCLOSURE INTEGRITY". PULLBOXES MUST COMPLY WITH THE TIER 22 RATING. THE LIDS MUST COMPLY WITH THE TIER 15 RATING. MARKINGS SHOWING THE RATING MUST BE LABELED OR STENCILED ON THE INSIDE AND OUTSIDE FACE OF THE BOX AND ON THE UNDERSIDE OF THE LID.
- PULL BOX AND PULL BOX LID SHALL NOT SHOW ANY EVIDENCE OF FAILURE WHEN SUBJECTED TO ANSI/SCTE 77 2007 TEST LOADS. THE TEST LOAD SHALL BE APPLIED ON A SMOOTH STEEL LOAD PLATE (1"x10"x10") THAT IS POSITIONED OVER A 1/2" THICK RUBBER PAD.
- PULL BOX SHALL NOT SHOW EVIDENCE OF FAILURE WHEN SUBJECTED TO ANSI/SCTE 77 SPECIFICATIONS AT THE CENTER OF AND PERPENDICULAR TO ANY SIDE WITH THE OPPOSITE SIDE UNIFORMLY SUPPORTED. TEST LOAD SHALL BE APPLIED AS IN NOTE 15 ABOVE.
- THE PULL-BOX LID SHALL NOT PUNCTURE, CRACK OR SPLIT WHEN SUBJECTED TO AN IMPACT OF 70 FOOT-POUNDS MINIMUM USING A "C" TUP PER ASTM D-2444.
- LIDS SHALL NOT CHIP WHEN DROPPED.
- TWO PULL-BOXES MAY BE SELECTED FROM EACH LOT OF ONE HUNDRED DELIVERED, AND USED FOR TEST PURPOSES. FAILURE OF ANY TEST PULL-BOX MAY BE CAUSE FOR REJECTION OF THE LOT.
- WHERE A PULL-BOX WITH EXTENSION IS SPECIFIED IN THE PLANS, IT MAY CONSIST OF A SECOND PULL-BOX INSTALLED IMMEDIATELY BENEATH THE FIRST, OR IT MAY BE A DIFFERENT PART WHICH MEETS THE APPLICABLE DIMENSIONS AND SPECIFICATIONS OF THIS PLAN.
- PULL-BOXES SHALL BE INSTALLED ON A BED OF 1" CRUSHED ROCK WHICH SHALL BE A MINIMUM OF 12 INCHES IN DEPTH AND SHALL EXTEND A MINIMUM OF 6 INCHES BEYOND THE PULL-BOX SIDES.
- ALL MATERIALS MUST BE NEW AND ALL PRODUCTS SHALL HAVE CONSISTENT DIMENSIONS, THICKNESS AND COLOR WITHIN THE ALLOWABLE MANUFACTURING TOLERANCE SPECIFIED IN THE SUBMITTAL OR REFERENCED STANDARDS.
- REQUIRED INFORMATION AND SUBMITTAL  
IN ADDITION TO THE INFORMATION AS REQUIRED IN PUBLIC WORKS MATERIAL APPROVAL PROCEDURES, THE FOLLOWING INFORMATION SHALL BE SUBMITTED TO THE CITY ENGINEER BEFORE ANY TESTING OR APPROVAL CAN BE GRANTED.  
(a) FOR MATERIALS AND PRODUCTS CONSISTING OF PLASTIC RESIN, FIBERGLASS MATERIALS, FIBERGLASS REINFORCED PLASTIC (FRP), REINFORCED PLASTIC MORTAR (RPM), POLYMER CONCRETE OR VITRIFIED POLYMER COMPOSITE, OR ANY COMBINATION THEREOF:  
(1) A DESCRIPTION OF ANY FELT OR OTHER FABRIC USED TO MANUFACTURE THE PRODUCTS.  
(2) WOVEN, NON-WOVEN OR PUNCHED.  
(3) PROPERTIES OF AGGREGATES, CHOPPED GLASS FIBERS OR OTHER REINFORCING REQUIRED:  
i. THE AMOUNT, LOCATION AND ORIENTATION OF THE CHOPPED GLASS FIBERS.  
ii. THE GRADE OF THE GLASS FIBERS.  
iii. THE TYPE AND GRADATION OF ANY AGGREGATES OR SANDS USED.
- COVERS AND FRAMES WITH MATERIALS THAT ARE MADE OF PLASTIC RESIN, FIBERGLASS, FRP, RPM, POLYMER CONCRETE OR VITRIFIED POLYMER COMPOSITE SHALL NOT BE USED IN VEHICULAR TRAFFIC AREAS.
- ALL PULL BOXES AND LIDS MUST BE TESTED AND CERTIFIED BY AN INDEPENDENT THIRD PARTY TESTING LAB AT NO COST TO THE CITY. THE CITY HAS A RIGHT TO RECERTIFY EACH MANUFACTURER EVERY YEAR AT NO COST TO THE CITY.
- MANUFACTURER WILL WARRANTEE THEIR PULL BOXES AND LIDS FOR 2 YEARS

