

UNIFORM DESIGN CRITERIA

A. STREETS

Geometrics:

The design of a subdivision street system should result from an evaluation of topographical conditions, the traffic likely to be generated by the types and numbers of planned uses, and the purpose of each street. The street system must allow an acceptable pattern of lots (see Sections 17.36.150 through 17.36.230 of the City's Municipal Code).

All streets shall intersect other streets at right angles, and shall have at least 50 feet of centerline tangent, as measured from the prolongation of the cross-street property line to the angle point or beginning of curve.

For cul-de-sacs and residential minors, "T" or three-way intersections are preferable to four-way intersections. On these streets, intersections should be spaced at least one hundred fifty feet apart, measured from centerline to centerline.

For collector and arterial streets, four-way intersections are preferable. On these streets, intersections should be spaced at least six hundred feet apart.

Blocks on minor and collector streets should not be longer than one thousand two hundred feet, unless topography and lower density of development make longer blocks desirable.

Collector, arterial and thoroughfare streets shall intersect at right angles and shall be straight at least fifty feet from the intersection, measured from the cross-street property line, unless the City Engineer approves an alternate design.

Streets with a regular cross section and no special provision for turn around shall be provided at the edges of a subdivision when the City determines they may be extended in the future.

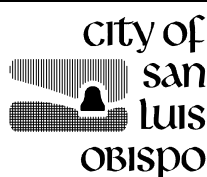
Space for turning vehicles shall be provided at the ends of access courts (cul-de-sac). If the court serves seven or more dwellings, a turning circle shall be provided with dimension equal to or greater than those in the Engineering Standard 7020.

The turning circle may include landscaping or parking within a central island so long as space for turning and backing from driveways is provided to the satisfaction of the City Engineer.

If the court serves six or fewer dwellings, a hammerhead or other arrangement may be approved by the City Engineer and Fire Marshal.

Alleys may be required in industrial, commercial and multifamily residential subdivisions where necessary to provide alternative, controlled access to arterial and thoroughfare streets. Alley right-of-way and pavement width shall be a minimum of twenty feet. Where two alleys intersect, a paved area free of obstructions shall be provided for safe visibility and turning.

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Street types and requirements. The following is a chart of street types and the requirements for each type of street.

Notes

- (A) Right-of-way shall extend 2' beyond edge of roadway, back of curb, or back of sidewalk, as the case may be.
- (B) Additional right-of-way may be required for noise-attenuation features.
- (C) In determining function, maximum development allowed by zoning will be used.
- (D) See Alternate Parking Section
- (E) See Alternate Sidewalk and Bike lane Section
- (F) See Bicycle Transportation Plan for details

STREET REQUIREMENTS

Street Type	Function (c)	Total R/W Width	
Cul-De-Sac (access court)	Low Speed Access to 8 or Fewer Dwellings	26' to 42' (A)	Min. centerline curve radius 75'; maximum length 300'; those serving 4 or fewer dwellings may exceed 300' but not 600'; must have turning space as provided in item Engineering Standard 7020 for cul-de-sac design.
Hillside Cul-de-Sac	Low-speed access to 10 or fewer dwellings where the prevailing land slope is more than 15%	26' to 34' (A)	Min. centerline curve radius 75'; maximum length 300'; those serving 6 or fewer dwellings may exceed 300' but not 600'; must have turning space as provided in item 7 below.
Residential Minor	Low-speed access to about 50 dwellings	40' to 56' (A)	Min. centerline curve radius 150'; roadway shall be designed for a safe stopping speed of 25 mph.
Hillside Residential Minor	Low-speed access to about 50 dwellings where the prevailing land slope exceeds 15%	36' to 52' (A)	Min. centerline curve radius 100'; roadway shall be designed for a safe stopping speed of 25 mph.
Residential Collector	Moderate-speed circulation within a neighborhood of 300 to 500 dwellings	44' to 60' (A)	Min. centerline curve radius 250'; roadway shall be designed for a safe stopping speed of 35 mph. On streets designated for bike lanes, 4' to 8' bike lanes on each side of street (F).
Commercial/Industrial Collector	Access and circulation within commercial and industrial areas	44' to 68' (A)	Loop streets rather than cul-de-sacs are encouraged within subdivisions; cul-de-sacs shall provide 40' radius. On streets designated for bike lanes, 4' to 8' bike lanes on each side of street (F).
Arterial	Convenient, moderate-speed circulation between neighborhoods and between different land use areas	86' to 94' (A) (B)	Left-turn lane, 12' wide; 5' bicycle lane each side; driveway access may be limited, min. centerline curve radius 500'; shall be designed for safe stopping speed of 50 mph. Bike lanes shall be 6.5' to 8.0' in width on each side of street (F).
Thoroughfare (Highway)	Unencumbered, moderate to high-speed travel between communities	84' to 104' (See note A) (See note B)	Median/left-turn lane 14' wide; 6.5' to 8.0' bicycle lane each side (F); no driveway access; access from streets, particularly minors and collectors, may be limited; min. centerline curve radius 500'; shall be designed for safe stopping speed of 65 mph.

