

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

PROCEDURES FOR THE
PREPARATION OF STREETLIGHT PLANS
BY
PRIVATE DEVELOPER

MARK PESTRELLA
Director of Public Works

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INTRODUCTION

In October 1964, the Los Angeles County adopted a subdivision ordinance which requires a street lighting system in each division of land in the unincorporated territory. The Regional Planning Commission may waive this requirement if streetlights will not fit within the neighborhood pattern, or if all lots within the land division contain no less than 40,000 square feet. The streetlights may also be required for parcel maps, deeded streets, conditional use permits, road improvement permits, and developments on existing lots. Special requirements may apply for developments within the Rural Outdoor Lighting District or Community Standards Districts. Specific street lighting requirements contained in those districts shall be checked for compliance. These procedures are developed in order to provide uniform design standards for the installation of streetlights in the County.

Currently, the County requires three types of streetlights as follows:

1. LS-1 streetlights are Southern California Edison (SCE) owned and maintained streetlights. The developer/applicant is required to prepare the street lighting plan and SCE designs the electrical and conduit plans and install the streetlights. The developer/applicant is responsible for the plan preparation and installation costs. The developer is also responsible for the operation and maintenance costs for the streetlights from the time they are energized until they are accepted by the County and SCE is authorized to transfer the streetlights to a County lighting district account.
2. LS-2 streetlights are County owned and maintained streetlights. LS-2 streetlights are not metered and are on a fixed rate. The developer/applicant is required to prepare the street lighting plan and the street lighting electrical plan. The developer/applicant is also responsible for furnishing and constructing the streetlight improvements including the installation of underground conduit systems, pull boxes, pull ropes, stub-outs, conductors, foundations, poles, mast arms, service pedestals and cabinets, streetlights, and all other necessary appurtenances in accordance to Public Works standards. The developer/applicant is responsible for all associated installation costs. The developer/applicant is also responsible for the operation and maintenance costs for the streetlights from the time the streetlights are energized until they are accepted by County and SCE is authorized to transfer the streetlights to County lighting district account.
3. LS-3 streetlights are County owned and maintained streetlights that are metered on a variable rate depending on lamp energy consumption. The plan preparation and installation of the required streetlights follow the same procedures as prescribed for LS-2 streetlights.

PLAN SUBMITTAL

The applicants are required to submit and pay for the projects online. The required street lighting plan or electrical plan for LS-1, LS-2 and, LS-3 streetlights shall be submitted online to EPIC-LA, a County electronic plan check, permit and inspections portal. For any inquiries, Traffic and Lighting Division, Street Lighting Section is located at 1000 South Fremont Avenue, Building A-9 East, 4th Floor, Alhambra, California 91803 and can be reached at (626) 300-4726.

The street lighting plan and electrical plan submittal shall include the following:

1. A written request for the review and approval which shall include the date of the request, the name, the address and phone number of the person making the request.
2. A copy of the conditions of approval from Regional Planning Commission, Land Development Division, or from the local municipality indicating the street lighting requirements for the subdivision or development to be constructed.
3. Two copies of the street lighting plan and/or electrical plan.
4. Tract/Parcel Map or Plan showing the area being developed.
5. Street improvement plan showing the existing and/or proposed driveway locations, and/or any other items which may interfere with the location of the proposed streetlights.
6. Existing/proposed traffic signal plans, if necessary.
7. A check for plan check fees made payable to Los Angeles County Department of Public Works.
8. If annexation to County lighting district is required, a street lighting map, and Assessor's Parcel Numbers, including project boundaries on CD disk in either MicroStation or Auto-Cad formats.
9. Electronic submittal of the required plans and documents is acceptable by contacting Street Lighting Section at (626) 300-4726.

The Street Lighting Section's files and maps are available for research and review at the public counter from Monday through Thursday from 7:00 a.m. to 5:30 p.m. Street Lighting personnel are available to answer questions regarding procedures and design criteria during those hours.

LS-1 STREET LIGHTING PLAN FORMAT

1. The street lighting plan sheet size shall be 2 feet by 3 feet.
2. The street lighting plan shall be drawn to an engineering scale from 40 to 60 feet per inch, and the scale be clearly indicated on each sheet.
3. Each street lighting plan sheet shall include a clear indication of true north.
4. Each street lighting plan sheet shall be clearly numbered 1 of 3, 2 of 3, 3 of 3, etc.
5. The street lighting plan shall include the Thomas Brothers map page number and coordinates of the development.
6. The first sheet of the street lighting plan shall include:
 - A. A legend defining the symbols used to designate the lamp sizes and pole types to be installed as shown in Attachment A.
 - B. The design guidelines as shown in Attachment B.
 - C. General notes as specified by Street Lighting Section as shown in Attachment C.
 - D. Signature blocks as shown in Attachment D: The street lighting plan shall be prepared by, or prepared under the supervision of a professional civil engineer. In addition, the street lighting plan shall bear the seal or stamp of the registrant and the expiration date of the certificate or authority. The street lighting plan shall include two signature blocks. One signature block shall include the private engineer's name, registration number, phone number, and address. The other signature block shall provide for approval by the Department of Public Works.
7. The street lighting plan shall show street centerlines, street right-of-way lines and dimensions, curb-to-curb widths, street names, lot lines, lot numbers, and development boundaries.
8. The street lighting plan shall show existing and proposed driveways, catch basins, culverts, parkway drains, wheelchair access ramps, and any other items which may interfere with the installation of proposed streetlights.
9. The street lighting plan shall include the locations of existing streetlights within 250 feet of the boundary of the proposed project, the lamp sizes, and the type of poles and numbers.

10. The street lighting plan shall include the locations and sizes of any streetlights approved for adjacent or nearby developments which have not yet been installed but may affect the locations of the new streetlights to be installed. The development for which the streetlights were approved shall be indicated on the street lighting plan.
11. A sample of the street lighting plan is shown in Attachment E.

LS-2 and LS-3 STREET LIGHTING PLAN FORMAT

1. The street lighting plan sheet size shall be 2 feet by 3 feet.
2. The street lighting plan shall be drawn to an engineering scale from 40 to 60 feet per inch, and the scale be clearly indicated on each sheet.
3. Each street lighting plan sheet shall include a clear indication of true north.
4. Each street lighting plan sheet shall be clearly numbered 1 of 3, 2 of 3, 3 of 3, etc.
5. The street lighting plan shall include the Thomas Brothers map page number and coordinates of the development.
6. The first sheet of the street lighting plan shall include:
 - A. A legend defining the symbols used to designate the lamp sizes and pole types to be installed as shown in Attachment F.
 - B. The design guidelines as shown in Attachment G.
 - C. General notes as specified by Street Lighting Section as shown in Attachment H.
7. Signature block as shown in Attachment J: The street lighting plan shall be prepared by, or prepared under the supervision of a professional civil engineer. In addition, the street lighting plan shall bear the seal or stamp of the registrant and the expiration date of the certificate or authority.
8. The street lighting plan shall show street centerlines, street right-of-way lines and dimensions, curb-to-curb widths, street names, lot lines, lot numbers, and development boundaries.
9. The street lighting plan shall show existing and proposed driveways, catch basins, culverts, parkway drains, wheelchair access ramps, and any other items which may interfere with the installation of proposed streetlights.
10. The street lighting plan shall include the locations of existing streetlights within 250 feet of the boundary of the proposed project, the lamp sizes, and the type of poles and numbers.

11. The street lighting plan shall include the locations and sizes of any streetlights approved for adjacent or nearby developments which have not yet been installed but may affect the locations of the new streetlights to be installed. The development for which the streetlights were approved shall be indicated on the street lighting plan.
12. The street lighting plan shall include the conduit design and symbols as shown in Attachment K.
13. A sample of the street lighting plan is shown in Attachment L.
14. The design guidelines for the street lighting electrical plan are shown in the Streetlight Electrical Design Guidelines Section.

ILLUMINATION DESIGN CRITERIA

In August 1963, the Board of Supervisors of the County of Los Angeles adopted a resolution requiring the levels of illumination recommended by the Illuminating Engineering Society (IES) to be adopted as guidelines for the design of street lighting systems.

These guidelines may be summarized for the streets most commonly encountered as follows:

<u>Street Classification</u>	<u>Right-of-Way Width</u>	<u>Curb-to-Curb Width</u>	<u>Minimum Average Footcandles</u>	<u>Maximum Uniformity Ratio</u>
1. Major Intermediate	100'	84'	1.4	3
2. Collector Intermediate	80'	64'	0.9	3
3. Local Residential	64' or less	40' or less	0.4	6

Illumination levels and uniformity ratios (ratio of average illumination level to minimum illumination level) required for streets with right-of-ways, or curb-to-curb widths other than those shown above must be approved by the Department of Public Works.

STREETLIGHT LAMPS, SPACINGS AND SIZES

The following is a tabulation of the spacing for the prescribed lamp sizes that will achieve the IES guidelines. LED Streetlight is the standard fixture for new subdivisions, unless other types of lighting fixtures are required. The LED Streetlight equivalents for HPSV streetlights are shown in Attachment M. The proposed use of non-standard equipment must be submitted for review and approval with detailed calculations and photometric data showing that the illumination and uniformity requirements are satisfied.

<u>Curb-to-Curb Width</u>	<u>Lamp Size</u>	<u>Spacing</u>	<u>Configuration</u>
84'	LED equivalent for 200 Watt (22,000 Lumen)	70' max 60' min	Staggered
64'	LED equivalent for 150 Watt (16,000 Lumen)	70' max 60' min	Staggered
40', 36' And 34'	LED equivalent for 100 Watt (9,500 Lumen)	170' max ⁽¹⁾ 130' min (on tangents or on curves with R>700')	Staggered
		140' max ⁽²⁾ 110' min (on tangents or on curves with R>700')	One Side
		120' max ⁽³⁾ 95' min (Curves with R<700')	One Side

1. This spacing to be used on tangents, and curves with a radius greater than 700 feet.
2. This spacing to be used on tangents, and curves with a radius greater than 700 feet.
3. This spacing to be used on curves with a radius less than or equal to 700 feet.

The maximum spacings as indicated will provide the IES recommended minimum illumination levels. In actual practice, these spacings are usually reduced to fit block lengths and to provide clearances from driveways, catch basins, and other obstructions. Spacings greater than those shown above will only be permitted under special circumstances and should be discussed with the Street Lighting Section prior to submittal of the street lighting plan for review.

The preceding spacings will provide the recommended illumination levels and uniformity ratios along the mid-block portions of a street. However, IES recommends higher levels of illumination in areas of potential traffic conflict and other special situations such as intersections, knuckles, and cul-de-sacs. Satisfying the criteria at these locations may require adjustment of the mid-block spacings. The mid-block spacings should be adjusted to provide nearly equal distances between lights within the same block. The minimum spacings between lights shall be less than 25% variation from the maximum spacings allowed. For example, on local streets when using the stagger system, the maximum and minimum spacings will be 170' and 130', respectively. The streetlights should also be placed on or near lot lines when possible to do so without a substantial increase in the number of streetlights or significant deviations in spacings.

Attachment N (Exhibit L-1 through Exhibit L-10) shows the preferred, alternate, or required locations and sizes of streetlights for the situations most frequently encountered. The preferred locations should be used whenever possible. The alternate locations should be used only when the preferred location falls outside the development boundaries or when the preferred location is not feasible due to driveways, catch basins, or other obstructions.

STREETLIGHT ILLUMINATION DESIGN REFERENCES

American National Standard Practice for Roadway Lighting (IES RP-8, standards) available from the Illuminating Engineering Society, 120 Wall Street, New York, New York 10005

UNDERGROUNDING

The State of California Public Utilities commission issued directives in November 1969 and May 1970 that provide:

1. That underground wiring "should be standard for all extensions".
2. That "underground should be mandatory for all new residential subdivisions".

These directives require electrical lines to be placed underground along all new streets. The County requires new streetlight installations on existing streets in the unincorporated territory to be served with underground wires. It shall be the responsibility of the developer to obtain the requirements of Southern California Edison and/or County and, where applicable, the requirements of the local municipality, regarding the undergrounding of street lighting wiring on existing streets for his/her project.

STREET LIGHTING ELECTRICAL DESIGN GUIDELINES

Scope of Document, Purpose and Constraints

The purpose of these guidelines is to provide standards in the preparation of LS-2 and LS-3 street lighting electrical plans. The guidelines shall conform to the County Electrical Code, Standard Plans and Standard Specifications for Public Works Construction. These guidelines can greatly benefit the design and significantly reduce time for the review and approval of streetlight electrical plans.

Streetlight Electrical Plan Format

1. The street lighting electrical plans. Sheet size shall be 2 feet by 3 feet.
2. The street lighting electrical plan shall be drawn to an engineering scale not to exceed 60 feet per inch, and the scale be clearly indicated on each sheet.
3. Each street lighting electrical plan sheet shall include a clear indication of true north.
4. Each street lighting electrical plan sheet shall be clearly numbered 1 of 3, 2 of 3, 3 of 3, etc.
5. The street lighting electrical plan shall include the Thomas Brothers map page number and coordinates of the development.
6. Signature block: The street lighting electrical plan shall be prepared by, or prepared under the supervision of a professional Electrical Engineer. In addition, the street lighting electrical plan shall bear the seal or stamp of the registrant and the expiration date of the certificate or authority.

Required Design Elements

1. New Service
 - A. The electrical designer shall contact the Southern California Edison to obtain the following documents before submitting electrical plans for review by County electrical engineer:
 - I. Utility "Will Serve Letter" as a commitment of utility company to energize the designed electrical installation.
 - II. Utility contributed Available Short Circuit Current value. Usually it is provided in a format of "Response to Letter of Request for Short Circuit Current Value for Panel Size and Protection Coordination".

B. New Services shall be in compliance with the latest Utility Company requirements, latest edition of the Standard Plans and Standard Specifications for Public Works Construction, and County Electrical Code.

C. New Services shall be utilized for street lighting only.

2. Street lighting Electrical Plans:

The first sheet of electrical plans shall include:

- I. Site plan, which shall indicate the location of proposed new electrical service (-s) with address.
- II. Vicinity map, which shall show a project location in reference to major streets and freeways.
- III. Utility company service planning office, service planner name and contact information including phone number and email.
- IV. Load summary.
- V. Single line diagram, which shall indicate:
 1. Utility transformer kVA rating, voltage, impedance data, X/R ratio, service conductors' data.

Service pedestal current, voltage and short circuit current ratings. Service Pedestal shall 100A, 240/120VAC, 1 Phase, 3 Wire, provided with photo cell, protected by 15A/1P circuit breaker, (4) 30A/2P feeder circuit breakers and 30A-rated contactors. Enclosure shall be NEMA Type 3R.
- VI. Grounding and bonding details.
- VII. Panel load schedule, which shall indicate voltage, current, short circuit current rating for the panel interior, main and branch circuit breakers. Load summary for each phase shall be provided in amperes and kVA.
 1. Maximum number of streetlights shall be limited to (15) fifteen lights per circuit.
 2. Two adjacent streetlight poles on the same side of the street shall be powered by separate circuits.
 3. Distribution panel shall include (4) 30A/2P circuit breakers.
 4. All streetlight circuits shall be 240VAC.