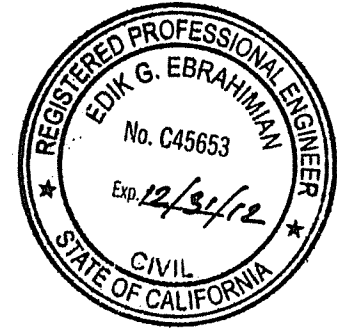
BUREAU OF STREET LIGHTING

DEPARTMENT OF PUBLIC WORKS

CITY OF LOS ANGELES

PULL-BOX

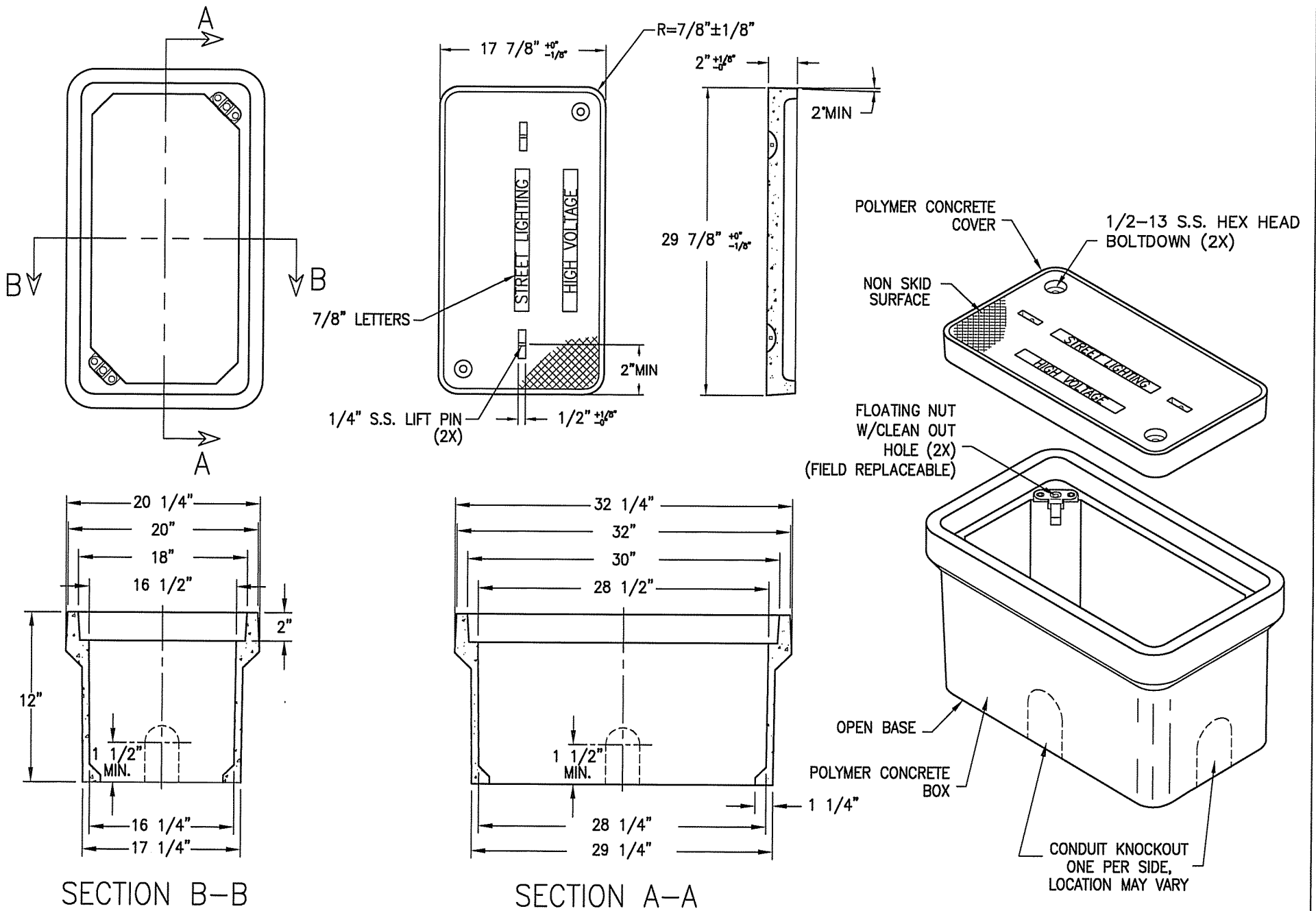
STANDARD PLAN  
COMPOSITE TYPE 2



SUBMITTED BY: *[Signature]* O.E. Nova  
DATE: *May 24, 2011*  
APPROVED: *May 24, 2011*  
*[Signature]*  
DIRECTOR, BUREAU OF STREET LIGHTING

