



CITY of OAKLAND

Street Light Design Manual



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations



Preface

CITY OF OAKLAND

STREET LIGHT DESIGN MANUAL

The City of Oakland's Electrical Services Division of the Public Works Agency has prepared the Street Light Design Manual for the City of Oakland.

The purpose of the City of Oakland Street Light Design Manual is to assist public and private designers in the design and construction of street lighting, and also to assure design uniformity governing City of Oakland's street lighting warrants.

The Street Light Design Manual is to be used as a companion document in conjunction with the City of Oakland Standard Details for Public Works Construction, Illuminating Engineering Society of North America Lighting Handbook, and the Standard Plans & Specifications for the State of California Department of Transportation.

Section(s) of the Street Light Design Manual may only be modified to suit specific adverse field conditions with the approval from the Manager of Electrical Services. This Design Manual will be revised periodically and reprinted to reflect the changing technology of the street lighting industry.

Electronic copies of this publication are available for download at City of Oakland, Public Works Agency's website or upon request from Electrical Services' Division.

Suggestions and comments for improving and or amending the Street Light Design Manual are welcomed and will be considered in the preparations of future revisions.



A handwritten signature in black ink, appearing to read "R. Godinez II".

Raul Godinez II, P.E.
Director of Public Works Agency



Oakland Street Light Design Manual



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

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Introduction

This street light design manual has been developed by Oakland Public Works, Electrical Services Division for use by private developers, lighting consultants, outside agencies, and City staff to assist in the design and installation of street lights within the Oakland city boundary.

Please read and become familiar with these standards and requirements prior to start of design. The standards and requirements stated and referred herein this manual apply to all developments within the Oakland city public right of way.

All street light design must be approved and stamped by Electrical Services prior to start of construction. Requests for street light inspections will be denied until appropriate documentation of approved design is provided.

If you have any questions or suggestions regarding the content of these standards and requirements, please contact:

City of Oakland Public Works
Electrical Services Division
7101 Edgewater Dr, Bldg. 2
Oakland, CA 94621
Tel: (510) 615-5430
Fax: (510) 615-5411

City Street vs. Private Street:

Streets classified as private streets or private driveways may use this manual as a best practice reference but are not required by the City to comply. Street lights on private streets will not be maintained by Oakland Public Works. Please consult with Oakland Community and Economic Development Agency (CEDA) for more information on dedication of City street vs. private street. Note: In an event when a private street is to be transferred over to the City as a City dedicated street, all street lighting standards and requirements must be met at the cost of the property owner prior to acceptance of street light maintenance responsibilities.

Disclaimer:

City of Oakland, Electrical Services does not endorse products or manufacturers. Manufacturers' names appear herein only because they are considered the highest quality, best performing, most cost effective and commercially available for its kind. If a manufacturer would like to include its product in this manual, please contact the Electrical Services Division for information on product evaluation process and procedure. Only the Electrical Services' manager has the authority to accept /incorporate new product(s) in this manual based on quality, performance, maintainability, energy efficiency, cost effectiveness, and practicality of product.



Design and Material Requirements

1. City Standard Illumination Levels and Uniformity Ratio
 - 1.1. City standard illumination levels and uniformity ratio can be found in Appendix A, Oakland Street Lighting Warrants.
 - 1.2. Contact Electrical Services prior to street light design for information on street classification or Electrical Services will provide comment during initial plan review on required City standard street light illumination levels and uniformity.
 - 1.3. Designed average maintained illumination level shall meet City minimum required level while not exceeding City optimum level.
 - 1.4. Designed uniformity ratio shall meet City minimum required uniformity ratio
 - 1.5. Electrical Services will accept the design of Crime lighting level standards if requested or directed by the Oakland Police Dept.
2. Placement of Streetlight(s)
 - 2.1. Center of streetlight pole shall be placed 2.5 feet behind face of curb.
 - 2.2. All proposed streetlights shall be installed 20 feet laterally from existing/proposed tree(s) or vice versa.
 - 2.3. All proposed streetlight poles shall be a minimum of 5 feet from edge of existing/proposed driveway.
 - 2.4. Spacing of streetlight poles shall be designed to meet City standard illumination levels and uniformity ratio.
3. Photometric Calculation
 - 3.1. Photometric calculation shall be comply with American National Standard Practice for Roadway Lighting (ANSI/IESNA RP-8)
 - 3.2. Photometric calculation shall be base on the following design parameters:
 - 3.2.1. Incorporate adjacent street light(s) outside of project limits.
 - 3.2.2. Lamp lumen depreciation (LLD) factor - 0.80 for HPS luminaires.
 - 3.2.3. Street light distribution - Type III .
 - 3.2.4. Road Surface Classification - R3.
 - 3.2.5. Do not include light source(s) other than street lights .
 - 3.3. Calculate average maintained illumination value for each street in project.
 - 3.3.1. Average Maintained Illuminance – The average level of horizontal illuminance on the roadway pavement when the output of the lamp and luminaire is diminished by the maintenance factors; expressed in average footcandles for the pavement area.

Design and Material Requirements (cont'd)

- 3.4. Calculate uniformity ratio for each street in project.
 - 3.4.1. Uniformity Ratio – The ratio of the Average Maintained Illuminance level to the Minimum Maintained Illuminance level.
- 3.5. Location of street light(s) shall match street light layout plan.

4. Service Enclosure

- 4.1. For developments installing 3 or more new street lights, a minimum of one unmetered Type IIIAF, 100 Amp, service pedestal (Tesco or approved equal) is required.
 - 4.1.1. Service pedestal shall be hot dipped galvanized steel.
- 4.2. Service enclosure shall be centrally installed to serve proposed street lights.
 - 4.2.1. Refer to Appendix C for typical service enclosure single line diagram.
- 4.3. Metering
 - 4.3.1. Streetlight service shall always be unmetered.
 - 4.3.2. Park lighting, irrigation controls, traffic signals, auxiliary power outlets for holiday lighting and all non streetlight related power shall be metered.
 - 4.3.2.1. A single metered or dual metered Type IIIAF service enclosure may be used in lieu of an unmetered service enclosure to combine unmetered street light service with metered services.
 - 4.3.2.1.1. If applicable, traffic signal service shall be on its own meter.
 - 4.3.2.1.2. If applicable, all other non street light and traffic signal service shall be on its own meter.
- 4.4. Service enclosure shall be painted to match color of streetlight poles.
 - 4.4.1. Refer to Section 8.4 for City standard colors
 - 4.4.2. If streetlight poles are unpainted galvanized, enclosure color shall be unpainted aluminized.

5. Voltage and Voltage Drop

- 5.1. Street light voltage shall be either 120V or 240V. No other voltage will be accepted.
- 5.2. Voltage drop shall not exceed 3% of nominal voltage.
 - 5.2.1. If Electrical Services suspects non compliance to voltage drop requirement, upon request from Electrical Services, the designer must submit voltage drop calculations prior to approval of street light design.

6. Controls

- 6.1. Streetlight(s)
 - 6.1.1. One photocell shall be installed on the poletop of streetlight pole nearest to the service enclosure.

Design and Material Requirements (cont'd)

6.1.2. Photocell shall be wired to control the operation of all street lights connected on the same string/circuit.

6.2. Street light(s) with sidewalk-side pedestrian light

6.2.1. One photocell shall be installed on the poletop of street light pole closest to the service enclosure.

6.2.2. Street light and pedestrian light circuits shall be separated.

6.2.3. Photocell shall be wired to control the operation of all street lights and pedestrian lights connected to the same circuit.

6.2.4. Additional controls for pedestrian lights shall be as follows:

6.2.4.1. Programmable time clock shall be installed in service enclosure to turn all pedestrian lights off during late night hours.

6.2.4.2. Programmable time clock shall be Intermatic ET170 Series – 7 Day electronic time switch or approved equal.

6.3. Post-top pedestrian ornamental luminaire

6.3.1. One photocell shall be installed at the base of luminaire fixture closest to the service enclosure.

6.3.2. Street light and ornamental pedestrian light circuits shall be separated.

6.3.3. Photocell shall be wired to control the operation of all ornamental pedestrian lights connected to the same circuit.

6.3.4. Additional controls for ornamental pedestrian lights shall be as follows:

6.3.4.1. Programmable time clock shall be installed in service enclosure to turn all pedestrian lights off during late night hours.

6.3.4.2. Programmable time clock shall be Intermatic ET170 Series – 7 Day electronic time switch or approved equal.

7. Lamp Type

7.1. All street light and pedestrian lamps shall be High Pressure Sodium (HPS)

7.1.1. No exceptions allowed.

8. Luminaire Type

8.1. Cobra head type:

8.1.1. Luminaire shall be Type III distribution, flatglass cutoff type.

8.2. Ornamental luminaire:

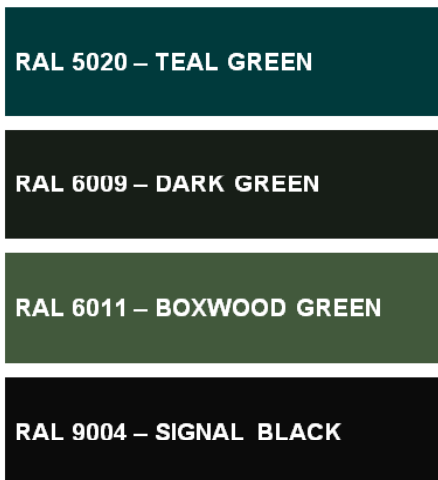
8.2.1. Luminaire fixtures shall be Type III distribution.

8.2.2. Refer to City approved luminaire types on pages 12 to 24.

Design and Material Requirements (cont'd)

9. Light Pole

- 9.1. For major/collector streets - Typical street light poles shall be galvanized round tapered 28' 6" poles.
 - 9.1.1. For alternative acceptable pole styles, refer to City Acceptable Poles on pages 29-30 for options.
 - 9.1.2. 14' ornamental pedestrian lights may be incorporated into streetlight design to contribute additional lighting for improved lighting uniformity.
- 9.2. For residential streets – The following are acceptable streetlight poles:
 - 9.2.1. Round tapered 28' 6" poles.
 - 9.2.2. Round tapered 25' poles.
 - 9.2.3. Ornamental pedestrian 14' poles
 - 9.2.4. For acceptable pole styles, refer to City Acceptable Poles on page XXXX for reference.
- 9.3. Electrical Services reserves the right to approve or reject proposed street light pole(s).
- 9.4. Pole finish shall be galvanized or painted with one of the following City standard colors:



10. Curb Box

- 10.1. Install a #5 non-concrete curb box behind each streetlight and at each splice junction.
- 10.2. Refer to City standard E-7 and E-9 in Appendix C for details.

Design and Material Requirements (cont'd)

11. Wiring

- 11.1. #2 AWG THHN wires shall be used from PG&E service connection to service enclosure.
- 11.2. For 120V streetlights – 2-#8 AWG THHN/THWN (Blk/Wh) wires + 1-#8 AWG THHN/THWN (Grn) bonding/ground wires shall be used.
- 11.3. For 240V streetlights – 2-#8 AWG THHN/THWN (Blk/Red) wires + 1-#8 AWG THHN/THWN (Grn) bonding/ground wires shall be used.

12. Conduit

- 12.1. Street light conduits shall be 2" Schedule 80 HDPE. PVC conduits are not allowed.
- 12.2. Street light conduit depth shall be a minimum of :
 - 12.2.1. 18" in non traffic area (planter strip, sidewalk, median)
 - 12.2.2. 24" in roadway
- 12.3. In joint trench, street light conduit shall be installed above or adjacent to all other dry utility lines.

13. Fuse

- 13.1. For 120V streetlights - Install an in-line water tight fuseholder, HEB-AA with a 5A KTK fuse for each streetlight, in the adjacent curb box.
- 13.2. For 240V streetlights - Install an in-line water tight fuseholder, HEX-AA with a 5A KTK fuse for each streetlight, in the adjacent curb box

14. Temporary Street Lighting

- 14.1. All existing street lights shall remain in operation at all times until final connections are made.
- 14.2. For a project that require disconnection /removal of existing street light(s) and will affect continuous operation of street light(s) for 1 or more days, temporary street lighting will be required.
 - 14.2.1. If anticipated street light disruption is 2 weeks (14 days) or less, temporary light tower(s) may be used. Project plans shall include construction note to provide light tower (s).
 - 14.2.1. If anticipated street light disruption is more than 2 weeks (14 days), a temporary street lighting plan is required to provide uninterrupted street light service.

Required Design Plan Submittals

1. Project Title Sheet
 - 1.1. Indicate location of project
2. Street Light Quantity and Type
 - 2.1. List quantity, wattage, and fixture type for all existing street lights within project area to remain or removed.
 - 2.2. List quantity, wattage, and fixture type for all proposed new street lights within project area.
3. City Standard Details
 - 3.1. Standard details shall conform to City of Oakland Standard Details for Public Works Construction, 2002 Edition
 - 3.2. Include and/or reference all applicable City standard detail drawings for street light installations.
 - 3.2.1. Street light foundation details
 - 3.2.2. Curb box requirements
 - 3.2.3. Standard street light dimension details
 - 3.2.4. Anchor Bolt details
 - 3.2.5. Conduit details
 - 3.2.6. Conductor identification
 - 3.2.7. Wire splice details
4. Lighting Layout Plan
 - 4.1. Lighting layout plan(s) shall include all of the following:
 - 4.1.1. Locations of all existing/new utilities within the public right of way.
 - 4.1.2. Location(s) of point of electric service (PG&E or existing City service)
 - 4.1.3. Location(s) of all street lights within project limits
 - 4.1.4. Location(s) of existing and proposed trees.
 - 4.1.5. Location(s) of centralized street light service pedestal(s).
 - 4.1.6. Routing of designated circuit(s) to all street light locations.
5. Single Line Diagram
 - 5.1. Identify street light service distribution from point of service (PG&E or City service) to each street light circuit.
 - 5.2. Identify street light controls



Required Design Plan Submittals (cont'd)

6. Photometric Calculation

6.1. Calculation shall include all of the following

- 6.1.1. Layout of all street lights within project limits
- 6.1.2. Average maintained illuminance and uniformity ratio for each street within project limits
- 6.1.3. IES photometric file and street light fixture details used in calculation.

7. Temporary Street Lighting Plan

- 7.1. If anticipated street light disruption will be more than 2 weeks (14 days), a temporary street lighting plan is required for review.
- 7.2. Temporary street lighting plan shall include photometric calculation.



List of City Approved Luminaires

City Approved Luminaire Notes:

1. The list of luminaires shown below vary in architectural style, performance, and cost. All projects must choose one or a combination of luminaires in this list for its street light application.
2. Exceptions for luminaires not shown in this list will not be given for reasoning based on past street light installations.
3. Electrical Services reserves the right to approve or reject proposed street light pole(s).

Symbols:

- ?V? – Specify voltage
- ?W? – Specify wattage
- \$ - \$100 - \$200 per luminaire fixture
- \$\$ - \$200 - \$400
- \$\$\$ - \$400 - \$600
- \$\$\$\$ - \$600 - \$800
- \$\$\$\$\$ - >\$800



Claremont



Cobra (L)



Cobra (S)



Contemporary



Domus



Forrest Park



Gull Wing



Icon Slide



Merriweather



Tear Drop

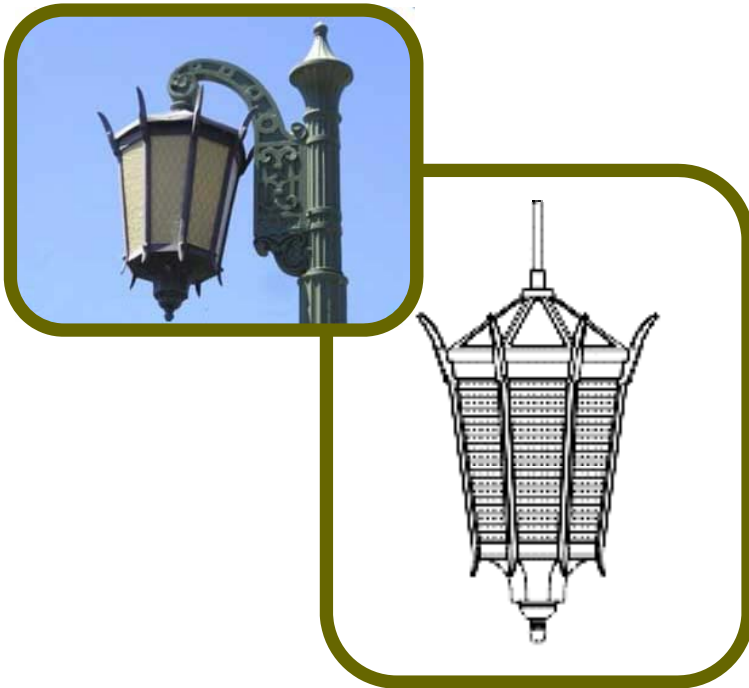


Universe



Washington

Claremont Luminaire



Manufacturer(s): Spring City

Catalog #:
Spring City Edgewater

Photometric File:

Application: Residential street lighting

Lamp Type: 70W, 100W HPS

Optical System: Type III

Ballast Voltage: Multi-tap 120/240V

Color: Boxwood Green only

Special Requirements: Use only with ornamental bracket arm (with fluted cap and acorn finial) and 14' fluted ornamental pole.

Luminaire Cost: \$\$\$\$



As shown: Claremont luminaire w/ arm on 14' fluted pole.

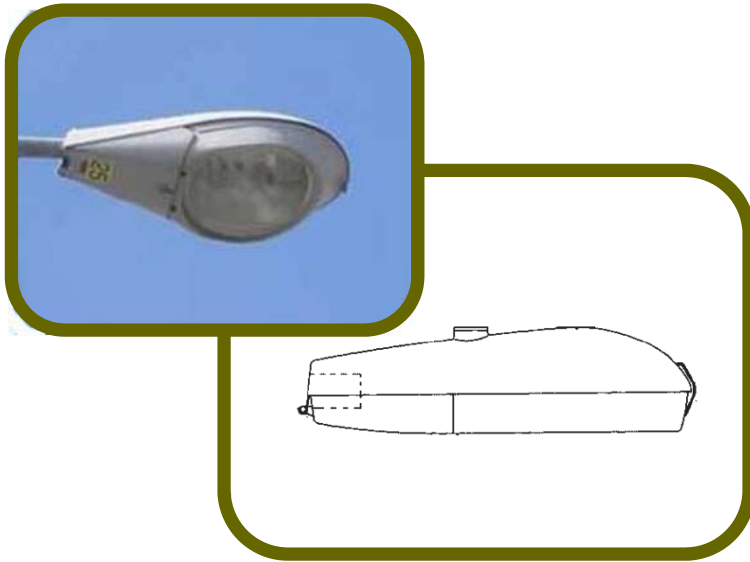
Color: Boxwood Green

Location: Rockridge District



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

Cobra Head Luminaire (For Arterial/Collector Streets)



Manufacturer(s): GE, Lumec

Catalog #:

GE – MDCL20S3M22FMC31	200W
GE – MDCL25S3M22FMC31	250W
GE – MDCL31S3M22FMC31	310W
GE – MDCL40S3M22FMC31	400W

Description:

Photometric File: GE1002.ies

Application: Arterial and/or collector street lighting

Lamp Type: 200W, 250W, 310W, 400W HPS

Optical System: Type III, flat glass cutoff

Ballast Voltage: Multi-tap 120/240V

Color: Unpainted or painted to match street light pole

Special Requirements: Use only with City 25' or 28'6" pole.

