

Response to Proposal Comments: Sahuarita Phase II Monitoring and Initial Evaluation of Other Roads

Arizona Game and Fish Comment Responses:

1. Isn't it premature to ask for post-construction monitoring dollars for a project that will not begin until 2013?
The post-construction monitoring is for the portion of Sahuarita Road between La Villita Road and Country Club Road
2. Not all the objectives outlined in the proposal can be attained given the design.
We agree that a single project in and of itself, unless conducted on a wide, landscape level, can adequately provide the sample size necessary to develop relationships between wildlife use of culverts and various culvert dimensions and land use patterns, or more importantly the value of determining the effectiveness of such linkages (see review in Nicholls & Margulles 1991; Inglis & Underwood 1992). However, with similar monitoring efforts being conducted in other portions of Pima County, these studies can collectively contribute to answering the objectives outlined in the proposal and identified in the Recommended Research/Information Topics for RTA Wildlife Linkage Projects. Corridor width will be assessed as the distance of continuous open space/undeveloped land along Sahuarita Road that surrounds each underpass; analysis of corridor width relative to underpass use metrics is provided in the proposal Appendix A.
3. Not clear on what initial studies curtails or even how an initial assessment will be accomplished
See amended proposal for clarification.
4. How can proper evaluation of post-construction monitoring be attained if there is no pre-construction monitoring data to compare?
Pre-construction monitoring will occur along Sahuarita Road for a minimum of 1 year prior to road construction.
5. Issues pertaining to statement "this component will address the following research/information topics"
See response to Question 2. The point of using standardized methods on multiple roadways will provide RTA with a growing database of variables that contribute to or inhibit wildlife use of crossing structures and other wildlife crossing mitigation structures. Indeed, no single study can adequately capture the variation in underpass sizes, traffic volumes, and landscape configurations that all contribute to the success, or lack thereof, of wildlife crossing structures unless conducted on a large, landscape scale. However, studies that seek to replicate monitoring strategies and sampling efforts can provide useful information on the value of site-specific efforts to maintain and enhance wildlife movement, and more importantly can direct future management decisions when analyzed in concert with other local studies of the same nature.

Arizona Game and Fish (II) Comment Responses:

1. The proposal lacks adequate detail for a proper evaluation.
We provide specific details on the monitoring strategy, data analysis, and landscape evaluation in the Appendix. Without specifics to what the question is directed at, we can not provide a specific response. Several additional details have been provided in the amended proposal based on other specific comments.
2. The proposed wildlife crossings were inadequately evaluated.
The point of the initial assessment was to identify locations which would provide wildlife movement across Sahuarita Road in light of it being widened from 2 lanes to 4 lanes. This stretch of Sahuarita Road has been identified on the RTA Priority Wildlife Corridors List. The goal of the Phase I study was to relate the proposed road widening project to locations that serve as long-term areas of open space which could provide continued opportunities for wildlife movement. Therefore, the road assessment evaluated where the best locations to incorporate wildlife crossing structure into the design process could occur; monitoring of these locations immediately prior to construction will identify additional features that need to be implemented to maximize the functionality of recommended crossings (see proposal). To address the point that a 2 day visit is inadequate to determine if a wildlife crossing structure is part of an important wildlife linkage: indeed a 2-year study may be inadequate as evidenced by published reports and manuscripts studying wildlife/roadway interactions in Canada, California, Wyoming, Montana, and Florida. The point of this effort was to see where the best locations to incorporate wildlife crossing structures would be (based on future land use and topographic constraints) in order to address those locations in the design phase for Sahuarita Road; baseline monitoring immediately prior to construction would provide additional inference on how to maximize the use of those structures.
3. Spending an estimated \$700,000 on four retrofits that actually lead to a reduction in the Openness Index is not a wise use of limited dollars.
The recommended dimensions have been documented in numerous technical reports and manuscripts to provide crossing opportunities through the structures by the wildlife species identified in the Phase I report. Moreover, the openness value has received increasing scrutiny as to its legitimacy in being used as a defining metric for underpass effectiveness (see review in Jacobson 2007). The recommended underpass dimensions all increase the height of the structure, which may be the most important underpass dimension to facilitate certain species of wildlife. Furthermore, maintaining the existing openness values through the design process would lead to excessive construction costs. For example if the openness value for culvert 1 was maintained at 1.81, increasing the road width to 150 feet would necessitate an increase in the roadbed height to accommodate a structure height of 11 feet; this would add increased costs to construction to achieve the desired roadbed elevation.

4. A wide variety of local fauna and herpetofauna are currently using this area for crossing is not adequately determined.

The Phase I report did not conduct a study to determine actual use, however the area represents an important wildlife linkage as identified in the Arizona's Wildlife Linkages Assessment. See revised proposal to reflect proper wording and terminology.
5. Providing ramps for wildlife in an underpass structure that is an ephemeral wash is not necessary.

This item has been removed from the proposal.
6. Using the bobcat as the focal species to design underpass structures ignores limitations for what other species may require. A bobcat is more of a generalist when it comes to the use of underpass structures...that is they will use small diameter underpass structures. A species such as mule deer, which is much more sensitive to underpass dimensions is a more adequate umbrella species.