REVISIONS		
NO.	DESCRIPTION	DATE
A	REVISED COVER DIMENSIONS	3/2/10
B	MODIFIED TO MEET ANSI/SCTE77 2007	3/31/11

SUPERSEDES	REFERENCES
L-201-0	
VAULT INDEX NUMBER: L-201-1	
SHEET 1 OF 1 SHEETS	



- WHERE "PULL-BOX" IS SPECIFIED IN THE PLANS, IT SHALL CONSIST OF A PULL-BOX AND LID, AND SHALL MEET THE REQUIREMENTS OF THIS PLAN.
- PULL-BOXES CAN BE MADE OF OTHER NON-CONCRETE, NON-CORROSIVE MATERIALS UPON APPROVAL BY THE ENGINEER.
- ALL EDGES AND CORNERS SHALL HAVE SMOOTH AND UNIFORM RADIUS OF 1/4" OR LESS UNLESS OTHERWISE SPECIFIED HEREON.
- VOIDS, BLEMISHES, OR IMPERFECTIONS EXCEEDING 3/8" IN MAXIMUM DIMENSION SHALL NOT EXIST IN ANY SURFACE.
- ALL SURFACES EXPOSED AFTER INSTALLATION SHALL BE SMOOTHLY FINISHED. CHIPS AND VOIDS THEREIN ARE NOT PERMITTED.
- MOLD, JOINT, OR SEAM LINES WITHIN 1" OF THE TOP OF THE BOX SHALL BE SMOOTHLY FINISHED.
- CONDUIT KNOCKOUTS SHALL BE REMOVABLE WITHOUT DAMAGE TO THE REMAINDER OF THE BOX.
- LIDS MADE OF POLYMER CONCRETE MUST HAVE A MINIMUM OF TWO LAYERS OF CONTINUOUS REINFORCEMENT, ONE AT THE TOP AND ONE AT THE BOTTOM. PULL BOXES MADE OF POLYMER CONCRETE MUST HAVE CONTINUOUS REINFORCEMENT ON THE INNER AND THE OUTER FACE OF THE BOX.
- WHERE REINFORCING INTERSECTS, IT SHALL BE SECURE.
- THE LIFT BAR IN THE PULL-BOX LID SHALL BE SECURELY ATTACHED TO THE REINFORCING MATERIAL OR MADE EQUALLY SECURE IN THE LID BY SOME OTHER METHOD.
- LETTERS SHOWN ON LID SHALL NOT BE DIFFERENT FROM OR OF A SIZE LESS THAN THAT INDICATED HEREON.
- LID SHALL SEAT EVENLY ON THE LID FLANGE AND SHALL NOT ROCK MORE THAN 1/8" INCH.
- ONE LID BOLT 1/2"-13 x 3 1/2" MINIMUM SHALL BE PROVIDED WHICH SHALL EXTEND THROUGH THE PULL-BOX AND LID. THEY SHALL SECURE THE LID WITH HEX HEAD NUT AND WASHER WHICH SHALL BE RECESSED BELOW THE TOP OF LID. BOLTS SHALL BE LOCATED SYMMETRICALLY WITH RESPECT TO THE TOP SURFACE OF THE LID AND SHALL HAVE A NON-CORROSIVE SURFACE.
- ALL PULLBOXES AND LIDS MUST COMPLY WITH ALL TEST PROVISIONS OF ANSI/SCTE 77 2007 "SPECIFICATIONS FOR UNDERGROUND ENCLOSURE INTEGRITY". PULLBOXES AND LIDS MUST COMPLY WITH THE TIER 22 RATING. MARKINGS SHOWING THE RATING MUST BE LABELED OR STENCILED ON THE INSIDE AND OUTSIDE FACE OF THE BOX AND ON THE UNDERSIDE OF THE LID.
- PULL-BOX AND LID SHALL NOT SHOW ANY EVIDENCE OF FAILURE WHEN SUBJECTED TO ANSI/SCTE 77 2007 SPECIFICATIONS AT THE CENTER OF THE LID WITH THE EDGES SUPPORTED BY THE PULL BOX FOR 10 CYCLES. THE TEST LOAD SHALL BE APPLIED ON A SMOOTH STEEL LOAD PLATE (1"x10"x20") THAT IS POSITIONED OVER A 1/2" THICK RUBBER PAD.