Luminaire Cost: \$



As shown: Cobra head luminaire w/ 8' arm on 28'6" pole.

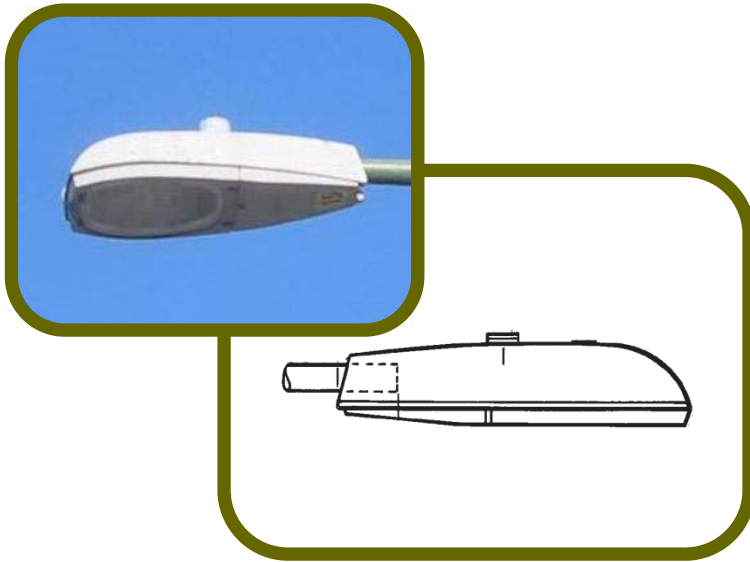
Color: Unpainted galvanized

Location: Oakport Ave



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

Cobra Head Luminaire (For Collector/Residential Streets)



Manufacturer(s): GE, Lumec

Catalog #:

GE - M2AC07S1M2GMC31	70W
GE - M2AC10S1M2GMC31	100W
GE - M2AC15S1M2GMC31	150W
GE - M2AC20S1A2GMC31	200W

Description:

Photometric File:

GE7285.ies (GE 70W-150W)
GE7304.ies (GE 200W)

Application: Collector and/or residential street lighting

Lamp Type: 70W, 100W, 150W, 200W HPS

Optical System: Type III, flat glass cutoff

Ballast Voltage: Multi-tap 120/240V

Color: Unpainted or painted to match street light pole

Special Requirements: Use with City 25' or 28'6" Pole Only

Luminaire Cost: \$



As shown: Cobra head luminaire w/ 6' arm
on 28'6" pole.

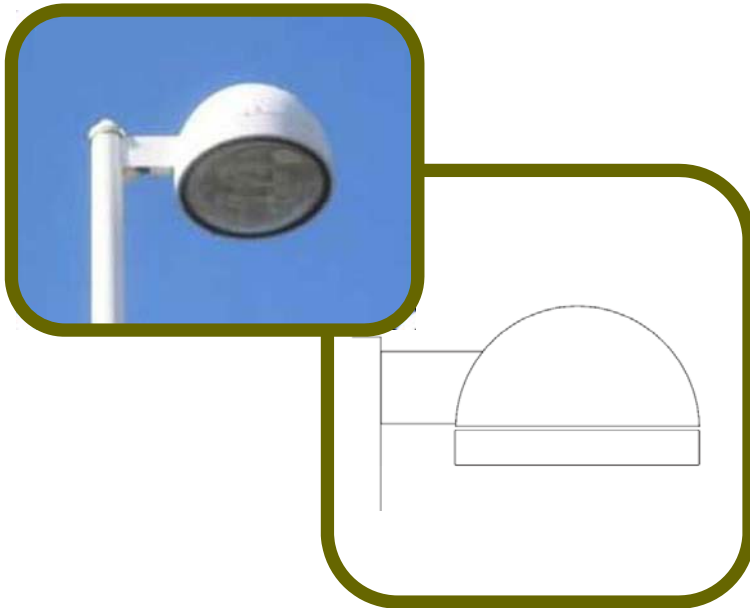
Color: Boxwood Green

Location: Edes Ave



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

Contemporary Luminaire



Manufacturer(s): Gardco

Catalog #:

MA22-1-3-400HPS-QUAD-OC (22", Street side)
MA17-1-3-150HPS-QUAD-OC (17", Sidewalk side)

Photometric File:

GR34H.ies (Street side)
GR315H.ies (Sidewalk side)

Application:

22" Luminaire - Arterial and/or collector street lighting
17" Luminaire – Sidewalk side pedestrian lighting

Lamp Type:

400W HPS (Street Side)
150W HPS (House Side)

Optical System: Type III

Ballast Voltage: Multi-tap 120/240V

Color: White only

Luminaire Cost: \$\$\$\$



As shown: Contemporary luminaire w/ pedestrian luminaire on 30' pole

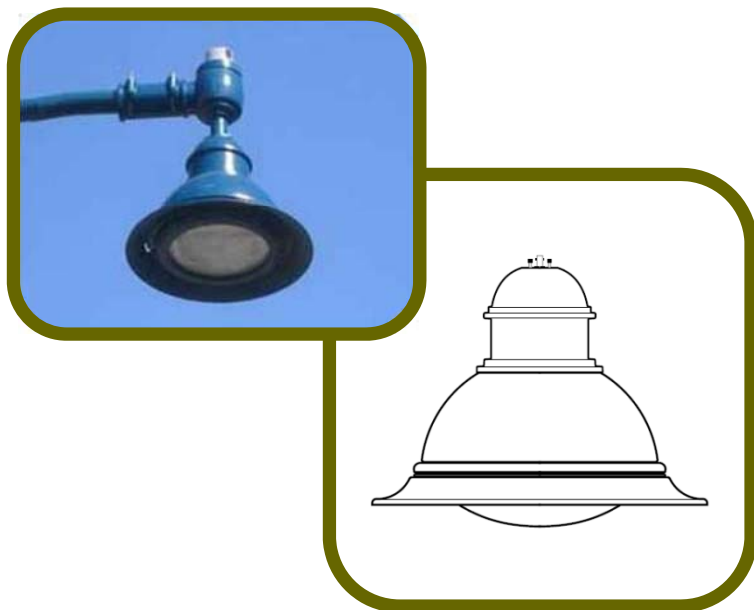
Color: White

Location: Broadway Autorow



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Electrical Services Division
Dept of Infrastructure and Operations

Domus Luminaire



Manufacturer(s): Lumec

Catalog #:

DMS50-*W*-HPS-SC3M- *V*- SMB-SCITX (Large Domus)
DOS-*W*-HPS-SG3- *V*-SMB-SCITX-LMS (Small Domus)

Photometric File:

s0105312.ies (Domus DMS50, 200-250W)
s0206071.ies (Domus DOS, 35-150W)

Application:

Domus DMS50 - Arterial and/or collector street lighting
Domus DOS – Residential street lighting and/or
sidewalk side pedestrian lighting

Lamp Type: 35W, 100W, 150W, 250W HPS

Optical System: Type III

Ballast Voltage: Multi-tap 120/240V

Color: Teal Green only

Special Requirements:

Luminaire Cost: \$\$\$



As shown: Domus DOS luminaire w/ 3' arm on 16' octagonal pole.

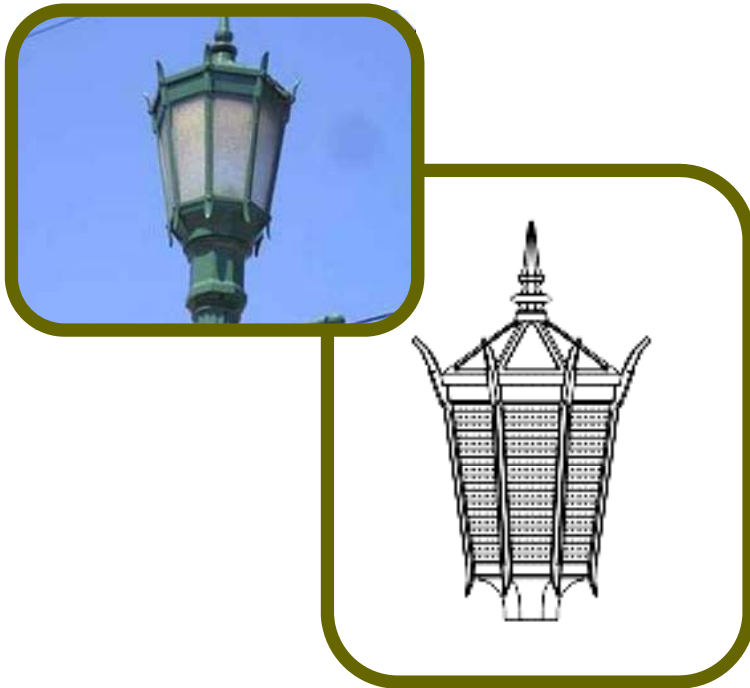
Color: Teal Green

Location: Coliseum Gardens



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

Forrest Park Luminaire



Manufacturer(s): Lumec, Spring City

Catalog #:
Spring City Edgewater

Photometric File:
EDG-YRP3.ies (Spring City)

Application:
Residential street lighting and/or pedestrian lighting

Lamp Type: 35W, 70W HPS

Optical System: Type III distribution

Ballast Voltage: Multi-tap 120/240V

Color: Boxwood Green, Teal Green, Dark Green

Special Requirements: Use only with City 14' ornamental pole

Luminaire Cost: \$\$\$\$



As shown: Forrest Park luminaire on 14' fluted pole.

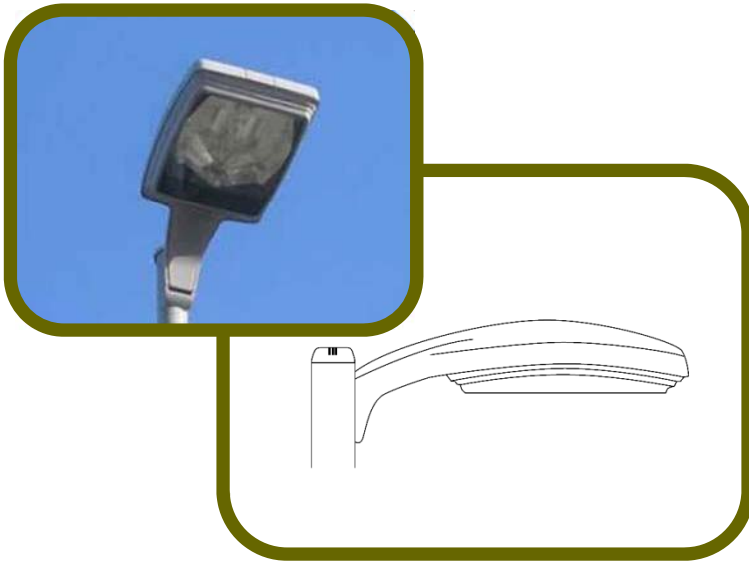
Color: Boxwood Green

Location: Int'l Blvd, East Lake District



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Gullwing Luminaire



Manufacturer(s): Gardco

Catalog #: G18-1-3XL-?W?HPS-?V?-NP

Photometric File:

GW3X15H.ies (150W HPS)

GW3X25H.ies (250W HPS)

Application: Arterial and/or collector street lighting

Lamp Type: 150W, 250W HPS

Optical System: Type III, Horizontal Lamp

Ballast Voltage: Multi-tap 120/240V

Color: Natural Aluminum

Special Requirements: Use only with City 25' or 28'6" pole

Luminaire Cost: \$\$\$\$\$

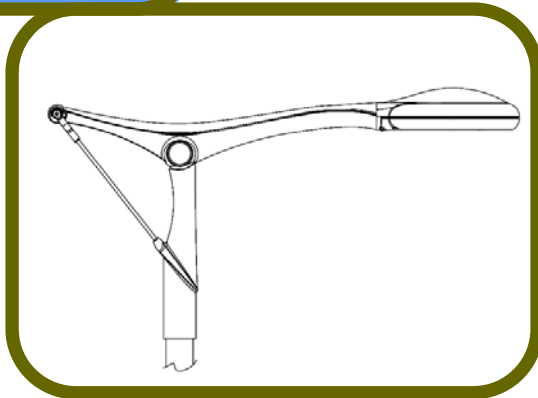


As shown: Gullwing luminaire on 28'6" pole.

Color: Unpainted Galvanized, Silver

Location: Zhone Way

Icon Slide Luminaire



Manufacturer(s): Cooper

Catalog #: SDS-?W?-HPS-MT-OG-R

Photometric File: SDS-150-HPS-XX-3S.ies

Application: Collector and/or residential street lighting

Lamp Type: 35W, 50W, 70W HPS

Optical System: Cutoff Type 3 (SE3) w/ House side shield

Ballast Voltage: Multi-tap 120/240V

Color: Dark Green only

Special Requirements: Use only with City 25' Round Pole

Luminaire Cost: \$\$\$\$

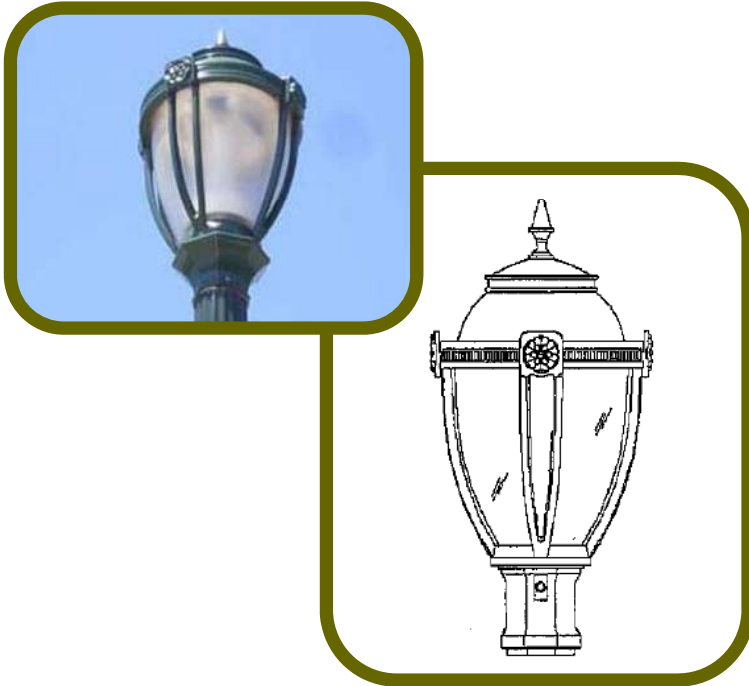


As shown: Icon Slide luminaire w/ 30' pole

Color: Dark Green

Location: Wood Street

Merriweather Luminaire



Manufacturer(s): Lumec

Catalog #:

L80-?W?HPS-PC-CS-SE3-?V?-SF70-FN10-SC1-LMS19987B

Photometric File: lu2000035.ies

Application:

Residential street lighting and/or pedestrian lighting

Lamp Type: 35W, 50W, 70W HPS

Optical System: Cutoff Type 3 (SE3)

Ballast Voltage: Multi-tap 120/240V

Color: Any City standard street light color. See Section 8.4.

Special Requirements: Use only with City 14' Ornamental Pole

Luminaire Cost: \$\$\$\$



As shown: Merriweather luminaire
14' fluted pole.

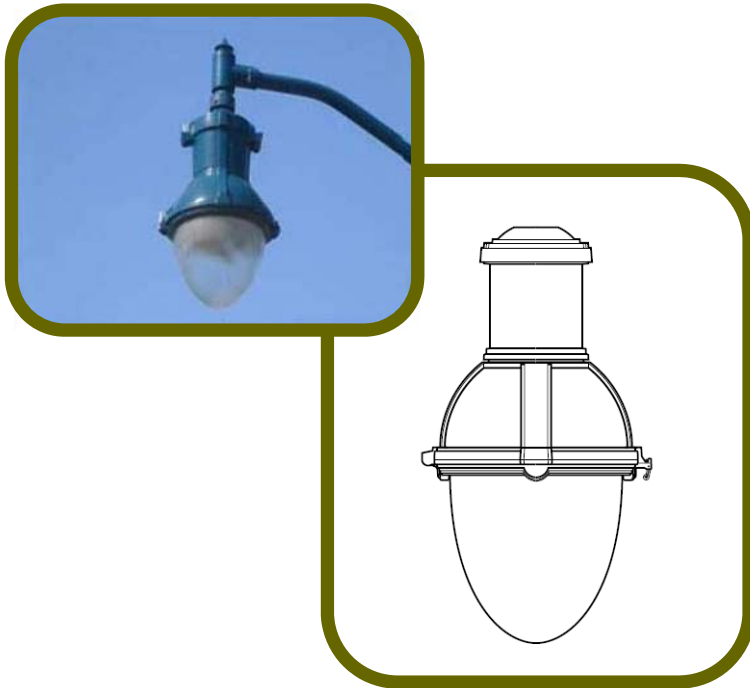
Color: Dark Green

Location: MacArthur Blvd, Laurel District



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

Tear Drop Luminaire



Manufacturer(s): Lumec

Catalog #:

RN20-?W?HPS-THA3-ACDR-QTA/240-SMA-PH8-SC1TX

Photometric File:

s0104092.ies (100-150W)

s0104062.ies (200-250W)

Application: Arterial , collector , or residential street lighting

Lamp Type: 150W, 200W, 250W HPS

Optical System: Type III, acrylique globe

Ballast Voltage: Multi-tap 120/240V

Color: Teal Green, Dark Green only

Special Requirements:

Luminaire Cost:



As shown: Twin Tear Drop w/ pedestrian luminaire on 30'octagonal pole.

