

DESIGN STANDARDS
SECTION DS 7
STREET LIGHTING

DS 7-01 GENERAL:

- A. INTENT:** The intent of these Design Standards is to provide minimum standards for the design of street lighting to serve the ultimate level of development as defined on the City General Plan. These Design Standards describe typical practices for new or modified street lighting systems. The Street lighting system shall be owned and maintained by the City of Vacaville unless otherwise specified by these City Standard Specifications or determined by the Director of Public Works.
- B. GOVERNING CRITERIA:** These Design Standards, in conjunction with the most current requirements of National Electric Code (NEC) and Pacific Gas and Electric (PG&E) company shall govern the design of all street lighting within the City of Vacaville. In the event that there is a conflict between these requirements or with other “Current Standards” so defined hereafter, the Director of Public Works shall determine which document governs. Additionally, if there are criteria or issues not addressed in these documents, the Director of Public Works will determine the criteria to be used in the design. All street lighting improvements shall be designed in accordance with current accepted engineering practices. These Design Standards are minimum standards and are intended to assist the Design Engineer, but not substitute for competent work. The City Engineer/Director of Public Works at their sole discretion may require more stringent requirements for unusual circumstances, special conditions, and/or environmental constraints.
- C. CURRENT STANDARDS:** Street Light design shall be completed in accordance with all current applicable laws, standards, and regulations, including but not limited to the National Electric Code, California Electric Code, CALTRANS Standard Specifications, and the City of Vacaville Municipal Code, Storm Water Management Plan, Standard Drawings, and City Standard Specifications which include the Construction Standards, and the Design Standards.

DS 7-02 APPROVED STREET LIGHT LUMINAIRES AND MOUNTINGS:

- A.** The approved type of street light luminaires and mountings for use in the public right-of-way or that which is to be maintained by the City of Vacaville shall conform to the criteria shown in **Table DS 7-1**, paragraph B below and all other criteria included in Section CS 15, “Street Lighting,” of the Construction Standards.

**TABLE DS 7-1
APPROVED STREET LIGHT DESIGN TYPES³**

Luminaire and Mounting Type	Where allowed by street classification²	Locations¹ and Nominal Spacing
Cobra Head on single mast arm	Cul-de-Sac, Residential, and Collector	250 feet staggered
Cobra Head on single mast arm	Arterial	125 feet staggered
Cobra Head on dual mast arm	Arterial within the median	See footnote ³
Decorative Post Top Type Mount	Cul-de-Sac and Residential	170 feet staggered
Decorative Post Top Type Mount	Collector	190 feet staggered
Decorative Tear Drop Mount on single mast arm	Arterial (64 foot wide)	150 feet staggered
Decorative Tear Drop Mount on single mast arm	Arterial (80 foot wide)	125 feet staggered

¹ See Standard Drawing 7-01A & B for additional requirements for the placement of street lights at intersections, expanded corners and cul-de-sacs.

² Industrial Streets shall use Cobra Head lighting with spacing based upon the street width which matches either a collector or arterial street classification shown in Table DS 7-1 and the lighting intensity shown on Table DS 7-2 unless otherwise approved by the City Engineer/Director of Public Works.

³ The design of street lighting systems using dual mast arms will be considered on a case by case basis and shall be subject to the approval of the City Engineer/Director of Public Works. See Construction Standards Section CS 15, "Street Lighting," for details of approved luminaire fixtures, electrolier standards and arms, and other related equipment.

B. ALLOWABLE USE OF DECORATIVE LIGHTING: Private development use of the Decorative lighting included in **Table DS 7-1** is only allowed when a Lighting Assessment District is proposed or already established to maintain the lighting. The Lighting Assessment District shall be developed by the City Engineer and is subject to the Approval of the City Council. The selection of the type of Decorative Light shown in **Table DS 7-1** proposed for use in the design shall be subject to the approval of the Director of Public Works. Only the approved Street Light luminaires, poles, and other related equipment included in Section CS 15,

“Street Lighting,” of the Construction Standards are allowed for use in the design.

DS 7-03 LIGHTING FIXTURE INTENSITY:

- A. The street light design shall include high pressure sodium luminaires conforming to the criteria for lighting intensity shown in **Table DS 7-2**:

**TABLE DS 7-2
LIGHTING INTENSITY**

Street Classification	Lighting Intensity (Luminaire Wattage)
Cul-de-Sac and Residential	70
Collector and Industrial	100
Arterial	200

DS 7-04 STREET LIGHTING LAYOUT

A. GENERAL:

1. Street light layout shall be in accordance with the spacing and layout requirements shown in **Table DS 7-1** and the Standard Drawings.
2. Street lights shall be normally located on property lines and whenever possible, at least five (5) feet from driveways or any above ground facility, and at such locations to maximize their separation from trees. The Design Engineer shall review the utility joint trench plan and coordinate the location of street lighting to ensure conformance to these requirements.
3. Street lights should be located on the outside edge of the curve for horizontal curvilinear street alignment.

B. STREET INTERSECTION, EXPANDED CORNER, AND CUL-DE-SAC LOCATIONS:

Street lighting for intersections, Expanded Corners and Cul-de-Sacs shall be located at the locations shown on Standard Drawing 7-01A and 7-01B and the lighting within the limits of the street shall also conform to the spacing requirements shown in **Table DS 7-1**.

C. LOCATION RELATIVE TO SIDEWALK, CURB AND GUTTER

The electrolier location shall conform to the following:

1. Where the sidewalk is contiguous to the curb and the sidewalk width is seven (7) feet or less, the street light pole shall be centered two (2) feet behind the back of the sidewalk.
2. Where the sidewalk is contiguous to the curb and the sidewalk width is more than seven (7) feet, or when the sidewalk is separated from the curb, the street light pole shall be centered two (2) feet from the gutter flow line.