VIII. Raceway schedule. Designer shall specify the following items:

1. Conduit and conductor type and size.
2. Number of current-carrying and grounded conductors.
3. Corresponding pedestal and distribution panel circuit number.
4. Approximate conductor length.
5. Voltage drop for each circuit. Calculated voltage drop to any point of electrical installation shall be less than or equal to 3%.
6. Conduit fill ratio. Calculated value shall not exceed 40%.

3. Other Street Lighting Electrical Plans

- A. WIRING DIAGRAM – FOR DETAILS, SEE ATTACHMENT O, EXHIBIT E-1.
- B. LEGEND FOR WIRING DIAGRAM – FOR DETAILS, SEE ATTACHMENT O, EXHIBIT E-2.
- C. SERVICE PEDESTAL – FOR DETAILS, SEE ATTACHMENT O, EXHIBIT E-3.
- D. PANEL WIRING DIAGRAM – FOR DETAILS, SEE ATTACHMENT O, EXHIBIT E-4.
- E. PANEL SCHEDULE – FOR DETAILS, SEE ATTACHMENT O, EXHIBIT E-5.

MATERIAL

Electrical material shall be UL listed or labeled by a national testing laboratory as approved by the County.

1. Rigid polyvinyl chloride conduit (type PVC) and fittings shall be listed (UL50, 514b, 651) Cantex® schedule 80 PVC or approved equal.
2. Service pedestal shall be UL listed. Myers catalog or approved equal.
3. Conductors shall be listed (UL 83) Southwire® type THHN/THWN-2 or approved equal.
4. Conductor splices shall utilize listed (UL 486a, 486b, 486d) insulated connectors suitable for direct burial/submersible installation. Unless otherwise specified, insulated connectors shall be Polaris® LSRW or approved equal.
5. Pull boxes, covers, and extension shall be polymer concrete material, concrete gray, shall be pre-cast with traffic covers suitable for H-20 loading, pulling irons and conductor supports. Pull boxes shall be Armorcast or approved equal.
6. Luminaire shall be provided with ANSI C136.41 receptacle with four contacts, three twist lock contacts, a shorting cap, and a 0-10V dimmable driver.

ATTACHMENT A

LS-1 STREETLIGHTS LEGEND

-  PROPOSED LED EQUIVALENT FOR (100 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
-  PROPOSED LED EQUIVALENT FOR (150 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
-  PROPOSED LED EQUIVALENT FOR (200 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
-  PROPOSED LED EQUIVALENT FOR (250 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
-  PROPOSED LED EQUIVALENT FOR (___ WATT) HPSV STREETLIGHTS ON WOOD POLES
-  PROPOSED ___ WATT LED STREETLIGHTS ON EXISTING WOOD POLES
-  EXISTING STREETLIGHT, TYPE OF POLE, SIZE OF LAMP AND POLE NUMBER AS INDICATED.
-  STREETLIGHT APPROVED PER ADJACENT DEVELOPMENT. INDICATE TRACT NUMBER, PARCEL MAP NUMBER, PLAN NUMBER, ETC.
-  PROPOSED STREETLIGHT SHOWN ON A DIFFERENT SHEET
-  PROPOSED HIGHWAY SAFETY LIGHT (HSL) – LIGHTS ON SIGNAL STANDARDS
-  EXISTING HIGHWAY SAFETY LIGHT (HSL) – LIGHTS ON SIGNAL STANDARDS
-  EXISTING CALTRANS STREETLIGHT
-  EXISTING _____ LUMEN STREETLIGHT ON _____ POLE TO BE REMOVED
-  EXISTING _____ LUMEN STREETLIGHT ON _____ POLE TO BE RELOCATED
-  NEW LOCATION OF RELOCATED STREETLIGHT
-  EXISTING 9,500 LUMEN HPSV STREETLIGHT ON _____ POLE TO BE UPGRADED TO 71-WATT LED STREETLIGHT
-  EXISTING 16,000 LUMEN HPSV STREETLIGHT ON _____ POLE TO BE DOWNGRADED TO 39-WATT LED STREETLIGHT

C = CONCRETE
W = WOOD
S = STEEL
= LUMENS

ATTACHMENT B

ILLUMINATION DESIGN GUIDELINES FOR LS-1 STREETLIGHTS

LED EQUIVALENT FOR (100 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 0.4 FOOTCANDLES, FOR “LOCAL RESIDENTIAL” STREETS. THE LUMINAIRE SHALL HAVE A TWENTY-FIVE (25) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

LED EQUIVALENT FOR (150 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 0.9 FOOTCANDLES, FOR “COLLECTOR INTERMEDIATE” STREETS. THE LUMINAIRE SHALL HAVE A THIRTY (30) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

LED EQUIVALENT FOR (200 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 1.4 FOOTCANDLES, FOR “MAJOR INTERMEDIATE” STREETS. THE LUMINAIRE SHALL HAVE A THIRTY (30) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

LED EQUIVALENT FOR (250 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 1.4 FOOTCANDLES, FOR “HIGHWAY INTERMEDIATE” STREETS. THE LUMINAIRE SHALL HAVE A THIRTY (30) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

ATTACHMENT C

GENERAL NOTES FOR LS-1 STREET LIGHTING PLANS

1. THE STREET LIGHTING PLANS EXPIRE TWO YEARS AFTER THE LATEST DATE OF APPROVAL.
2. THE LOCATION OF A STREETLIGHT MAY ONLY BE ADJUSTED IN THE FIELD UP TO TEN (10) FEET, ONLY TO AVOID AN OBSTRUCTION SUCH AS A CATCH BASIN, DRIVEWAY, ETC. ANY DEVIATION EXCEEDING TEN (10) FEET MUST HAVE THE APPROVAL OF THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS, STREET LIGHTING SECTION. IF SUCH APPROVAL IS NOT OBTAINED, THE STREETLIGHTS PROPOSED BY THIS PLAN WILL NOT BE ACCEPTED BY COUNTY LIGHTING MAINTENANCE DISTRICT.
3. A REVISED STREET LIGHTING PLAN SHALL BE SUBMITTED FOR ANY CHANGES IN THE MAP, SUCH AS STREET ALIGNMENT, LOT OR PARCEL SIZES, BOUNDARIES, ETC.
4. THE STREETLIGHT POLES SHALL BE AMERON TYPE 1-C1 SERIES OR AGENCY APPROVED EQUAL.
5. ALL STREETLIGHT WIRING SHALL BE UNDERGROUND.
6. ON STREETS WHERE THE SIDEWALK AND CURB ARE GREATER THAN SIX AND ONE HALF (6½) FEET IN WIDTH, THE MAST ARMS AND BRACKETS SHALL BE PERPENDICULAR TO THE CURB FACE. THE STREETLIGHT ELECTROLIERS SHALL BE PLACED TWENTY-FOUR (24) INCHES FROM THE CURB FACE TO THE CENTER OF THE POLE. USE A FOUR (4) FOOT LONG MAST ARM FOR 39-WATT LED STREETLIGHT AND SIX (6) FOOT LONG MAST ARM FOR ALL OTHER WATTAGE, UNLESS OTHERWISE SPECIFIED.
7. ON STREETS WHERE THE SIDEWALK AND CURB ARE LESS THAN OR EQUAL TO SIX AND ONE HALF (6½) FEET IN WIDTH, THE STREETLIGHT ELECTROLIERS AND PULL BOXES SHALL BE PLACED OUTSIDE OF THE SIDEWALK AREA UNLESS OTHERWISE SPECIFIED. USE AN EIGHT (8) FOOT LONG MAST ARM FOR ALL WATTAGE, UNLESS OTHERWISE SPECIFIED.
8. ALL LIGHTS SHOWN ON THE PLANS SHALL BE ENERGIZED PRIOR TO ACCEPTANCE OF THE LIGHTING SYSTEM TO A COUNTY LIGHTING MAINTENANCE DISTRICT.
9. EXISTING STREET LIGHTING SYSTEMS SHALL REMAIN IN OPERATION DURING ANY MODIFICATION. ANY PROPOSED TEMPORARY STREET LIGHTING SYSTEM MUST BE APPROVED BY THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS.
10. FIVE (5) FOOT CLEARANCE TO BE MAINTAINED FROM FIRE HYDRANT.
11. FOUR (4) FOOT CLEARANCE TO BE MAINTAINED FROM TOP OF SLOPE AT COMMERCIAL DRIVEWAY, AND TWO (2) FOOT CLEARANCE FROM RESIDENTIAL DRIVEWAY.

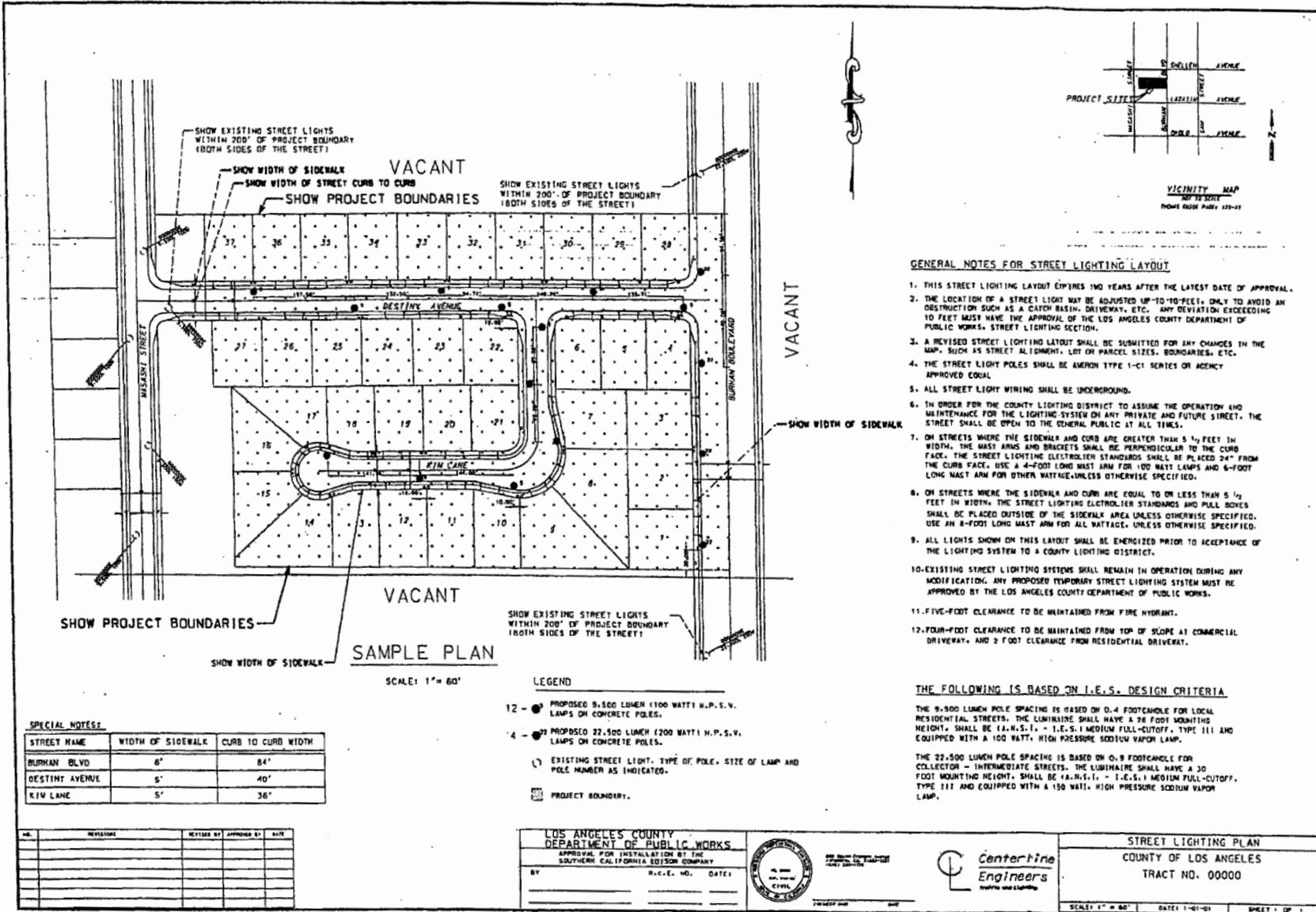
ATTACHMENT D

SIGNATURE BLOCK FOR LS1

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS		
APPROVAL FOR INSTALLATION BY SOUTHERN CALIFORNIA EDISON		
BY	R.C.E. NO.	DATE

ATTACHMENT E

SAMPLE STREET LIGHTING PLAN FOR LS-1 SYSTEM



ATTACHMENT F

LS-2 AND LS-3 STREETLIGHTS LEGEND

- L¹⁰ ● PROPOSED LED EQUIVALENT FOR (100 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
- L¹⁵ ● PROPOSED LED EQUIVALENT FOR (150 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
- L²⁰ ● PROPOSED LED EQUIVALENT FOR (200 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
- L²⁵ ● PROPOSED LED EQUIVALENT FOR (250 WATT) HPSV STREETLIGHTS ON CONCRETE POLES
- L ● PROPOSED LED EQUIVALENT FOR (___ WATT) HPSV STREETLIGHTS ON WOOD POLES
- EXISTING STREETLIGHT, TYPE OF POLE, SIZE OF LAMP AND POLE NUMBER AS INDICATED.
- ⊗ STREETLIGHT APPROVED PER ADJACENT DEVELOPMENT. INDICATE TRACT NUMBER, PARCEL MAP NUMBER, PLAN NUMBER, ETC.
- ⊕ PROPOSED STREETLIGHT SHOWN ON A DIFFERENT SHEET
- ⊗ PROPOSED HIGHWAY SAFETY LIGHT (HSL) – LIGHTS ON SIGNAL STANDARDS
- ⊗ EXISTING HIGHWAY SAFETY LIGHT (HSL) – LIGHTS ON SIGNAL STANDARDS
- ⊕ EXISTING CALTRANS STREETLIGHT
- C,S,OR W,R,# ⊕ EXISTING _____ LUMEN STREETLIGHT ON _____ POLE TO BE REMOVED
- C OR W,R,# ⊕ EXISTING _____ LUMEN STREETLIGHT ON _____ POLE TO BE RELOCATED
- C OR W,R,# ⊕ NEW LOCATION OF RELOCATED STREETLIGHT
- C,S,OR W,R,# ⊕ EXISTING 9,500 LUMEN HPSV STREETLIGHT ON _____ POLE TO BE UPGRADED TO 71 -WATT LED STREETLIGHT
- C,S,OR W,R,# ⊕ EXISTING 16,000 LUMEN HPSV STREETLIGHT ON _____ POLE TO BE DOWNGRADED TO 39-WATT LED STREETLIGHT

C = CONCRETE
W = WOOD
S = STEEL
= LUMENS

ATTACHMENT G

ILLUMINATION DESIGN GUIDELINES FOR LS-2 AND LS-3 STREETLIGHTS

LED EQUIVALENT FOR (100 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 0.4 FOOTCANDLES, FOR “LOCAL RESIDENTIAL” STREETS. THE LUMINAIRE SHALL HAVE A TWENTY-FIVE (25) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

LED EQUIVALENT FOR (150 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 0.9 FOOTCANDLES, FOR “COLLECTOR INTERMEDIATE” STREETS. THE LUMINAIRE SHALL HAVE A THIRTY (30) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

LED EQUIVALENT FOR (200 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 1.4 FOOTCANDLES, FOR “MAJOR INTERMEDIATE” STREETS. THE LUMINAIRE SHALL HAVE A THIRTY (30) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

LED EQUIVALENT FOR (250 WATT) HPSV STREETLIGHTS, THE POLE SPACING IS BASED ON 1.4 FOOTCANDLES, FOR “HIGHWAY INTERMEDIATE” STREETS. THE LUMINAIRE SHALL HAVE A THIRTY (30) FOOT MOUNTING HEIGHT, SHALL BE (ANSI-IES) MEDIUM, TYPE II OR TYPE III.