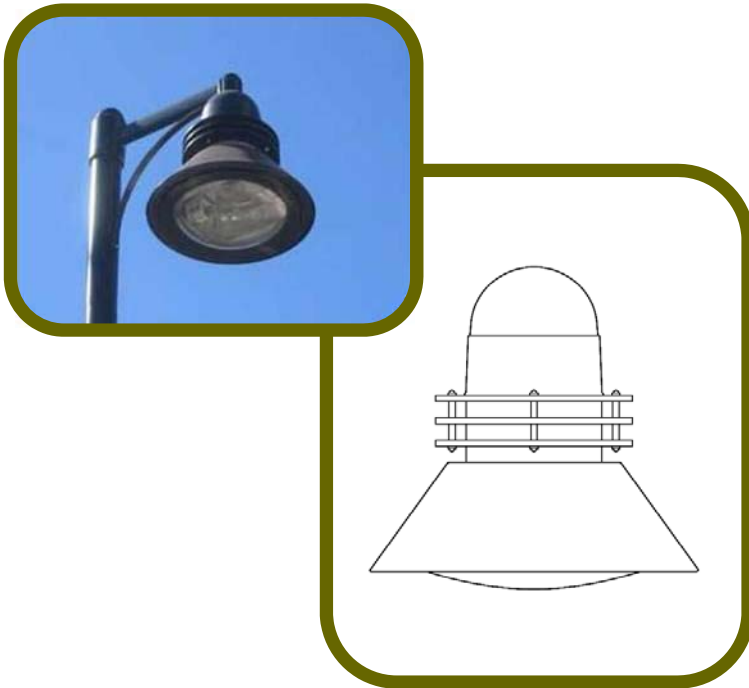
Color: Teal Green

Location: Hegenberger Rd



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

Universe Luminaire



Manufacturer(s): AAL

Catalog #:

UCM-SR-ANG-H2-70HPS- BLK

Photometric File: UCM-H2-150HPS.ies

Application:

Residential street lighting and/or pedestrian lighting

Lamp Type: 70W HPS

Optical System: Type II horizontal sag glass

Ballast Voltage: Multi-tap 120/240V

Color: Black only

Special Requirements: Use only with City 16' Round Pole

Luminaire Cost: \$\$\$\$\$



As shown: Universe pedestrian luminaire on 16' round pole.

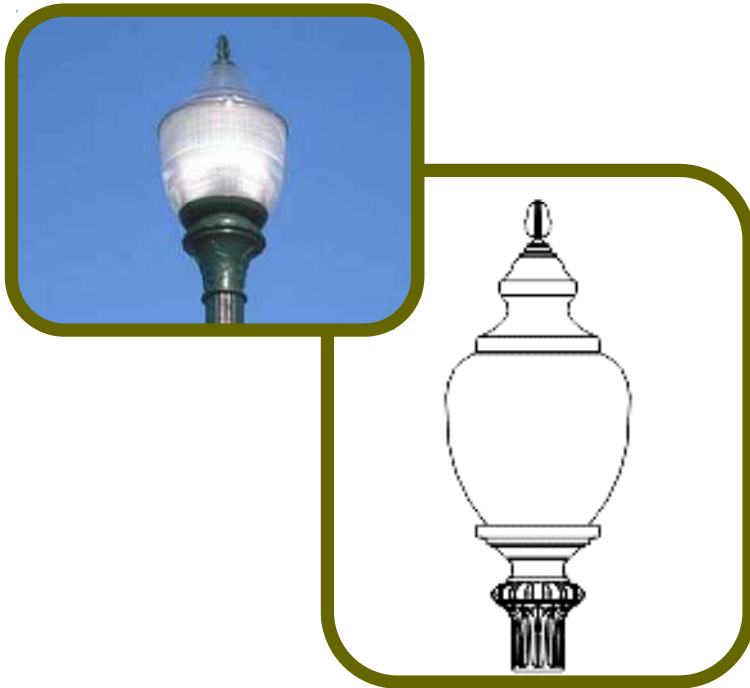
Color: Black

Location: 8th St near Mandela Pkwy



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

Washington Luminaire



Manufacturer(s): Lumec

Catalog #:

L50-?W?HPS-ACDR-FC-SE3-QTA/240 SFO-PH7-SC1TX

Photometric File: lu200118.ies

Application:

Residential street lighting and/or pedestrian lighting

Lamp Type: 70-100W HPS

Optical System: Cutoff, Type III

Ballast Voltage: Multi-tap 120/240V

Color: Any City standard street light color. See Section 8.4.

Special Requirements: Use with City 14' Ornamental Pole Only

Luminaire Cost: \$\$\$\$



As shown: Washington luminaire on 14' fluted pole.

Color: Dark Green

Location: Mandela Parkway



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

List of City Approved Poles

City Approved Pole Notes:

1. The list of poles shown below vary in architectural style and cost. All projects must choose one or a combination of luminaires in this list for its street light application.
2. Exceptions for luminaires not shown in this list will not be given for reasoning based on past street light installations.
3. Electrical Services reserves the right to approve or reject proposed street light pole(s).

Symbols:

- \$ - < \$1000 per pole assembly (including mast arm if applicable)
- \$\$ - \$1000 - \$2000
- \$\$\$ - \$2000 - \$3000
- \$\$\$\$ - \$3000 - \$4000
- \$\$\$\$\$ - \$4000 - \$5000
- \$\$\$\$\$\$ - >\$5000



**14' Fluted
Ornamental**



16' Round



**16' Octagonal
Ornamental**



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

List of City Approved Poles (cont'd)

City Approved Pole Notes:

1. See Page 25 for notes.



**20'
Candelabra**



**20' Octagonal
Ornamental**



20' Gooseneck

List of City Approved Poles (cont'd)

City Approved Pole Notes:

1. See Page 25 for notes.



25' Round



**25' Round
Tapered**



List of City Approved Poles (cont'd)



**28'6" Round
Tapered**



**28' 6" Fluted
Ornamental**



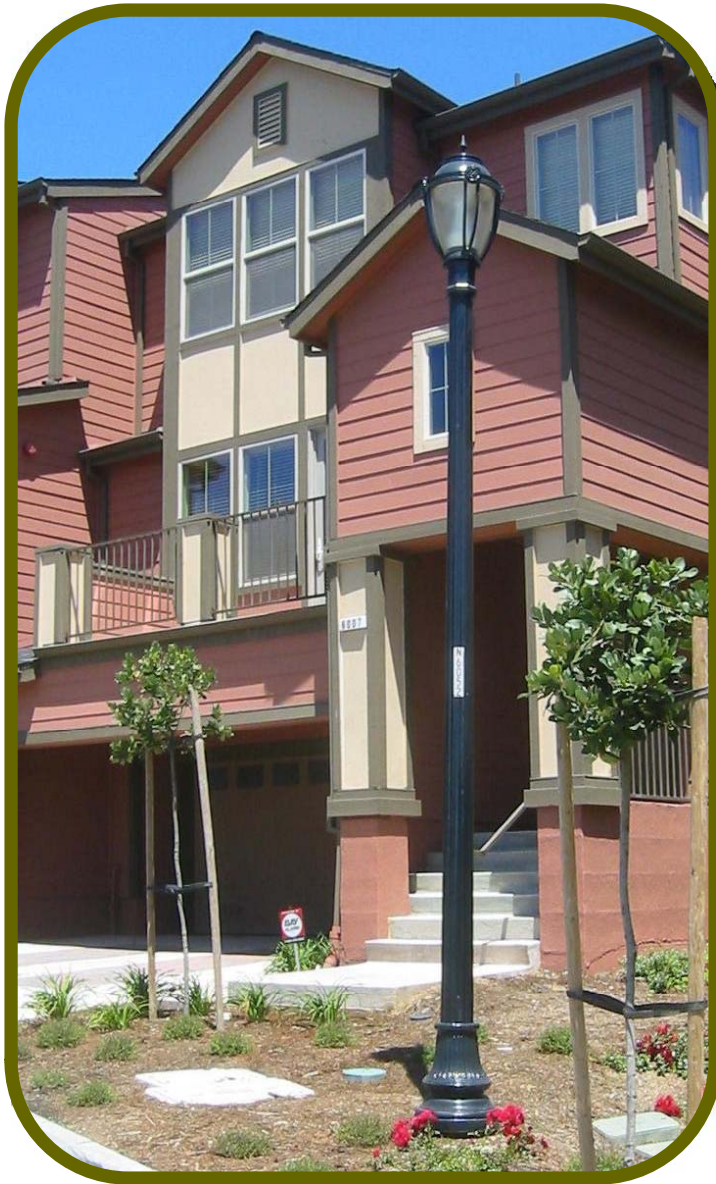
List of City Approved Poles (cont'd)



**30' Octagonal
Ornamental**



14' Fluted Ornamental Pole

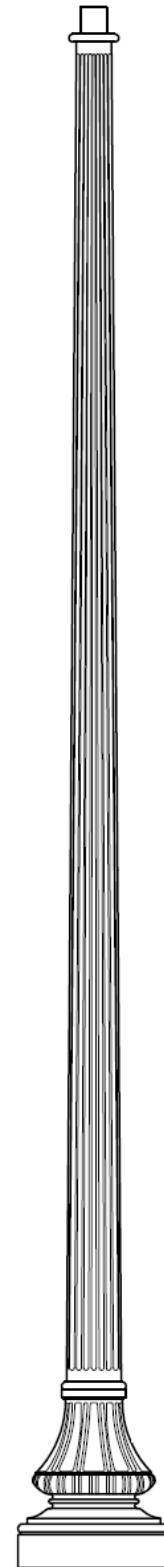


Manufacturer: Visco

Catalog #: VI-B17-7-F/14-3" Tenon

Color: Any City standard street light color. See Section 8.4.

Cost: \$\$



16' Round Pole



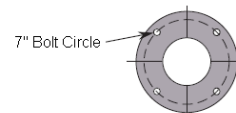
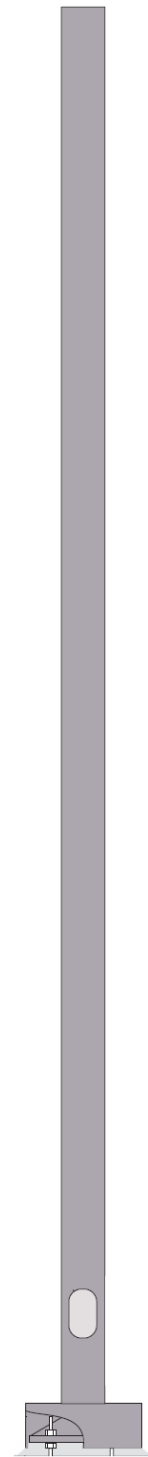
Manufacturer: AAL

Catalog #: PR-4R16-125

Color: Black only

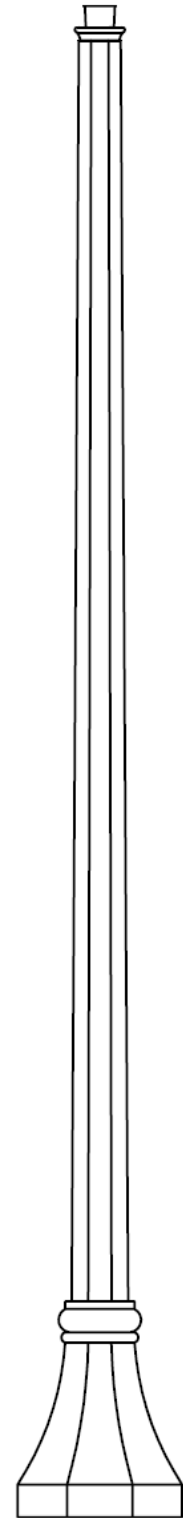
Cost: \$\$

Note(s): For use with "Universe" style luminaire only.
Bolt circle is 7" (not typical City standard)



Public Works Agency
Electrical Services Division
Dept of Infrastructure and Operations

16' Octagonal Ornamental Pole



Manufacturer: Visco

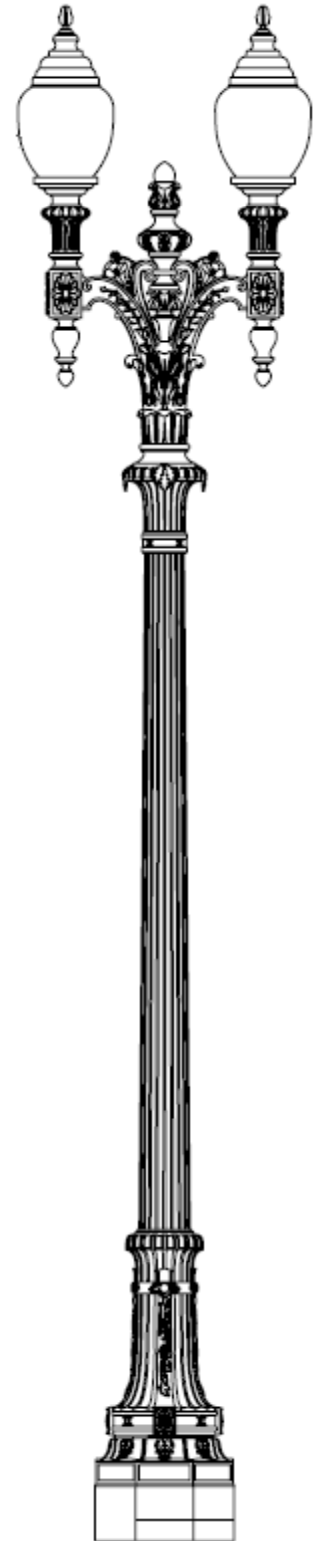
Catalog #: VI-Y-OAP1-OCT/16'2"

Height: 16' 2"

Color: Teal Green only

Cost: \$\$\$

20' Candelabra Pole



Manufacturer: Spring City

Pole Catalog #:
PSOKL-24-14.44
AROKL-25

Description:
Pole
Cross Arm

Luminaire: New Frontier , 118 refractive polycarbonate globe, type 3 distribution, 250W HPS, clamp on dome reflector,

Color: Boxwood Green, Dark Green, Signal Black

Cost: \$\$\$\$\$\$



20' Gooseneck Pole



Manufacturer(s): CE Toland & Son

Luminaire: 35W HPS Hexagonal Lantern

Pole Description: Galvanized steel center stem, copper gooseneck pole w/ cast iron base.

Color: Natural unpainted

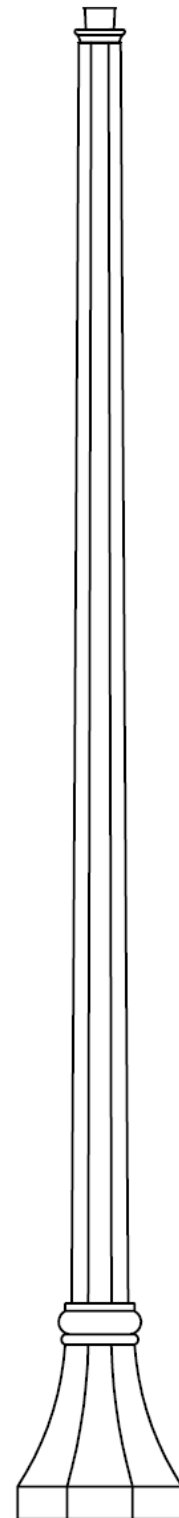
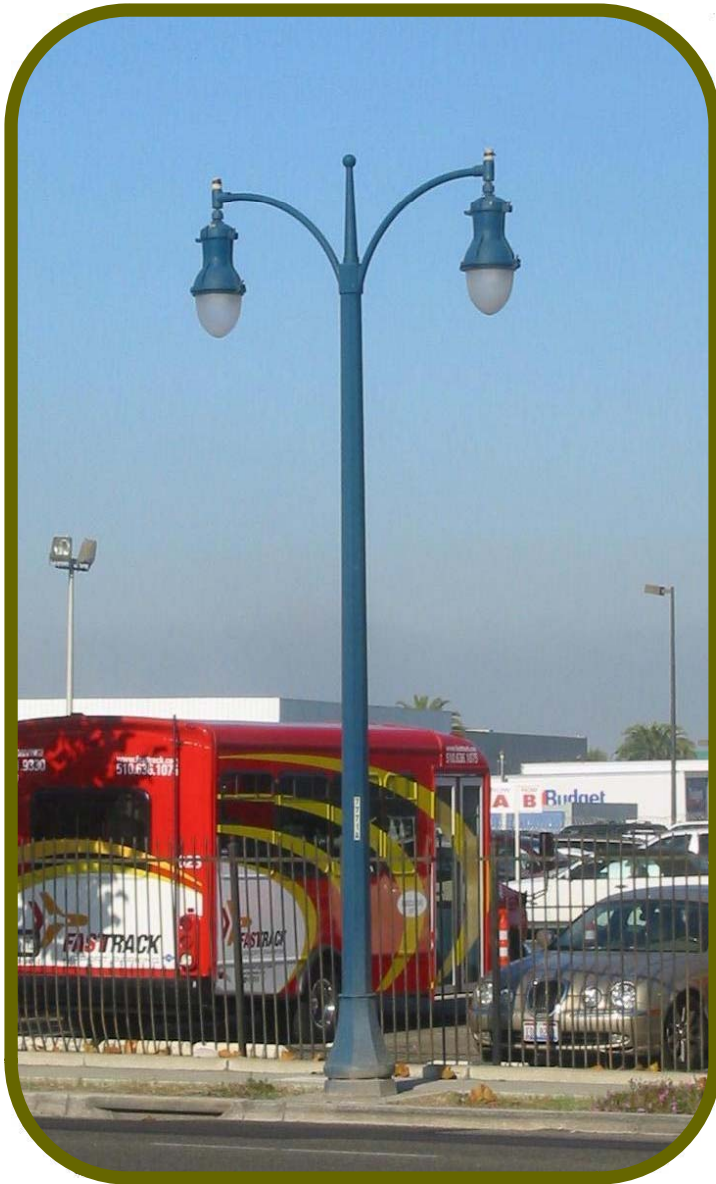
Cost: \$\$\$\$\$\$

Notes:

See Appendix C for foundation details.
For use at Lake Merritt Necklace of lights only.



20' Octagonal Ornamental Pole



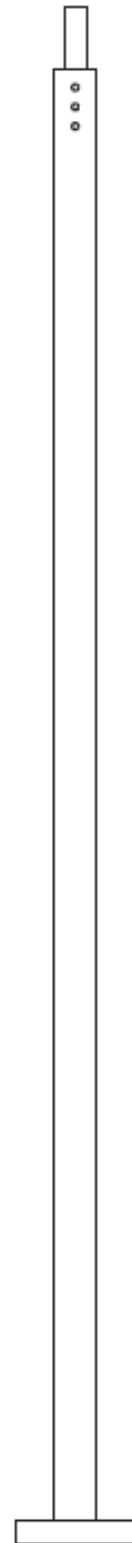
Manufacturer: Visco

Catalog #: VI-OCT/8-MD322-OT/20'

Color: Teal Green only

Cost: \$\$\$\$

25' Round Pole



Manufacturer: Cooper Lighting

Catalog #: SRX5M25S-OG

Height: 25' (optional 15' pedestrian luminaire)

Color: Dark Green only

Cost: \$\$\$

Notes: For use with Icon Slide luminaire only



25' & 28'6" Round Tapered Pole



Manufacturer: Union Metal

Catalog #:

LA10354-K-PC
LA10354-K-GV
LA10354-F-PC
TY15-28.5-PC
LA10354-F-GV
TY-15-28.5-GV
LA10354-FF-PC
LA10354-FF-GV
1322-6-PC
1322-6-GV
1322-8-PC
1322-8-GV

Pole Description:

25' single luminaire, powered coated pole w/ 2 bolt mast arm shoe
25' single luminaire, galvanized pole w/ 2 bolt mast arm shoe
28'6" single luminaire pole, powered coated w/ 2 bolt mast arm shoe
28'6" single luminaire pole, powered coated w/ 3 bolt mast arm shoe
28'6" single luminaire pole, galvanized w/ 2 bolt mast arm shoe
28'6" single luminaire pole, galvanized w/ 3 bolt mast arm shoe
28'6" duplex luminaire pole, powder coated w/ 2 bolt mast arm shoe
28'6" duplex luminaire pole, galvanized w/ 2 bolt mast arm shoe
6' luminaire mast arm, powder coated
6' luminaire mast arm, galvanized
8' luminaire mast arm, powder coated
8' luminaire mast arm, galvanized

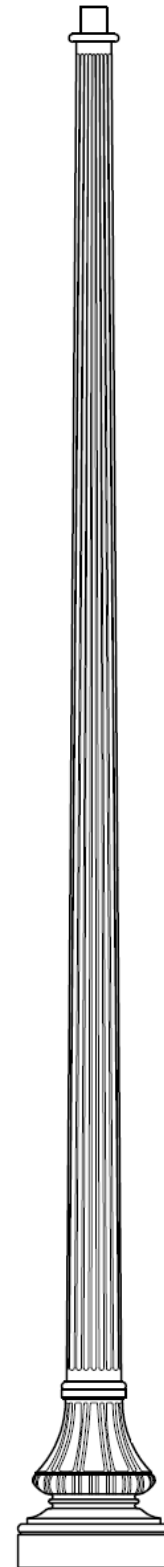
Color: Any City standard street light color. See Section 8.4.

