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## DEPARTMENT OF ENGINEERING & CAPITAL PROJECTS

### *DIRECTIVES AND PROCEDURES*

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SUBJECT: STREET LIGHT INSTALLATION GUIDELINES

NUMBER: 2021-01

DATE EFFECTIVE: MAY 4, 2021

SUPERSEDES: N/A

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#### **PURPOSE:**

Public street lighting is to provide for nighttime visibility and enhance traffic safety in the public right-of-way. In addition, street lighting may provide a sense of personal safety to pedestrians, bicyclists, and transit users as they travel along and across City roadways.

It is the intent of these guidelines to establish criteria under which the City will require the installation of public street lighting. These guidelines also establish and document physical and technical standards relating to the installation of public street lighting for private developer or City-funded projects.

#### **REFERENCES:**

Chapter 12.34 of the Municipal Code allows the City to require installation of certain public improvements, including street lighting, in conjunction with development or improvement of land. Since December 19, 1977, the City of Chula Vista has utilized an informal policy for the installation of street lights within the City limits.

City of Chula Vista, 2012 Subdivision Manual, Section 3-407.1 *Street Lights*.

State of California, Caltrans Traffic Manual, Chapter 9 – Traffic Signals and Lighting.

#### **PROCEDURES:**

1. The standards and guidance in this Directive replace Section 3-407.1 *Street Lights* in the City's Subdivision Manual in its entirety.
2. Unless a variance is granted by the City Engineer, such variance being considered on a case-by-case basis, street lighting shall be required in accordance with the standards set forth and contained in this policy for development or improvement of private property.
3. For locations where there are existing utility poles and street lighting is required, and there is no scheduled utility underground district established, the street lighting may be installed on a utility pole upon approval by the City Engineer or designee. The street light must comply with San Diego Gas & Electric (SDG&E) construction standards and permit requirements, but will become

- City-owned and maintained. Approval for using utility pole for street lighting purposes must also be granted by SDG&E or other appropriate utility pole owner.
4. As required by the City, the developer/applicant shall be responsible for the design and construction of these street lighting systems per this Directive. At the first improvement plan submittal stage, the developer/applicant is required to submit improvement plans showing street light locations and type. At the second submittal, the developer/applicant is required to submit the following: pull box location and type, conduit placement and wire size, service point location(s) and voltage drop calculations. Developer/applicant will be responsible for furnishing and installing the complete street lighting system including underground circuitry, standard(s), and luminaire(s). The number and location of street lights shall be subject to the approval of the City Engineer or designee.

### **STREET LIGHT LOCATIONS:**

Street lights should be provided at intersections, uncontrolled marked crosswalks, horizontal/vertical curves and knuckles, at end of cul-de-sacs that are longer than 120', midblock locations, and at other potential traffic safety locations as may be determined by the City Engineer or designee.

At signalized intersections, safety lights shall be provided as follows:

- Provide a minimum of 1.0 maintained foot-candles (mfc) and a maximum of 2.0 mfc in the center of the intersection. Typically, this is achieved by providing one luminaire at each corner of the intersection.
- Provide 1.2 mfc or brighter on intersections which include collector streets.
- Provide 1.4 mfc or brighter on intersections where at least one of the streets is a four-lane street.
- Provide a minimum of 0.15 mfc in the crosswalks. Generally, a safety light will extend over a portion of each marked crosswalk.
- Use CCT 4000K safety lights.
- Safety light luminaires should be Type IV or Type III distribution.
- Provide photometric light study as required by City Engineer or designee.

At non-signalized intersections, safety lights should be provided per Table 1. Note that very large non-signalized intersections (i.e., 6+ lane street vs 6+ lane street) may use Type CV-4 safety lighting when required by the City Engineer or designee.