ATTACHMENT H

GENERAL NOTES FOR LS-2 AND LS-3 STREET LIGHTING PLANS

1. THIS STREET LIGHTING PLAN EXPIRES TWO YEARS AFTER THE LATEST DATE OF APPROVAL.
2. THE LOCATION OF A STREETLIGHT MAY ONLY BE ADJUSTED IN THE FIELD UP TO TEN (10) FEET, ONLY TO AVOID AN OBSTRUCTION SUCH AS A CATCH BASIN, DRIVEWAY, ETC. ANY DEVIATION EXCEEDING TEN (10) FEET MUST HAVE THE APPROVAL OF THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS, STREET LIGHTING SECTION. IF SUCH APPROVAL IS NOT OBTAINED, THE STREETLIGHTS PROPOSED BY THIS PLAN WILL NOT BE ACCEPTED BY COUNTY LIGHTING MAINTENANCE DISTRICT.
3. REVISED STREET LIGHTING PLANS SHALL BE SUBMITTED FOR ANY CHANGES IN THE MAP, SUCH AS STREET ALIGNMENT, LOT OR PARCEL SIZES, BOUNDARIES, ETC.
4. THE STREETLIGHT POLE SHALL BE CONCRETE AMERON TYPE 1-C1 SERIES OCTAGONAL POLE, COLOR MIX 01 WITH ANTI-GRAFFITI COATING OR AGENCY APPROVED EQUAL. FOR DETAILS, SEE ATTACHMENT I, EXHIBIT L-1.
5. CONCRETE POLES SHALL BE ANCHORED BY 1" X 36" X 4" STEEL ANCHORED BOLTS IN A TWELVE (12) INCH BOLT CIRCLE WITH PROJECTION AND FOUNDATION CAP. FOR DETAILS, SEE ATTACHMENT I, EXHIBIT L-1.
6. LUMINAIRE SHALL BE LIGHT-EMITTING DIODE (LED).
7. LUMINAIRE SHALL BE PROVIDED WITH ANSI C136.41 RECEPTACLE WITH FOUR CONTACTS, THREE TWIST LOCK CONTACTS, A SHORTING CAP, AND A 0-10V DIMMABLE DRIVER.
8. ALL STREETLIGHT WIRING SHALL BE UNDERGROUND.
9. ON STREETS WHERE THE SIDEWALK AND CURB ARE GREATER THAN SIX AND ONE HALF (6 ½) FEET IN WIDTH, THE MAST ARMS AND BRACKETS SHALL BE PERPENDICULAR TO THE CURB FACE. THE STREETLIGHT ELECTROLIERS SHALL BE PLACED TWENTY-FOUR (24) INCHES FROM THE CURB FACE TO THE CENTER OF THE POLE. USE A FOUR (4) FOOT LONG MAST ARM FOR 39-WATT LED STREETLIGHT AND SIX (6) FOOT LONG MAST ARM FOR ALL OTHER WATTAGE, UNLESS OTHERWISE SPECIFIED.
10. ON STREETS WHERE THE SIDEWALK AND CURB ARE LESS THAN OR EQUAL TO SIX AND ONE HALF (6 ½) FEET IN WIDTH, THE STREETLIGHT ELECTROLIERS AND PULL BOXES SHALL BE PLACED OUTSIDE OF THE SIDEWALK AREA UNLESS OTHERWISE SPECIFIED. USE AN EIGHT (8) FOOT LONG MAST ARM FOR ALL WATTAGE, UNLESS OTHERWISE SPECIFIED.

11. EXISTING STREET LIGHTING SYSTEMS SHALL REMAIN IN OPERATION DURING ANY MODIFICATION. ANY PROPOSED TEMPORARY STREET LIGHTING SYSTEM MUST BE APPROVED BY THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS.
12. FIVE (5) FOOT CLEARANCE TO BE MAINTAINED FROM FIRE HYDRANT.
13. FOUR (4) FOOT CLEARANCE TO BE MAINTAINED FROM TOP OF SLOPE AT COMMERCIAL DRIVEWAY, AND TWO (2) FOOT CLEARANCE FROM RESIDENTIAL DRIVEWAY AND CURB RAMPS.
14. ALL WORK SHALL BE IN ACCORDANCE TO THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, UNLESS OTHERWISE NOTED ON THE PLAN.
15. ALL WORK IN THE PUBLIC RIGHT-OF-WAY SHALL BE PER THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' STANDARDS, CODES, AND PERMIT REQUIREMENTS, AND TO THE SATISFACTION OF PUBLIC WORKS.
16. PULL BOXES SHALL BE PLACED ADJACENT TO THE PROPOSED STREETLIGHTS WITH MINIMUM FIVE (5) FEET CLEARANCE FROM THE SIDE OF THE FOUNDATION FOR EACH STREETLIGHT STANDARD TO FACILITATE MAINTENANCE OF THE INDIVIDUAL STREETLIGHT.
17. PULL BOXES LOCATED ADJACENT TO DRIVEWAYS AND ALLEYS SHALL BE INSTALLED AT A MINIMUM DISTANCE OF FIVE (5) FEET FROM THE TOP OF THE DRIVEWAY "X" OR FIVE (5) FEET FROM THE TRAVEL WAY OF THE ALLEY. PULL BOXES SHALL NOT BE INSTALLED IN ANY PART OF A DRIVEWAY, CURB RAMP AREA OR OTHER TRAVELLED WAY.
18. PULL BOXES SHALL BE NO. 5 (10"X17"X24") WITH CONCRETE COVER INSCRIBED "STREET LIGHTING HIGH VOLTAGE". PULL BOXES, COVERS, AND EXTENSION SHALL BE POLYMER CONCRETE MATERIAL, CONCRETE GRAY, SHALL BE ARMORCAST OR AGENCY APPROVED EQUAL .
19. STREETLIGHTS SHALL BE ERECTED SO THAT THE BASE DOOR IS FACING THE STREET.
20. LS-3 STREETLIGHT FOUNDATION SHALL BE IN ACCORDANCE WITH DETAIL STANDARD AS SHOWN ON THE PLAN. FOR DETAILS, SEE ATTACHMENT I, EXHIBIT L-3.
21. FOUNDATION CAPS SHALL BE THE SAME COLOR, FINISH, AND MATERIAL AS THE ADJACENT SIDEWALK, AND BE A MINIMUM OF FOUR (4) INCHES THICK. THE FOUR (4) INCHES THICK PCC CAP SHALL BE CONSTRUCTED TO THE BACK OF THE ROADWAY CURB.
22. PROPOSED LS-3 STREETLIGHT FOUNDATIONS, PEDESTALS, PULL BOXES AND OTHER ASSOCIATED LS-3 STREETLIGHT SYSTEM APPURTENANCES SHALL BE INSTALLED WITHIN THE PUBLIC RIGHT-OF-WAY.

23. CONTRACTOR SHALL LOCATE AND PROTECT SUBSTRUCTURE(S) AND SHALL PROVIDE A MINIMUM TWELVE (12) INCH HORIZONTAL CLEARANCE BETWEEN FOUNDATION AND SUBSTRUCTURES. IN THE EVENT THAT A TWELVE (12) INCH CLEARANCE CANNOT BE ACHIEVED, THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR RELOCATION OF SUBSTRUCTURES AT NO COST TO THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS.
24. STREETLIGHTS SHALL BE CONSTRUCTED PER THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS APPROVED PLAN. STREETLIGHTS NOT CONSTRUCTED ACCORDING TO THE APPROVED PLAN SHALL BE REMOVED AND RELOCATED AT NO COST TO THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS.
25. THE DEVELOPER AND/OR APPLICANT SHALL COORDINATE WITH SCE FOR THE LOCATION OF THE SERVICE PEDESTAL PRIOR TO THE APPROVAL THE STREET LIGHTING PLAN.
26. SAFETY CLEARANCE SHALL BE OBTAINED FROM THE AFFECTED UTILITY COMPANY BEFORE DOING ANY WORK IN CLOSE PROXIMITY TO ANY OVERHEAD ELECTRIC LINE.
27. IN THE EVENT OF OVERHEAD LINE CONFLICT WITH STREETLIGHTS, THE CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS WITH SCE TO RAISE THEIR OVERHEAD FACILITIES IN ORDER TO PROVIDE FOR THE REQUIRED CLEARANCES WITH EXISTING AND/OR PROPOSED STREETLIGHTS AT NO COST TO THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS.
28. CONTRACTOR SHALL REPAIR AT HIS COST; THE DAMAGE CAUSED TO ANY EXISTING UNDERGROUND UTILITY DURING THE CONSTRUCTION OF STREETLIGHTS.
29. ALL CONDUITS FROM PULL BOX TO STREETLIGHT SHALL BE ONE AND A HALF (1 1/2) INCHES UL APPROVED PVC SCHEDULE 80, UNLESS OTHERWISE SPECIFIED.
30. ALL CONDUITS FROM PULL BOX TO PULL BOX SHALL BE THREE (3) INCHES UL APPROVED PVC SCHEDULE 80, UNLESS OTHERWISE SPECIFIED.
31. ALL CONDUITS FROM SERVICE PEDESTAL TO PULL BOX SHALL BE THREE (3) INCHES UL APPROVED PVC SCHEDULE 80, UNLESS OTHERWISE SPECIFIED.
32. All CONDUITS SHALL BE LAID TO A DEPTH OF NOT LESS THAN THIRTY (30) INCHES BELOW THE GUTTER FLOW LINE, UNLESS OTHERWISE SPECIFIED. FOR DETAILS, SEE ATTACHMENT I, EXHIBIT L-4.
33. ALL SPLICES BELOW GRADE SHALL BE WATERTIGHT, TAPED AND SCOTCHKOTED.
34. IT WILL BE THE RESPONSIBILITY OF THE DEVELOPER AND/OR APPLICANT TO FURNISH AND CONSTRUCT ALL THE STREETLIGHTS IMPROVEMENTS INCLUDING INSTALLATION OF UNDERGROUND CONDUIT SYSTEM, PULL BOXES, PULL ROPES,

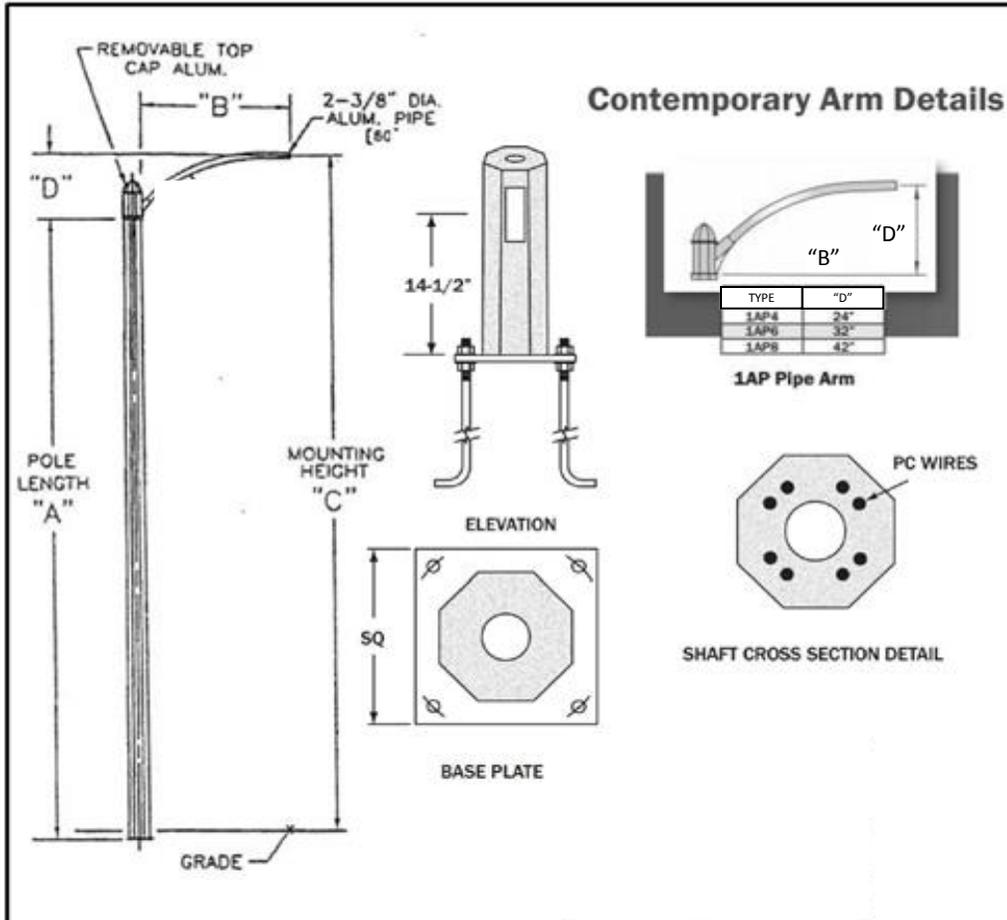
STUB-OUTS, CONDUCTORS, FOUNDATIONS, POLES, MAST ARMS, SERVICE PEDESTALS AND CABINETS, STREETLIGHTS, AND ALL OTHER NECESSARY APPURTENANCES IN ACCORDANCE TO COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS STANDARDS.