Cost: \$

Notes: For luminaire mast arm > 8', please contact Electrical Services for additional requirements



28'6" Fluted Ornamental Pole



Manufacturer: Visco

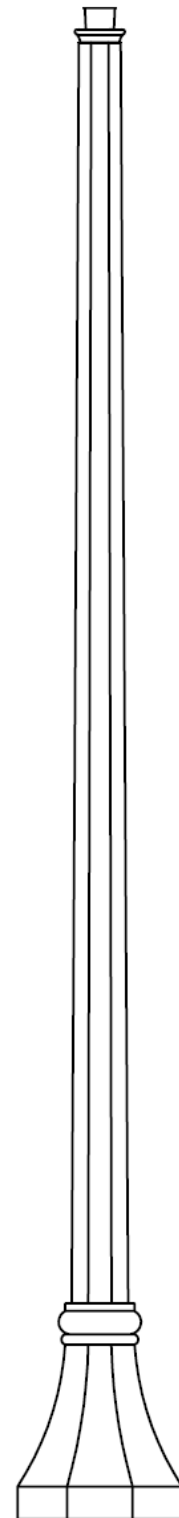
Catalog #: VI-B9/21-F/28'6"

Height: 28' 6"

Color: Dark Green only

Cost: \$\$\$\$\$

30' Octagonal Ornamental Pole



Manufacturer: Visco

Catalog #: VI-OCT/8-OAP2-OCT/30'

Height: 30' (optional 16' pedestrian luminaire)

Color: Teal Green only

Cost: \$\$\$\$\$

Appendix A: Street Lighting Warrant

ATTACHMENT A

1999 AMENDED

CITY OF OAKLAND

STREET LIGHTING WARRANTS

INTRODUCTIONS

The primary purpose of urban street lighting is to produce safe and comfortable vision during the night on public streets and sidewalks.

The benefits of such lighting include reduction of accidents, facilitation of traffic flow, promotion of nighttime operation of businesses and industries, enhanced neighborhoods and/or increased personal safety and security of the public.

OBJECTIVES

The design objective for night illumination of Oakland's streets is to provide a level and quality of street lighting that:

- Promotes and supports safe operation of vehicles at night.
- Enables pedestrians to identify persons and activities at a safe distance.
- Deters unlawful activity.
- Is consistent with practice throughout the country.
- Is efficient and economical in operation.
- Is responsive to the diverse needs of the community.

ILLUMINATION CRITERIA

The illumination criteria for the City's street lighting system is expressed in accordance with the American National Standard Practice for Roadway Lighting, ANSI/IES RP-8, 1983. Using this acceptable methodology, general illumination and uniformity guidelines have been developed to meet the street lighting needs of the City of Oakland.

CLASSIFICATIONS

ANSI/IES RP-8, 1983 Definitions



Appendix A: Street Lighting Warrant (cont'd)

1999 City of Oakland Street Lighting Warrants

Page 2

Roadway Classifications

Major:

That part of the roadway system which services as the principal network for through-traffic flow. The routes connect areas of principal traffic generation and important highways entering the city.

Collector:

The distributor and collector roadways servicing traffic between major and local roadways. These are roadways used mainly for traffic movements within residential, commercial and industrial areas.

Local:

Roadways used primarily for direct access to residential, commercial, industrial or other abutting property. They do not include roadways carrying through-traffic. Long local roadways will generally be divided into short sections by collector roadway systems.

Industrial:

Serves to provide direct access and/or is adjacent to industrial property. Passes through areas zoned for commercial, manufacturing and transportation land use.

Transit Access:

Serves for pedestrian access to Bay Area Rapid Transit (BART) District stations/parking lots and Alameda County (AC) Transit stops.

Area Classifications

Downtown:

A central civic or business area that is densely developed and characterized by high volume of nighttime vehicular and pedestrian traffic and having high-rise buildings.

Commercial:

Appendix A: Street Lighting Warrant (cont'd)

A business area of a municipality where ordinarily there are many pedestrians during night hours. This definition applies to densely developed business areas outside, as well as within the central part of a municipality. The area contains land use which attracts a relatively heavy volume of nighttime vehicular and/or pedestrian traffic on a frequent basis.

Intermediate:

Those areas of a municipality often characterized by moderately heavy nighttime pedestrian activity such as in blocks having libraries, community recreation centers, large apartment buildings or neighborhood retail stores.

Residential:

A residential development, or a mixture of residential and small commercial establishments, characterized by few pedestrians at night. This definition includes areas with single family homes, town houses, and/or small apartment buildings.

Residential Aesthetic:

Same as residential above but to further enhance the ambiance of a neighborhood.

Crime:

Designated by the Oakland Police Department to be areas where increased street lighting would have a significant impact on deterrence of street crime.

Ornamental:

Areas where decorative luminaries are chosen to enhance the ambiance and provide a more aesthetically pleasing appearance. This classification is a minimum level for the road class. If practical, the higher level set for the type of area (downtown, commercial, intermediate, and residential) is desired.

Note: City staff will determine the appropriate roadway classification for each street segment based on historical practice, area survey, and/or applicable zoning ordinances.



Appendix A: Street Lighting Warrant (cont'd)

1999 City of Oakland Street Lighting Warrants

Page 4

CITY OF OAKLAND					
Street Lighting Guidelines					
Roadway & Area Classification		MINIMUM STANDARDS		OPTIMUM STANDARDS	
		Illuminance (Footcandles)	Uniformity Ratio (Avg. to Min.)	Illuminance (Footcandles)	Uniformity Ratio (Avg. to Min.)
Major	Downtown	2.0	3:1	3.5	2:1
	Commercial	1.6	3:1	2.9	2:1
	Intermediate	1.2	3:1	2.0	3:1
	Residential Optimal (Cobra)	0.8	3:1	1.3	3:1
	Ornamental	0.44	4:1	0.44	4:1
	Ornamental glare reducing	.18	4:1	.18	4:1
	Residential Aesthetic (Cobra)	.35	23:1	.35	23:1
	Ornamental	.22	34:1	.22	34:1
	Ornamental glare reducing	.09	15:1	.09	15:1
	Collector	Downtown	1.5	4:1	2.5
Commercial		1.1	4:1	1.8	3:1
Intermediate		0.8	4:1	1.3	3:1
Residential Optimal (Cobra)		0.6	4:1	1.0	4:1
Ornamental		.35	4:1	0.35	4:1
Ornamental glare reducing		0.19	4:1	0.19	4:1
Residential Aesthetic (Cobra)		0.30	50:1	0.30	50:1
Ornamental		0.16	31:1	0.16	31:1
Ornamental glare reducing		0.07	23:1	0.07	23:1
Local		Commercial	0.8	6:1	1.2
	Intermediate	0.7	6:1	1.1	4:1
	Residential Optimal (Cobra)	0.4	6:1	0.6	4:1
	Ornamental	.25	6:1	0.25	6:1
	Ornamental glare reducing	.15	6:1	0.15	6:1
	Residential Aesthetic (Cobra)	0.2	55:1	0.2	55:1
	Ornamental	.13	31:1	.13	31:1
	Ornamental glare reducing	0.08	23:1	0.08	23:1
Crime		1.5	4:1	1.5	4:1
Industrial		1.4	3:1	1.4	3:1
Transit Access		3.0	2:1	3.0	2:1

Note: All totally new street lighting systems should be designed to the optimum standard level. Where any street segment has a mixture of developments which would lead to a question of classification, the classification having the highest Illuminance Value and the lowest Uniformity Ratio shall prevail



Appendix A: Street Lighting Warrant (cont'd)

The Residential Aesthetic lighting level is a minimum level. This level generally allows a block to eliminate a maximum of every other light pole that would have been required in a street light design to meet the Residential Cobra or Ornamental area classifications. The block petitioners will need to determine exactly which light(s) they want not installed with the following exclusions:

1. Lights lighting intersections unless exempted by Public Works Agency Traffic Engineers, and
2. No two or more lights consecutively eliminated.
3. Bus stops.
4. Sharp curves.

APPLICATION OF CITY OF OAKLAND WARRANTS

The intent of the Street Lighting Warrants is to provide guidelines for levels of street lighting consistent with the national standards, while recognizing the unique needs of the City of Oakland and the diversity of its community.

The street lighting values expressed above are to be used as a general guideline in the design and maintenance of the City's street lighting system. The guidelines are intended to establish the level of street lighting for each roadway classification. The City may, however, exercise judgement and discretion with regard to specific street lighting applications to ensure that the needs of the community are met and to maximize the effectiveness of the street lighting system.

To request higher levels of lighting, the Oakland City Council authorizes City staff to accept petitions in accordance with the following process. On local residential streets citizens will be notified by mail that they will need to submit petitions requesting to increase existing street lighting level.

Individual Request

- A neighborhood representative must list all properties within the street block(s) by the street addresses and state specific lighting requested on the City petition form provided by the Electrical Division. The City of Oakland's Electrical Division will determine and provide the deadline date to return the petition. The petition can then be circulated by the neighborhood representative to residents for signatures.



Appendix A: Street Lighting Warrant (cont'd)

- The City petition form must be signed by majority of the residents within a minimum of a block that abuts the street. A block is defined from street intersection to street intersection or a maximum of 800 feet in length. A petition has no maximum limit on the number of blocks or length. Petitions are only acceptable in areas where improvements are planned or the citizen(s) petitioning agree to pay for associated costs of lighting modification.
- The petitioners will then return the petition before the deadline to the Electrical Services Division for implementation. A petition will not be accepted after the deadline date if it impacts cost. Implementation will occur only if funding is available.

Area (Homeowner's Association) Request

- A homeowner's association may submit a request on behalf of its area rather than utilizing the individual petition process. Requests can be given directly to the Electrical Division.

EXCLUSION

When deemed appropriate, the City Council may exclude or modify by resolution certain streets, street segments or areas from the City's street lighting warrants.

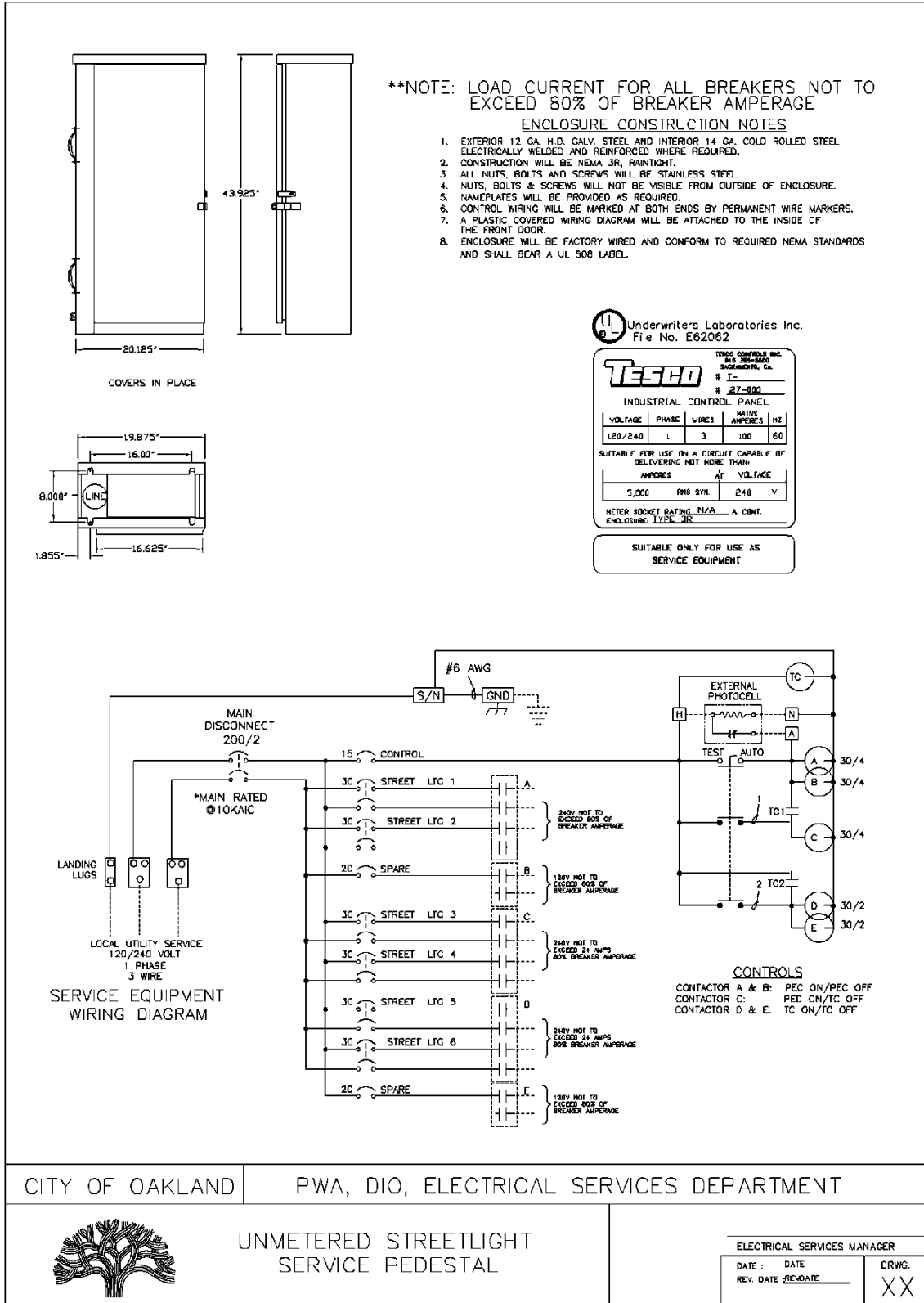
DISCLAIMER

Nothing contained in these warrants is intended to establish or create a legal standard or duty toward the public. The warrants embody objectives toward which the City is committed to strive, and the City is not actionable for failures to provide street lighting to meet warrant levels or other objectives, whether by accident, power or equipment failure, act of God, or fiscal constraints.

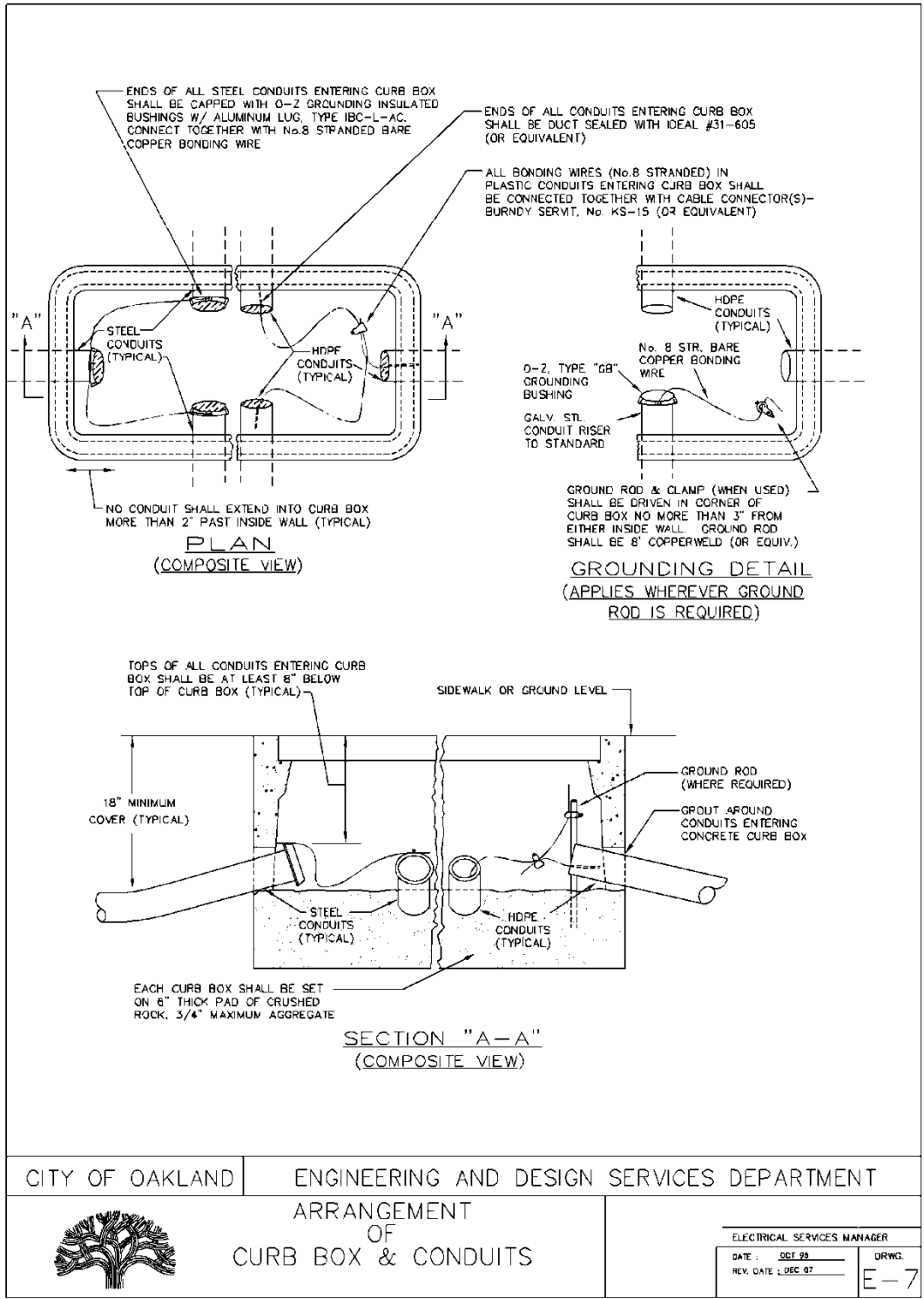
Data/Street Lights/SLW-99.doc



Appendix B: Service Enclosure Single Line



Appendix C: Electrical Standard Drawings



Appendix C: Electrical Standard Drawings (cont'd)

THE INSCRIPTION "CITY OF OAKLAND - ELECTRICAL" SHALL BE CAST IN ALL CURB BOX COVERS.