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Street Type	Travel Lane Width	Parking Lane Width	Sidewalk Width
Cul-De-Sac (access court)	Minimum Roadway width of 16-ft. Fire Department May Require 20' of unobstructed Access	One 8-ft lane on each side	6-ft Sidewalk on at least one side
Hillside Cul-de-Sac	Minimum roadway of 16', Fire Dept. may require 20' wide unobstructed access	One 8' lane on one side (D)	6' sidewalk on at least one side (E)
Residential Minor	One 12' travel lane Each way	One 8' lane on each side, see item 1 below	6' sidewalk on each side (E)
Hillside Residential Minor	One 10' travel lane Each way	One 8' lane on each side (D)	6' sidewalk on each side (E)
Residential Collector	One 14' travel lane Each way	One 8' lane on each side (D)	6' sidewalk on each side (E)
Commercial/Industrial Collector	One 14' travel lane Each way	One 8' lane on each side (D)	6' sidewalk along frontages zoned C-S or M; all other zones, 10' sidewalk (E)
Arterial	Two 12' travel lanes each way	No curbside parking	10' sidewalk along frontage zoned O, C-R, or C-C; 6' elsewhere (E)
Thoroughfare (Highway)	Two 14' travel lanes each way	No curbside parking	Sidewalks adjacent to roadway are discouraged (E), where provided, widths shall be as for arterials

Grades and Cross Slope:

Street grades on other than arterials and thoroughfares, shall not exceed fifteen percent. Grades on arterial streets and thoroughfares shall not exceed ten percent, unless the City Engineer approves a steeper grade, which shall not exceed fifteen percent. The grade on switchbacks or curbs of less than fifty-feet centerline radius shall not exceed five percent.

The minimum street grade shall be one percent, except that where topographical conditions do not allow any feasible alternative, and with the approval of the City Engineer, grades not less than 0.3 percent may be allowed.

Design of street grades at intersections shall follow the principles indicated in the most current edition of AASHTO manual "A Policy on Geometric Design of Highways and Streets."

In sloping terrain, separate one-way travel lanes may be used in order to reduce cut and fill. Such one-way lanes shall have a minimum unobstructed width of twenty feet, a minimum paved width of fourteen feet, and a maximum length of five hundred feet.

Where excavation or fill slopes extend beyond the street right-of-way, easements for the slopes may be required by the City.

Cross slope shall be considered during street construction and rehabilitation design. Cross slope is typically 2 percent but may range from 1.5 percent to 3 percent to accommodate terrain.

For streets where curbs are at different heights, a quarter crown point is typical with the crown no more than 10 feet from the high side curb face.

The grade break at the gutter should not exceed 20 percent at a driveway to prevent vehicles from dragging on the ground or sidewalk.

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Streets designed with super elevation shall be designed in accordance with current California Department of Transportation Highway Design Manual guidelines.

Slopes for crossings and access points shall meet accessibility requirements.

Pavement:

Pavement design shall follow the California Department of Transportation Highway Design Manual, be based on a 20-year design life and the "R-value" of the subgrade material. New local streets shall be designed for a 50-year life.

Pavement thickness shall be based on Traffic Indices shown in City Engineering Standard #7110.

Variations of the design standards may be approved by the City Engineer to meet individual circumstances.

See also Section B and Engineering Standard #7110 for other requirements affecting street design.

Sidewalks and Bicycle Lanes:

Curb returns shall be designed to minimize overly steep grades of curbs through the returns, to the satisfaction of the City Engineer. Generally, the grades of curb returns should not exceed the grades of the adjacent streets and should accommodate state standards for accessible curb ramps.

Sidewalk shall be designed and constructed per Engineering Standards.

Standard sidewalk width is 6 feet. Commercial sidewalk widths are 8, 10 and 12 feet, depending on the location of the commercial development. In areas where these widths cannot be maintained, sidewalk shall have a minimum of 5 feet clear width, including the curb top.

All sidewalks shall have a minimum thickness of 4 inches, and driveways shall have a minimum thickness of 6 inches.

Integral curb, gutter and sidewalk shall be constructed without a cold joint between the curb and the sidewalk.

The City may approve alternatives to sidewalks or bicycle lanes immediately adjacent to the roadway. Such alternate routes shall be within a public right-of-way and shall provide a level of access and pedestrian/cyclist safety equivalent to or better than provided by conventional locations. Where alternative pedestrian paths or bicycle paths are provided to the satisfaction of the City, the conventional sidewalks or bicycle lanes may be eliminated. Where curbside parking is provided, there must be safe pedestrian access to it.

The alternative pedestrian path or bicycle paths shall be logically related to conventional sidewalks or bike lanes in order to safely divert pedestrian/bicycle travel from roadway sections lacking roadside walks or bike lanes.

The City may require improved walkways, in addition to sidewalks, through blocks more than nine hundred feet long to provide access to parks or public facilities.

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Any existing feature in the sidewalk that is of a special, unique, unusual, or historic nature, as determined by the City, shall not be replaced, removed, or altered without specific approval of the City Engineer.

Curb Ramps:

Curb ramps shall be installed at all intersections where sidewalks exist or are to be built at some future date.

Curb ramps should be located in the most logical place to accommodate pedestrians crossing in the crosswalk.

Curb ramps shall comply with the provisions and standards required by the City, State, and Federal Government. Any deviation from standards requires a finding of unreasonable hardship by the City Engineer.

Mission Style Sidewalk District:

The following requirements apply to construction in the Mission Style Sidewalk District, which is defined in Resolution No. 9114 (2000 Series). See map in appendix.

- a. Mission Style Sidewalk, curb and gutter shall be constructed per City Engineering Standard #4220.
- b. All driveways, curb ramps, tree wells and catch basins shall conform to Mission Style Sidewalk requirements.
- c. All sign posts and parking meter posts shall be relocated behind the tile row and be installed per City Engineering Standards.
- d. All new utility vaults, water meter boxes, and sewer cleanouts shall be located behind the tile row or future tile row and shall conform to City Standards. Wells, boxes, lids and covers shall be stained or coated to match surrounding sidewalk. Stains and coatings shall be submitted to the City for approval prior to application. Lids and covers may be cast iron or dark galvanized slip-resistant diamond-plate. Lids and covers in traffic areas shall be traffic rated.
- e. City-approved flag sockets shall be installed, at locations determined by City Engineer.
- f. All new installations of Mission Style Sidewalk shall include Mission Style Curb and Gutter.
- g. Any existing feature in the sidewalk that is of a special, unique, unusual, or historic nature, as determined by the City, shall not be replaced, removed, or altered without specific approval of the City Engineer.