35. SCE OR ITS CONTRACTOR WILL INSTALL NEW TRANSFORMER, RISER, AT THE SCE SERVICE POINT, AND PROVIDE SERVICE CONNECTION. ALL COSTS TO BE PAID BY THE DEVELOPER AND/OR APPLICANT.
36. ALL CONDUIT WORK BETWEEN SCE SERVICE POINT AND THE PROPOSED SERVICE PEDESTAL SHALL CONFORM TO SCE STANDARDS, PUBLISHED IN SCE'S UNDERGROUND STRUCTURES STANDARDS MANUAL (UGS), AVAILABLE AT WWW.SCE.COM AND THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, SECTION 86, UNLESS OTHERWISE NOTED ON THE PLANS.
37. SERVICE PEDESTAL SHALL BE INSTALLED WITH CABINET ACCESS DOOR FACING THE STREET.
38. ALL STREETLIGHTS SHOWN ON THIS PLAN SHALL BE ENERGIZED PRIOR TO ACCEPTANCE OF THE LIGHTING SYSTEM TO A COUNTY LIGHTING MAINTENANCE DISTRICT. THE DEVELOPER AND/OR APPLICANT SHALL ENSURE THAT ALL REQUIRED ELECTRICAL INSPECTIONS ARE COORDINATED WITH SCE AND THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS' INSPECTOR PRIOR TO COVERING OR ENERGIZING THE LIGHTING SYSTEM.
39. ALL STREETLIGHT IMPROVEMENTS SHALL BE COMPLETED IN ACCORDANCE TO COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS APPROVED STREET LIGHTING PLANS PRIOR TO THE ACCEPTANCE OF THE STREET LIGHTING SYSTEM TO COUNTY LIGHTING MAINTENANCE DISTRICT.
40. PRIOR TO ACCEPTANCE OF THE WORK, THE DEVELOPER AND/OR APPLICANT SHALL SUBMIT ONE COMPLETE SET OF "AS BUILT" PLANS AND ANY PERTINENT DATA AS REQUIRED BY THE ENGINEER SHOWING IN DETAIL ALL CONSTRUCTION CHANGES.

ATTACHMENT I

EXHIBIT L-1

Ameron Type 1-C1 Streetlight Pole and Mast Arm



Ameron Catalog Number	Pole Height "A"	"C" (PER ARM LENGTH)			Base Plate (SQ)
		4'-0" (1.22m)	6'-0" (1.83m)	8'-0" (2.44m)	
ICI-23	23' - 3"	25' - 0"	25' - 8"	26' - 6"	12"
ICI-28	28' - 3"	30' - 0"	30' - 8"	31' - 6"	12"

Ameron Catalog Number	Anchor Bolt	Bolt Circle	Ultimate G.I. Moment (Ft. LBS.)	Weight (LBS.)
ICI-23	1" x 36" x 4"	12 - 1/2"	22,000	940
ICI-28	1" x 36" x 4"	12 - 1/2"	27,400	1,240

NOTES:

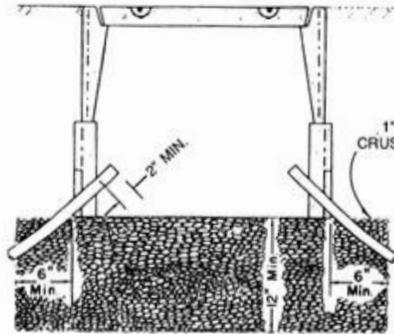
CONCRETE TO BE 6,000 PSI COMPRESSION MINIMUM IN 28 DAYS.
 MANUFACTURED TO ASTM C 1089-88.
 BASEPLATE ASTM A-36 FULLY PRESTRESSED WITH (8) 5/15" DIA. (8) A-416 WIRES.
 DIMS IN BRACKETS ARE MILLIMETERS UNLESS NOTED OTHERWISE.

Ameron	POLE PRODUCTS & SYSTEMS
	POLES W/CF ALUM ARMS

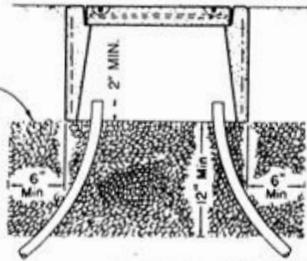
ATTACHMENT I

EXHIBIT L-2

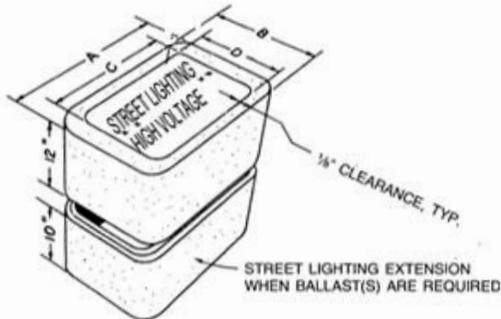
Pull Box Specifications



TYPICAL STREET LIGHTING INSTALLATION



TYPICAL TRAFFIC SIGNAL INSTALLATION



PULL BOX NO.	TYPE	DIMENSIONS (Inches)				STREET LIGHTING EXTENSION
		Outside		Cover		
		A	B	C	D	
3-1/2	P.C.C.	19	13	15	10	None
	Plastic	16-3/8	11	15-3/8	10	
5	P.C.C.	25	15	21-3/4	11-3/4	10"
	Plastic	24	14-1/16	23	11-1/16	
6	P.C.C.	34	22	29-3/4	17-3/4	None
	Plastic	31-1/2	18-5/8	30-1/2	17-5/8	

NOTES:

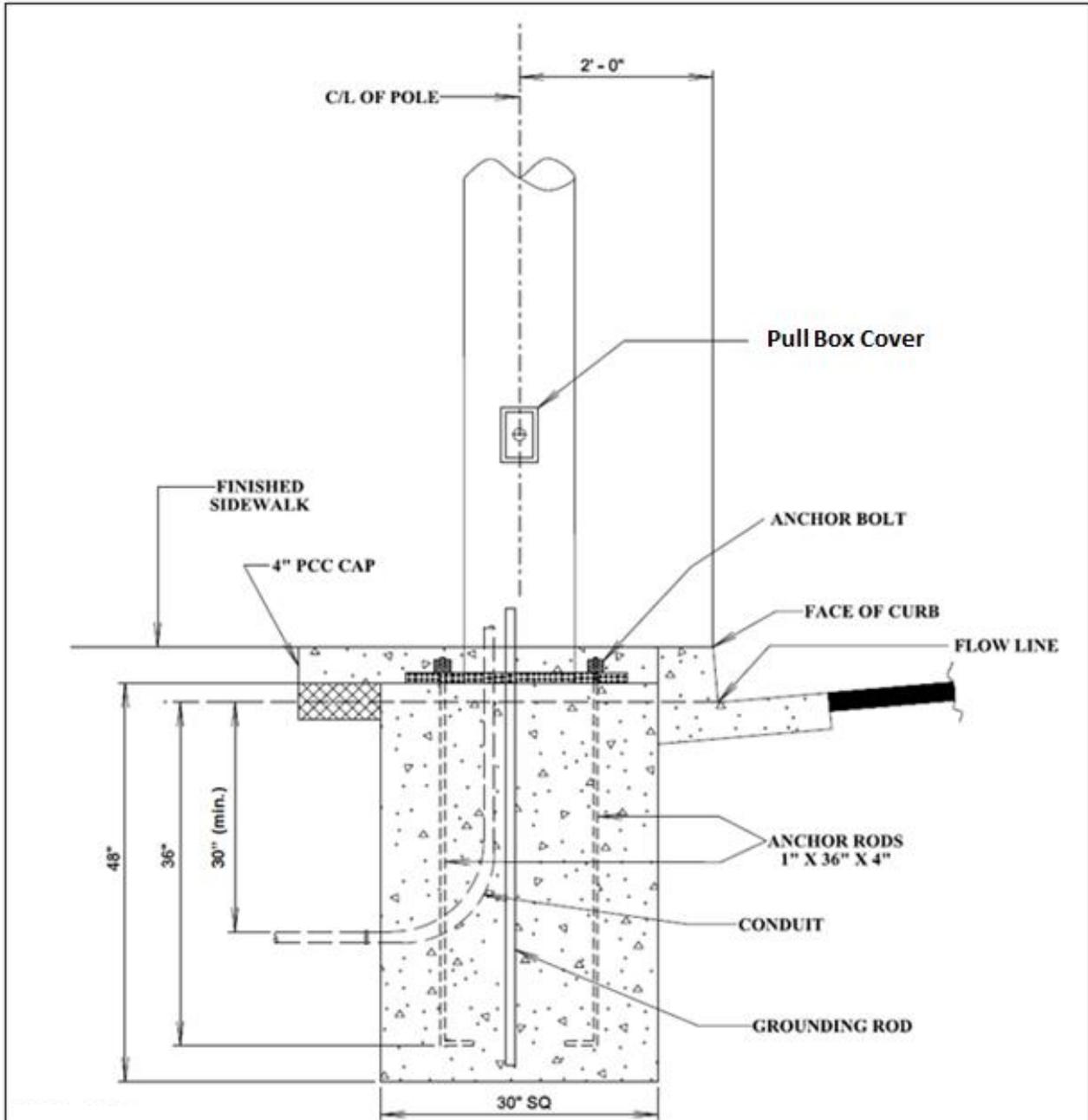
FOR STREET LIGHTING INSTALLATIONS A NO. 5 PULL BOX IS REQUIRED.

PULL BOXES		1
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ATTACHMENT I

EXHIBIT L-3

LS-2 AND LS-3 Streetlight Foundations



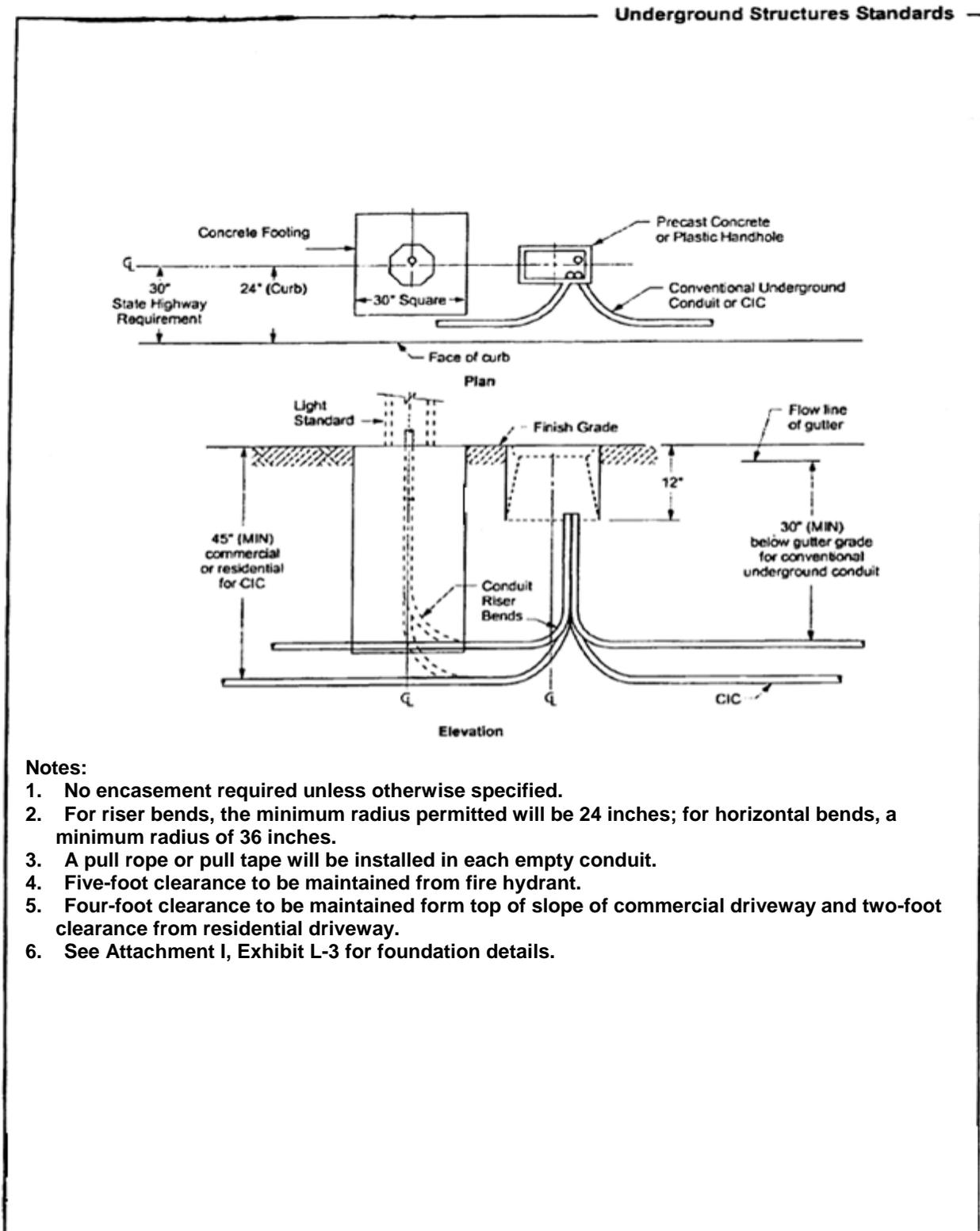
Note:

Construction shall conform to these requirements unless otherwise directed by the county engineer. Foundation bolts shall not be cut off for any reason. Extension couplers shall not be permitted. Anchor bolt dimensions per manufacturers specification.

