

Chapter 11.12

BASIC ROAD DESIGN AND CONSTRUCTION STANDARDS

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11.12.005 **Alternate materials and methods.**

The provisions of these roadway standards are not intended to prevent the use of any material or method of construction not specifically prescribed within, provided any alternate is approved by the County Engineer with the concurrence of the Director.

The County Engineer may approve any such alternate, provided he/she finds that the proposed design is satisfactory and complies with the intent of these standards and that the materials, method or work offered is, for the purpose intended, at least the equivalent of that prescribed within these standards in suitability, strength, effectiveness, durability and safety. (Ord. 3239 § 2, 2013; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.007 **Exceptions and appeals.**

- A. Except as otherwise provided herein, exceptions to specific provisions of the standards set forth in this Chapter may be granted by the County Engineer with the concurrence of the Director, provided that adequate justification that such exceptions provide the same overall practical effect is documented in writing prior to approval. Request for exception shall be made in writing by the applicant or the applicant's authorized representative. The request shall state the specific section(s) for which an exception is requested, material facts supporting the contention of the applicant, the details of the exception or alternative measure proposed, and a map showing the proposed location and siting of the exception or alternative measure.

- B. Where an exception is not granted pursuant to the provisions of this Chapter, the applicant may, within ten (10) days of the date of the decision, appeal to the Board of Supervisors. The appeal shall set forth in writing the reasons for the appeal and shall be submitted to the clerk of the Board along with the appeal fee set forth in Chapter 3.40. A copy of the appeal shall be submitted to the Department by the appellant. The clerk shall schedule the matter for public hearing before the Board within thirty (30) days and give notice of the hearing. Within forty-five (45) days of receipt of the appeal, the Board shall consider the public record, receive testimony, and make all findings and determinations necessary to approve, conditionally approve, or deny the exception. (Ord. 3298 § 5, 2016; Ord. 3239 § 2, 2013; Ord. 3175 § 1, 2011; Ord. 1875 § 2 (part), 1991).

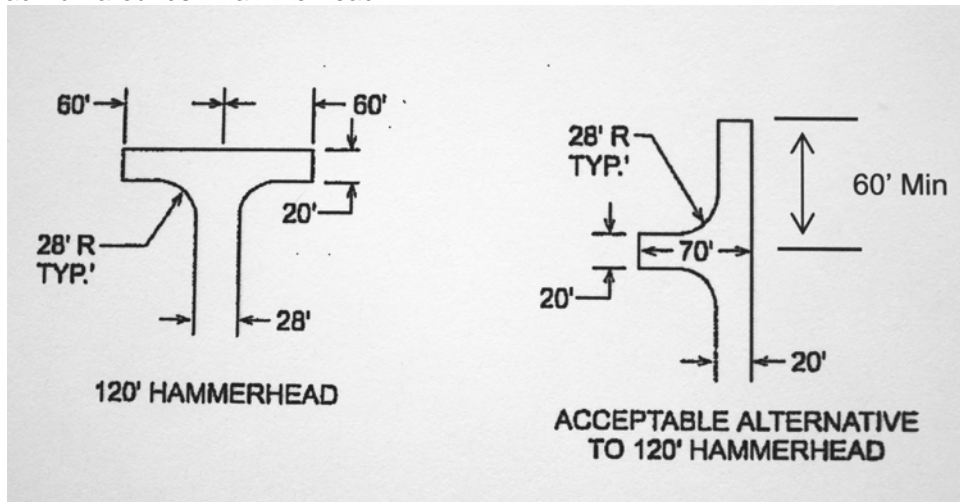
11.12.010 Geometrics and roadbed design. In conjunction with the state specifications and AASHTO, as applicable, the following minimum standards of the geometrics and roadbed design for proposed improvements shall govern the preparation of plans and construction for such improvements:

- A. **Width of Traveled Way and Shoulders.** The minimum width of a traveled way and shoulders shall be as follows:

Road Classification	Traveled Way	Width of Shoulders
Arterial	24 feet to 60 feet	varies 4 feet to 8 feet
Major Collector	24 feet	8 feet with 6 feet paved
Minor Collector	24 feet	6 feet with 4 feet paved
Local Road	20 feet	No shoulder required for parcel maps with parcels two acres or larger and for unpaved roads serving four parcels or less
		1 foot with 0 feet paved for parcel maps with paved roads and for paved roads serving four parcels or less
		2 feet with 0 feet paved for final maps with parcels two acres or larger
		4 feet with 3 feet paved for urban development on final maps
One-way Road	12 feet	2 feet with 0 feet paved
Driveway	12 feet	No shoulder required
Common Driveway	18 feet	1 foot dirt shoulder