Street Parking:

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The City may approve alternatives to the provision of curbside parking along cul-de-sacs, residential minors, residential collectors and commercial/industrial minors. Alternate parking may be allowed for any subdivision where the City determines the resulting street design is adequate for the type and extent of planned uses. It is encouraged in hillside developments where the amount of grading may be reduced in comparison with conventional street sections.

If curbside parking is not provided, alternate parking equivalent to one space for each twenty-five feet of frontage shall be provided. Such alternate parking shall be provided within a public right-of-way, or on lots adjacent to the street, with convenient access to the street.

Access Restrictions:

Reserve strips of land to control access from adjoining property to public streets may be required by the City. Such reserve strips shall be at least one foot wide and shall be deeded in fee to the City. They shall be shown and clearly labeled on the final map. Access restrictions may also be incorporated by note on the map.

B. DRAINAGE AND EROSION CONTROL

General:

All new development or redevelopment shall comply with the criteria and standards set forth in the Waterways Management Plan – Drainage Design Manual.

Streets:

Cross gutters are only allowed at intersections. Cross gutters are not allowed to cross highway/regional routes, arterial streets or bus routes. Cross gutters will only be allowed to cross a collector street at intersections where the collector street traffic is required to stop or yield.

Water Quality:

Where a new development project results in the installation of 5,000 ft² or more of impervious drive surfaces or when a redevelopment project results in the addition of impervious drive surfaces resulting in 5,000 ft² or more of drive surfaces; all stormwater runoff from drive surfaces shall be treated in accordance with the Best Management Practices (BMP) published in the most current addition of the California Stormwater Quality Association’s Best Management Practice Handbook.

Drive surfaces is defined as the parking stalls, loading bays, trash areas and drive aisles.

For the purposes of water quality design, peak flow BMPs shall be designed to treat the runoff from 28 percent of the 2 year storm event and volumetric BMPs shall be design to treat the runoff from a 1 inch per 24-hour storm event.

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Subsurface Groundwater Drainage:

Underground dewatering improvements (such as a retaining wall subdrain or groundwater collection system) shall not deposit collected groundwater or spring water to the gutter or other surface drainage facility. Such systems shall be designed to retain the water on-site or deposit the collected water to an approved collection system.

C. WATERLINES

Main Size:

Minimum water main size shall be 8 inches except:

- a. A 6-inch main may be used in normal gridded street patterns where two 8-inch looped mains in adjacent streets are to be connected if the length is less than 350 feet and it will not have to support a fire hydrant.
- b. Dead-end mains require special approval of both Fire Dept. and Utilities Dept. For dead-end mains the minimum size shall be:
 - 4-inch main if less than 150 feet long and serving less than 10 dwelling units.
 - 6-inch main if over 150 feet but less than 350 feet long and serving less than 25 dwelling units.
 - 8-inch main if over 350 feet but less than 700 feet long and serving less than 50 R-1 dwelling units (with triple valve at intersection)
 - 10-inch main if over 700 feet but less than 1500 feet long and serving less than 75 R-1 dwelling units (with triple valve at intersection and 250-foot maximum fire hydrant spacing).
- c. Recycled water mains shall be sized in accordance with the Recycled Water Master Plan, or as determined by the Utilities Department.

Location:

Water mains shall be located per Engineering Standards #6010, #6110 and #6140.

Minimum clearance between mains and street surface shall be 3 feet.

Minimum clearance between recycled water mains and street surface shall be 5 feet.

Materials:

All water main pipe shall conform to AWWA standards, and all waterline construction shall meet State Health Department standards. Only ductile iron and PVC water main pipe will be acceptable. Unless there are special design considerations, PVC mains shall be pressure **Class 200**, and

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ductile iron mains shall be pressure **Class 150**. All recycled water mains shall be pressure **Class 350** ductile iron pipe.

Fittings:

Where water mains have adjacent fittings, the fittings shall be locked together with flanges.

Services:

Water service shall include all facilities necessary for the transmission of water from the nearest point of adequate supply to a meter vault at the front of each lot. For condominium projects, a separate meter vault shall be provided for each condominium unit at the street frontage or as approved by the City Engineer. Pumping and storage equipment to provide sufficient volume and duration of flow of water shall be provided. The design and location of the water system serving the proposed subdivision shall be provided to the satisfaction of the City Engineer and Utilities Director. Water lines need not be provided to lots which will be in perpetual open space and which will not require irrigation or fire suppression.

All new services shall be 1, 2 or 4 inches or larger. All new services greater than 2 inches shall have a bypass per Engineering Standard #6250.

Size of water services shall be based on UPC, and adequate for maximum density allowable on each specific lot. Meters shall not be larger than service line.

New water services shall be installed perpendicular to water main.

Fire Protection:

Fire hydrants shall be installed according to the City Fire Code and to the satisfaction of the Fire Marshal and City Engineer. Fire hydrant location and service sizing shall meet the requirements of the Fire Department Developer's Guide.

On mains of 12 inches and larger, fire hydrant location and spacing shall allow, whenever possible, for the placement of a fire hydrant instead of a blowoff assembly at low points and at the ends of water mains, as appropriate.