DS 7-05 DESIGN COORDINATION:

- A. For all projects which will include the construction of street lights, the developer should contact PG&E early in the design process regarding providing service to the expanded street light system. The developer/ Design Engineer shall be responsible for processing the PG&E application for electrical service for the proposed lighting system.
- B. It shall be the Developer's responsibility to install all new PG&E facilities to provide service to the development site.
- C. Existing street lights which must be relocated or repositioned as a result of the developer's construction shall be the responsibility of the developer.
- D. Once the street light locations have been established and approved by the City Engineer/Director of Public Works, copies of the Street Lighting Project Plans shall be sent to PG&E by the Design Engineer.

The following data should be requested:

1. Service Point Location
2. Street Light Numbers

DS 7-06 CONDUIT: The conduit design shall conform to the following criteria:

- A. Conduits shall be sized in accordance with the National Electrical Code but shall not be less than 1½ inches in diameter.
- B. The street light conduit shall be installed at least 24" from the "joint" trench location and within the public right-of-way.
- C. The minimum depth of the conduit shall conform to the following criteria in addition to the requirements of Section CS 15, "Street Lighting," of the Construction Standards:
 1. **Outside the street pavement:** Conduit installed outside of street pavement shall be placed not less than twenty four (24) inches below the surface of the ground or sidewalk.
 2. **Within the existing street pavement:** Conduit installed within existing street pavement (asphalt concrete paved) areas shall be placed not less than twenty-four (24) inches when the trench is not excavated

and backfilled in accordance with the City's Standard for Rockwheel Trench. However, the conduit may be installed with 18 inches of cover provided that the trench is excavated and backfilled in accordance with Section CS 3-07, "Rockwheel Trench," of these City Standard Specifications.

3. **Within the proposed street pavement:** Conduit installed within areas of proposed street pavement shall be installed at a depth not less than the subgrade elevation or twenty-four (24) inches, whichever is greater.

DS 7-07 CONDUCTORS: The conductors shall conform to the following criteria:

- A. The conductors shall be stranded copper wire conforming to the requirements included in Section CS 15, "Street Lighting," of the Construction Standards.
- B. The size of the conductors shall be determined by voltage drop calculations prepared in accordance with the National Electric Code except as amended by this Section DS 7, "Street Lighting," of the Design Standards. The conductor shall be sized such that the voltage drop in the circuit from the service point to the last Street Light on the circuit will not exceed 5% of the nominal voltage which is normally 120 volts. However, in any case, the minimum size of the conductors shall conform to the following:
 1. The minimum size of any conductor within the conduit from the pull box adjacent to the electrolier to within the electrolier shall be #10.
 2. The minimum size of conductor within all other conduit runs is #8.

DS 7-08 PULL BOXES: Pull boxes shall be located at the base of all lights, where two or more conduits intersect, at angle points, street crossings, and 90 degree bends. Pull boxes shall also be located where conduit runs are more than 150 feet in length from the service point to the first street light location.

DS 7-09 CIRCUIT: The circuit shall be designed for 120 volts with a connection to an underground 120 volt service point connection unless otherwise approved by the Director of Public Works. No more than six street lights shall be included on a circuit without designing a multiple circuit. The multiple circuits for staggered lighting layout shall include a separate hot leg for each side of the street from the branch in the circuit to the service point. The neutral conductor may be shared between the two sides of the street from the branch of the circuit to the service point.

DS 7-10 PROJECT PLAN REQUIREMENTS:

- A. The Design Engineer shall include full details of the proposed street lighting system design on the Project Plans which conforms to the City of Vacaville Standard Specifications.
- B. A Street Lighting Plan shall be shown on a separate plan sheet of the Project Plans unless an exception is granted by the City Engineer/Director of Public Works.
- C. The Design Engineer shall prepare and submit voltage drop calculations in accordance with Section DS 7-07, "Conductors," of these Design Standards to the City Engineer/Director of Public Works for review.
- D. The Project Plans shall show the following information:
 - 1. The street light and associated conduit shall be shown in plan view and in the typical section for the street.
 - 2. The size and quantity of all conduits and conductors shall be identified in tabular form or be noted next to each conduit run.
 - 3. Luminaire and Mounting type (see **Table DS 7-1**).
 - 4. Wattages of the luminaires and Lighting Distribution Pattern (Type) if different from Type III.
 - 5. Location and size of all pull boxes.
 - 6. The location of the PG&E service point and notes specifying the requirements for making the connection from the service point to the proposed Street Lighting system.
 - 7. Street Light Numbers as assigned by PG&E.
 - 8. Location of existing street lighting including size and depth of conduit and size and quantity of conductor and pull boxes that are impacted by the proposed project construction.
 - 9. Any other pertinent information required for construction.
- E. On Private Development projects, if the Design Engineer has not been able to obtain the PG&E service point and City Street Light numbers in a timely manner from PG&E, the City Engineer may at its discretion approve the subdivision or other development Project Plans designating the Street Lighting Plans as "Incomplete". The following note will then be added to the plans: **"The Street Lighting Plan included herein is not approved with these plans. Approval of this plan will only occur after the service points and City Street Light numbers have been established by PG&E and are reflected as a revision to these plans. Street subgrade shall not be approved for paving until the Street Lighting Plan has been revised and approved by the City Engineer and all conduit street crossings are installed."** The Sheet Index included on the Title Sheet for the Project Plans shall also designatethe Street Lighting Plan as "Incomplete".