ATTACHMENT I

EXHIBIT L-4

Typical Conduit and Riser Bend Installation for Pull Box through Service to Streetlight Standards



ATTACHMENT J

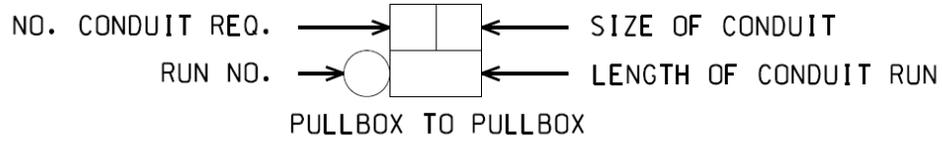
SIGNATURE BLOCK FOR LS2 AND LS3

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS		
APPROVAL FOR INSTALLATION		MPANY
BY	R.C.E. NO.	DATE

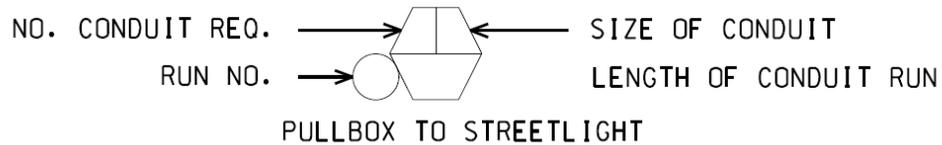
ATTACHMENT K

LEGEND OF CONDUIT SYMBOLS

MAIN LINE CONDUIT



STREET LIGHT CONDUIT

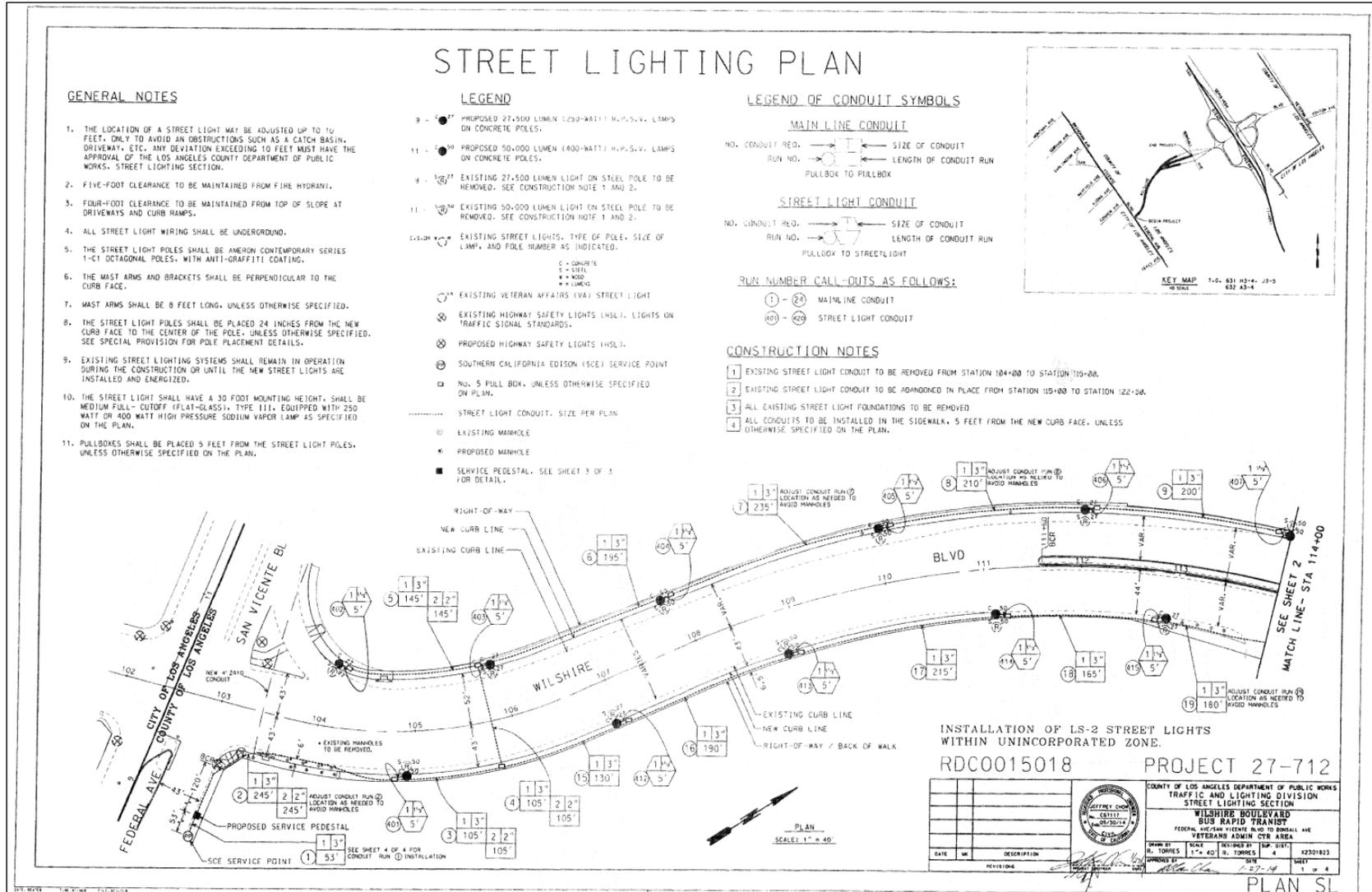


RUN NUMBER CALL-OUTS AS FOLLOWS:

- ① - ②4 MAINLINE CONDUIT
- ④01 - ④20 STREET LIGHT CONDUIT

ATTACHMENT L

SAMPLE STREET LIGHTING PLAN FOR LS-2 AND LS-3 SYSTEM



ATTACHMENT M

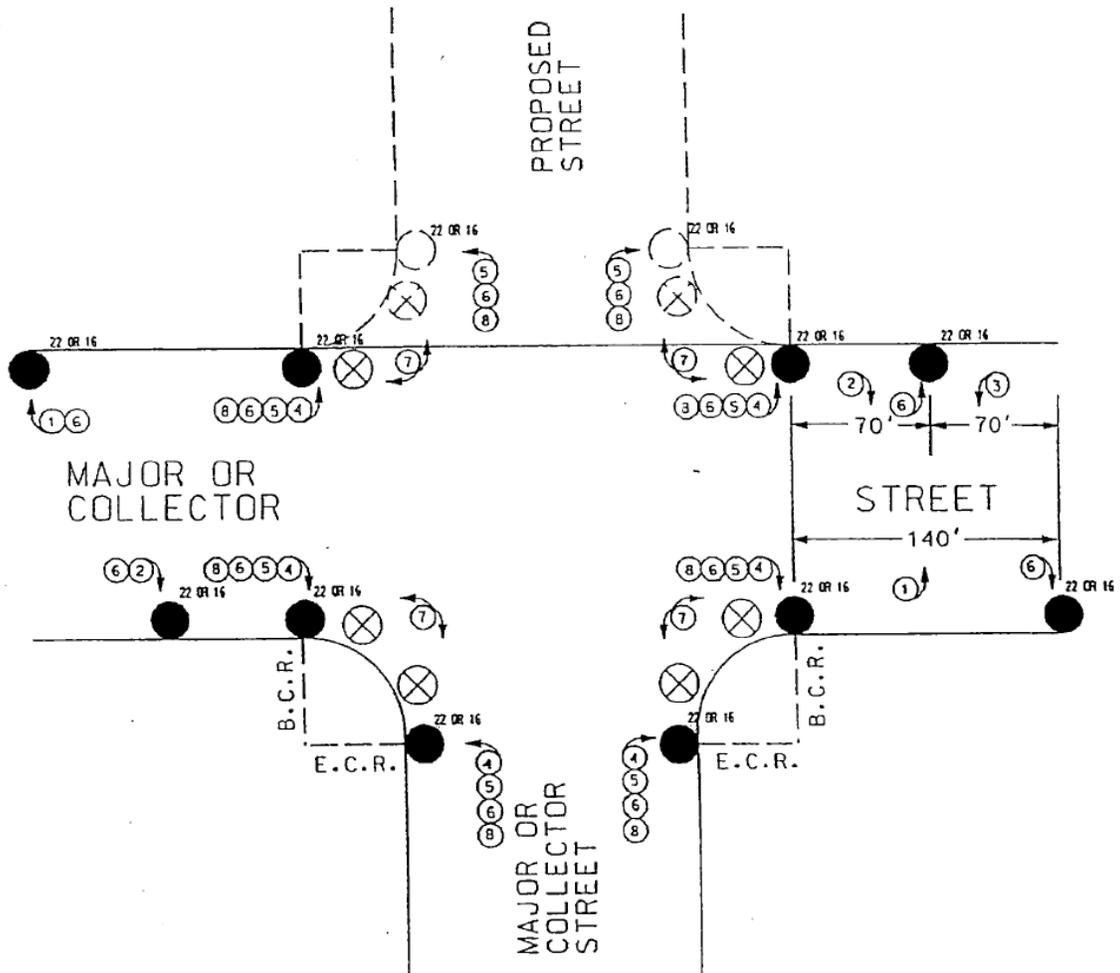
Approved LED Streetlights for the Equivalent of H.P.S.V Streetlights

		Manufacturer	Catalog Number	Power
Local	100W HPSV	Eaton Cooper Lighting	VERD-A016-D-U-T2-7030-4N7-AP	36
		General Electric (GE)	ERL1004B330AGRAY	31
		Holophane & American Lighting	ATBS F MVOLT R2 MP NL P7 3K	47
		Leotek	GCJ1-20H-MV-WW-2R-GY-580-PCR7	39
Collector	150W HPSV	Eaton Cooper Lighting	VERD-A028-D-U-T3-7030-4N7-AP	72
		General Electric (GE)	ERL1006A330AGRAY	47
		Holophane & American Lighting	ATBS H MVOLT R3 MP NL P7 3K	60
		Leotek	GCM2-30H-MV-WW-3R-GY-610-PCR7	58
Major	200W HPSV	Eaton Cooper Lighting	VERD-G-A028-D-U-T3-7030-4N7-AP	103
		General Electric (GE)	ERLH011B330AGRAY	98
		Holophane & American Lighting	ATBM D MVOLT R3 MP 4B NL P7 3K	95
		Leotek	GCM2-40H-MV-WW-3R-GY-850-PCR7	107
Major	250W HPSV	Eaton Cooper Lighting	VERD-G-A02-D-U-T2-7030-4N7-AP	143
		General Electric (GE)	ERLH013B330AGRAY	111
		Holophane & American Lighting	ATBM E MVOLT R3 MP 4B NL P7 3K	115
		Leotek	GCM2-40H-MV-WW-3R-GY-950-PCR7	121
Major	310W HPSV	Eaton Cooper Lighting	VERD-G-A02-D-U-T2-7030-4N7-AP	143
		General Electric (GE)	ERLH013B330AGRAY	111
		Holophane & American Lighting	ATBM G MVOLT R3 4B NL P7 3K	150
		Leotek	GCM2-40H-MV-WW-3R-GY-950-PCR7	121
Major	400W HPSV	Eaton Cooper Lighting	VERD-M-A0385-D-U-T3-7030-4N7-AP	152
		General Electric (GE)	ERLH014B330AGRAY	122
		Holophane & American Lighting	ATBM H MVOLT R3 4B NL P7 3K	164
		Leotek	GCM2-40H-MV-WW-3R-GY-950-PCR7	121

ATTACHMENT N

EXHIBIT L-1

Major or Collector Highway intersection with Major or Collector Highway

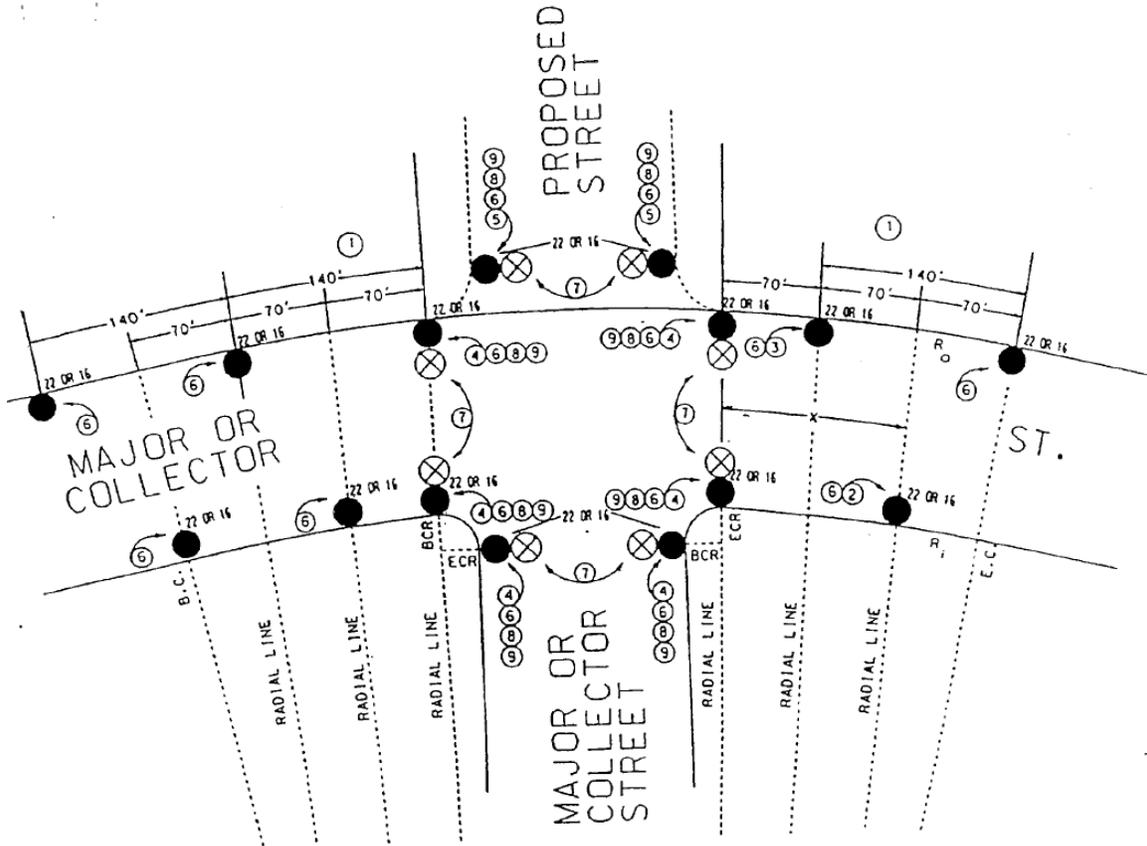


1. 140' SPACING FROM INTERSECTION LIGHT TO FIRST MID-BLOCK LIGHT ON EXIT SIDE. TYPICAL.
2. 70' SPACING FROM INTERSECTION LIGHT TO FIRST MID-BLOCK LIGHT ON APPROACH SIDE. TYPICAL.
3. 70' STAGGERED SPACING FOR MID-BLOCK LIGHTS. TYPICAL.
4. REQUIRED LOCATIONS AT B.C.R. FOR T-INTERSECTION.
5. REQUIRED LOCATIONS AT B.C.R. FOR 4-WAY INTERSECTION.
6. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
7. PROPOSED HIGHWAY SAFETY LIGHTS (LIGHTS ON SIGNAL STANDARDS). LIGHT LOCATIONS PER PROPOSED SIGNAL PLAN.
8. INTERSECTION LIGHTS ARE NOT REQUIRED WHEN HIGHWAY SAFETY LIGHTS ARE PROPOSED. THE FIRST MID-BLOCK LIGHTS SHALL BE MEASURED FROM THE B.C.R.