Hydrant reflectors shall be installed for each hydrant in accordance with Engineering Standard #7920.

D. SEWER

Design:

Sewer main size shall be determined by designing for flowing half-full, considering the flow generated by the development, the ultimate upstream development, and infiltration.

Minimum sewer main size shall be 8 inches; except a 6 inch minimum size main may be allowed for the last run which ends in a manhole and cannot be later extended to serve other properties.

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Laterals shall be sized to be adequate (4 inch minimum) for maximum allowable density on each specific lot.

Sewer main slope shall be sufficient to provide 3 feet per second minimum velocity flowing half-full. Grades shall be designed from manhole outlets to inlets.

Sewer main depth shall accommodate all lateral connections and allow a 12 inch minimum vertical clearance between laterals and other utility conduits.

Design flow criteria are summarized as follows (for newly constructed mains only -- City Engineer will provide data for older mains):

DOMESTIC SEWAGE (GALLONS /PERSON /DAY)	
Average dry-weather flow (ADWF)	84
Peak dry-weather flow (PDWF)	210 x peak reduction factor

STORM WATER INFILTRATION INFLOW (GALLONS /FEET ² /DAY)		
Not more than 1 dwelling/17,000 ft ² (or equivalent)	well drained area	0.005
	lowland	0.007
More than 1 dwelling/17,000 ft ² (or equivalent)	well drained area	0.012
	lowland	0.017

Reductions in peak flows occur because of storage in the system and diversification of development. The estimated factors which should be applied to obtain peak dry-weather flows are summarized as follows:

<u>Population Range</u>	<u>Peak Reduction Factor</u>
0 - 1,800	1.00
1,800 - 2,600	0.96
2,600 - 3,500	0.92
3,500 - 5,000	0.88
5,000 - 7,000	0.84
7,000 - 9,800	0.80
9,800 - 15,000	0.76
15,000 - 35,000	0.72
35,000 - 50,000	0.68

Where two or more lines enter a manhole, sufficient elevation difference shall be provided in the trough elevations, whenever possible, to prevent the smaller of the lines from being surcharged by the larger line(s) under normal operating conditions. Top of smaller pipe shall be no lower than top of larger pipe(s).

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Sewer mains and laterals shall be designed so as to be usable by each lot without the need for an ejector pump. Exceptions may be granted on a case-by-case basis by the City Engineer.

Curves may be permitted provided that pipe deflection is limited to manufacturer's recommendations, with a minimum radius of 100 feet, and the curves are only in one plane (either horizontal or vertical) between adjacent manholes. Sewer mains and laterals shall be located as shown in Engineering Standards #6010, 6110, 6140 and 6810.

All sewer mains shall be located within a dedicated city street or alley or within a recorded easement. (The City may make available its powers of condemnation, if needed, to acquire a sewer easement for development of a subdivision. All costs shall be borne by the subdivider.)

Manholes:

Manholes shall be spaced no further than 400 feet apart. Upstream ends of sewer mains shall terminate at manholes.

All manholes not within a street or paved drive shall be within an easement to the City and accessible by an all-weather dust free road.

All inlets shall be designed and installed such that the top of pipe elevations match, as much as possible.

All manholes shall be constructed with precast bases as shown in Engineering Standards #6610 and 6620. Minimum manhole width shall be 4 feet. Brick or block manholes will not be allowed except under special circumstances where it is not feasible to construct pre-cast manholes.

Manholes shall be 4 feet in diameter unless the size and/or number of inlet(s) and outlet(s) warrants the use of a 5-foot diameter manhole.

Concentric cones shall be used. Eccentric cones may be used only in special cases, and only with approval of the City Utilities Department. Steps will not be allowed in manholes. Manholes shall be watertight.

Manholes shall not be located at the centerline of intersections.

Manholes which are expected to experience turbulence or large build up of gases such as experienced at siphons, shall have a protective coating or liner. The Utilities Department will make the final determination of which locations will require the coating or lining. The coating or liner proposed by the Engineer, must be approved by the Utilities Department.

An all-weather access at least 12 feet wide must be provided to all manholes for maintenance with truck-mounted equipment. The access road grade shall not exceed 20 percent, and a truck turn-around may be required at convenient points.

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Materials:

Vitrified clay pipe (VCP), asbestos cement pipe and bituminous fiber pipe shall not be permitted for mains or laterals. Concrete pipe will be permitted only for sizes of 18 inches and larger, and then subject to the approval of the City Utilities Department.

Cast iron (Class 150), and PVC (DR 35) may be used for sewer mains. Laterals shall be cast iron (Class 150), PVC (DR 35), or Schedule 40ABS. Other pipe materials may be allowed with prior approval of the City Utilities Department.

Lateral connections to main shall be made with a factory-fabricated wye and a 1/8 bend, of the same material as the main.

Cement or hot-pour joints will not be allowed. Rubber coupler joints shall be per City Standard Specifications. Changes in grade shall be made using appropriate fittings.

Abandoned laterals shall be disconnected at the main, and capped at both ends and the main with an approved watertight seal.

Laterals:

Sanitary sewer laterals shall be stubbed to the front property line of each lot. All facilities for the transmission of sewage from each of the lots to the nearest adequate point of connection to the City's sewer system shall be installed as acceptable to the City Engineer. Sewer lines need not be provided to lots which will be in perpetual open space use. The requirement for a sewer lateral may be waived upon a finding by the City that an alternative waste disposal system, which will provide a level of protection for public health and natural resources at least equivalent to public sewer, will be installed and maintained.

Sewer laterals shall have backwater valves installed whenever the flood level rim of the lowest fixture in the building (including basements) is less than 12 inches above the rim of adjacent upper or lower manhole, whichever controls, as determined by the City Engineer.