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**Table 1. Street Lighting at Non-Signalized Intersections**

<b>Street A @ Street B</b>	<b>B1</b> Residential streets up to 40' wide, industrial streets up to 40' wide, and collector or higher streets up to 40' wide (curb to curb)	<b>B2</b> Residential streets greater than 40' wide, industrial streets greater than 40' wide, collector or higher streets greater than 40' wide and up to 52' wide (curb to curb)	<b>B3</b> Collector or higher streets greater than 52' wide (curb to curb)
<b>A1</b> Residential streets up to 40' wide, industrial streets up to 40' wide, and collector or higher streets up to 40' wide (curb to curb)	<b>A1 to B1</b> Install one (1) pole with a Type CV-2 luminaire on the far right corner of the wider street or street with the higher traffic volume	<b>A1 to B2</b> Same as A2 to B1	<b>A1 to B3</b> Same as A3 to B1
<b>A2</b> Residential streets greater than 40' wide, industrial streets greater than 40' wide, collector or higher streets greater than 40' wide and up to 52' wide (curb to curb)	<b>A2 to B1</b> Install one (1) pole with a Type CV-3 luminaire on each of the far right corners of the wider street or street with the higher traffic volume	<b>A2 to B2</b> Same as A2 to B1	<b>A2 to B3</b> Same as A3 to B2
<b>A3</b> Collector or higher streets greater than 52' wide (curb to curb)	<b>A3 to B1</b> Install one (1) pole with a Type CV-3 luminaire on each of the far right corners of the wider street and one (1) pole with a Type CV-2 on each of the far right corners of the narrower street	<b>A3 to B2</b> Install one (1) pole with a Type CV-3 luminaire on each of the far right corners	<b>A3 to B3</b> Same as A3 to B2

Reference:

<b>Luminaire</b>	<b>Min. Required Lumens</b>	<b>Street Distribution</b>	<b>Light</b>	<b>Lighting Color Temperature</b>
Type CV-1	4,900	Type II		3000K
Type CV-2	8,000	Type III		4000K
Type CV-3	15,000	Type IV		4000K
Type CV-4	21,000	Type IV		4000K

Midblock street lighting should be provided as follows:

- RESIDENTIAL STREETS (up to 40' wide): LED, Minimum 4,900 lumens, Type II, CCT 3000K, 350' to 450' staggered spacing (alternating sides of the street).

- RESIDENTIAL STREETS (greater than 40' wide), INDUSTRIAL STREETS (any width), and COLLECTOR STREETS (up to 52' wide): LED, Minimum 8,000 lumens, Type III, CCT 4000K, 300' to 400' staggered spacing.
- COLLECTOR STREETS (greater than 52' wide), MAJOR STREETS, ARTERIAL STREETS, and EXPRESSWAYS: LED, Minimum 15,000 lumens, Type IV, CCT 4000K, 175' to 250' staggered spacing.
  - Street light spacing should be 350' to 500' if street lights are on the same side of the street.
  - Twin luminaire street lights in raised medians are not preferred. However, if twin luminaires are approved by City Engineer or designee, then they should be spaced 150' to 250' in the median.

**STREET LIGHT STANDARDS:**

The following standards apply to new, relocated, and/or upgraded street lights within the City right-of-way:

- 1) Street lighting standards, foundation and details per TRF-08A, TRF-08B, and TRF-08C.
- 2) Sufficient lighting should be provided at the following:
  - a) Signalized intersections
  - b) Non-signalized intersections (including roundabouts and traffic circles) per Table 1
  - c) Uncontrolled marked crosswalks
  - d) Horizontal and vertical curves and knuckles
  - e) At end of cul-de-sac that are longer than 120'
  - f) Midblock locations
  - g) Other potential traffic safety locations as may be determined by the City Engineer or designee
- 3) Street light construction summary:
  - a) Poles shall be installed plumb and 6.75' from center of pole to the face of curb. In all cases, poles shall be installed a minimum of 36" from the face of curb to center of pole. Large trees should not be placed within 25' of a street light (measured from the tree trunk to the center of the pole).
  - b) Base Depth, Anchor Bolts, Grounding (TRF-08B and TRF-08C) Coil 15'- #6 Bare copper ground wire to be installed 3" below the foundation and extended through the foundation to the system neutral.
  - c) Each pole shall have a fuse and fuse holder per TRF-08C.