ATTACHMENT N

EXHIBIT L-2

Major or Collector Highway intersection with Major or Collector Highway when Curves are involved



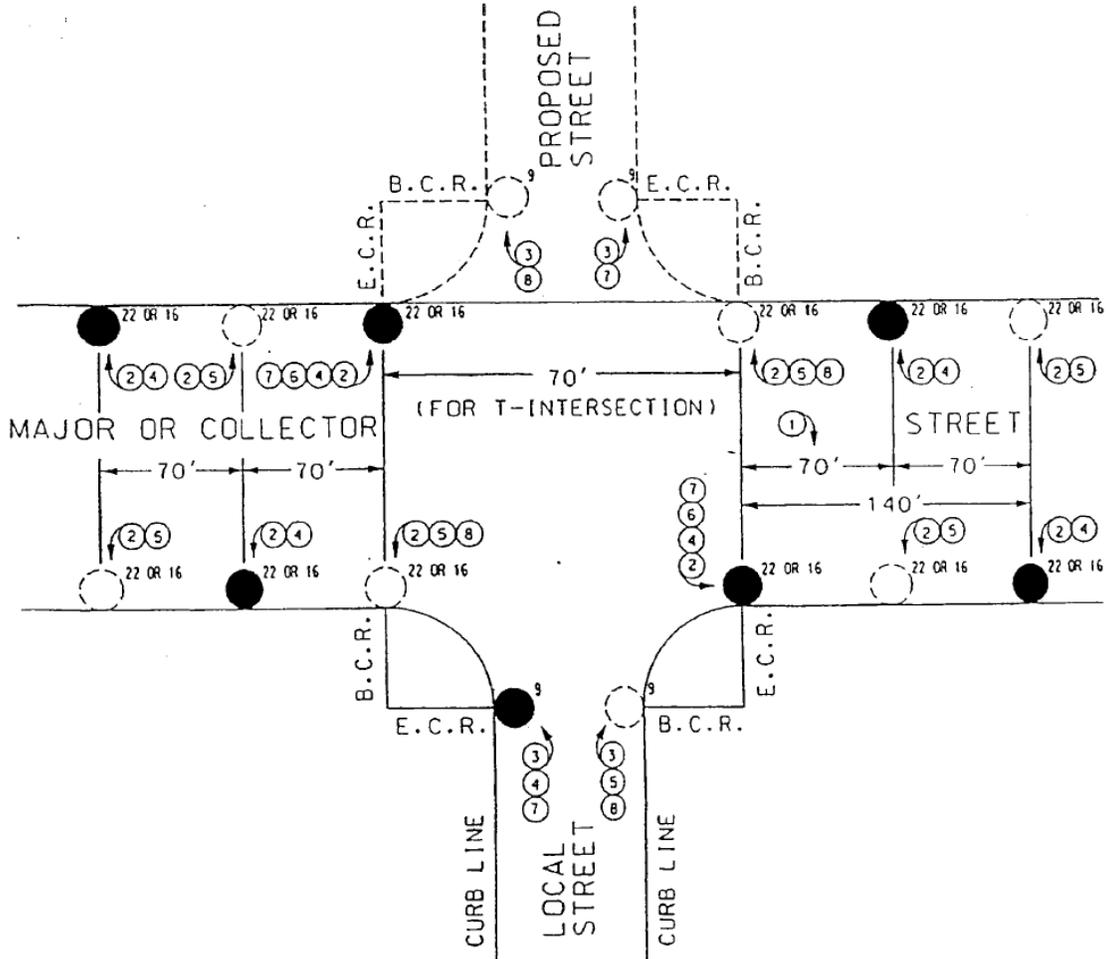
R_0 = OUTSIDE RADIUS. R_i = INSIDE RADIUS. R = CENTERLINE RADIUS

1. WHEN CURVES ARE INVOLVED. SPACING BETWEEN LIGHTS ON OUTSIDE CURVE CONTROLS.
2. $X = R_i/R_0(140')$ ON INSIDE CURVE SPACING FROM INTERSECTION LIGHT TO FIRST MID-BLOCK LIGHT ON EXIT SIDE. TYPICAL.
3. 70' SPACING FROM INTERSECTION LIGHT TO FIRST MID-BLOCK LIGHT ON APPROACH SIDE. TYPICAL.
4. REQUIRED LOCATIONS AT B.C.R. FOR T-INTERSECTION.
5. REQUIRED LOCATIONS AT B.C.R. FOR 4-WAY INTERSECTION.
6. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
7. PROPOSED HIGHWAY SAFETY LIGHTS (LIGHTS ON SIGNAL STANDARDS). LIGHT LOCATIONS PER PROPOSED SIGNAL PLAN.
8. INTERSECTION LIGHTS ARE NOT REQUIRED WHEN HIGHWAY SAFETY LIGHTS ARE PROPOSED. THE FIRST MID-BLOCK LIGHT SHALL BE MEASURED FROM THE B.C.R.
9. LIGHTS AT INTERSECTION TO BE PLACED AT B.C.R. EXCEPT OTHERWISE NOTED.

ATTACHMENT N

EXHIBIT L-3

Major or Collector Highway intersection with Local Street

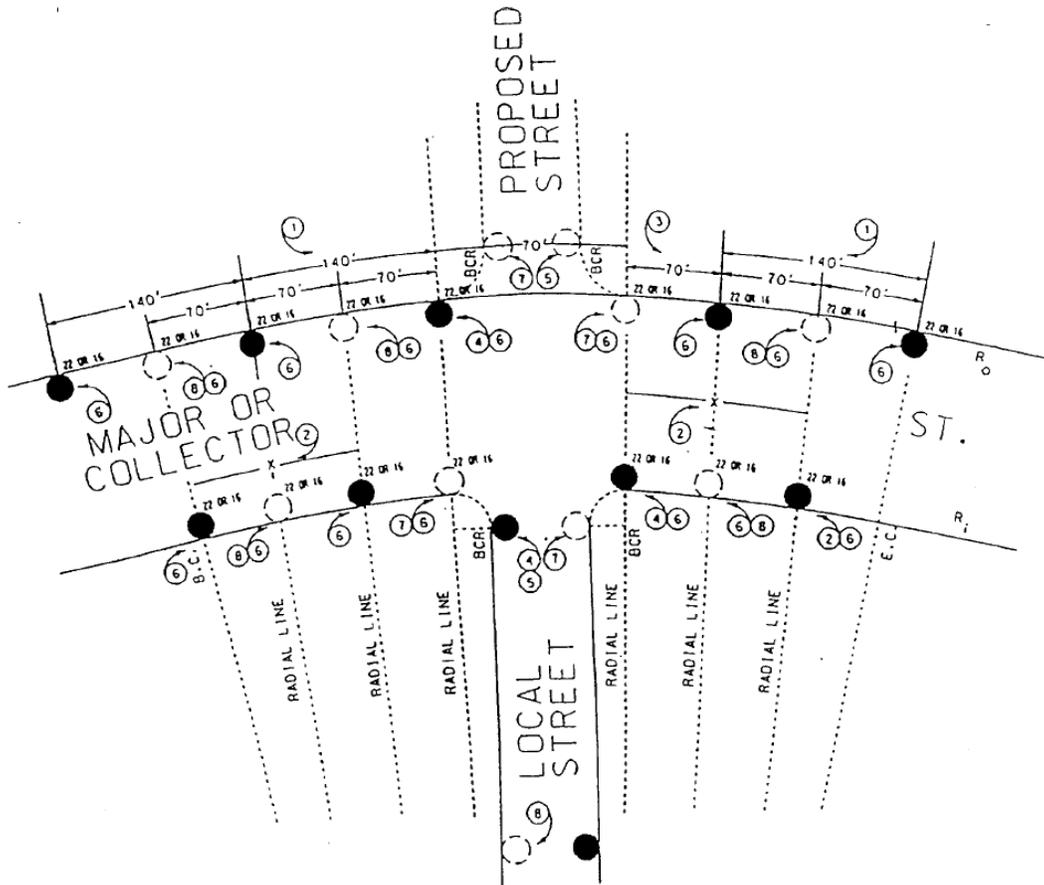


1. 70' STAGGERED ON MAJOR (84' CURB TO CURB) OR COLLECTOR (64' CURB TO CURB). TYPICAL.
2. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
3. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
4. PREFERRED LOCATION FOR T - INTERSECTION.
5. ALTERNATE LOCATION FOR T - INTERSECTION.
6. LIGHTS ON BOTH SIDES OF STREET WHEN STREET IS ENTIRELY IN DEVELOPMENT, OTHERWISE INSTALL LIGHTS ON ONE SIDE (HALF SYSTEM).
7. PREFERRED LOCATION FOR 4 - WAY INTERSECTION.
8. ALTERNATE LOCATION FOR 4 - WAY INTERSECTION. USE EITHER ALL PREFERRED LOCATIONS OF ALL ALTERNATE LOCATIONS.

ATTACHMENT N

EXHIBIT L-4

Major or Collector Highway intersection with Local Street when curves are involved



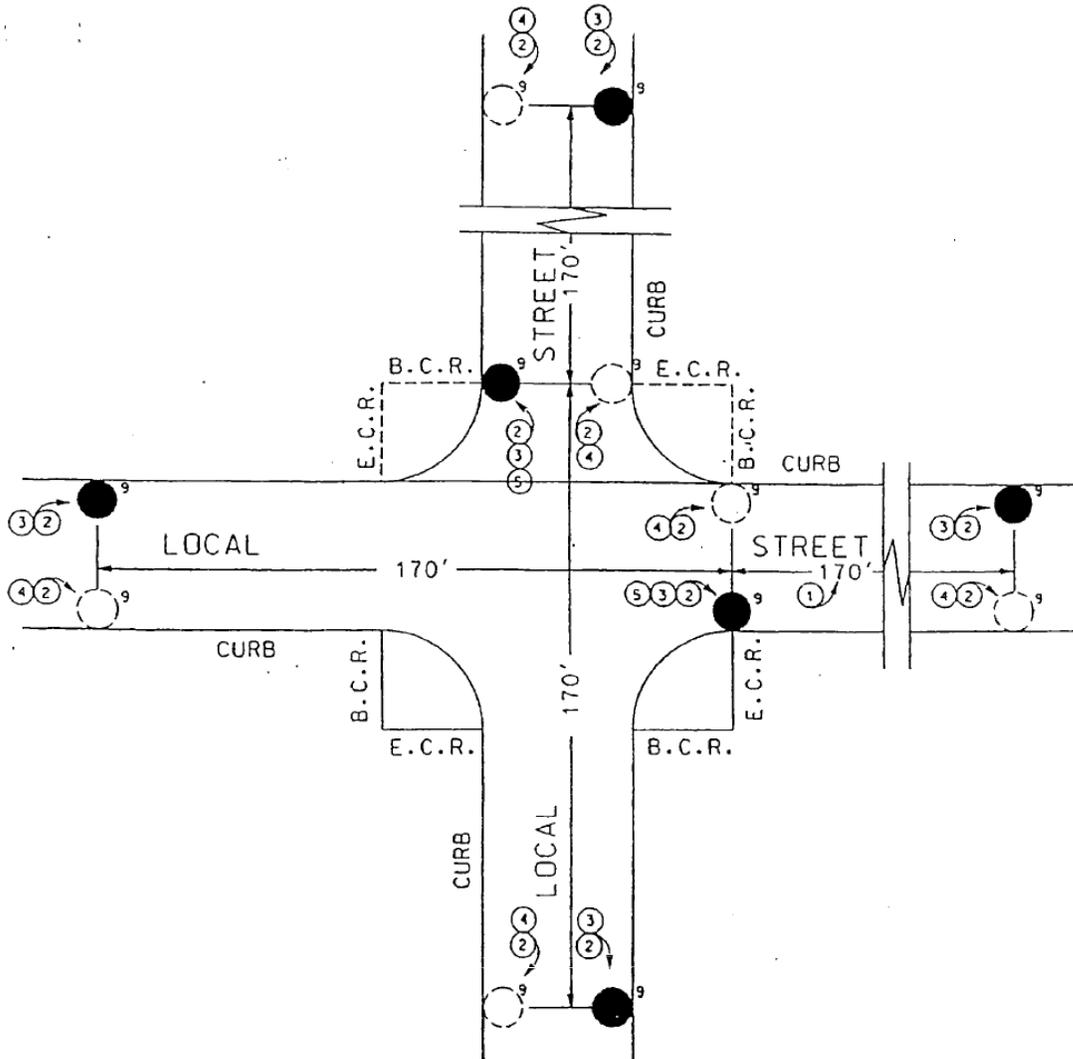
R_0 = OUTSIDE RADIUS. R_i = INSIDE RADIUS. R = CENTERLINE RADIUS

1. WHEN CURVES ARE INVOLVED SPACING BETWEEN LIGHTS ON OUTSIDE CURVE CONTROLS.
2. $X = R_i/R_0(140')$ ON INSIDE CURVE SPACING FROM INTERSECTION LIGHT TO FIRST MID-BLOCK LIGHT ON EXIT SIDE. TYPICAL.
3. 70' SPACING FROM INTERSECTION LIGHT TO FIRST MID-BLOCK LIGHT ON APPROACH SIDE. TYPICAL.
4. PREFERRED LOCATIONS FOR T-INTERSECTION.
5. PREFERRED LOCATIONS AT B.C.R. FOR 4-WAY INTERSECTION.
6. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
7. ALTERNATE LOCATIONS FOR INTERSECTION.
8. ALTERNATE LOCATIONS
9. LIGHTS AT INTERSECTION TO BE PLACED AT B.C.R. EXCEPT OTHERWISE NOTED.

ATTACHMENT N

EXHIBIT L-5

Local Street Intersection with Local Street, 4 - Way



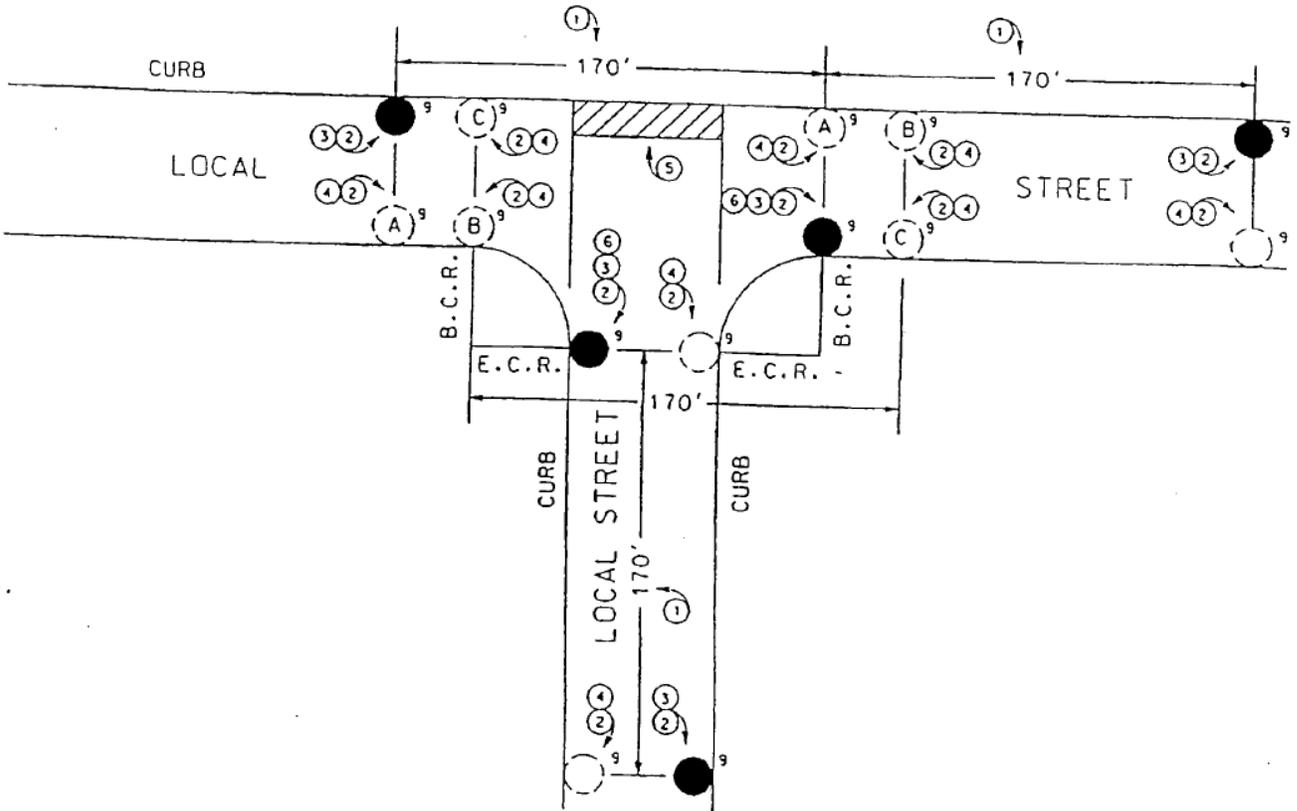
FOUR – WAY INTERSECTION

1. 170' MAXIMUM STAGGERED SPACING ON LOCAL STREET (34', 36', OR 40' CURB TO CURB) IS PREFERRED. USE 140' MAXIMUM ONE – SIDE FOR HALF – STREET IMPROVEMENT.
2. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
3. PREFERRED LOCATION (ONE INTERSECTION LIGHT MAY BE PLACED UP TO 20' FROM B.C.R. OR E.C.R.).
4. ALTERNATE LOCATIONS. USE ALL PREFERRED OR ALL ALTERNATE LOCATIONS ON EACH STREET.
5. ONE LIGHT ON EACH STREET AT INTERSECTION TO PROVIDE TWICE MID – BLOCK ILLUMINATION AS RECOMMENDED BY I.E.S.