- PULL-BOX AND LID SHALL NOT SHOW ANY EVIDENCE OF FAILURE WHEN SUBJECTED TO ANSI/SCTE 77 2007 SPECIFICATIONS AT THE CENTER OF AND PERPENDICULAR TO ANY SIDE WITH THE OPPOSITE SIDE UNIFORMLY SUPPORTED. TEST LOAD SHALL BE APPLIED AS IN NOTE 15 ABOVE.
- THE PULL-BOX LID SHALL NOT PUNCTURE, CRACK OR SPLIT WHEN SUBJECTED TO AN IMPACT OF 70 FOOT-POUNDS USING A "C" TUP PER ASTM D-2444.
- LIDS SHALL NOT CHIP WHEN DROPPED.
- TWO PULL-BOXES MAY BE SELECTED FROM EACH LOT OF ONE HUNDRED DELIVERED, AND USED FOR TEST PURPOSES. FAILURE OF ANY TEST PULL-BOX MAY BE CAUSE FOR REJECTION OF THE LOT.
- WHERE A PULL-BOX WITH EXTENSION IS SPECIFIED IN THE PLANS, IT MAY CONSIST OF A SECOND PULL-BOX INSTALLED IMMEDIATELY BENEATH THE FIRST, OR IT MAY BE A DIFFERENT PART WHICH MEETS THE APPLICABLE DIMENSIONS AND SPECIFICATIONS OF THIS PLAN.
- PULL-BOXES SHALL BE INSTALLED ON A BED OF 1" CRUSHED ROCK WHICH SHALL BE A MINIMUM OF 12 INCHES IN DEPTH AND SHALL EXTEND A MINIMUM OF 6 INCHES BEYOND THE PULL-BOX SIDES.
- ALL MATERIALS MUST BE NEW AND SHALL HAVE CONSISTENT DIMENSIONS, THICKNESS AND COLOR WITHIN THE ALLOWABLE MANUFACTURING TOLERANCE SPECIFIED IN THE SUBMITTAL OR REFERENCED STANDARDS.
- REQUIRED INFORMATION AND SUBMITTAL:  
IN ADDITION TO THE INFORMATION AS REQUIRED IN PUBLIC WORKS MATERIAL APPROVAL PROCEDURES, THE FOLLOWING INFORMATION SHALL BE SUBMITTED TO THE CITY ENGINEER BEFORE ANY TESTING OR APPROVAL CAN BE GRANTED.  
(a) FOR MATERIALS AND PRODUCTS CONSISTING OF PLASTIC RESIN, FIBERGLASS MATERIALS, FIBERGLASS REINFORCED PLASTIC (FRP), REINFORCED PLASTIC MORTAR (RPM), POLYMER CONCRETE OR VITRIFIED POLYMER COMPOSITE, OR ANY COMBINATION THEREOF.  
(1) A DESCRIPTION OF ANY FELT OR OTHER FABRIC USED TO MANUFACTURE THE PRODUCTS.  
(2) WOVEN, NON-WOVEN OR PUNCHED.  
(3) PROPERTIES OF AGGREGATES, CHOPPED GLASS FIBERS OR OTHER REINFORCING REQUIRED.  
i. THE AMOUNT, LOCATION AND ORIENTATION OF THE CHOPPED GLASS FIBERS.  
ii. THE GRADE OF THE GLASS FIBERS.  
iii. THE TYPE AND GRADATION OF ANY AGGREGATES OR SANDS USED.
- COVERS AND FRAMES WITH MATERIALS THAT ARE MADE OF PLASTIC RESIN, FIBERGLASS, FRP, RPM, POLYMER CONCRETE OR VITRIFIED POLYMER COMPOSITE SHALL NOT BE USED IN VEHICULAR TRAFFIC AREA AND SHALL BE TESTED SEPARATELY.
- ALL PULL BOXES AND LIDS MUST BE TESTED AND CERTIFIED BY AN INDEPENDENT THIRD PARTY TESTING LAB AT NO COST TO THE CITY. THE CITY HAS A RIGHT TO RECERTIFY EACH MANUFACTURER EVERY YEAR AT NO COST TO THE CITY.
- THE MANUFACTURER WILL WARRANT THEIR PULLBOXES AND LIDS FOR 2 YEARS.