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- d) Trench depth shall be 18" minimum in the parkway and 30" minimum in the street areas. Backfill shall be compacted to 95%.
- e) A pull box shall be installed within five (5) feet of each street light unless the street light is within 10' of SDG&E service point.
- f) Pull Boxes shall be installed on both sides of the street crossing, within 10' of SDG&E service point(s), and every 190 feet.
- g) Conduit shall be installed at a minimum of 30" below final grade in street and a minimum of 18" below final grade when behind curb. (See TRF-09B for Conduit and Trench).
- h) Conduit shall be min. 2", Schedule 80 PVC. No ABS or Rigid Galvanized Steel.
- i) Luminaires shall be level.
- j) Wires to be THW #8, #6, #4, or #2 with #6 or #8 insulated copper ground. Use #8 ground for #8 and #6 circuit wires and #6 ground for #4 and #2 circuit wires. Types THHN, THWN not acceptable. The entire circuit run shall use the same size wire. No cascading of wire sizes allowed.
- k) Voltage-Drop to be less than 3% (3.6 volts for 120V circuits and 7.2 volts for 240V circuits). Add 5 extra lineal feet of wire in your calculations at each pull box and 40' for each luminaire. Voltage Drop Calc required for each circuit having two or more lights or where the service is over 500' away.
- l) Construction "As-Built" drawings shall be submitted prior to final inspection (see "Requirements").
- m) When laying conduits across a street, they shall be at right angles to the curb line. Conduits shall not cross the street within an intersection or the cul-de-sac turnaround area.
- n) Construction plans shall reference:
  - i) Street light stationing.
  - ii) Street light size (watts).
  - iii) Street light installation detail (Refer to TRF-08A, TRF-08B, TRF-08C, TRF-09A and TRF-09B).
  - iv) SDG&E service point and stationing. Indicate serving voltage (120v or 240v).
  - v) Service pull box and installation detail.
  - vi) Size of conduit (2" minimum), Schedule 80 PVC.
  - vii) Indicate trench depth.
  - viii) Size and number of wires.
  - ix) Street Light Note:

*The service point(s) shown hereon are approximate only. Service point(s) are subject to revision by final SDG&E plans. It shall be the developer/applicant's responsibility to provide the proper services to the street lights shown on this plan according to the applicable City of Chula Vista plans and specifications. The developer/applicant shall be responsible for providing conduit and conductors from street lights to approved service point(s) furnished by SDG&E. Conduit runs and*

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*conductor size from street lights to service points shall be shown on these plans and shall be approved by the City Engineer prior to construction.*

- o) The Engineer of Record shall be responsible for providing final “As-Built” drawings once the street lighting system is installed and approved by the City’s Inspector. The construction “As-Built” drawings will be the basis for providing the final drawings. The final drawings are to be CAD drafted and shall be signed off by the Engineer of record.
- p) All non-standard City street lights, including pedestrian lighting, shall be approved by the City Engineer or designee.
- q) Structural pole base calculations are required to be submitted as a supporting document when non-standard street lights are to be reviewed by the City and considered for installation. Calculations shall be wet-stamped, signed, and prepared by a licensed engineer in the State of California with experience in street light pole structural analysis (i.e., Structural Engineer, qualified Civil Engineer).
- r) Fuses:
  - i) Fuses shall be slow blow 10A, 13/32” x 1 ½” In-line type fuse. The fuse shall be installed in the hot leg of the lighting conductor of each luminaire. When twin luminaires are installed in a median, each luminaire shall be fused. The luminaire shall be fused in the base of the pole (not in the adjacent pull box).
  - ii) A 20A In-line fuse shall be installed in the “Street Light Service” pull box adjacent to the SDG&E service point to protect the circuit.
  - iii) Fuse holders shall be completely waterproof and shall grip the fuse in load side section when it is opened. (Type HEB or HEX for 120 and 240 volt circuits).
- s) Luminaires:
  - i) Certified luminaire performance data shall be furnished with “Equipment List and Drawings” conforming to the Caltrans Standard Specifications. This data shall include complete photometric test data in the form of Isolux charts at a scale of (1” = 20’) for the luminaire and wattages indicated on the plans. Alternate data may be in the form of horizontal foot-candle values recorded on a (15’ x 15’) grid, extending one hundred-fifty feet (150’) longitudinally from the light source and fifteen feet (15’) behind and one hundred-twenty feet (120’) in front of the light source for the luminaire and wattage indicated on the plans. Failure to satisfactorily meet the referenced values in this Directive will be sufficient to reject a proposed design or product at the sole option of the City.
  - ii) The test shall be performed by an independent and recognized testing laboratory or by the manufacturer’s laboratory. When the tests are performed by the manufacturer’s laboratory, the test data shall be certified. Required: IES (LM79) Approved method for the electrical and photometric measurements of solid state lighting products and recommended: LM80, IES approved method for measuring lumen maintenance of LED lighting sources. Subsequent to contractor’s installation of any street light luminaires, field checks may be