ATTACHMENT N

EXHIBIT L-6

Local Street Intersection with Local Street, 3 - Way ("T")



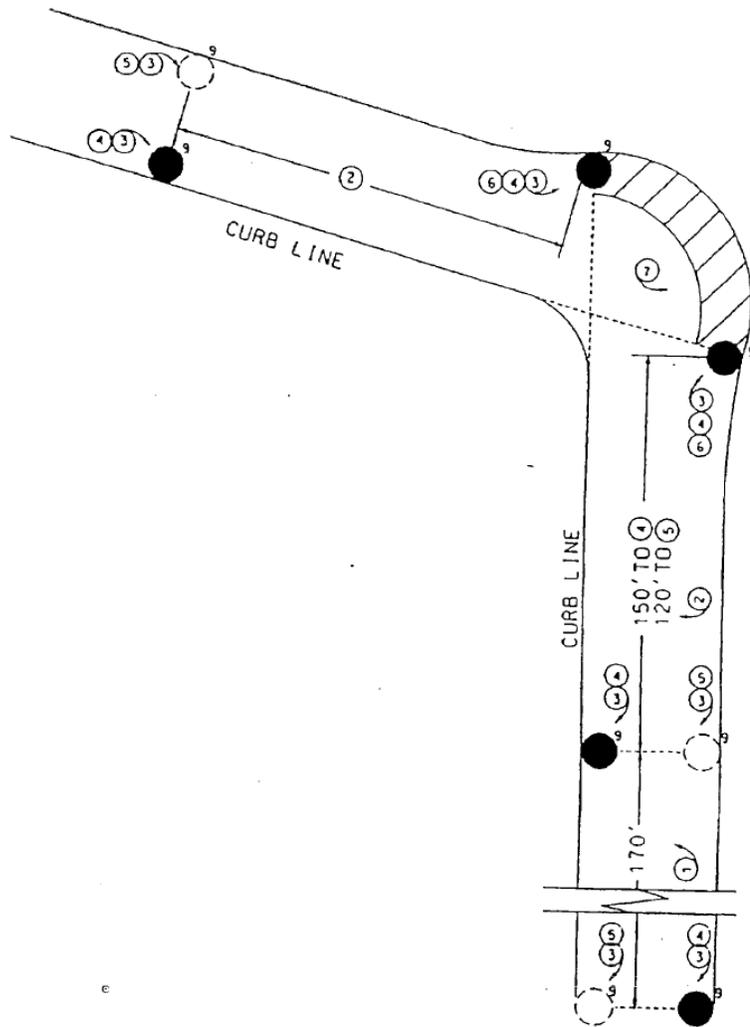
T - INTERSECTION

1. 170' MAXIMUM STAGGERED SPACING ON LOCAL STREET (34', 36', OR 40' CURB TO CURB) PREFERRED. USE 140' MAXIMUM ONE - SIDE FOR HALF - STREET IMPROVEMENT.
2. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
3. PREFERRED LOCATION (ONE INTERSECTION LIGHT MAY BE PLACED UP TO 20' FROM B.C.R. OR E.C.R.).
4. ALTERNATE LOCATION.
5. AVOID PLACING LIGHTS IN THIS AREA. CONSULT OUR STREET LIGHTING SECTION PRIOR TO PLACING LIGHT WITHIN THIS AREA.
6. ONE LIGHT ON EACH STREET AT INTERSECTION TO PROVIDE TWICE MID - BLOCK ILLUMINATION AS RECOMMENDED BY I.E.S.

ATTACHMENT N

EXHIBIT L-7

Local Street Knuckle Type Intersection

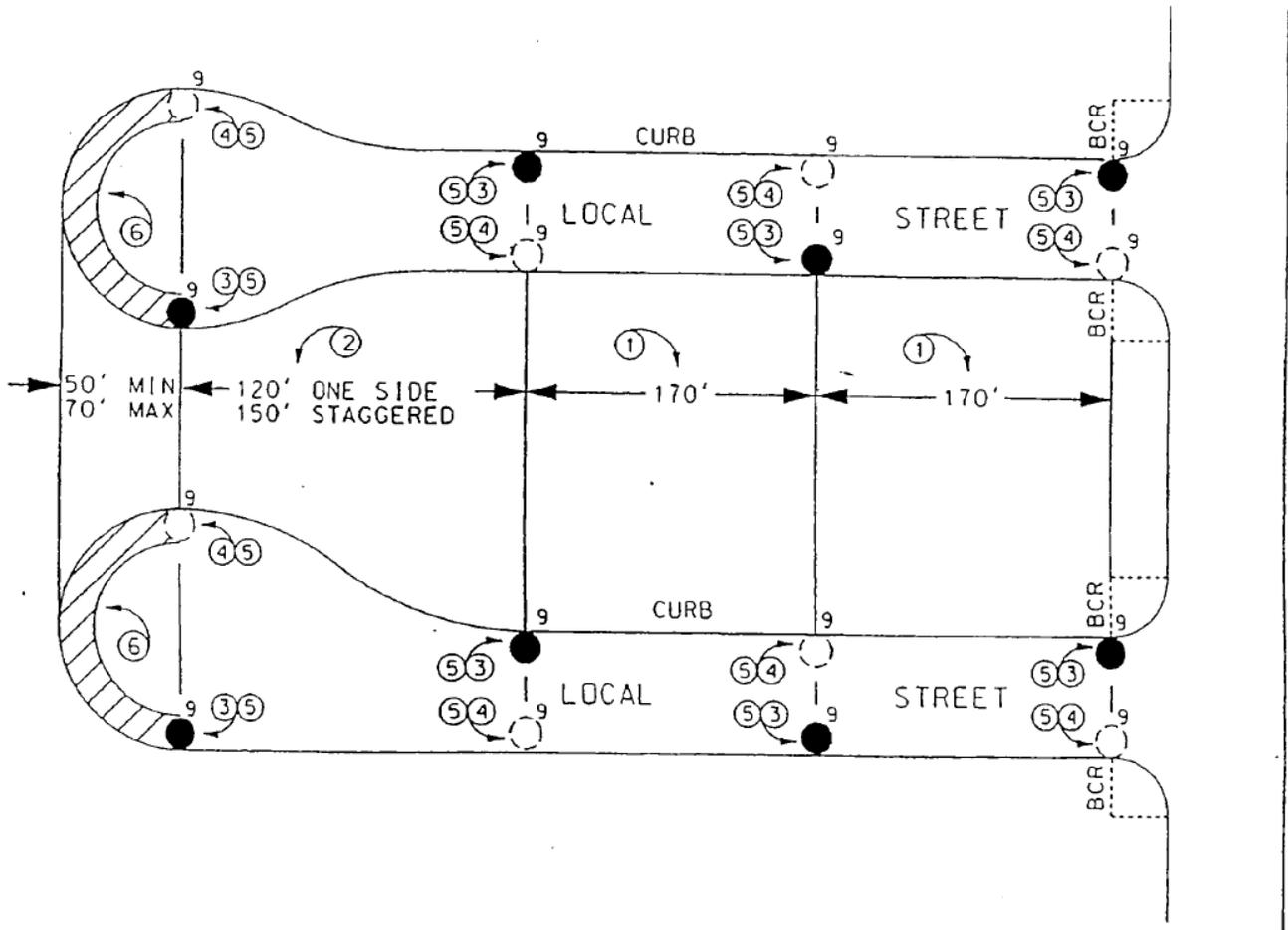


1. 170' MAXIMUM STAGGERED SPACING ON LOCAL STREET (34', 36', OR 40' CURB TO CURB) PREFERRED. USE 140' MAXIMUM ONE – SIDE FOR HALF – STREET IMPROVEMENT.
2. REDUCED SPACING FROM INTERSECTION LIGHT TO FIRST MID – BLOCK DUE TO CURVATURE OF ROADWAY AS RECOMMENDED BY I.E.S.
3. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
4. PREFERRED LOCATION (ONE INTERSECTION LIGHT MAY BE PLACED UP TO 20' OUTSIDE OF CURB PROLONGATIONS.).
5. ALTERNATE LOCATION. USE BOTH PREFERRED OR BOTH ALTERNATE LOCATIONS ON EACH STREET.
6. ONE LIGHT ON EACH STREET AT INTERSECTION TO PROVIDE TWICE MID – BLOCK ILLUMINATION AS RECOMMENDED BY I.E.S.
7. AVOID PLACING LIGHT IN THIS AREA. CONSULT OUR STREET LIGHTING SECTION PRIOR TO PLACING LIGHT WITHIN THIS AREA.

ATTACHMENT N

EXHIBIT L-8

Local Street Cul-De-Sac

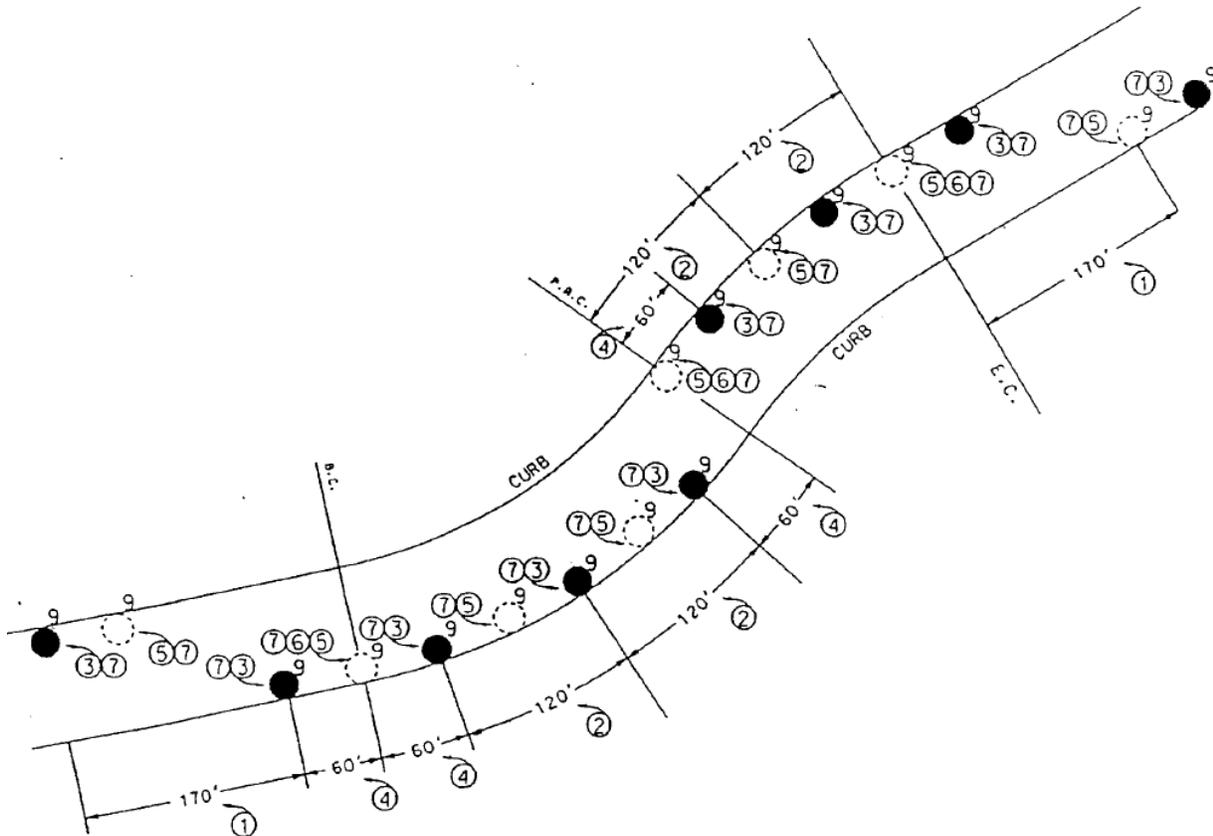


1. 170' MAXIMUM STAFFERED SPACING ON LOCAL STREET (34', 36', OR 40' CURB TO CURB) PREFERRED. USE 140' MAXIMUM ONE - SIDE FOR HALF - STREET IMPROVEMENT.
2. REDUCED SPACING FROM CUL - DE - SAC LIGHT TO FIRST MID - BLOCK LIGHT DUE TO CURVATURE OF ROADWAY AS RECOMMENDED BY I.E.S.
3. PREFERRED LOCATION.
4. ALTERNATE LOCATION. USE ALL ALTERNATE LOCATIONS OR ALL PREFERRED LOCATIONS.
5. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
6. AVOID PLACING LIGHTS IN THIS AREA.