E. SURVEY

Street Monuments:

Street monuments shall be set to reference street centerlines at all intersections, angle points, beginning and ending of curves, radius point of cul-de-sacs, and at tract boundary as required by the City Engineer.

Monuments shall be set no further apart than 500 feet along centerlines, and shall be shown on the final subdivision map.

Monuments shall be constructed per Engineering Standard #9020.

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Tract Boundary Monuments:

Tract boundary monuments shall be set to reference tract boundary lines at all angle points, beginning and ending of curves, and intersections with street right-of-way lines.

Tract boundary monuments shall be set no further apart than 500 feet along boundary lines, and shall be shown on the final subdivision map.

Tract boundary monuments shall be constructed of iron pipe, no smaller than 1.5 inches in diameter, no shorter than 30 inches in length, capped and stamped with either the land surveyor's or registered engineer's number, and indicated by a marker stake extending above the ground surface.

Lot Stakes:

Lot stakes shall be set to reference lot lines at all angle points, and beginning and ending of curves, except where said point is to be set with a tract boundary monument.

Lot stakes shall be constructed of 3/4 inch plugged galvanized pipe at least 18 inches in length, or a #3 rebar with plastic cap. If a lot corner falls on concrete or rock, the corner shall be set with a lead plug. All corners shall be tagged or marked with either the land surveyor's or registered engineer's number.

All lot stakes shall be set at ground surface, with white marker stakes located immediately adjacent. Offset staking or alternative staking will not be allowed without prior approval of the City Engineer.

F. PROJECT PLANS

All improvement plans shall be prepared and signed by a registered Civil Engineer. The public improvement plans shall use the standards set forth in Engineering Standard #9910. Each utility company whose facilities are involved shall sign the original plans indicating they have reviewed and approved the plans. Construction may not begin until the plans are signed by the City Engineer, and submittals required by the Standard provided to the City at no charge.

G. STREET LIGHTING

Light Placement – New Streets:

All new streets shall have lighting placed in accordance with the following table.

Light Placement – Existing Streets:

New projects in existing developed areas with street lighting already installed are subject to the following requirements:

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Existing local or collector streets: Additional street lighting is required at the nearest intersection if no lighting exists at that location.

Existing arterial street or thoroughfare: Additional street lighting is required if the existing street lighting does not meet current lighting standards per the following table.

Street Width	Spacing	Placement	Location
> 40 feet (major street)	200' – 250'	Alternate Sides of the street	- directly behind back of sidewalk for embedded poles - 18 inches behind curb face for foundation mounted poles
≤ 40 feet (minor street)	200' – 250'	One side of the street	- directly behind back of sidewalk for embedded poles - 18 inches behind curb face for foundation mounted poles

Where unusual sidewalk conditions exist, such as meandering sidewalks, poles may be set at the front of the sidewalk as long as a minimum of 5 feet is maintained from the curb face. Residential light poles shall be placed on lot lines whenever possible.

Lights and trees should have a 20-foot minimum separation. Shrubs shall be planted a minimum of 5 feet from street light poles.

Intersection lighting shall be placed to minimize the likelihood of the pole being struck by turning traffic.

Lighting Service:

Service point is to be obtained from PG&E. When the lighting has been installed in conformance with the City’s requirements, the City will authorize PG&E to energize those lights installed as part of public improvements for ownership and maintenance by the City. Lights to be maintained and paid for by a private party must be authorized by that party.

A single service point may be used for no more than one block or 1000 feet, whichever is the lesser distance.

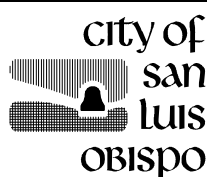
No more than 4 Luminaries shall be used on a multiple street light system.

All street lighting shall be 120VAC.

Grounding:

Grounding of all street lights is required. The grounding electrode shall be in the first pull box

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adjacent to the PG&E service box.

Conduit & Conductors:

Conduit for street lighting shall be a minimum of 2 inches in diameter. Conductors shall be copper. Conductors from the pull box to the luminaire shall be solid copper (black & white) #10. All other wiring shall be minimum of #8.

When service points are used for more than one light in series, an electrical design for the lighting circuit shall be submitted to the City for approval. Voltage drop between the point of service and the end of each lighting circuit shall not exceed 5 percent.

Street Lighting Standards:

Street lighting shall conform to the provisions in the City Standard Specifications and Engineering Standard #7910 in conjunction with the State Standard Specifications and Standard Drawings.

Arm extension past curb face (feet)	Mounting Height (feet)	Luminaire	Wattage
Pavement width > 40 feet			
8	33	HPS	200
Pavement width ≤ 40 feet			
6	30	HPS	70
6	30	HPS	100 at intersections

Each standard shall have a pull box at the base for splicing and fuses regardless of pole type.

Foundation mounted steel poles shall be used if any of the following conditions exist:

- Replacing an existing foundation mounted pole on the existing foundation.
- Soil or other conditions require a foundation mounted pole.
- Conflict with utilities or other facilities do not allow the light to be installed behind the sidewalk and remain in the right of way.
- Placing pole behind the sidewalk results in a mast arm length greater than 15 feet.

Embedded steel poles shall be used for all other conditions.

Double arm poles (Type 15D) shall be used only in City parking lots or areas where a maintenance vehicle can readily access the pole without traffic control. Use of double arm

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poles in other applications such as medians must be approved by the City Engineer and will be authorized only when no other option exists.

All street light poles, mast arms and street light luminaries shall be of the same height, length and wattage on local residential streets within a subdivision.