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- performed at random by the City Engineer or his assigned representative. Failure to satisfactorily meet or exceed the referenced values during field check will be justification for replacement by the contractor at the sole option of the City.
- iii) Each luminaire shall consist of an assembly that utilizes light emitting diodes (LEDs) as the primary light source.
  - iv) The luminaire shall be a single self-contained device, not requiring on-site assembly for installation with an optical assembly that shall provide an IES Distribution Type IV, Type III, or Type II with cutoff optics.
  - v) IP (Ingress or Intrusion Protection) Rating: Optical assembly shall be IP-65 minimum. The power supply enclosure shall be IP-55 minimum.
  - vi) The luminaire housing shall be primarily constructed of metal. Finish shall be gray in color, powder coated and rust resistant.
  - vii) There shall be a multi-volt (120/240) power supply assembly mounted on the die-cast Powr/module door and easily removable and replaceable through the use of quick disconnect plugs.
  - viii) The one-piece pipe clamp (slip fitter) shall be capable of adapting to 1-1/4" to 2" pipe without rearrangement of clamp or bolts.
  - ix) There shall be a pre-wired tool-less adjustment photoelectric control receptacle.
- t) Wiring:
- i) Service runs to lights shall be THW stranded copper wire #8 minimum. Copper wire shall conform to the applicable portion of ASTM B3 and B8.
  - ii) Size of wire shall be determined by means of voltage drop calculations and shall also be indicated on the "As-Built" plans.
  - iii) Wire connectors shall be of type approved by the City's Inspector and bear the UL seal of approval. The installation procedure, including connector size and crimping tools shall conform to the manufacturer's recommendations. Aluminum conductors are not to be allowed. #10 wire shall be used from the base of the pole to the luminaire.
- u) Splices shall be permitted in pull boxes and lighting standard hand holes only. All splices in pull boxes shall be waterproof with epoxy capsulation (3M type) or heat-shrink tubing.
- v) Pull boxes:
- i) No. 3 1/2 Pull Box (15-3/8" x 10-1/8") or City-approved equivalent shall be per Caltrans Standard Specifications. Pull boxes shall be installed per TRF-09 and use a non-concrete/composite lid. A pull box shall be installed within five (5) feet of each street light standard unless within 10' of SDG&E service point.
  - ii) Pull boxes shall not be spaced more than 190 feet apart.
  - iii) The bottom of the pull box shall rest firmly on a six (6) inch-thick bed of one-inch crushed rock extending six (6) inches beyond the outside edges of the pull box. Pull boxes shown in the vicinity of curbs shall be placed adjacent to the

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- back of the curb, and where practical, shall be installed with the short side parallel to the curb.
- iv) Pull boxes shall not be installed in any part of a driveway or other traveled way unless approved by the City’s Inspector. A steel “traffic-rated” cover shall be provided on any pull box installed in a travel way or driveway. Pull box covers shall be inscribed “Street Lighting.”
  - v) Pull boxes shall be installed on both sides of a street crossing and within 10’ of SDG&E service points. If a street light is within 10’ of an SDG&E service point, no additional pull box shall be required.
  - w) Street light poles and mast arms:
    - i) Street light poles shall be octagonal pre-stressed concrete, shall be gray in color and have an anti-graffiti coating, and shall have a two-inch aluminum or steel pole top mast arm (MAS), all as manufactured by AMERON (or City-approved equivalent).
    - ii) Maximum distance behind curb face shall be 6.75’ to center of pole (or 1.25’ behind 5’ wide contiguous sidewalk). The standard MAS length shall be 8’. If due to conflict, the street light pole must be installed behind the curb face, then the minimum distance is to be 36” to center of pole (in this case, a 6’ mast arm may be used). See TRF-03 and TRF-08B for additional details.
    - iii) Pole shape and color shall be uniform for any one project and replacement poles shall match existing ones.