BUREAU OF STREET LIGHTING      DEPARTMENT OF PUBLIC WORKS      CITY OF LOS ANGELES

## PULL-BOX

## STANDARD PLAN COMPOSITE TYPE 3



SUBMITTED BY: *AT O.E. Nova*

DATE: *August 4, 2011*

APPROVED *Aug 16 2011*

DIRECTOR, BUREAU OF STREET LIGHTING

### REVISIONS

NO.	DESCRIPTION	DATE
1	MODIFIED TO MEET ANSI/SCTE77 2007	7/27/11

### SUPERSEDES

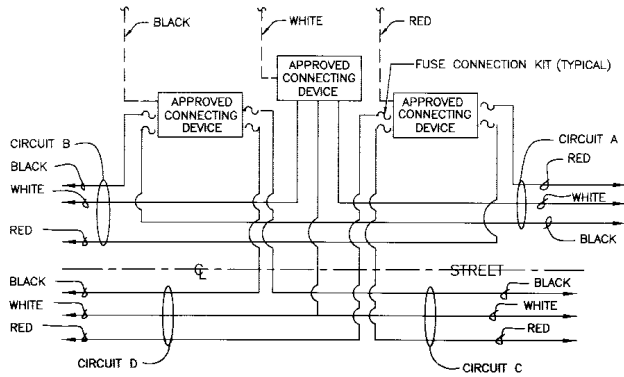
### REFERENCES

L-201-0

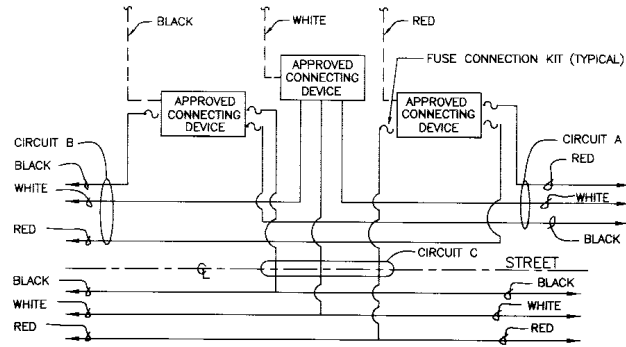
VAULT INDEX NUMBER:

SHEET 1 OF 1

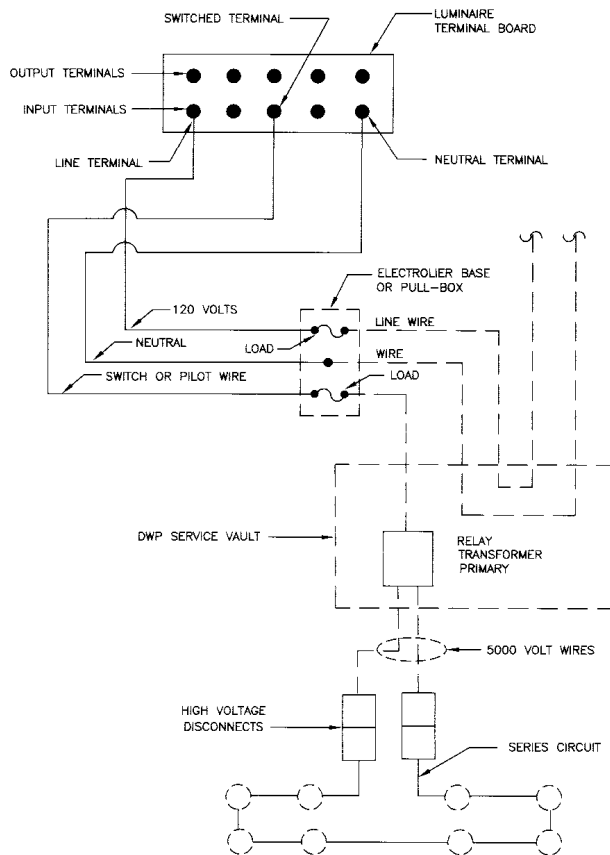




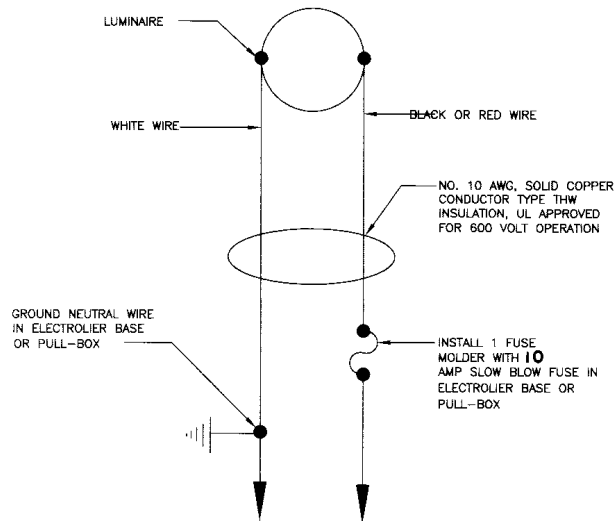
TYPICAL CONNECTOR DETAIL A



TYPICAL CONNECTOR DETAIL B



TYPICAL SERIES CIRCUIT CONTROL  
PHOTOELECTRIC SWITCH  
WIRING DETAIL



TYPICAL  
MULTIPLE CIRCUIT ELECTROLIER  
WIRING DETAIL

— INDICATES WIRES INSTALLED BY STREET LIGHTING CONTRACTOR  
- - - INDICATES WIRES INSTALLED BY SERVING COMPANY

BUREAU OF STREET LIGHTING

DEPARTMENT OF PUBLIC WORKS

CITY OF LOS ANGELES

**TYPICAL WIRING DETAILS**

STANDARD PLAN  
**L-301-1**

Submitted by: *Yama Muro*

Date: *1/6/04*

APPROVED *Jan 6, 2004*

*Phil Reed*  
DIRECTOR, BUREAU OF STREET LIGHTING