Alternates and Additions:

Street lights installed in certain areas, such as the Downtown, may be required to be a specialized pole, as determined by the City.

H. **LANDSCAPING & IRRIGATION**

Landscaping and Irrigation shall conform to the provisions in Section 13.20 of the City Municipal Code and Engineering Standards.

Hardscape:

Walkways and pads for appurtenances in parks shall be concrete or pervious concrete, built in accordance with City Standards for sidewalk construction and graded to prevent water from ponding on the walkway or pad. Unless variances are justified and approved by the City Engineer, walkways must meet current ADA accessibility requirements.

Pads in sod areas, such as picnic table pads, shall be round, oval or have rounded edges to allow mowing without damage to mow blades and pads.

Median islands:

Median island noses shall have a 5-foot section of standard sidewalk concrete at intersections. Island noses should not extend into intersection crosswalk areas. Island areas 4 feet or less shall be hardscaped. All hardscaped surfaces within median islands except for the 5-foot section within the island nose, shall be decorative.

Playgrounds and Miscellaneous areas:

An engineered wood surfacing, meeting accessibility requirements, shall be used under play equipment. Alternative surfaces shall be submitted to the City Engineer for review and approval.

Benches and picnic tables shall be of a low maintenance material such as rubber coated steel. No wood is allowed. Alternative materials shall be submitted to the City Engineer for review and approval.

Irrigation:

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Design Parameters

- Soil types shall be considered when designing irrigation systems.
- All systems shall be designed to avoid runoff, low-head drainage, overspray or water flow onto adjacent property, non-irrigated areas such as walkways, roads, structures and park appurtenances.
- Irrigation equipment and schedules shall be closely matched to infiltration rates to minimize or eliminate run off.
- Irrigation shall be managed for minimizing water use with methods available such as low-precipitation heads, drip irrigation, moisture sensors and check valves.
- Temporary irrigation systems for areas to be ultimately self sustaining, should be clearly identified and removed when no longer required.
- All irrigation systems shall include flow sensing with automatic shut off.
- Ensure adequate supply at point of connection, may include items such as booster pumps, pressure regulators, adequate service sizes.
- Recycled water irrigation systems shall comply with current Department of Public Health standards.
- For new installations, pullbox spacing shall not exceed 200', and conduit fill shall not exceed 26%.

Boxes

Irrigation boxes shall be placed in landscaped areas whenever possible. If irrigation boxes are set in hardscape areas, they shall be concrete boxes. The boxes shall be traffic rated if the area is open to public traffic or used by maintenance vehicles. Irrigation boxes in playing fields shall be buried 4 inches below grade.

System Pressure

Where an existing meter or irrigation system is present, the designer shall obtain the current line pressure to use in design. Where no existing system exists, the City of San Luis Obispo Utilities Department shall be contacted to determine approximate existing system pressures.

For systems that will be temporarily connected to the potable water system and eventually connected to the recycled water system, or for areas that may be set up to use both systems, the designer shall consider the pressure in both systems and design the irrigation system so that it will work with either pressure.

The designer shall contact the responsible maintenance division for the landscaped area (City of San Luis Obispo Public Works for City projects or areas to be dedicated) to determine the watering window to be used for the area. The designer shall use that in determining the number of valves on at any given time and the resulting load on the system. Calculations of system capacities and any assumptions made about the system, shall be submitted for review and approval. Calculations submitted shall clearly show an accounting for system losses and concurrent loading to prevent under sizing of the system. Where systems do not operate as needed to provide even distribution of water, including problems

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resulting from an under sized service, the designer will be responsible provide any needed redesign and to pay for necessary field corrections.

The irrigation design shall include a pressure reducer or booster pump to be installed, if needed, based on the actual pressure in the new irrigation system. System shall be designed for maximum efficiency.

Recycled Water

Any area shown in the Utilities Department master plan for connection to recycled water, either at the time of construction or in the future, shall meet all the necessary requirements for use of non-potable water. Spray patterns shall be plotted on the plans to show compliance with requirements for non-potable water contact with park facilities. Consideration shall be given to placement of facilities such as drinking fountains, play equipment, picnic tables and benches to prevent any possibility of irrigation spray hitting park facilities.

When recycled water is used on any parcel, a County approved backflow preventer shall be installed on potable water service line.

Runoff and Overspray on Roadways

Irrigation of median islands and other areas adjacent to roadways shall use a minimum number of spray heads to reduce likelihood of overspray onto the roadway. Where spray heads are used, they shall be set in from the edge approximately 6 inches to reduce overspray and damage from vehicles.

Designs shall show that every effort has been made to contain water in landscape areas for no runoff, or that runoff is caught and returned in some method to the landscaping.

Controller

Irrigation designers must contact the Parks and Urban Forest Maintenance Supervisor to determine what, if any, telemetry control equipment will be required. Systems are to be designed to current City Standards for Controller equipment where irrigated area is City owned or to be dedicated. If control is to be via phone line, the designer must coordinate with the City’s telephone system representative or City project manager to arrange for hook up.

Submittals

All projects shall submit the following:

- Landscape Design Plan – prior to construction, record drawings after construction
- Irrigation Design Plan - prior to construction, record drawings after construction
- Certificate that the planting and irrigation were constructed in accordance with the City approved plans – after construction from a licensed landscape architect or contractor

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Projects requiring Architectural Review Commission (ARC) including new houses on sensitive sites, construction of three or more dwellings on a lot, and new commercial buildings shall also submit the following:

- Planting notes and water conservation concept statement describing the water conservation measures taken and how the landscape design meets the esthetics of functional requirements of the site and of the proposed land use, including screening, solar access, climate modification and erosion control.
- Section / elevation view through the site showing the relationships between planting design, buildings, site improvements, and design.