NON-PORTLAND CONCRETE CEMENT COVER SHALL BE FURNISHED WITH LIFTING SLOTS BUT WITHOUT HOLD-DOWN BOLTS.


MINIMUM CURB BOX COVER CORNER RADIUS SHALL BE 1 1/4"

NON-PORTLAND CONCRETE CEMENT CURB BOX (SEE DIMENSIONS BELOW), SHALL BE FURNISHED WITH COVER (AS SHOWN ABOVE), AS A UNIT.

TABLE OF DIMENSIONS											
DIMENSIONS ARE IN INCHES AND SHOW THE ACCEPTABLE LIMITS											
CURB BOX & COVER SIZE NO.	CURB BOX						CURB BOX COVER				
	LENGTH		WIDTH		HEIGHT		LENGTH		WIDTH		HEIGHT
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
5	23 5/8"	25 3/8"	14 1/8"	15 7/8"	12	14	23 1/8"	23 1/4"	13 5/8"	13 3/4"	2"
6	30 7/8"	33"	17 7/8"	19 5/8"	12	14	30 3/8"	30 1/2"	17 3/8"	17 1/2"	2"

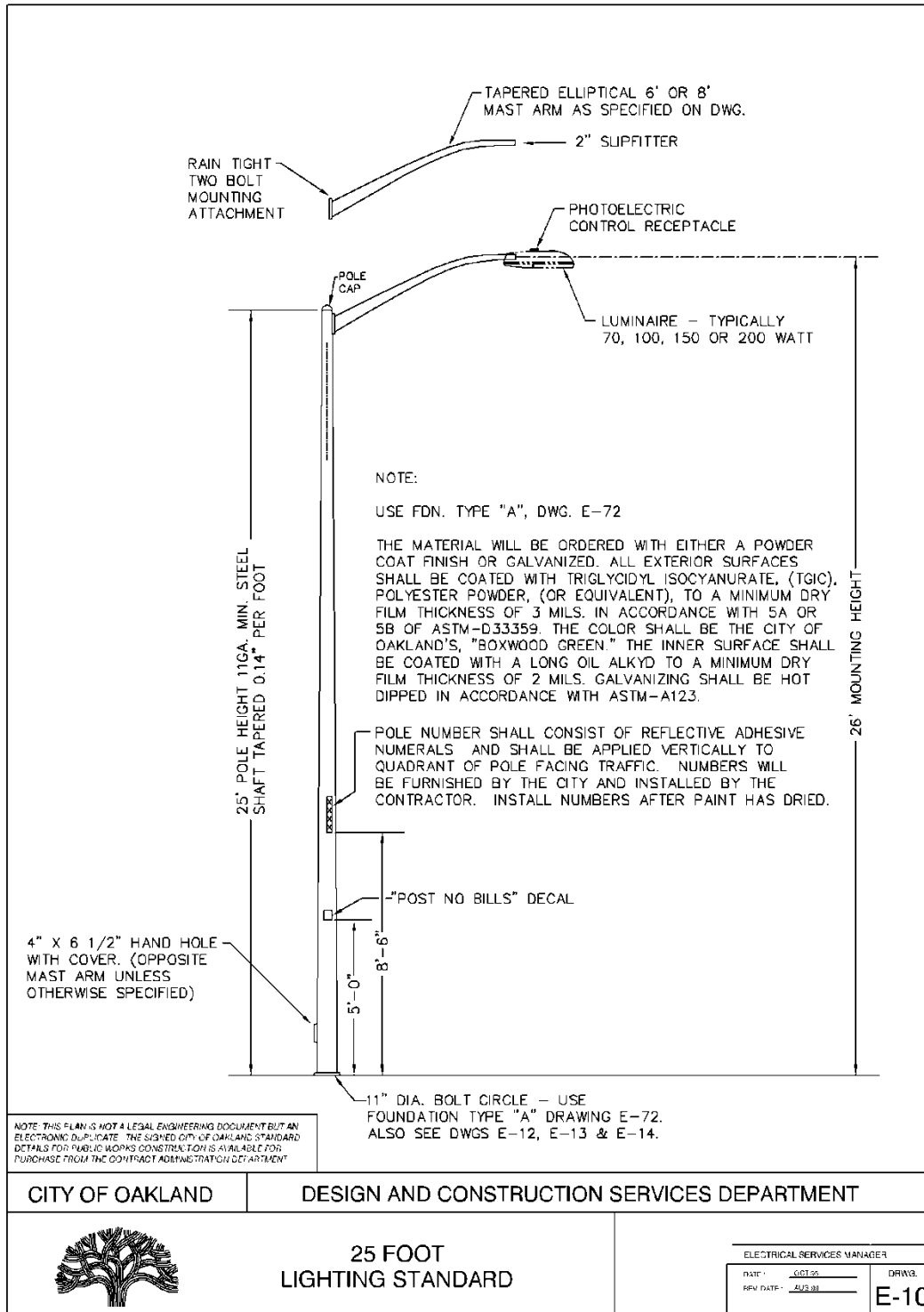
NOTES: MINIMUM CURB BOX COVER WALL THICKNESS SHALL BE 3/8" AT FLAT AREAS BETWEEN RIBS. COVERS SHALL BE FLUSH WITH TOP OF BOX WHEN INSTALLED. THE MATERIAL SHALL BE CONCRETE COLOR.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE SEALED CITY OF OAKLAND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION IS AVAILABLE FOR PURCHASE FROM THE CONTRACT ADMINISTRATION DEPARTMENT.

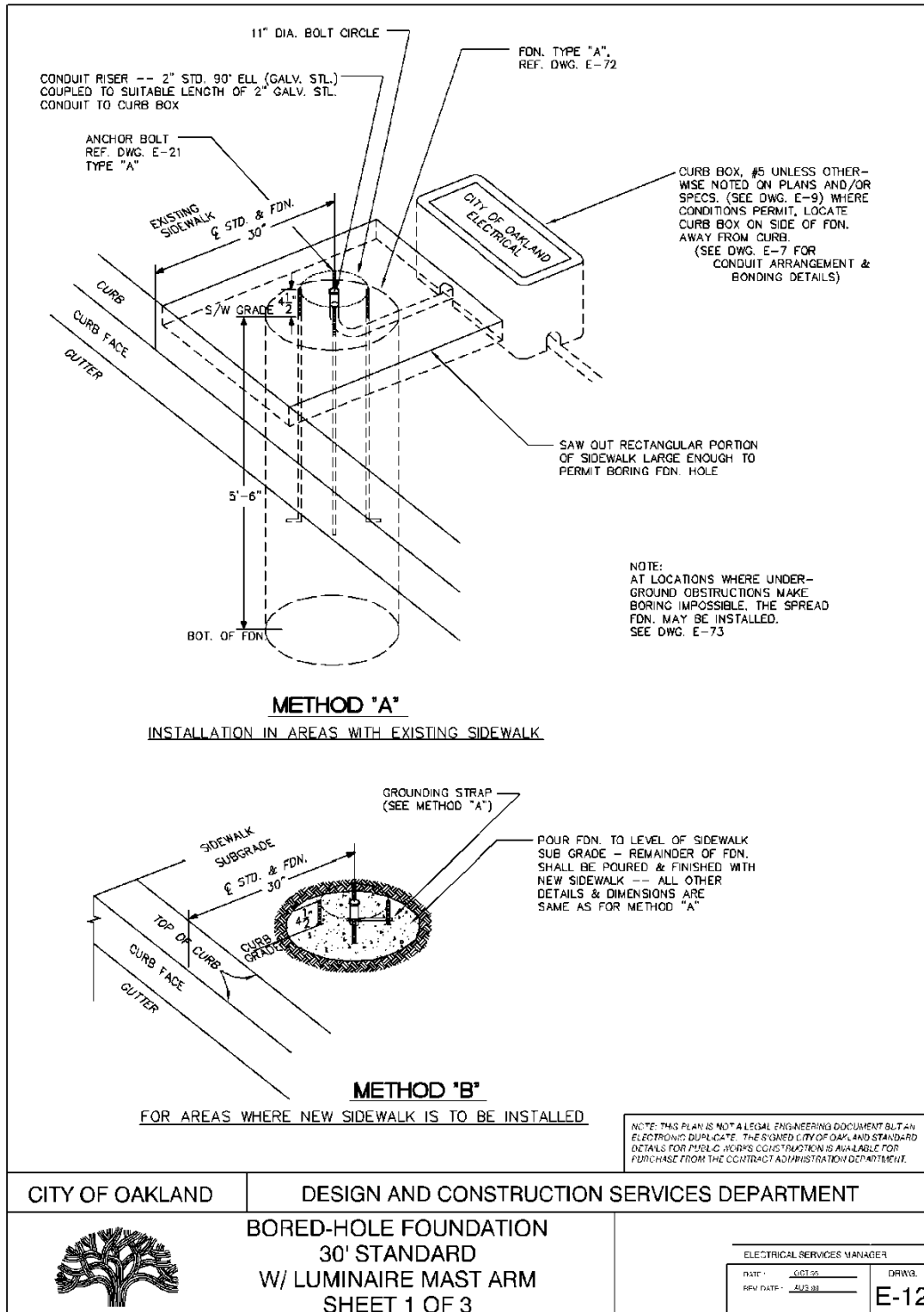
CITY OF OAKLAND	DESIGN AND CONSTRUCTION SERVICES DEPARTMENT
	PRECAST, NON-CONCRETE, STANDARD CURB BOXES
	ELECTRICAL SERVICES MANAGER
DATE: 08/25	DRWG. E-9
REV DATE: 05/28	



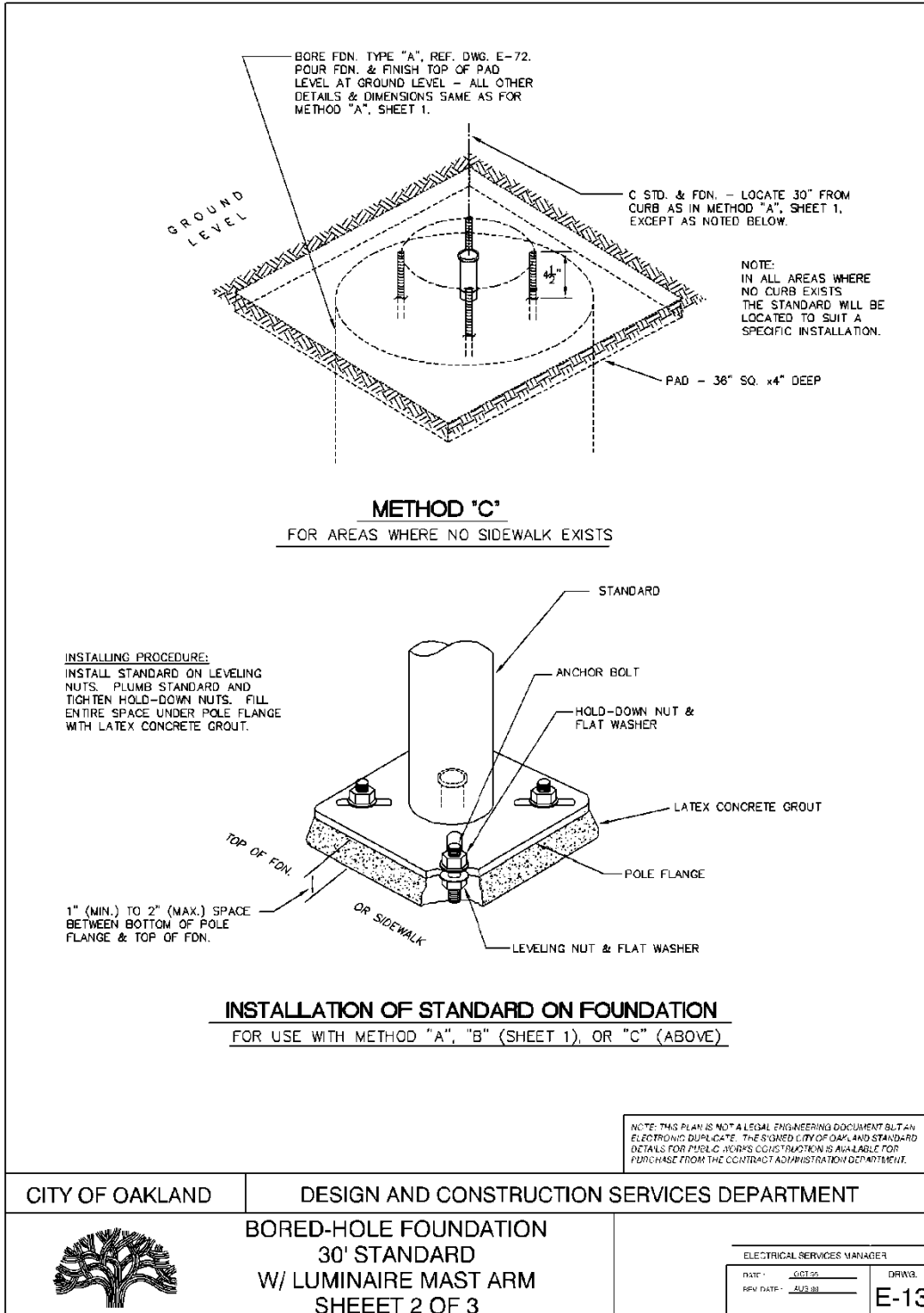
Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)

MATERIAL LIST					
PEND.	ITEM & DESCRIPTION	REQD.	UNIT PRICE	EXTN.	
A57	GROUNDING STRAP, 9-1/16" x 1-1/4" x 3/16" FLAT BAR, STEEL - DWG. E-32	1			
E32	3/4" I.P.S. U-BOLT, STEEL - DWG. E-32	1			
F36	2" I.P.S. U-BOLT, STEEL - DWG. E-32	1			
	STREET LIGHTING STANDARD, ANCHOR BASE TYPE, 11" DIA. BOLT CIRCLE	1			
	ANCHOR BOLT, 1" DIA. x 36" - DWG. E-21, TYPE "A"	4			
	1" REG. HEX. NUT, GALV. STL. (2 EA. FURNISHED WITH EA. ANCHOR BOLT) - DWG. E-21	8			
	1" FLAT WASHER, GALV. STL. (2 EA. FURNISHED WITH EA. ANCHOR BOLT) - DWG. E-21	8			
	2" CONDUIT ELL, STD. 90°, GALVANIZED STL - CPL. TO LENGTH OF 2" GALV. STL. CONDUIT	1			
	2" CONDUIT BUSHING, PLAIN, GALV. STEEL	1			
	2" CONDUIT BUSHING, GROUNDING, BRONZE - 0-2 No. GB2008	1			
	CURB BOX, No. 5 SIZE UNLESS NOTED OTHERWISE ON PLANS AND/OR SPECIFICATIONS SEE DWGS. E-9 & E-7 FOR DETAILS	1			
	CONCRETE, SIDEWALK, 5-SACK MIX	1 YD.			
	CONCRETE, LATEX	A.R.			
	CRUSHED ROCK, 3/4" MAXIMUM AGGREGATE	A.R.			

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE SIGNED CITY OF OAKLAND STANDARD DETAILS FOR PUELD.C. WORKS CONSTRUCTION IS AVAILABLE FOR PURCHASE FROM THE CONTRACT ADMINISTRATION DEPARTMENT.

CITY OF OAKLAND

DESIGN AND CONSTRUCTION SERVICES DEPARTMENT

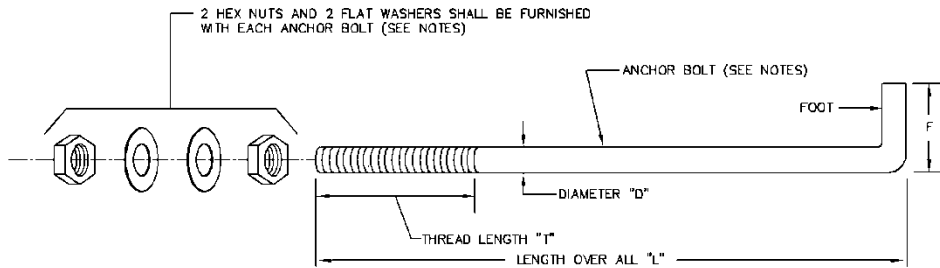


**BORED-HOLE FOUNDATION
30' STANDARD
W/ LUMINAIRE MAST ARM
SHEET 3 OF 3**

ELECTRICAL SERVICES MANAGER
 DATE: 08/25
 REV DATE: 05/30
 DRAWG. E-14



Appendix C: Electrical Standard Drawings (cont'd)



NOTES:

1. MATERIAL FOR ANCHOR BOLTS, HEX NUTS AND FLAT WASHERS SHALL BE HOT-ROLLED MILD STEEL A307 OR A36, SEE SHT E-74.
2. ANCHOR BOLTS SHALL HAVE A CUT THREAD AND SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM-A123 AFTER FORMING AND THREADING.
3. FLAT WASHERS SHALL BE GALVANIZED AFTER FORMING.

TABLE OF ANCHOR BOLT DIMENSIONS

ITEM	USE	D	L	T	F
1	FDN. FOR 3" OR 4" PIPE PEDESTAL OR STANDARD	5/8"	24"	8"	3
2	HAND DUG - HOLE FDN., 36" D.F., FOR ELECTROLIER	1"	36"	8"	4
3	BORED-HOLE FDN. (REF. TO DWG. E-72) FOR ELECTROLIER, TYPE "A"	1"	36"	8"	4
4	BORED-HOLE FDN. (REF. TO DWG. E-72) FOR STD. W/20' MAX. T.S. MAST ARM, TYPE "B"	1-1/4"	42"	8"	6
5	BORED-HOLE FDN. (REF. TO DWG. E-72) FOR STD. W/30' MAX. T.S. MAST ARM, TYPE "C"	1-1/2"	54"	8"	6

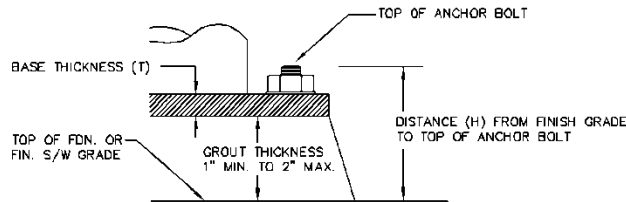


TABLE OF CONSTRUCTION DIMENSIONS

TYPE OF STANDARD	T	H
3" OR 4" PIPE PEDESTAL OR STANDARD	3/4" - 7/8"	4"
ELECTROLIER	3/4" - 1"	4-1/2"
STANDARD WITH 20' MAX. T.S. MAST ARM	1-1/4"	5"
STANDARD WITH 30' MAX. T.S. MAST ARM	1-1/2"	5-1/2"

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATION. THE STANDARD CITY OF OAKLAND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION IS AVAILABLE FOR PURCHASE FROM THE CONTRACT ADMINISTRATION DEPARTMENT.