Several published papers and reports studying bobcat ecology in urban environments have collectively determined that bobcats are NOT more of a generalist of underpass structures, as identified in Haas (2000), Ng et al. (2002), Lyren, et al. (2006), Riley, et al (2002; 2005), and Haas and Crooks (in review for Biological Conservation). We agree that mule deer are sensitive to underpass, and identify that the Santa Cruz River crossing provides suitable dimensions for mule deer to successfully navigate under Sahuarita Road.
7. There are not fencing criteria mentioned to funnel animals to the underpass structures.

Fencing recommendations will be provided at the conclusion of baseline monitoring, as identified in the Adaptive Management portion of the proposal (Appendix B)
8. Why should RTA pay \$25,000 to replace an existing CMP pipe? What is the benefit to wildlife?

The increase in culvert size will provide an added benefit to wildlife, particularly bobcat – which have been identified as increasing the probability of underpass use and frequency of underpass use as underpass size increases.

Arizona Game and Fish (II) Comment Responses:

1. Will there be additional crossings in this overall project or will the ones in the Construction proposal be the only ones?

Additional crossings within the project area include the span bridge over the Santa Cruz River and span crossing over Nogales Highway and the railroad tracks that parallel that roadway; additional small drainage structures may be required and included in the design process.

2. A height of 5 feet is not a suitable height for the passage of mule deer in general and at a distance of 150 feet this height seems extremely restrictive.

We did not identify a 5-foot high structure for mule deer; location 4 was recommended to be replaced with a 14.8-foot high span bridge to provide potential mule deer movement.

3. I am not certain how the monitoring is being conducted or what other than bobcat these structures are supposed to help.

Underpass monitoring will document all species or taxa that are utilizing the structures and be compared to track and roadkill surveys to evaluate the success of structures and/or identify additional mitigation measures that can maximize underpass use by the variety of species using them. The incorporation of larger crossing structures (and potential additional mitigation measures aimed at directing animals off the road and through the structures) focused along stretches of road that interface with town-identified areas of long-term protection will provide long-term opportunities for wildlife to move across Sahuarita Road.

4. Pertaining to the add-on areas, what is money being spent on there and why?

See revised proposal.

5. Include more detail in the proposal.

See revised proposal.

6. Will there be 150 feet of new ROW or is that the road width?

150 feet is the ROW.

7. Where are they located (mileposts are not given; how far apart are these structures)

Mileposts are not identified along this road; structures range between 250 to 2500 feet from each other

8. Is there a reason that the fifth recommended structure was not considered for an upgrade within this project?

The span bridge will not be replaced, because it would require raising the road profile a higher amount than the rest of the other culverts.

Also, there are a number of side entrances (private) that would require to be raised and possibly need to acquire additional right-of-way (increased cost).

9. Structures to be replaced are two-chamber box culverts yet in the funding proposal only three are proposed for funding. Are the two-chamber culverts being reduced to one chamber?

The two-chamber box culverts will still be two-chambers after construction however the height will be increased to the recommended heights in the Phase I report.

10. Why are there only 4 aprons being proposed for funding? Is the pipe not getting the apron?

The ramps will go away and the aprons will only be installed on the inlet side of the culvert. ADOT details show an apron on the outlet side which helps dissipate the energy. See revised construction proposal.

11. Responses to questions pertaining to structures:

- a. A cost-estimate of structures was not conducted as part of the Phase I study; effectiveness of recommendations was based on previous studies investigating relationships between the probability and frequency of wildlife crossings and underpass dimensions, as well as other features that have been identified in encouraging wildlife use of crossing and other drainage structures.
- b. A single opening was investigated for the four-chamber box culvert (i.e. convert to span bridge); a single opening was not recommended for the other structures, as the clearance was already prohibitive for mule deer use (as opposed to the clearance recommended for the four-chamber box culvert)
- c. An open span structure was recommended but is prohibitive based on the response to question 8.
- d. A larger width was not recommended, as the recommended openness value was addressed by increasing the height of the structure.
- e. The openness ratio was obtained from various reports, publications, and direct research experience on carnivore and mule deer use of urban wildlife crossing structures and range from 0.025 to 0.246 for the box/pipe culverts and 1.5 for the span bridge.
- f. Skyights have been identified as having a negative impact on wildlife use, particularly ungulates, as the light and noise within the structure (due to the gap in the structure between opposing lanes) are concentrated within the structure.
- g. The focal species for this project is bobcat, however additional measures being constructed at these structures will also aid use by smaller mammal and herpetofauna species.
- h. Fencing, if deemed necessary, will be addressed at the conclusion of the pre-construction monitoring.
- i. Ledges are not being proposed for the construction proposal.

12. Responses to questions pertaining to wildlife:

- a. Species potentially associated with game trails were identified using the existing underpasses (e.g. bobcat)

- b. The Phase I report did not conduct a study to determine actual use, however the area represents an important wildlife linkage as identified in the Arizona's Wildlife Linkages Assessment. See revised proposal to reflect proper wording and terminology.
 - c. The existing Santa Cruz River crossing (span bridge) and recommended span bridge would provide suitable crossings for mule deer based on their existing/recommended dimensions
 - d. Language has been amended
13. See Phase I report for land jurisdictions and future conservation plans along this road corridor.