Commercial or industrial projects on sites of 20,000 square feet or more, and residential projects of ten or more units shall submit in addition to the above:

- Landscape and irrigations plans prepared by a landscape architect or other qualified professional.
- Planting and irrigation details showing planting, irrigation staking and other pertinent details, not included in the current City Engineering Standards, which explain the landscape design and / or conservation measures.
- A maintenance program describing general maintenance procedures, including frequency and responsibilities for watering, replanting, pruning, irrigation equipment repair and programming, weed control, and fertilizing.

Plans for approval must show the following information and comply with City Engineering Drafting Standards:

- Scale
- North arrow
- Property lines
- Existing and proposed structures
- Streets
- Major natural features such as creeks and rock outcroppings
- Location, size, type, and quantity of plants
- Existing trees noted by type, location, trunk diameter, height, overall condition, expected life span, and whether or not the tree is proposed for removal or is to remain
- Table showing total paved area of the site and percentage of total site area devoted to irrigated turf
- Designation of hydrozones
- Below ground utilities
- Location, size and type of irrigation system components, including automatic controllers, main and lateral lines, sprinkler heads, emitters, backflow prevention devices, and rain sensing devices, where required by City Parks Maintenance supervisor

System Operational Requirements

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The designer of the irrigation system shall be responsible to insure that the system adequately provides water to all landscaping. Design shall insure areas of turf are not under watered, relative to the rest of the turf, resulting in brown patches. The designer may review the irrigation installation and make recommendations for corrective action on the part of the installer; however, if the system cannot, in spite of proper installation and adjustment of the irrigation, be operated to provide proper coverage, the designer shall redesign and direct revised installation at their cost until the system can be shown to operate properly via an audit and empirical data.

Landscaping:

Turf

- Irrigated turf areas shall not exceed twenty percent of the site’s total area. The ARC, or on projects exempt from ARC review, the Community Development Director, may allow larger turf areas where special water conservation measures are used and where their primary purpose is for recreation rather than esthetics, as in parks, sports complexes, playgrounds and private rear yards. Projects must show the following in addition to the general landscape plan requirements:
 - Water conserving turf varieties or ground covers are used wherever possible.
 - Planter and turf areas are designed for maximum water efficiency and ease of maintenance.
 - Turf is not used for narrow planters, raised beds, or small planters.
 - Turf is not planted on areas with slopes greater than 15 percent.

General Landscape Plan Requirements

- Decorative paving, ground covers, bark, crushed rock, wood chips, or concrete will be used for pathways, service areas, and other difficult to maintain areas.
- Plant material is selected according to its suitability to the climate, site geology, and topography.
- Preservation and protection of natural areas and native species is encouraged.
- Plants are grouped by water needs into distinct hydrozones, and irrigated by separate valves.
- Plant selection clearly emphasizes the use of drought tolerant and water conserving plants.
- Curbs, headerboards, pavers, or other materials are used to define the edges of planters and reduce irrigation run-off into unplanted areas.
- Pools, ponds, foundations, and other water features are designed to use water efficiently. Features shall recirculate water and be of a design, size, and shape to minimize water loss through evaporation.
- Landscaping shall be incorporated into parking lots to prevent large, uninterrupted expanses of paving.
- Planted areas shall have a 2-inch thick layer of mulch to reduce evaporation and control weeds.

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- A separate, interim erosion control plan shall be included for areas of steep slope, subject to erosion, to protect the slope and eliminate silted discharge from the site until the proposed final plant material can establish and prevent erosion on its own.

Mulch

Plant mulch shall be shredded redwood bark unless otherwise approved by the City Engineer.

I. BRIDGES AND CULVERTS

Design Criteria:

Design shall conform to the requirements of current California Department of Transportation and AASHTO guidelines and standards. Any variation from standards must be approved in writing by the City Engineer. Bridges shall be clear spans.

All bridge designs require approval by the City’s Architectural Review Commission.

Bridge design must account for impacts of future development considering areas within the City’s adopted urban reserve line.

Submittals must include the full construction plans for the bridge including details, a copy of the geotechnical report, scour calculations, and design calculations. A hard copy and an electronic PDF format copy for archiving shall be submitted for documents. The design loads, hydraulic information, and a log of test borings must be included in the plans.

Scour calculations must show adequate structure depth to prevent scour damage or undermining for the life of the structure. Geotechnical investigations shall include corrosivity testing of the soil for consideration in pile design and testing for the presence of naturally occurring asbestos, where rock types indicate a potential.

Structures with a required span between 19 feet and 20 feet shall be constructed with a minimum span of 20 feet. Clear span bridges shall be constructed in lieu of closed culverts whenever possible and a natural channel maintained. Closed culverts will be allowed where site constraints prevent a bridge from being constructed with enough clearance to allow for required storm passage with 12 inches of freeboard. Authorization to build culverts in lieu of clear span bridges must be approved by the City Engineer and regulatory agencies. Closed culverts shall be upsized to increase the depth of the culvert to allow the placement of 12 inches of natural gravels in the bottom of the culvert.

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Materials:

Vehicle bridges shall be constructed of a material which requires no maintenance for the first 30 years of its life. Concrete is the preferred material for construction; however, alternative materials may be approved by application in writing to the City Engineer with sufficient documentation to support an alternative including information showing the alternative is a superior material, or that concrete will not provide the desired life or freedom from maintenance in the given conditions. Vehicle bridges may use a pre-approved prefabricated structure.

Pedestrian and bicycle bridges may be furnished as prefabricated structures, including “rusted” steel. The material must be approved prior to the submittal for the structure itself.