ATTACHMENT N

EXHIBIT L-9

Local Street Curve, $R < 700'$

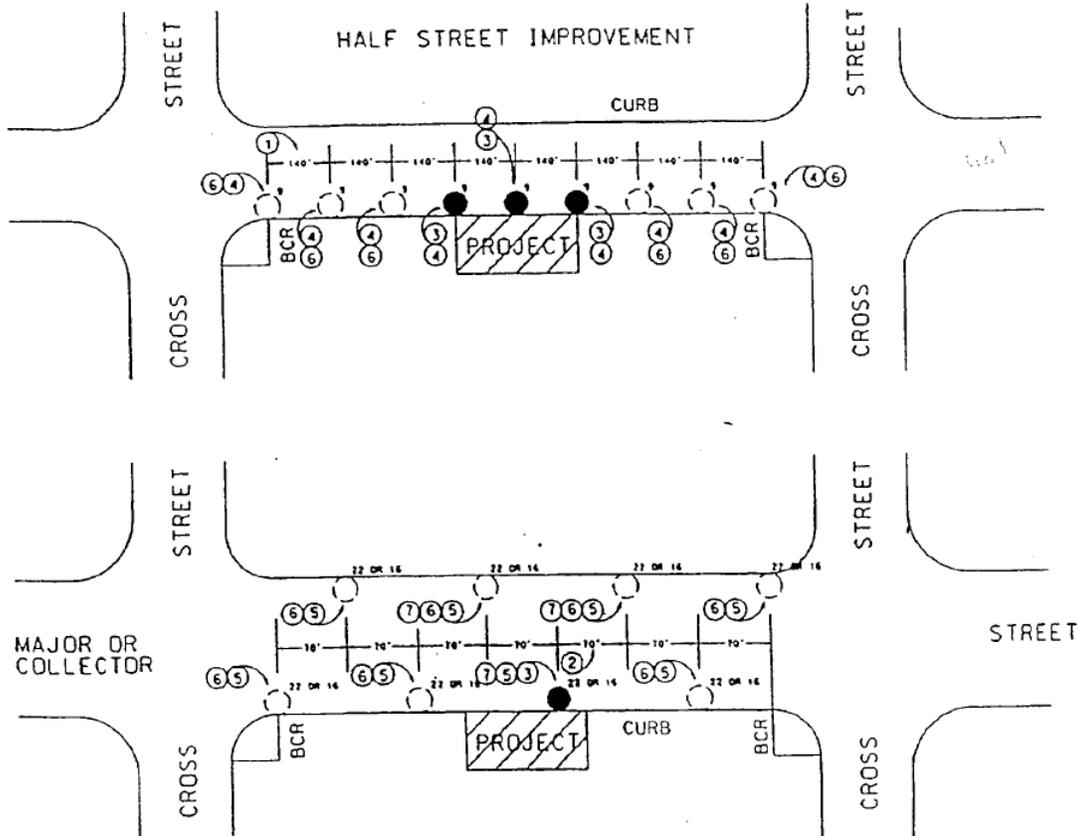


1. 170' MAXIMUM STAFFERED SPACING ON TANGENTS ON LOCAL STREET (34', 36', OR 40' CURB TO CURB) PREFERRED. USE 140' MAXIMUM FOR ON - SIDE IMPROVEMENT.
2. 120' MAXIMUM SPACING ON OUTSIDE OF CURVE WHERE $R \leq 700'$. TYPICAL.
3. PREFERRED LOCATION.
4. PREFERRED LOCATIONS SYMMETRICAL ABOUT BC, PRC, AND EC. CURVE SPACING EXTENDS TO FIRST LIGHT ON TANGENT.
5. ALTERNATE LOCATION. USE ALL PREFERRED LOCATIONS OR ALL ALTERNATE LOCATIONS.
6. PLACE LIGHTS ON BC, PRC, AND EC.
7. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.

ATTACHMENT N

EXHIBIT L-10

Mid-block Projects



1. 140' MAXIMUM ONE – SIDE SPACING ON LOCAL STREET (34', 36', OR 40' CURB TO CURB). TYPICAL.
2. 140' MAXIMUM SPACING ONE – SIDE HALF SYSTEM (70' MAXIMUM STAGGERED SPACING) ON MAJOR (84' CURB TO CURB) OR COLLECTOR (64' CURB TO CURB). TYPICAL.
3. PROPOSED LIGHT(S).
4. FOR LAMP SIZES SEE "STREETLIGHT SPACINGS AND SIZES" ON PAGE 6.
5. FUTURE (DO NOT SHOW ON LAYOUT) OR EXISTING (SHOW ON LAYOUT) LIGHTS FROM PROJECT BOUNDARY TO ADJACENT CROSS STREETS TO VERIFY THAT PROPOSED LIGHTS WILL FIT CONTINUOUS SYSTEM. IF DISTANCES ARE TOO LONG TO BE SHOWN TO SCALE. LAYOUT SHALL INCLUDE "NO SCALE" MAP (OR HARD – COPY) INDICATING DISTANCES TO CROSS STREETS AND LOCATIONS OF FUTURE AND EXISTING LIGHTS.
6. PLACE PROPOSED LIGHTS MIDWAY BETWEEN EXISTING LIGHTS ON STEEL OR CONCRETE POLES TO MAINTAIN STAGGERED SYSTEM (CONSULT STREET LIGHTING SECTION IF STAGGERED SPACING EXCEEDS 70'. PROPOSED LIGHT LOCATIONS SHALL BE INDEPENDENT OF EXISTING LIGHTS ON WOOD POLES).

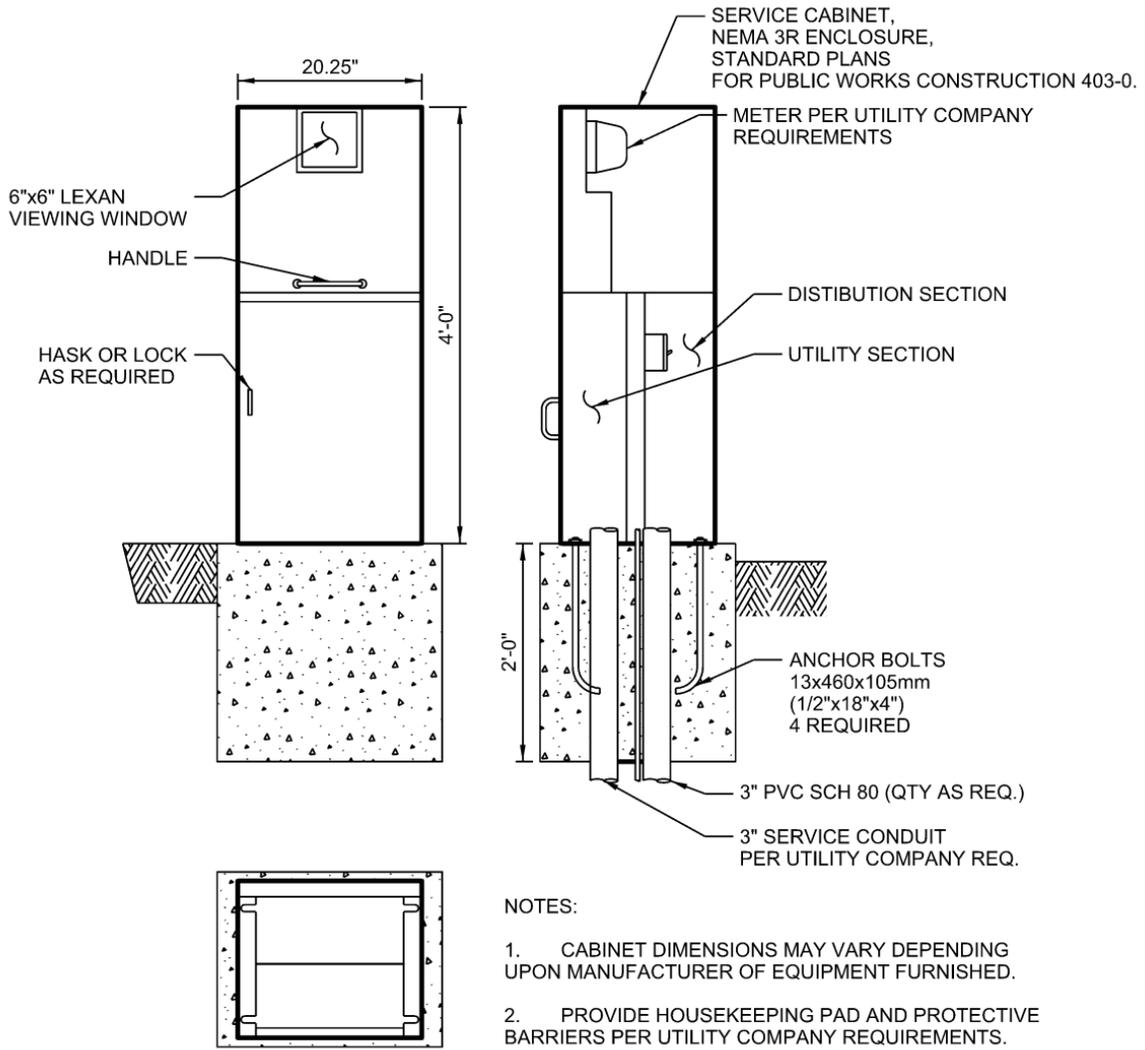
ATTACHMENT O

EXHIBIT E-2 (LEGEND)

10'		STREET LIGHT POLE. CONDUIT RUN 10FT (APPROX.) FROM UPSTREAM PULL BOX.
43'		PULL BOX. CONDUIT RUN 43FT (APPROX.) FROM UPSTREAM PULL BOX. SPPWC 405-0, NUMBER 5 PCC UNLESS OTHERWISE NOTED.
45'	#6	PULL BOX. CONDUIT RUN 45FT (APPROX.) FROM UPSTREAM PULL BOX. SPPWC 405-0, NUMBER 6 PCC.
10'	TBD	STREET LIGHT POLE AND PULL BOX. CONDUIT RUN 10FT (APPROX.) FROM PULL BOX TO POLE. CONDUIT RUN TO PULL BOX TO BE DETERMINED.
5'	122'	STREET LIGHT POLE AND PULL BOX. CONDUIT RUN 5FT (APPROX.) FROM PULL BOX TO POLE. CONDUIT RUN 122' (APPROX.) TO PULL BOX FROM UPSTREAM PULL BOX.
LP-5,7		PANEL "LP" CIRCUITS NUMBER (E.G. 5,7).
VD~3%		APPROXIMATE VOLTAGE DROP IN PERCENT.

ATTACHMENT O

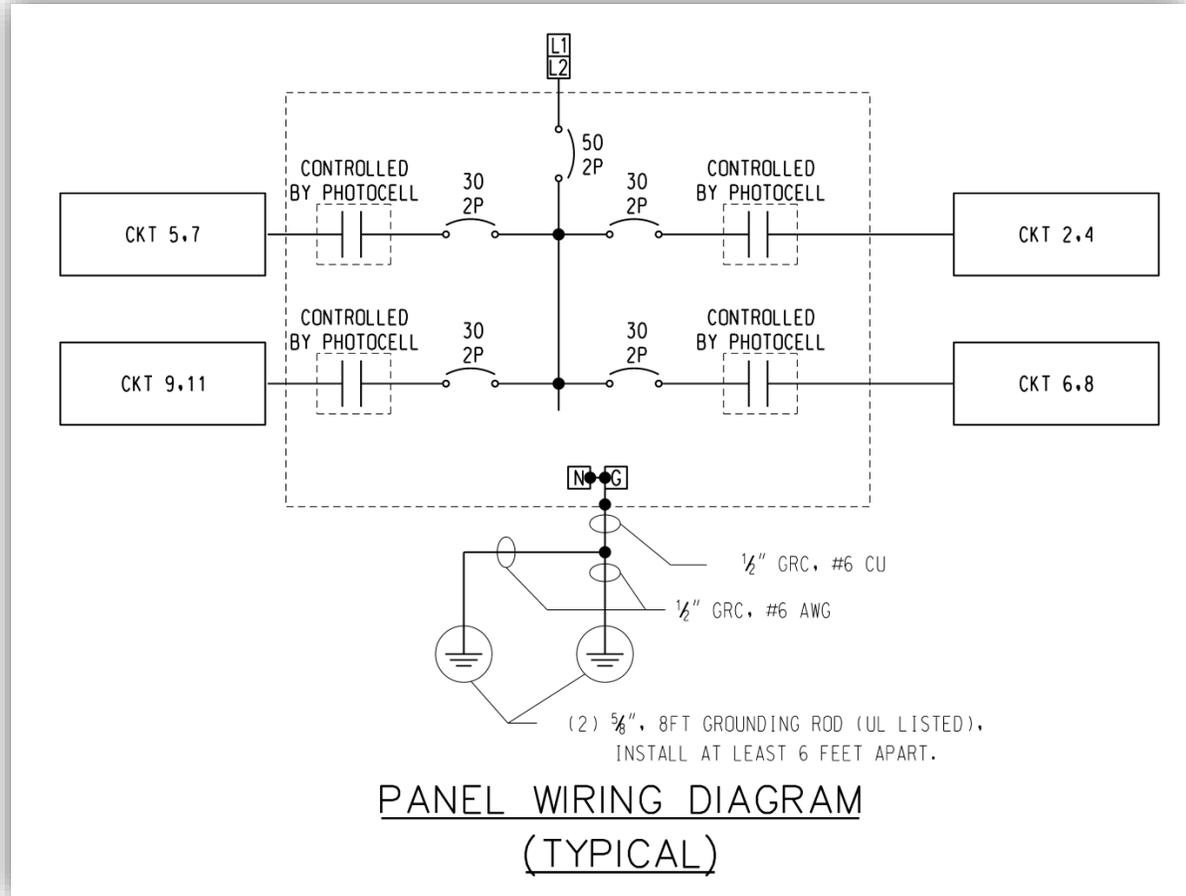
EXHIBIT E-3 (SERVICE PEDESTAL)



SERVICE PEDESTAL (TYP.)

ATTACHMENT O

EXHIBIT E-4 (PANEL WIRING DIAGRAM)



ATTACHMENT O

EXHIBIT E-5 (PANEL SCHEDULE)

PANEL "NORTH" SCHEDULE 120/240-1 PHASE-3 WIRE

PANEL: NORTH LOCATION: PEDESTAL AT INTERSECTION OF SAN VINCENT & FEDERAL AVE PHASE VOLTAGE: 120/240 PHASE: 1 WIRE: 3										MAINS: MCB: FEED: SCCR:					100 AMP 50 AMP BOTTOM 42kA				
CKT NO.	CB		LOAD DESIGNATION					PHASES		LOAD VA	LOAD DESIGNATION			CB		CKT NO.			
	TRIP	POLE	DESCRIPTION	MISC	REC	LITE	L1	L2	MISC		REC	LITE	DESCRIPTION	POLE	TRIP				
1	50	2	MAIN CB					1610		1610	15			STREET LIGHTS (SEE WIRING DIAGRAM)	2	20	2		
3	↓	↓	↓					1610		1610				↓	↓	↓	4		
5	20	2	STREET LIGHTS (SEE WIRING DIAGRAM)	13			1390	1390						NOT USED			6		
7	↓	↓	↓				1390		1390					NOT USED			8		
9			NOT USED											NOT USED			10		
11			NOT USED											NOT USED			12		
TOTAL:								3.0k	3.0k	CONNECTED KVA: 6.0k		CONNECTED Amps: 25.0							