Roadway Classification	Pole Height	MAS Length	Pole Designation	Anchor Bolt	Bolt Circle
Residential	23'-3"	8'	1C1-23	1" x 36" x 4"	12-1/2"
Collector	28'-3"	8'	1C1-28	1" x 36" x 4"	12-1/2"
Arterial	28'-3"	8'	1C1-28	1" x 36" x 4"	12-1/2"

- x) Anchor bolts and foundations:
  - i) Anchor bolts shall be of the type and size as shown on Chula Vista Standard Drawing, TRF-08B.
  - ii) Anchor bolts shall conform to the specifications of ASTM A 307, and shall be provided with two nuts and two washers each. Bolts, nuts and washers shall be galvanized by the hot-dip process conforming to ASTM A 153, or cadmium plated with Type NS coating conforming to ASTM A 165.
  - iii) Plumbing of the standard shall be accomplished by adjusting the nuts on the anchor bolts before the foundation cap is poured. Shims or other similar devices for plumbing or raking will not be permitted. After plumbing the standard, anchor bolts shall have ends cut and ground down to maximum exposed length of ¼ inch above the nuts.



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- iv) Pole base foundations for all standard street lights shall be installed per TRF-08B. All non-standard decorative style streetlights shall be submitted for approval by City Engineer or designee as noted in this Directive.
  - v) The non-standard street light installation detail shall show anchor bolt size and quantity, foundation diameter and depth, type and strength of concrete, size and quantity of steel (horizontal and vertical), anchor bolt setting guide (bolt circle, depth of embedment of base and leveling nuts), grounding method, dimension from curb and sidewalk and must match the structural calculation details.
  - y) Hook-up to SDG&E service point:
    - i) Contact SDG&E for service point(s). SDG&E will identify what service is available and where it is located. In rare cases, a new street light can be connected to an existing street light circuit, but not without permission from the City Engineer or designee. New voltage drop calculations shall be required to verify that existing circuit can handle additional load.
    - ii) The service point should be in the City's right-of-way; otherwise, the city will require an easement to the service point. Easements are expensive and time-consuming to the developer/applicant. Avoid service runs across private property.
  - z) Construction As-built drawing requirements:
    - i) Two (2) sets of "As-Built" drawings must be given to the City's Inspector before SDG&E will energize a light. Showing a North arrow, streets referenced to the nearest cross street, pole locations, pull box locations, conduit runs, service point locations, wattage/lamp at each pole
    - ii) As-Built drawings shall be per City standards.
    - iii) Provide the following information in addition to the "As-built" drawing:
      - (1) POLE:
        - (a) Manufacturer's name
        - (b) Supplier's name and contact information
        - (c) Material
        - (d) Height
        - (e) Mast arm length
        - (f) Footing type (AB)
      - (2) FIXTURE:
        - (a) Manufacturer's name
        - (b) Supplier's name and contact information
        - (c) Wattage and voltage
        - (d) Fuse size and type
        - (e) Smart node or photocell manufacturer model number
      - (3) DISTRIBUTION:
        - (a) Conduit type and size
        - (b) Wire type and gauge

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- (c) Pull box manufacturer and size
- (d) Service point ID number

In addition to developer/applicant-funded street lights in new communities or redeveloped areas, upon request of citizens or citizen groups, the City shall consider providing street lighting in cases where the proposed street lighting location would meet the conditions contained within this policy. Installation of street lighting under this circumstance is subject to available funding.

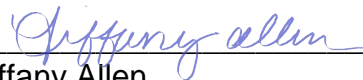


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William S. Valle  
Director of Engineering & Capital Projects/City Engineer

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May 9,2021

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Date



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Tiffany Allen  
Director of Development Services

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Date