CITY OF OAKLAND

DESIGN AND CONSTRUCTION SERVICES DEPARTMENT



**ANCHOR BOLTS
FOR
PEDESTALS & STANDARDS**

ELECTRICAL SERVICES MANAGER

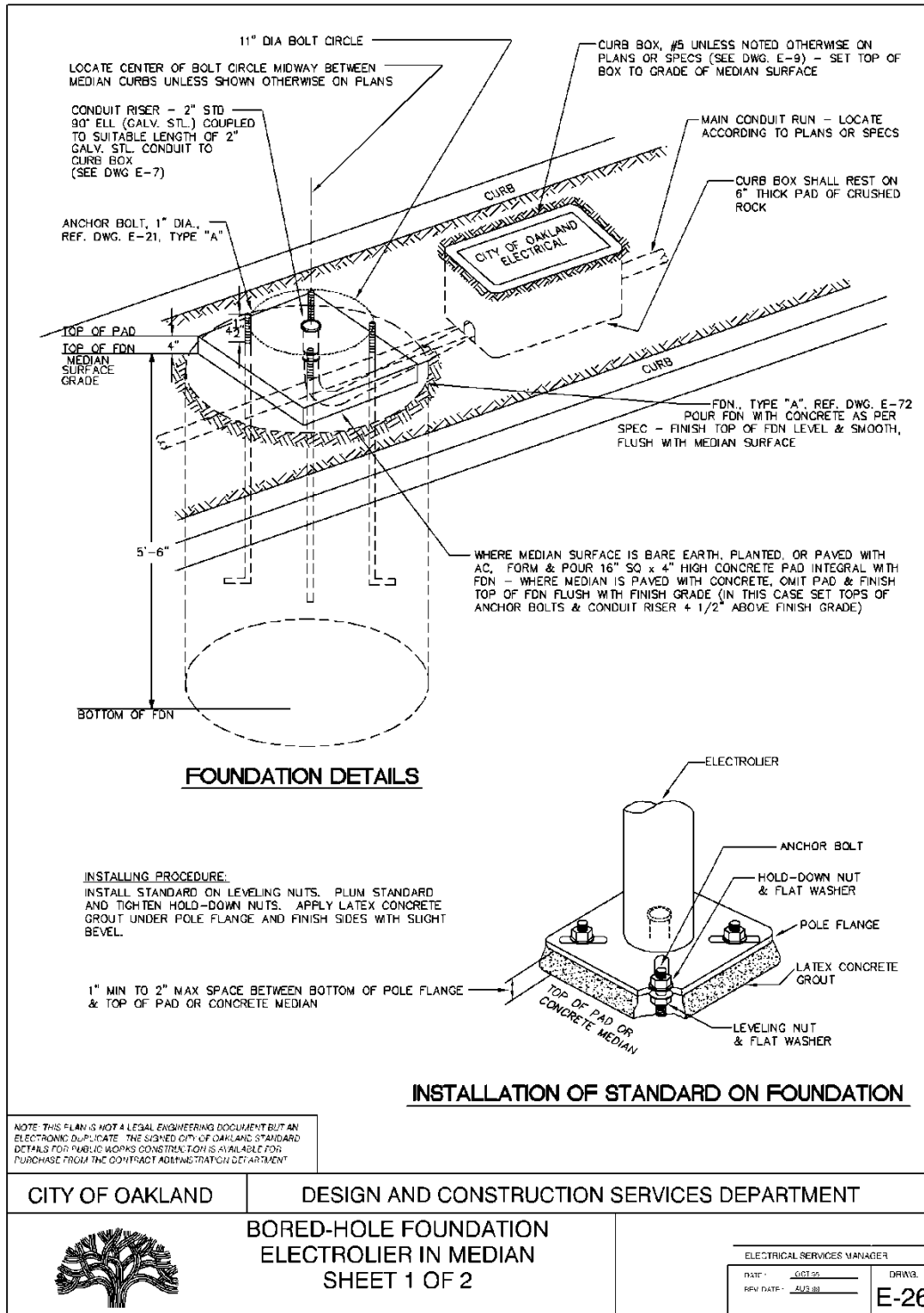
DATE: OCT 25
REV DATE: AUG 31

DRWG.

E-21



Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)

MATERIAL LIST

QTY	ITEM & DESCRIPTION	REQD.	UNIT PRICE	EXTN.
	GROUNDING STRAP, 9-1/16" x 1-1/4" x 3/16" FLAT BAR, STEEL - DWG. E-32	1		
	3/4" I.P.S. U-BOLT, STEEL - DWG. E-32	1		
	2" I.P.S. U-BOLT, STEEL - DWG. E-32	1		
	STREET LIGHTING STANDARD, ANCHOR BASE TYPE, 1" DIA. BOLT CIRCLE - SEE SPECIFICATIONS FOR DETAILS	1		
	ANCHOR BOLT, 1" DIA. x 36" LONG, GALV. STEEL - ITEM No. 3 OF DWG. E-21, TYPE "A"	4		
	1" REG. HEX NUT, GALV. STEEL (2 EA. FURNISHED WITH EA. ANCHOR BOLT) - DWG. E-21	8		
	1" FLAT WASHER, GALV. STEEL (2 EA. FURNISHED WITH EA. ANCHOR BOLT) - DWG. E-21	8		
	2" CONDUIT ELL, STD. 90°, GALV. STEEL - CPL. TO LENGTH (AS REQ.) OF 2" GALV. CONDUIT	1		
	2" CONDUIT BUSHING, PLAIN, GALV. STEEL	1		
	2" CONDUIT BUSHING, GROUNDING, BRONZE - 0-2 No. GB2008	1		
	CURB BOX, No. 5 SIZE UNLESS NOTED OTHERWISE ON PLANS OR SPECIFICATIONS - SEE DWGS. E-9 & E-7 FOR DETAILS	1		
	CONCRETE - SEE SPECIFICATIONS	1 YD.		
	LATEX CONCRETE	A.R.		
	CRUSHED ROCK, 3/4" MAXIMUM AGGREGATE	A.R.		

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONS BLUEPRINT. THE SIGNED CITY OF OAKLAND STANDARD DETAILS FOR PUELC WORKS CONSTRUCTION IS AVAILABLE FOR PURCHASE FROM THE CONTRACT ADMINISTRATION DEPARTMENT.

CITY OF OAKLAND

DESIGN AND CONSTRUCTION SERVICES DEPARTMENT



**BORED-HOLE FOUNDATION
ELECTROLIER IN MEDIAN
SHEET 2 OF 2**

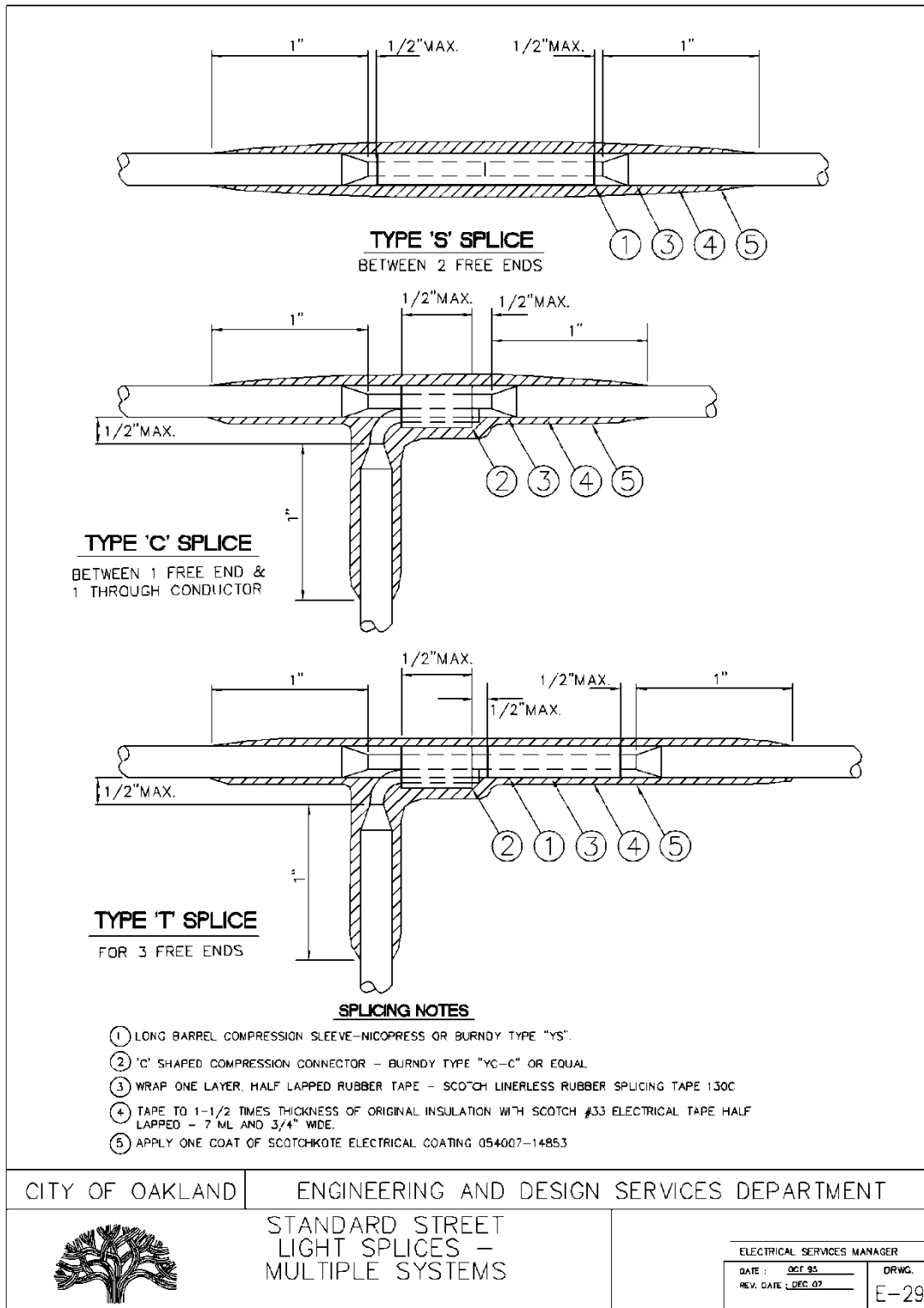
ELECTRICAL SERVICES MANAGER

DATE: 08/25
REV DATE: 05/30

DRWG.
E-27



Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)

CONDUCTOR NUMBERING FOR TRAFFIC SIGNAL CABLE

CONDUCTOR NUMBER	COLOR CODED		
	12-CONDUCTOR	9-CONDUCTOR	5-CONDUCTOR
1	RED	RED	RED
2	RED-BLACK	RED-BLACK	GREEN
3	GREEN	GREEN	ORANGE
4	GREEN-BLACK	GREEN-BLACK	BLACK
5	ORANGE	ORANGE	WHITE (NEUT.)
6	ORANGE-BLACK	BLACK	
7	BLUE	BLUE	
8	BLUE-BLACK	WHITE-BLACK	
9	BLACK	WHITE (NEUT.)	
10	BLACK-WHITE		
11	WHITE-BLACK		
12	WHITE (NEUT.)		

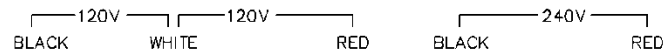
SEE SPECIFICATIONS FOR IMSA 19-1 OR 20-1 SPECS.

COLOR CODE FOR MISCELLANEOUS WIRE & CABLE

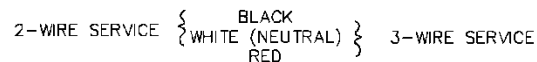
GROUND - GREEN

MULTIPLE STREET LIGHTING CIRCUITS (THWN/THHN WIRE)

ALL NIGHT CIRCUITS



TRAFFIC SIGNAL SERVICES (THWN/THHN WIRE)



NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE STANDARD CITY OF OAKLAND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION IS AVAILABLE FOR PURCHASE FROM THE CONTRACT ADMINISTRATION DEPARTMENT.

CITY OF OAKLAND

DESIGN AND CONSTRUCTION SERVICES DEPARTMENT



COLOR CODING
AND CONDUCTOR
NUMBERING FOR
WIRE AND CABLE

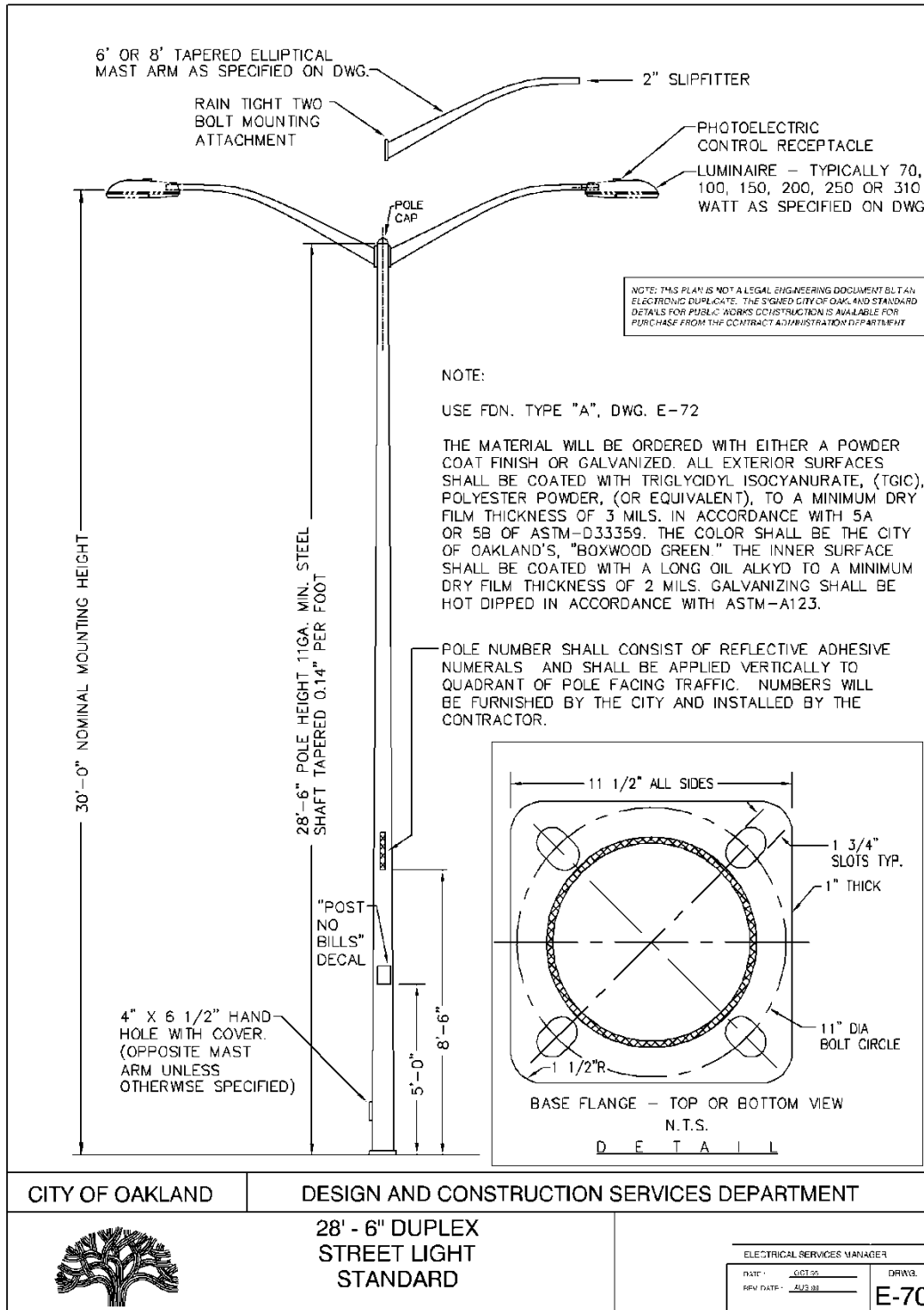
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REV DATE: _____

