

ARIZONA DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING GROUP
OFFICE MEMO

May 12, 1998

TO: Roadway Design Personnel
ADOT and Consultants

FROM: Terry H. Otterness
Design Program Manager
Roadway Design Section

RE: Safety End Sections for Pipe Culverts

We have adopted the attached Detail for use **when the pipe culvert ends are not located beyond the clear recovery zone for the particular location.**

Please note the following aspects of the Detail: there are applications for both cross culverts and parallel culverts; slope options include 4:1 and 6:1 rates; circular and arched pipe options are given; the plans will specify this information as indicated by General Note #1 on the Detail. The Pipe Summary Sheets are being modified to allow selection of the Detail with inclusion of the needed information.

Design Considerations:

Use of the safety end sections should generally be limited to those locations where the pipe ends are inside the clear recovery zone. On new designs, pipe ends are normally placed outside the clear zone; for existing culverts, conditions will vary and judgment must be used to determine whether to use the safety end section, extend the culvert, or do nothing based upon existing field conditions, budget, and scope of project.

Concrete headwalls are normally placed on culverts 48" and larger. This does not negate the use of safety end sections, however, consideration must be given to anchoring of the pipe end. In some locations, the safety end section may be inadequate in this regard and other provisions should be made.

A concrete apron may be added when local conditions support usage.

Cross-drainage Applications:

Studies have shown that single pipe applications up to 30” in diameter do not pose a safety hazard for errant vehicles. We have chosen the threshold to **begin placement of the safety end sections at the 30” diameter pipe** size, when warranted as previously discussed.


Parallel Drainage Applications:

Safety end sections for parallel drainage culverts will generally be considered starting at 24” diameter pipe. In considering the clear zone for driveway or similar applications, use a design approach of “at or near the clear zone” to allow for some judgment where pipe culverts may be just outside the calculated clear zone.

Hydraulic Considerations:


The Kansas DOT in cooperation with the University of Kansas has developed hydraulic design charts which may be utilized for the design of culverts with safety end sections. These charts are available upon request from Roadway Design or Bridge Drainage Design and should be utilized until any additional guidance is developed and adopted by ADOT.

Cadd Details:

Access to the Detail for in-house users is as follows: 

English version /usr/adot/user/hp/edetails.cel

Metric version /usr/adot/metric/user/hp/mdetails.cel

Access to the Detail for consultants is by telephone request through Roadway Design Cadd Support Team at 602-255-7341 or via the Internet at the ADOT Web site address <http://www.dot.state.az.us/roads/cae/special-details.html>. 

If there are any questions regarding the Detail, please contact Tom Scheck, me, or other Roadway Design personnel at 255-7341. Please insure design personnel in your respective areas receive this information. Distribution to consulting engineering firms will be through Engineering Consultant Services.

c:

Roadway Design Section Mgrs.
Bridge Drainage Design
Engineering Consultant Services
Statewide Project Management
Local Government Section
Roadside Development Section
Valley Freeway Group
attachment

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