

Standards for Private Driveways Crossings

These standards shall be considered the minimum to which driveway crossings shall conform. *Please note that swales or “dip crossings” are preferred over culvert crossings.*

- A. For roadside drainage NOT associated with a wash or arroyo**, the crossing detail (see Dip Crossing Detail, or Alternative A) developed by the acting County Engineer shall be the standard utilized for private residence. Culvert pipes are to be placed with the outlet at grade within the drainage area. The upstream portion may be “buried” if an inlet drop structure is provided. Culverts are to be placed with a minimum slope of at least 0.01 foot per foot. The property owner will be responsible for the maintenance, upkeep, and repair of the culvert crossing.
- B. For roadside or natural drainage associated with a wash or arroyo**, culverts can be permitted based on the following criteria (see Alternative B) unless an engineering analysis is provided, or required, for an alternative culvert design. An engineering analysis may be required by the County should there be circumstances that may cause concern over the safety of public and private property. *The Floodplain Administrator may authorize, or require, alternative designs on a case-by-case basis.*
1. Culvert crossing must adhere to the minimum pipe configurations shown in Table 1.
 2. Culvert pipes should have a minimum cover of one foot. Thickness of a concrete driveway may be included.
 3. All fill should be properly compacted (95% compaction) and stabilized to avoid failure due to erosion.
 4. Culvert length should be at least 4 feet wider than the width of the driveway, but should not exceed a distance equal to 10 times the individual culvert diameter.
 5. Culvert shall be installed with concrete cutoff walls (vertical or sloped) at both the upstream and downstream sides. Cutoff walls are to extend a minimum of two feet below the lowest adjacent channel grade or one foot below the scour depth of the wash, which ever is greater. Cutoff walls shall be keyed into the banks of the wash.
 6. Culvert crossings should, if possible, be setback from the upstream property line such that the low point in the driveway crossing is at or below the elevation of the channel bottom at the upstream property line.
 7. Culvert crossing should be set back from the downstream property line a distance equal to four times the difference between the width of the channel and the width of the culvert cells, and no less than 10 feet in any case.
 8. Culvert slope should be at a minimum slope of no less than $\frac{1}{2}$ the channel bed slope, and in no case less than .01 ft/ft (a one foot drop for every 100 foot run).
 9. The culvert must be aligned parallel to flow (i.e., with the roadway perpendicular to flow).

10. The culvert design resulting from application of the above criteria should not result in a culvert which has a top-of-road profile which exceeds the channel bank-height on either side of the channel. The design should result in a sag vertical curve over the pipes rather than a crest vertical curve. (Alternative B.)
11. Driveway culvert crossings for drainage areas exceeding those listed in Table 1 will need to be designed by an Arizona Registered Professional Civil Engineer.
12. All culvert crossings placed within the County Right-of-Way will require a Right-of-Way Use Permit. Contact the Santa Cruz County Public Works Office (520 375-7830) for further information.
13. All culvert crossings within a channel that has a 100-year discharge of 50 cubic feet per second or greater (approximately 14 acres of drainage area) will require a Floodplain Use Permit.
14. The property owner shall accept all responsibility for the maintenance, upkeep, and repairs of the culvert crossing.

Table 1
Minimum¹ Driveway Culvert Size/Number Configurations

Drainage Area (acres)	100-Year Discharge (cfs)	Minimum	CMP or RCP For	Culvert Circular ²	Diameter Pipes Only	(in Inches)
		1 Pipe Design	2 Pipe Design	3 Pipe Design	4 Pipe Design	
≤5	≤15	24	NA	NA	NA	
≤10	≤34	42	30	24	NA	
≤20	≤71	54	42	36	30	
≤30	≤106	60	48	42	36	
≤40	≤140	72	54	42	42	
≤50	≤171	NA	60	48	42	
≤60	≤202	NA	60	54	48	
≤80	≤259	NA	66	54	48	
≤100	≤313	NA	72	60	54	
≤120	≤364	NA	NA	66	60	
≤140	≤413	NA	NA	72	60	
≤170	≤482	NA	NA	72	66	
≤190	≤525	NA	NA	NA	66	
≤245	≤637	NA	NA	NA	72	

Minimum culvert cell sizes are based on required headwall inlet control for CMP culverts, with headwater one foot above the top of the pipe, for a typical 16 foot wide residential driveway (total pipe length = 20 feet)

¹ For driveways crossing drainages with a Q₁₀₀ greater than 637 cfs, an engineering analysis will be mandatory for anything other than an At-Grade crossing.

² Squash pipe of equivalent size may be substituted, upon approval of the Floodplain Administrator.