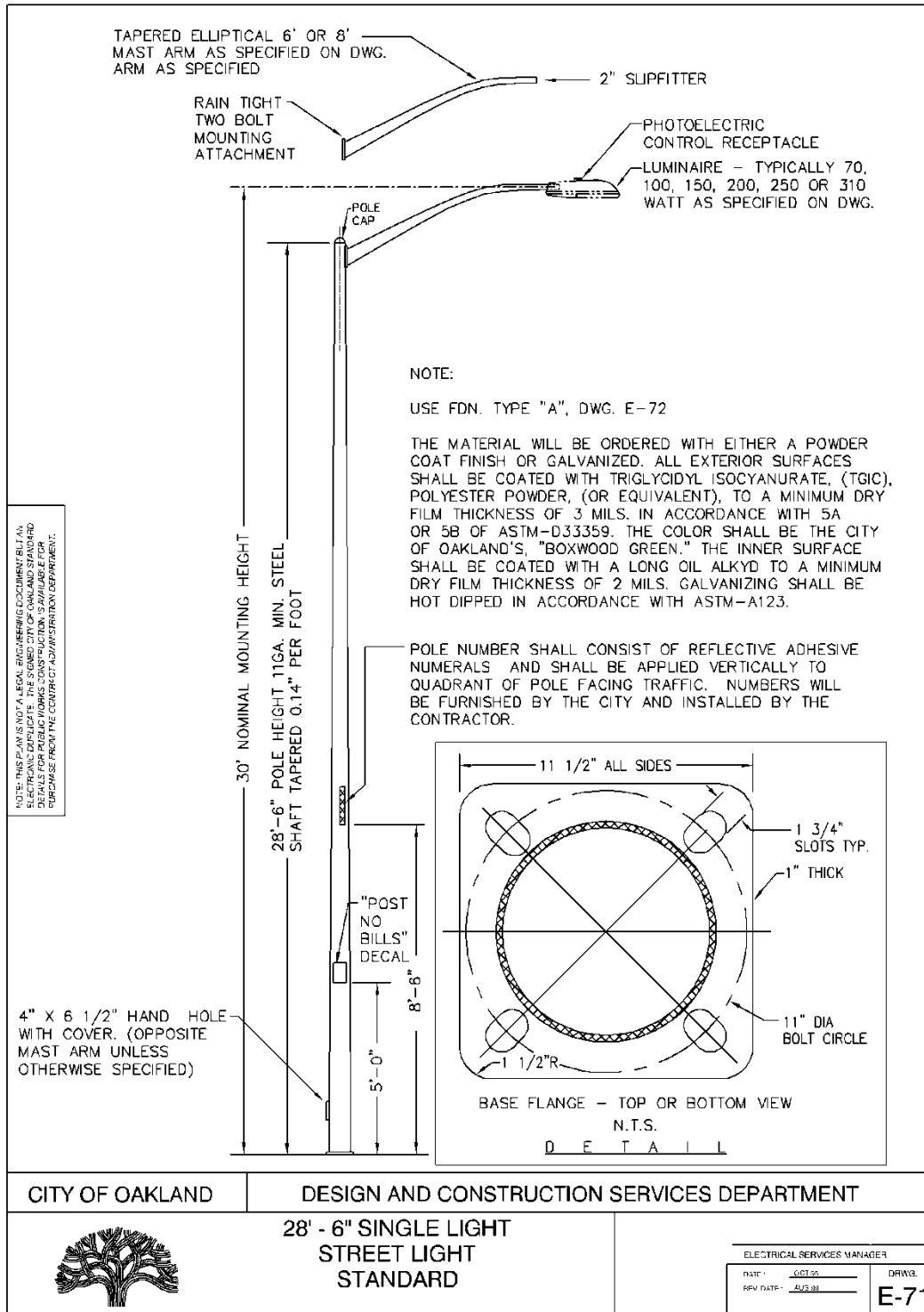
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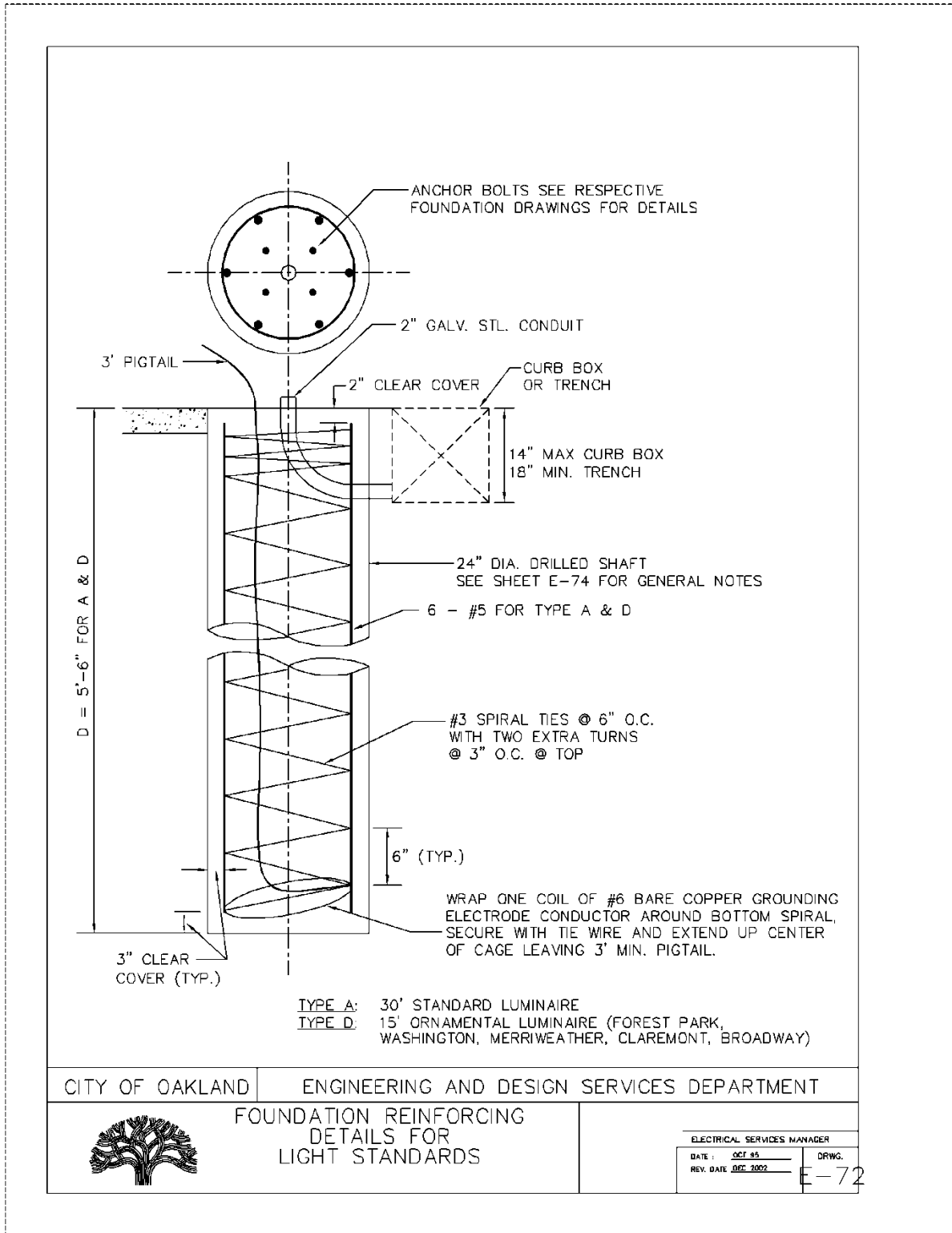
Appendix C: Electrical Standard Drawings (cont'd)



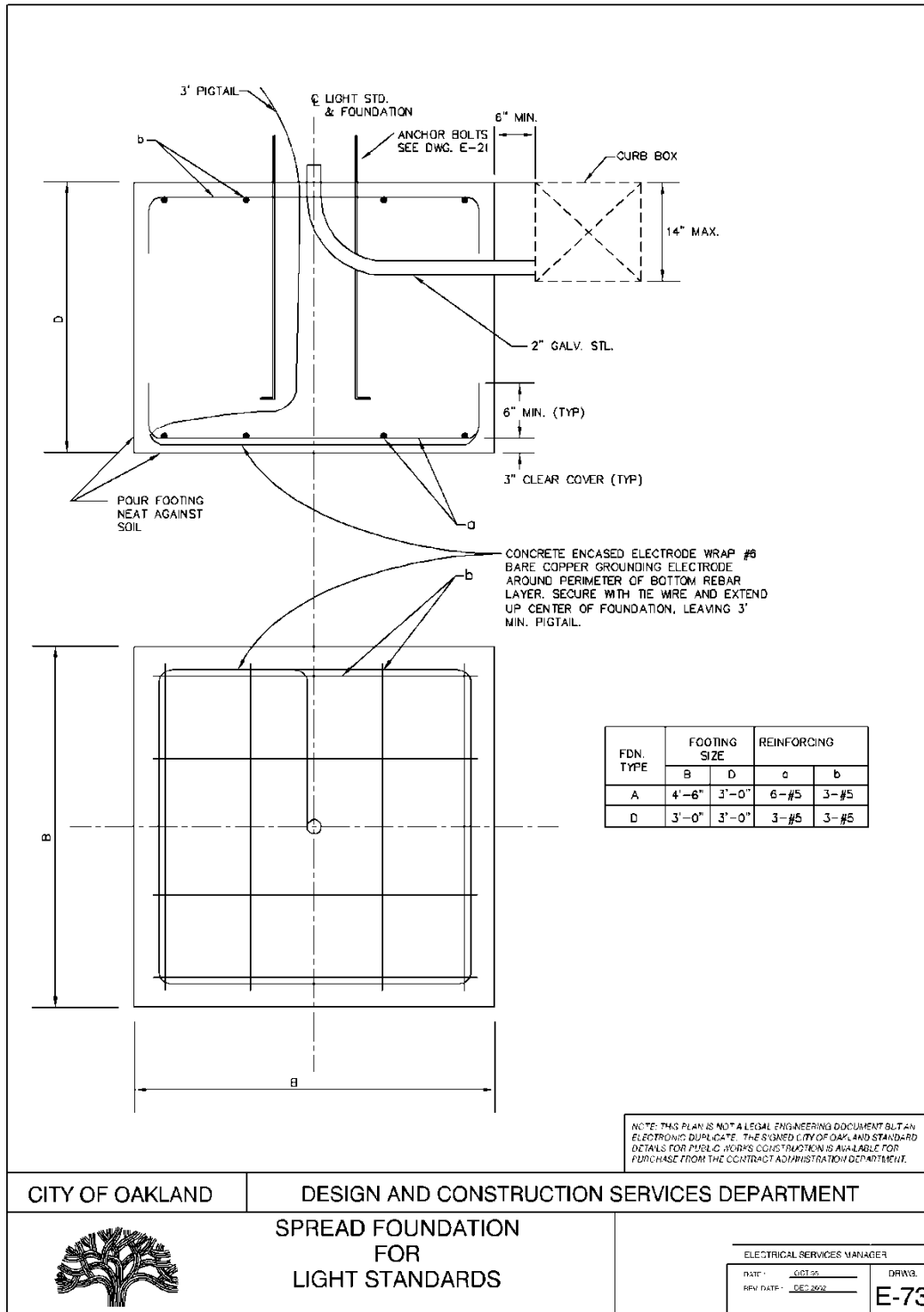
Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)

GENERAL NOTES

ALL WORK SHALL CONFORM TO THE 1997 UNIFORM BUILDING CODE, INCLUDING ALL THE REVISIONS AND AS ADOPTED BY THE LOCAL BUILDING CODES AND ORDINANCES.

ALL DIMENSIONS RELATING TO THE EXISTING CONDITIONS SHALL BE VERIFIED IN THE FIELD. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS. DIMENSIONS FOR BOLTS, BOLT CENTERS AND LOCATION IS PROVIDED FOR INFORMATION ONLY AND SHOULD BE VERIFIED BY THE EQUIPMENT SUPPLIER PRIOR TO INSTALLING AND POURING.

ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE NOTICE OF THE ENGINEER. WORK SHALL NOT BE COMMENCED UNTIL THE DISCREPANCIES ARE CLARIFIED AND THE REVISED DRAWINGS/INSTRUCTIONS ARE ISSUED BY THE ENGINEER.

JOB SITE REVIEW: THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST TWO DAYS PRIOR TO EACH OF THE FOLLOWING ITEMS SO THE ENGINEER MAY MAKE AN APPROPRIATE JOB SITE REVIEW IF AUTHORIZED BY THE OWNER.:

- PRIOR TO POURING ANY STRUCTURAL CONCRETE SUCH AS FOUNDATION AND RETAINING WALLS FOR DESIGNED STEEL REINFORCING AND ANCHOR BOLT REVIEW.

SAFETY MEASURES: AT ALL TIMES THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR ALL THE ENGINEERING OF TEMPORARY SHORING, ADDITIONAL REINFORCING, BRACING, FORMWORK, SCAFFOLDING, ERECTION METHODS AND RELATED CONDITIONS OF THE JOB SITE INCLUDING SAFETY OF PERSONS AND PROPERTY, AND FOR ALL NECESSARY INDEPENDENT ENGINEERING REVIEW OF THESE CONDITIONS. THE ENGINEER'S JOB SITE REVIEW IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES.

FOUNDATION

ALL SITE WORK AND GRADING, DRAINAGE SYSTEMS, FOUNDATIONS AND OTHER SOIL CONSIDERATIONS SHALL CONFORM TO THE RECOMMENDATION OF CHAPTER 29 OF UBC.

CONCRETE WORK SHALL CONFORM TO "ACI MANUAL OF CONCRETE PRACTICE", SPECIFICALLY "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS", ACI 301 INCLUDING LATEST EDITIONS. CONTRACTOR SHALL SUBMIT HIS PROPOSED METHOD OF CURING OF CONCRETE FOR REVIEW.

CONCRETE FOR **POURED IN PLACE** FOUNDATIONS AND RETAINING WALLS SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF **3,000** PSI IN 28 DAYS. MIX DESIGN SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AT LEAST TWO WEEKS PRIOR TO POURING CONCRETE. CONCRETE SLUMP SHALL BE 4.0" MAXIMUM. THE SLUMP SHALL BE DETERMINED BY ASTM C143.

CONCRETE FOR **PRECAST** RETAINING WALLS SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF **4,000** PSI IN 28 DAYS. MIX DESIGN SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AT LEAST TWO WEEKS PRIOR TO POURING CONCRETE. CONCRETE SLUMP SHALL BE 3.0" MAXIMUM. THE SLUMP SHALL BE DETERMINED BY ASTM C143.

SPECIAL INSPECTION SHALL BE PROVIDED PER SECTION 305 OF UBC.

REINFORCING STEEL SHALL BE DEFORMED BILLET STEEL, CONFORMING TO ASTM A615-82, GRADE 40, SPECIFICATION FOR #4 AND SMALLER AND ASTM A516-82, GRADE 60, SPECIFICATION FOR #5 AND LARGER. BARS SHALL BE CONTINUOUS AROUND CORNERS AND LAPPED MINIMUM 24" OR 32 DIAMETERS FOR GRADE 40 BARS, AND 48 DIAMETERS FOR GRADE 60 BARS UNLESS OTHERWISE SHOWN. LAPS SHALL BE STAGGERED. FIELD BENDING OF REINFORCING BARS SHALL BE AVOIDED AS FAR AS POSSIBLE. ONLY "COLD BENDING" OF BARS IS PERMITTED AS APPROVED BY THE ENGINEER. SUBMIT SHOP DRAWINGS AND MILL CERTIFICATES TO TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.

COVER FOR REINFORCEMENT SHALL BE 3" CLEAR FOR ALL CONCRETE POURED AGAINST AND/OR EXPOSED TO EARTH AND 2" CLEAR FOR ALL CONCRETE FORMED AGAINST EARTH UNLESS OTHERWISE SHOWN.

ALL BOLTS SHALL CONFORM TO ASTM A307 OR ASTM 1-36 UNLESS OTHERWISE NOTED.

ANCHOR BOLTS AND INSERTS SHALL BE RIGIDLY HELD IN PLACE PRIOR TO CONCRETING.

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CITY OF OAKLAND

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SITework AND FOUNDATION
GENERAL NOTES

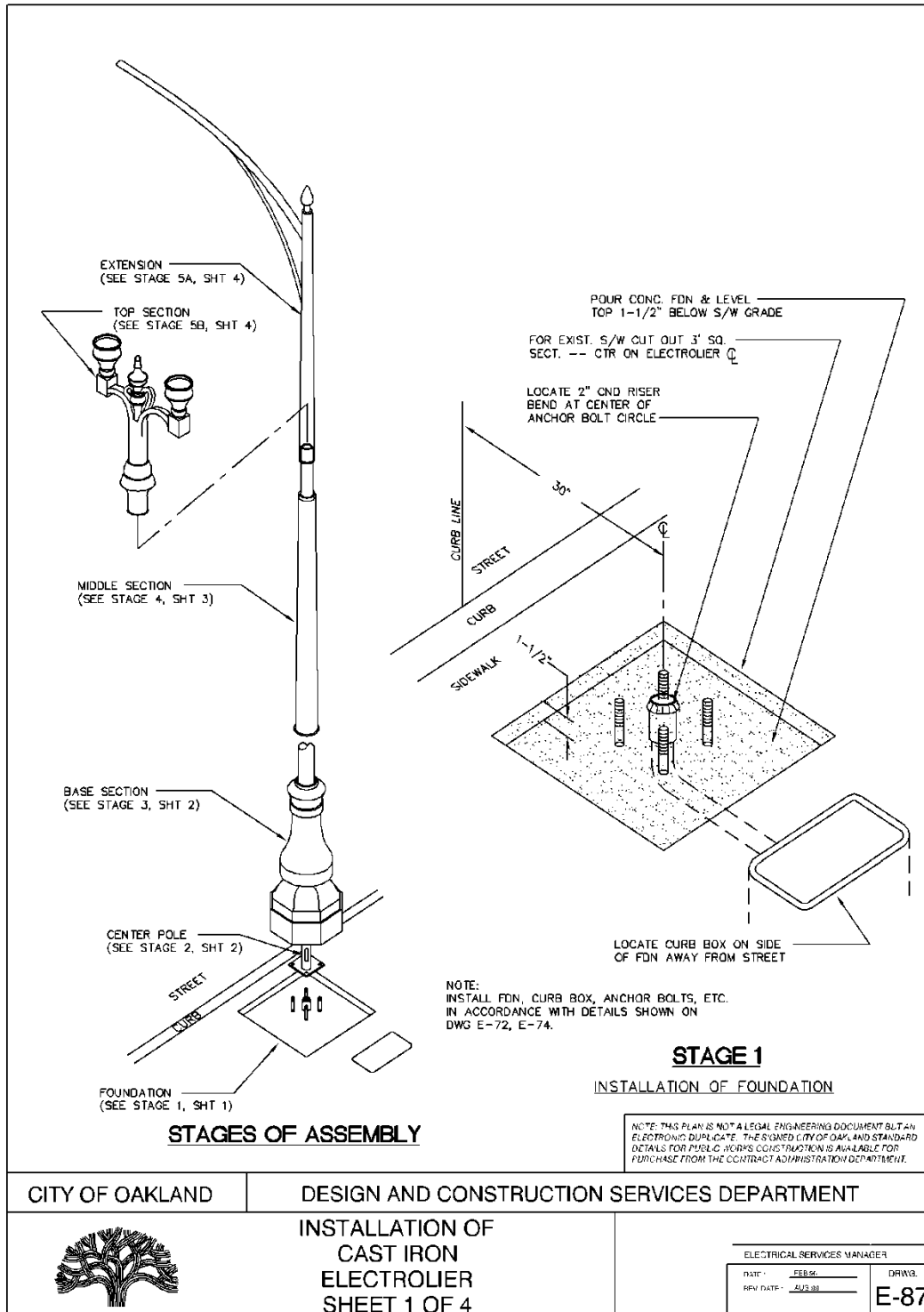
ELECTRICAL SERVICES MANAGER

PLANT - C0125
REV DATE - 03/08

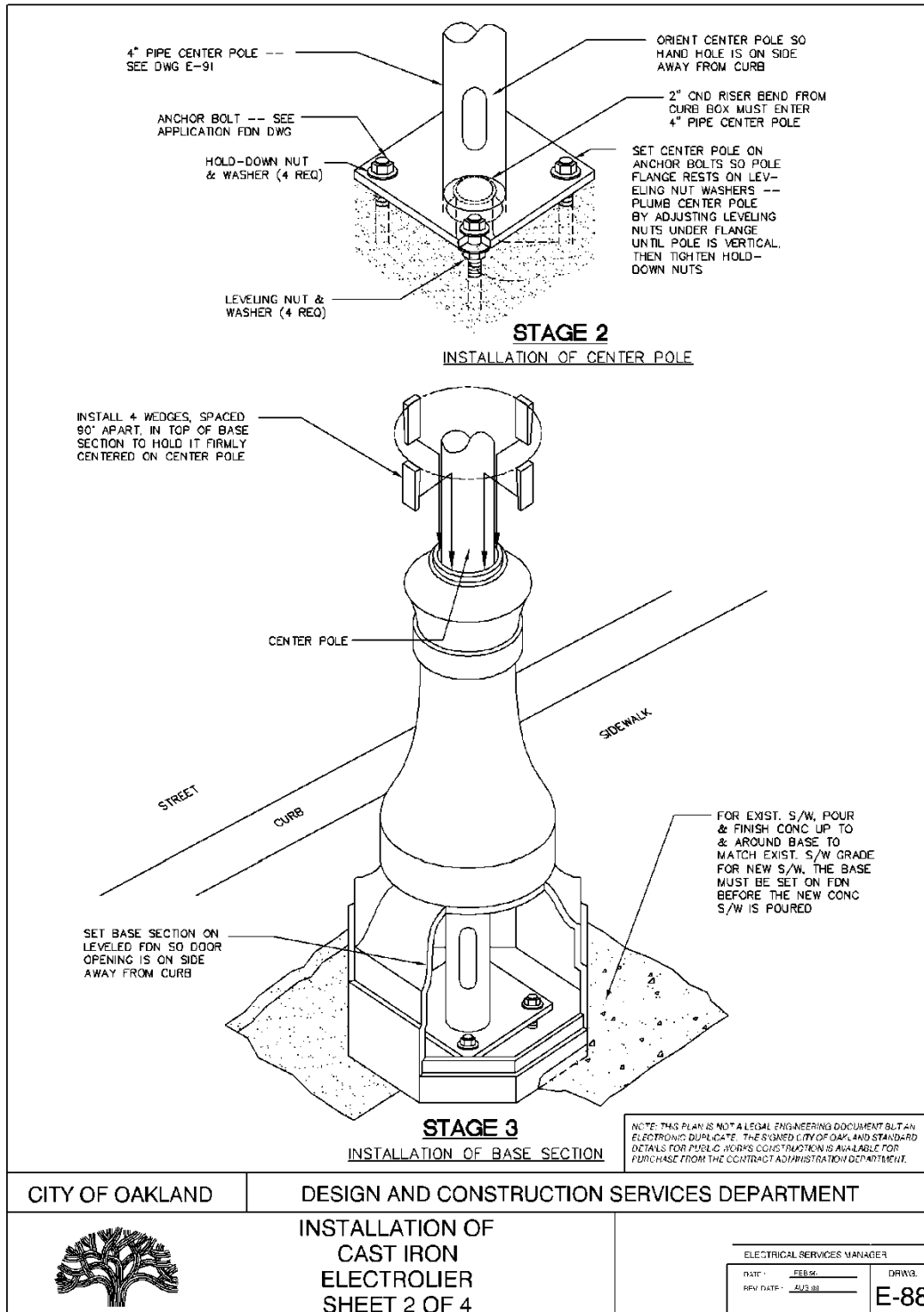
DRWG.
E-74




Appendix C: Electrical Standard Drawings (cont'd)