**REVISIONS**

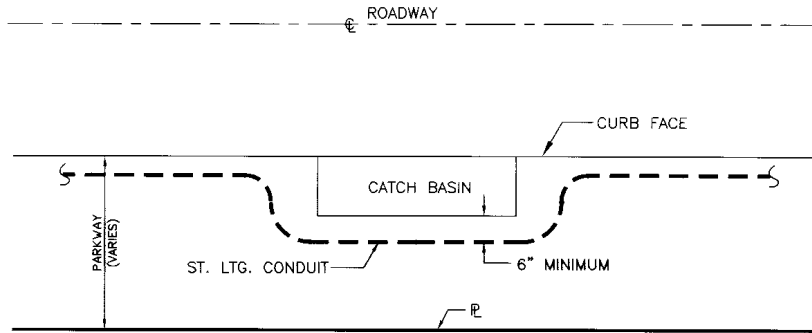
NO.	DESCRIPTION
1	Fuse size and solid conductor

**SUPERSEDES**

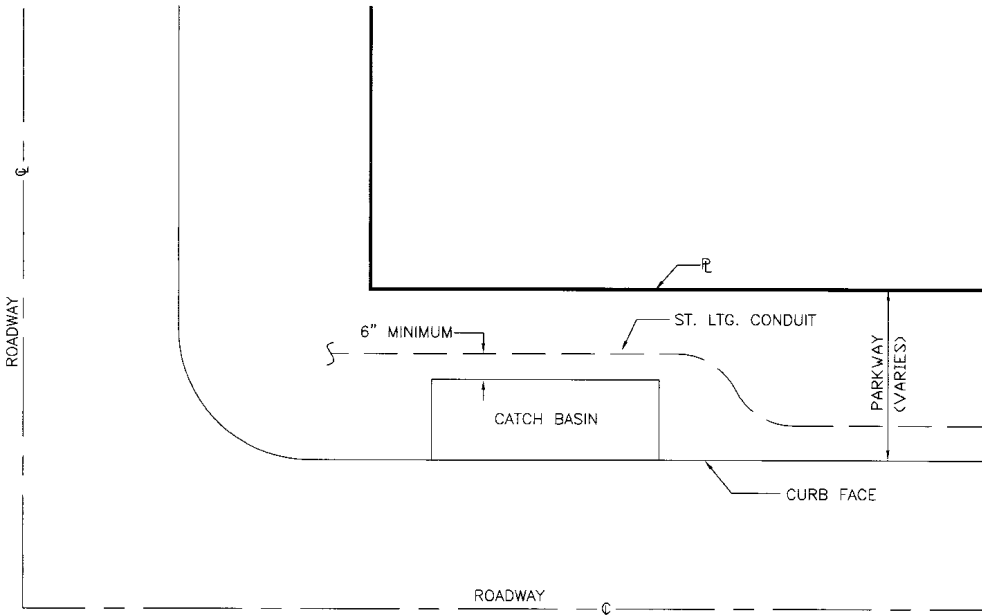
**REFERENCES**

VAULT INDEX NUMBER:

SHEET 1 OF 1 SHEETS



MID BLOCK



INTERSECTION

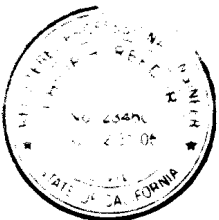
BUREAU OF STREET LIGHTING

DEPARTMENT OF PUBLIC WORKS

CITY OF LOS ANGELES

# CATCH BASIN CONSTRUCTION CLEARANCE DETAIL

STANDARD PLAN  
L-304-0



Submitted by: *Norma Mancera*

Date: *1/6/04*

APPROVED *Jan 6, 2004*

*Phil Reed*  
DIRECTOR, BUREAU OF STREET LIGHTING

## REVISIONS

NO.	DESCRIPTION
1	ELECTRONIC VERSION OF ORIGINAL

## SUPERSEDES

## REFERENCES

Vault Index Number:

SHEET 1 OF 1 SHEETS