New bridge decks will not be overlaid with asphalt unless authorized by the City Engineer. Where the City approves an overlay on the deck, an approved waterproof membrane shall be installed between the deck surface and the overlay. Waterproof / sealing membranes such as methacrylate seals may be required prior to acceptance where cracking of the deck is observed.

Barrier Rails:

Barrier rails for vehicle crossings must meet current AASHTO guidelines for crash ratings.

Bicycle and Pedestrian Facilities:

Vehicle bridges must be of adequate width to accommodate, at a minimum, a 5-foot bike lane and 5-foot sidewalk on both sides or match the width of the abutting bicycle and sidewalk facilities, whichever is greater. Bike lanes and sidewalks shall be constructed regardless of the presence of those facilities on the abutting roadway.

Design Life:

All structures shall be designed for a minimum 50-year service life.

J. SUBDIVISION DESIGN CRITERIA AND IMPROVEMENT STANDARDS

General requirement.

The design criteria for subdivisions and the required physical improvements for them shall be in compliance with the City’s grading ordinance, zoning regulations, subdivision standards, City Standard Specifications and Engineering Standards and other applicable regulations.

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Improvements.

Improvement work, including grading, shall not be commenced until plans for all such work have been approved by the City Engineer. All improvements shall be constructed under the inspection of and to the satisfaction of the City. Improvements to be installed by the subdivider, in accordance with these standards, include the following:

A. The full width of each street shall be improved by grading, base preparation, and paving. If a street constitutes a boundary of the subdivision or connects the subdivision with the rest of the City’s street system, even though it is not within the area to be subdivided, the full width of the roadway shall be improved. The City may, depending on individual circumstances, require full curb, gutter, and sidewalk improvements on the side opposite the subdivision.

B. Streets shall include concrete curb, gutter, sidewalk, and associated landscaping (street trees, parkway, and medians) along both sides. Alternative pedestrian walkways and bikeways shall be concrete or other hard surface material approved by the City. (Asphaltic concrete is not an approved alternate.)

C. The subdivider shall make provisions for any railroad crossing necessary for the subdivision, including application to the California Public Utilities Commission.

D. Separate bicycle paths or bicycle areas may be required.

E. Bus stops and benches shall be provided where the subdivision abuts existing or planned City bus routes and a stop would be required for the use of the neighborhood.

F. Durable boundary monuments shall be installed and shown on the final map.

G. Street trees shall be provided as required by the tree regulations, as set forth in Chapter 12.24 of the City’s Municipal Code.

H. Street name signs and traffic control and warning signs shall be installed. Traffic signals and traffic signal control conduits may be required by the City Engineer.

I. Utilities to be installed by the subdivider shall include those listed in this standard. The development of these facilities may require financial contribution for previous improvements to the systems, as provided in Chapter 13.04 of the City’s Municipal Code, in the most recent council resolution on utility connection charges, or in any agreement affecting a particular portion of a system.

- A water system for domestic service and fire protection shall be provided to each lot of the proposed subdivision or, for condominium projects, to each condominium unit.

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- Where identified as a recycled water service area in the Recycled Water Master Plan, recycled water lines shall be installed to serve those areas.
- A sewer system for domestic use shall be provided to each lot of the proposed subdivision.
- Storm drainage, erosion and flood control facilities.
- Street lights shall be provided.
- Electric power, gas, and telephone services shall be stubbed to each lot or, for condominium projects, to each condominium unit; and all facilities to distribute such services shall be provided according to the requirements of the responsible utility companies.
- Cable television service may be required.
- Fire alarm conduit may be required by the fire marshal.

J. All new utility distribution facilities shall be placed underground, except accessory facilities such as terminal boxes, meter cabinets, and transformers may be installed aboveground. The subdivider shall make all necessary arrangements with the utility companies for these facilities.

K. The subdivider shall carry out protective measures as required by the City to assure the proper functioning and maintenance of other required improvements and properties adjacent to the subdivision. Temporary protective improvements may be required prior to or concurrent with the construction of permanent improvements.

Multiple frontages.

Single-family residential lots with frontage on more than one street are discouraged, except for corner lots or where topography makes a single frontage impractical. The City may require the release of access rights on one frontage which shall be noted on the subdivision map.

Lot lines.

A. Lot lines should be at the top of slope banks.

B. Side lot lines should be perpendicular to the street on straight streets, or radial to the street on curved streets, unless another angle would provide better building orientation for solar exposure or more lot area to the south of the likely building site.

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C. On corner lots, the lot lines adjacent to streets shall be rounded with a twenty-foot radius.

Flag lots (deep lot subdivision).

Flag lots may be approved for subdividing deep lots where development would not be feasible with the installation of a standard street, either alone or in conjunction with neighboring properties, or where justified by topographical conditions. Such subdivision shall conform with the following:

A. The accessway serving the flag lot(s) shall not be included in the determination of required lot area for any lot.

B. The original lot shall have frontage on a dedicated street of at least the minimum length required by these regulations for the zone in which it is located, plus the accessway required to potential rear lots.

C. The accessway to the rear shall be at least twenty feet wide (with sixteen feet of pavement) for residential and conservation/open space zones, except where the accessway is more than one hundred fifty feet long it shall be at least twenty-four feet wide with twenty feet of pavement. For all other zones, the accessway shall be at least thirty feet wide with a paved roadway at least twenty-four feet wide.

D. Each lot shall have yards as required by the zoning regulations. A ten-foot yard shall be provided along the access road pavement.

E. The lot farthest from the street shall own the accessway in fee. Other lots using the accessway shall have an access easement over it.

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