- B. Turnouts. Turnouts shall be a minimum of ten (10) feet in width and a minimum of thirty (30) feet in length with a minimum twenty-five (25) foot taper at each end, and shall have a uniform surface with the adjacent road.
- C. Turning Bulbs. Turning bulbs shall have a minimum radius of forty (40) feet and shall have a uniform surface with the remainder of road.
- D. Hammerhead Turnarounds. Hammerhead

turnarounds may be used. The slope of the turnaround shall not exceed 6%, and the turnaround shall have a uniform surface conforming with the remainder of the road. Typical layouts of hammerhead turnarounds are illustrated below:



- E. Curve Widening. Curve widening shall be added to the required shoulder width on curves having a radius less than two-hundred (200) feet. The widening shall be at least equal to four-hundred (400) divided by the radius of the curve. The widened area shall have a uniform surface with the adjacent road.
- F. Percent of Crown. The minimum percent of crown for all class roads shall be two percent (2%).
- G. Superelevation Rate. The minimum superelevation rate for all class roads shall be 0.02 foot per one foot. The maximum superelevation rate shall not exceed 0.06 foot per one foot.
- H Side Slope Ratio. The side slope (fill) for all road classifications shall be no steeper than 2:1.
- I. Back Slope Ratio. The back slope (cut) ratio for all road classifications shall be no steeper than

- 1 1/2:1. A designed back slope ratio may be modified with the approval of the County Engineer depending upon the materials encountered. The modified back slope shall not be steeper than 1/2:1.
- J. Side Slope Ratio-Ditch. The side slope ratio for all roadside ditches shall not be steeper than 3:1 for unpaved ditches, and 6:1 for paved ditches with dikes.
- K. Ditch Depth. Unpaved ditches shall be no more than one (1) foot deep with the inclusion of appropriate bed material and paved ditches with dikes shall be no less than four (4) inches deep.
- L. Stopping Sight Distance. The stopping sight distance shall be based upon the posted speed limit or the minimum design speed, whichever is greater. The minimum design speed shall be thirty-five (35) miles per hour (mph) for arterial

and collector roads and twenty-five (25) mph for all other roads.

- M. Alignments. Alignment for horizontal curves shall be based upon the posted speed limit or minimum design speed, whichever is greater, and shall be no smaller than a fifty (50) foot interior curve radius with a minimum taper length of fifty (50) feet. Vertical curves shall provide for a sight distance consistent with the posted speed limit or the minimum design speed, whichever is greater, and shall have a minimum length of one hundred (100) feet.
- N. Drainage. Roadside drainage facilities shall be located outside of the traveled way. Culverts and/or down drains shall be three-hundred (300) feet apart or as necessary to protect the roadway unless satisfactory drainage calculations are submitted to demonstrate roadside drainage may be carried further. Cross-culverts shall be no less than eighteen

(18) inches in diameter. Culverts with a diameter of twenty-four (24) inches or more shall have appropriate inlet and outlet protection. (Ord. 3298 § 6, 2016; Ord. 3239 § 2, 2013; Ord. 2765 § 4 (part), 2007; Ord. 2579 § 11, 2004; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.020 Structural design standards.

- A. The structural section of the road surface shall be designed based on a twenty (20) year design life, or a thirty (30) year design life subject to approval by the County Engineer, and using stabilometer "R" values, and the expected traffic index, which are not less than those indicated below. In no event shall the structural section of a road include less than the following compacted depths of asphalt concrete and aggregate base:

Road Classification	Asphalt Concrete	Aggregate Base	Traffic Index (T.I.)
Arterial**	6"	12"	10
Major Collector	4½"	10"	8.5
Minor Collector	3½"	8"	6.5
Local Road	2"	6"	5
One-way Road	2"	6"	5
Driveway	Refer to Section 11.12.060	4"	N/A
Common Driveway	Refer to Section 11.12.060	4"	N/A

* An asphalt concrete surface is not required for final maps with minimum parcel size of five (5) acres, or for parcel maps with minimum parcel size of two (2) acres.