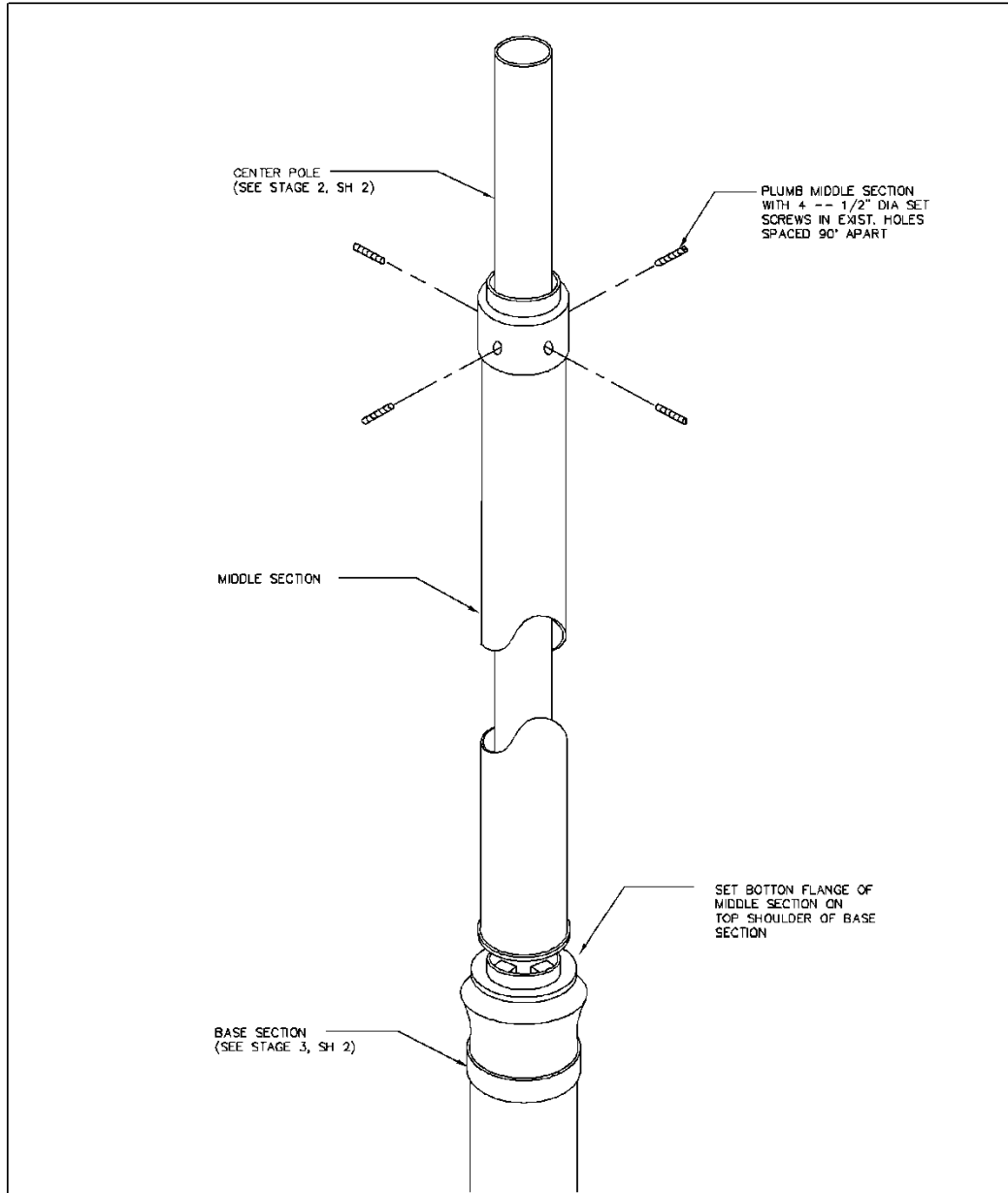
Appendix C: Electrical Standard Drawings (cont'd)



CITY OF OAKLAND	DESIGN AND CONSTRUCTION SERVICES DEPARTMENT			
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	<p style="text-align: right;">ELECTRICAL SERVICES MANAGER</p> <table border="1" style="width: 100%;"> <tr> <td>DATE: FEB 01</td> <td>DRWG.</td> </tr> <tr> <td>REV DATE: AUG 08</td> <td>E-88</td> </tr> </table>	DATE: FEB 01	DRWG.	REV DATE: AUG 08
DATE: FEB 01	DRWG.			
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Appendix C: Electrical Standard Drawings (cont'd)



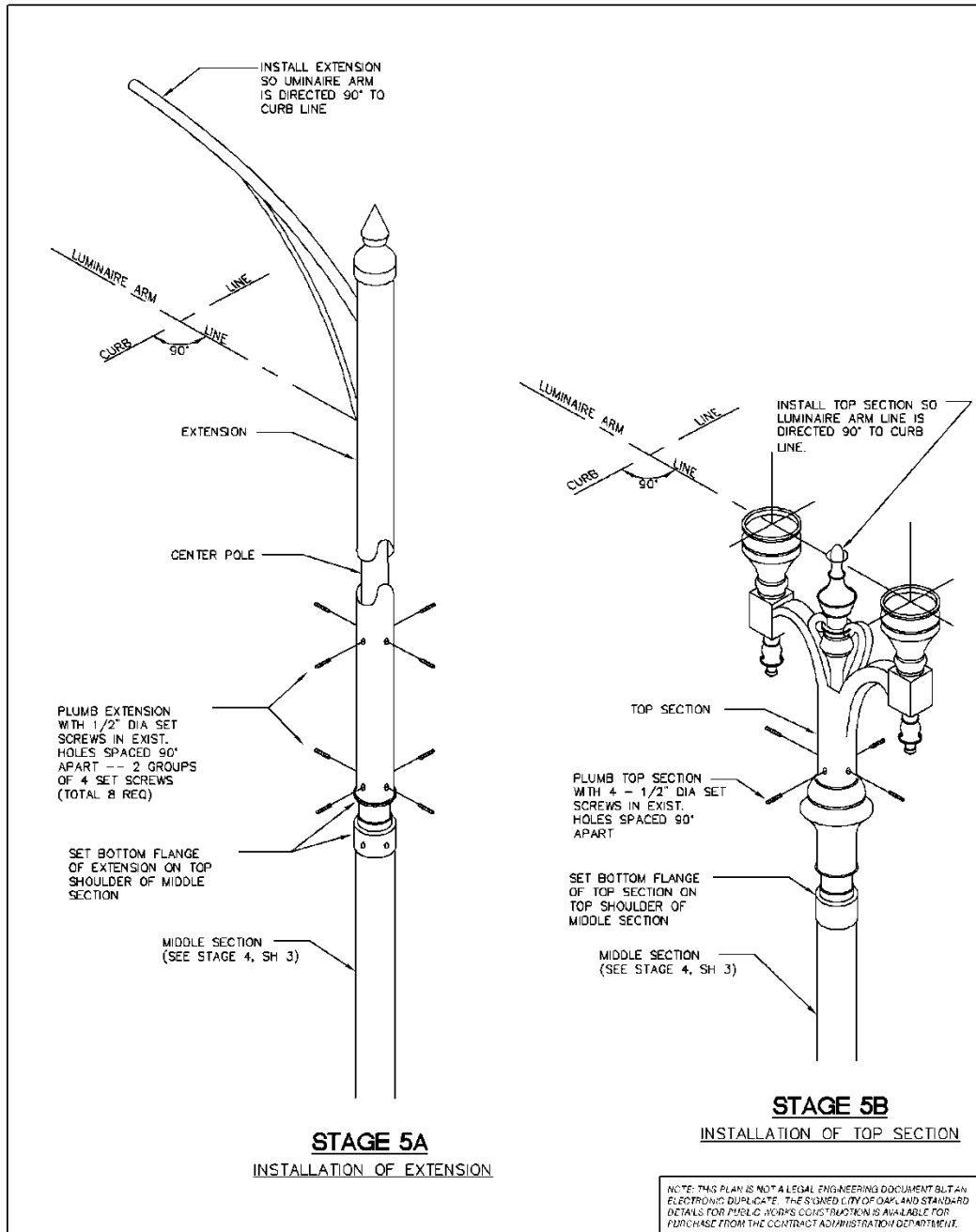
STAGE 4
INSTALLATION OF MIDDLE SECTION


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CITY OF OAKLAND	DESIGN AND CONSTRUCTION SERVICES DEPARTMENT
	INSTALLATION OF CAST IRON ELECTROLIER SHEET 3 OF 4
	ELECTRICAL SERVICES MANAGER DATE: FEB 04 REV DATE: AUG 08 DRAWG. E-89



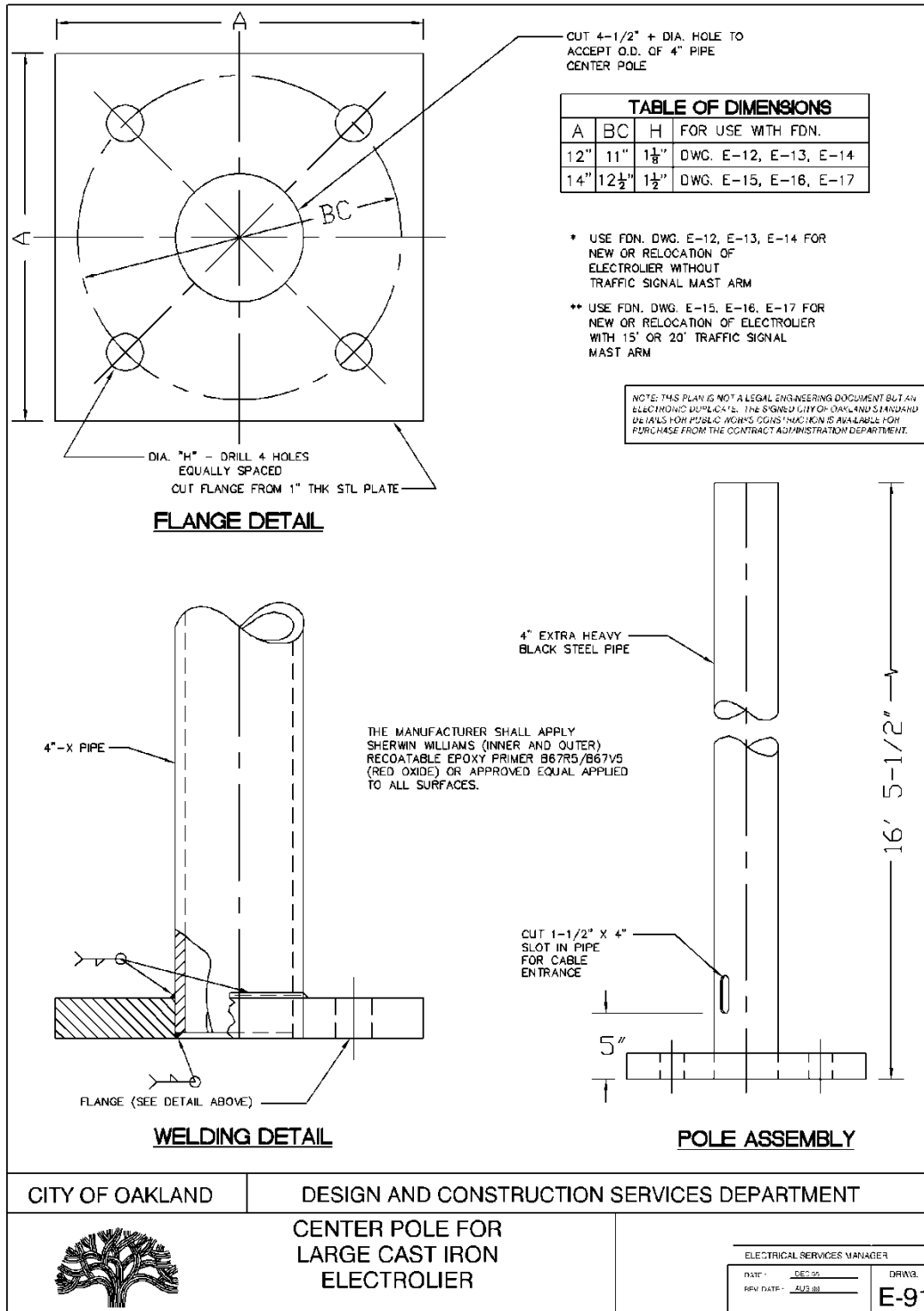
Appendix C: Electrical Standard Drawings (cont'd)



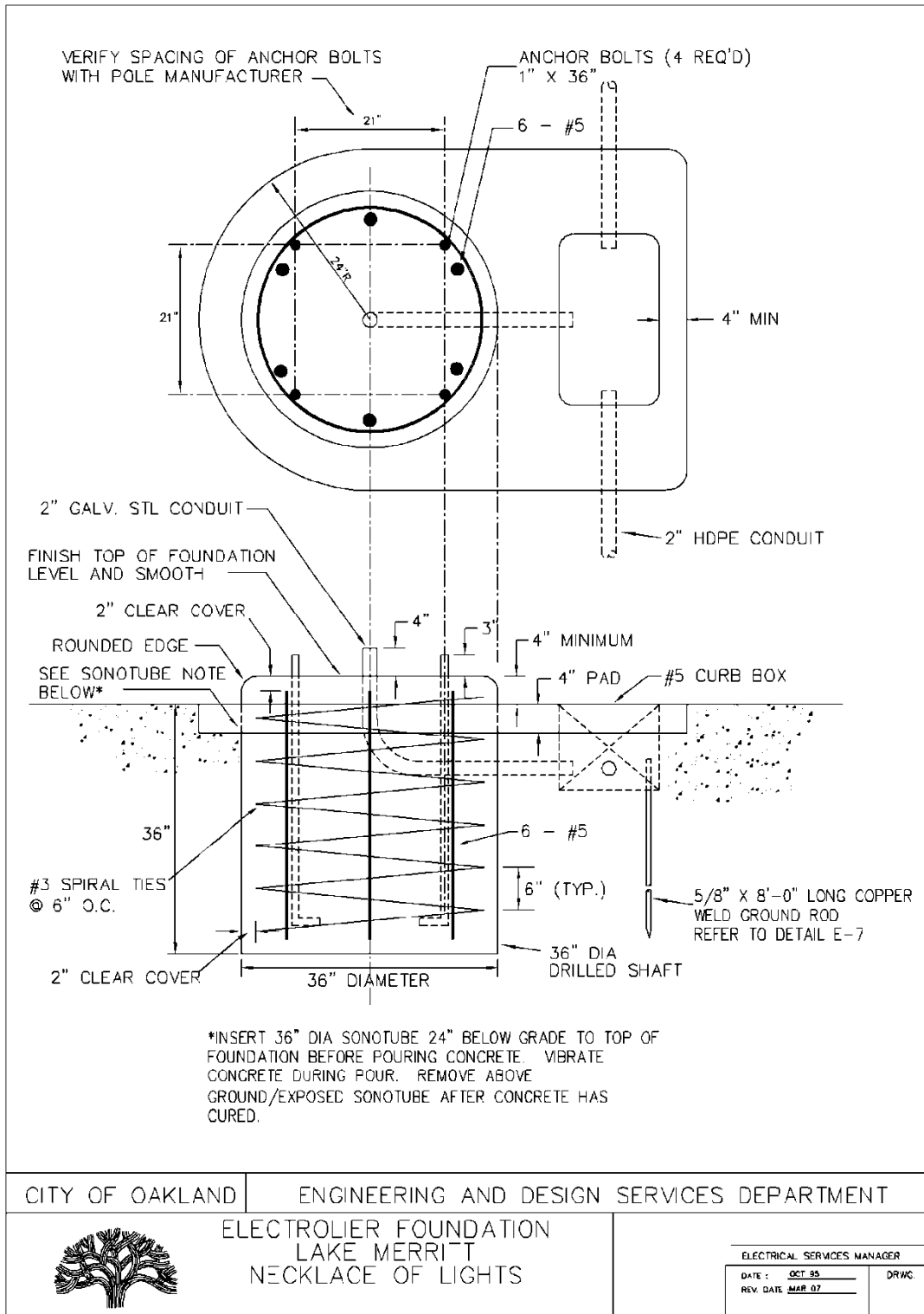
CITY OF OAKLAND	DESIGN AND CONSTRUCTION SERVICES DEPARTMENT					
	INSTALLATION OF CAST IRON ELECTROLIER SHEET 4 OF 4					
	<table border="1"> <tr> <td colspan="2">ELECTRICAL SERVICES MANAGER</td> </tr> <tr> <td>DATE: FEB 01</td> <td>DRWG.</td> </tr> <tr> <td>REV DATE: AUG 08</td> <td>E-90</td> </tr> </table>	ELECTRICAL SERVICES MANAGER		DATE: FEB 01	DRWG.	REV DATE: AUG 08
ELECTRICAL SERVICES MANAGER						
DATE: FEB 01	DRWG.					
REV DATE: AUG 08	E-90					



Appendix C: Electrical Standard Drawings (cont'd)



Appendix C: Electrical Standard Drawings (cont'd)



Appendix D: Revision Log

Description	Date
Typo correction on p. 31 & 40	7/14/08
Preface	10/7/09
Page # discrepancy	11/14/13