** The structural section shall be based on criteria developed for the specific project.

- B. All road structures shall be capable of supporting a 40,000 pound axle load and shall be constructed to carry at least the maximum load and provide the minimum vertical clearance as required by AASHTO and Vehicle Code sections 35550, 35750 and 35250. (Ord. 3298 § 7, 2016; Ord. 3239 § 2, 2013; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.030 Profiles. The minimum and maximum gradients for all class roads shall be as follows:

- A. The minimum gradient shall be one percent (1%);
- B. The maximum gradient for local roads below the three thousand foot elevation shall be sixteen percent (16%);
- C. The maximum gradient for local roads above the three thousand foot elevation shall be twelve percent (12%);
- D. The maximum slope for a turnaround shall not exceed six percent (6%);
- E. The maximum gradient for arterial and collector roads shall be as shown below:

Type of Terrain	Design Speed in Miles Per Hour (mph)					
	20	30	40	50	60	70
Level	7%	7%	7%	6%	5%	4%
Rolling	10%	9%	8%	7%	6%	5%
Mountainous	12%	10%	10%	9%	8%	6%

11.12.040 Cul-de-sacs.

- A. A cul-de-sac road shall be posted “Not a Through Road” and shall terminate in a turnaround bulb or hammerhead turnaround.
- B. The maximum length of a cul-de-sac road, including all cul-de-sac roads accessed from the cul-de-sac, shall not exceed the following cumulative lengths regardless of the number of parcels served:

Parcels zoned for less than one acre – 800 feet
 Parcels zoned for 1 acre to 4.99 acres - 1320 feet
 Parcels zoned for 5 acres to 19.99 acres* - 2640 feet
 Parcels zoned for 20 acres or larger* - 5280 feet

* Where parcels are zoned five acres or larger, turnaround bulbs shall be provided at intervals of a maximum of one thousand three hundred twenty (1,320) feet.

All lengths shall be measured from the edge of the roadway surface at its intersection with a through road to the end of the road surface at its farthest point. Where a cul-de-sac crosses areas of differing zoned parcel sizes, requiring different length limits, a turnaround bulb shall be required at each of the cumulative limits listed above for every zoning district it passes through.

- C. Exceptions to the standards for cul-de-sac roads for a tentative map as defined in Section 16.04.530 of this code shall only be granted when the Director has concurrence from the Tuolumne County Fire Prevention Division and only when all of the following circumstances apply:
 1. Measures have been incorporated into the approval of the tentative map to reduce fire hazard in a manner that have the same practical effect as limiting the length of a cul-de-sac road.
 2. The allowed increase in length does not exceed 10% of the allowed length prescribed in section “B” above.
 3. This exception would only apply to parcels zoned RE-5, RE-10, A, and AE that are 5 gross acres or larger. (Ord. 3239 § 2, 2013; Ord. 3175 § 2, 2011; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.050 Street signing. All streets shall be identified and signed at intersections to allow for speedy response of emergency equipment. The design, application and installation of street signs shall comply with the requirements of the MUTCD. Signs shall be installed indicating special roadway conditions, including weight limits, width and vertical clearance restrictions and one-way traffic. Signs shall be installed indicating special roadway

conditions, including weight limits, width and vertical clearance restrictions and one-way traffic. (Ord. 3298 § 8, 2016; Ord. 3239 § 2, 2013; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.060 Driveways.

- A. Driveways shall provide a minimum twelve (12) foot traffic lane with an all weather surface, have fifteen (15) feet of unobstructed vertical clearance and fourteen (14) feet unobstructed horizontal clearance with a maximum grade of sixteen percent (16%). Turnouts shall be provided at midpoint for driveways between one hundred fifty (150) feet and eight hundred (800) feet in length and at four hundred (400) foot intervals for driveways over eight hundred (800) feet in length. Turnouts are not required on common driveways which are required to have a minimum eighteen (18) foot wide traffic lane.
- B. Where residential dwellings are less than one hundred fifty (150) feet from the roadway, the driveway grade may exceed sixteen percent (16%) to a maximum twenty-two percent (22%), but the driveway shall be paved with asphalt concrete or concrete. In addition, a parking bay at least ten (10) feet wide and forty (40) feet long with a uniform surface with the adjacent road shall be provided at road grade.
- C. A turnaround bulb or hammerhead turnaround shall be provided within fifty (50) feet of all building sites on driveways over three hundred (300) feet in length.
- D. Exceptions to the driveway standards provided herein may only be granted by the Tuolumne County Fire Prevention Division in accordance with Section 15.20.050 of this code. (Ord. 3298 § 9, 2016; Ord. 3239 § 2, 2013; Ord. 3175 § 3, 2011; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.062 Gates on driveways. Gates may be installed on driveways provided they comply with the following standards:

- A. Each gate entrance shall be at least two (2) feet wider than the width of the traveled way serving the gate and a minimum width of fourteen (14) feet unobstructed horizontal clearance and unobstructed vertical clearance of fifteen (15) feet.
- B. All gates providing access from a road to a driveway shall be located at least thirty (30) feet from the roadway edge and shall open away from the roadway. (Ord. 3298 § 10, 2016; Ord. 3239 § 2, 2013; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.063 Gates on roads. The installation of a gate across a public road shall be prohibited. Gates may be installed on private roads that are not dedicated for public use and are limited to the use

of the owner or group of owners who are responsible for maintaining the road, provided they comply with the following requirements:

- A. The installation of a gate across a fire apparatus access road shall be approved by the Tuolumne County Fire Prevention Division.
- B. Each gate entrance shall be at least two (2) feet wider than the width of the traveled way serving the gate with a minimum width of fourteen (14) feet unobstructed horizontal clearance and fifteen (15) feet vertical clearance.
- C. Keys, codes, or other means of access through the gate shall be provided to all emergency response agencies.
- D. Where electric gates are installed, they shall have an approved means of emergency operation. The electric gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.
- E. Where a road is proposed to be gated, a turnaround bulb or a hammerhead turnaround shall be constructed between the gate and the adjacent intersecting road for the purpose of allowing vehicles to safely reverse direction in front of the gate without backing onto the adjacent un-gated road. (Ord. 3298 § 11, 2016; Ord. 3239 § 2, 2013)

11.12.065 One-way roads. All one-way roads shall be constructed to provide a minimum of one twelve (12) foot wide traffic lane. All one-way roads shall connect to a two lane roadway at both ends, and shall provide access to an area currently zoned for no more than a total of ten (10) dwelling units, including both primary and secondary units. No such road shall exceed two thousand six hundred forty (2,640) feet in length. Turnouts shall be constructed as follows:

- A. For one-way roads which exceed 300 feet but are less than 800 feet in length, a turnout shall be provided at approximately the mid point of the one-way road.
- B. For one-way roads which equal or exceed 800 feet in length, turnouts shall be provided at four hundred foot intervals along the one-way road. (Ord. 3239 § 2, 2013; Ord. 2579 § 12, 2004; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).

11.12.067 Alleys. Alleys, as defined in Section 17.04.070 of this code as "improved pedestrian alleyways" may be used for non-vehicular access and as "improved vehicular alleyways" may be used

for vehicular access, provided they comply with the standards established in the Tuolumne Parking & Alleyway Study dated October 15, 2010, as it may be amended by the Board of Supervisors. (Ord. 3239 § 2, 2013; Ord. 3193 § 1, 2012)

11.12.070 Specifications for material and construction.

- A. Conformance with Specifications. All materials furnished and the methods of performing any proposed work shall conform to and be done in accordance with the applicable portions of the state specifications and this title.
- B. Cessation of Construction Due to Weather Conditions. General climate and ground moisture conditions will determine the cessation of construction. The County Engineer may notify contractors and engineers to cease construction when, in his/her opinion, conditions are such that improvements cannot be constructed to the requirements of the state specifications or this title. Written notification by the County Engineer will be given on an individual basis as to when work may be initiated at the beginning of the construction season.
- C. Temporary Improvements. The installation of temporary improvements for winter cessation in order to make building sites accessible will be approved on an individual basis, provided that it is expressly understood that such improvements are of only a temporary nature and that they will be removed and replaced with permanent type improvements according to the approved plans and specifications and as may be indicated by the County Engineer. Plastic or pliable synthetic pipe may be installed within the roadway template for water main and sewer main purposes. (Ord. 3298 § 12, 2016; Ord. 3239 § 2, 2013; Ord. 1875 § 2 (part), 1991; Ord. 1559 § 1 (part), 1987).