CONCLUSIONS

This chapter recounts the scientific and analytical basis for comparison of the alternatives. It focuses on elements necessary to support comparison of action alternatives to advance the decision-making process and identify possible mitigation measures. The chapter necessarily highlights differences in impacts among action alternatives. General conclusions drawn from the findings presented in this chapter are:

- The Western and Eastern Sections of the Study Area present distinctly different environmental conditions.
- None of the kinds and degrees of impacts identified are atypical for a project like the proposed action.
- For most environmental elements, the kinds and degrees of impacts are relatively similar among the action alternatives; some noteworthy differences among the action alternatives do exist.
- Because of historical and projected population, job, and housing growth in the area, impacts on resources of concern would occur under the No-Action Alternative. In some instances, impacts under the No-Action Alternative would be greater than those that would occur under the action alternatives. As a specific example, energy use—in terms of annual fuel consumption—would be greater under the No-Action Alternative than under any of the action alternatives.

The proposed action would contribute to cumulative impacts on resources of regional concern. Historic and projected growth in employment, population, and housing has, however, generated the need for the proposed action; the proposed action would contribute little to inducing growth in the region.

Design of the action alternatives was developed to a level that facilitated meaningful analytical comparison of alternatives. Quantified impacts (e.g., anticipated displacements and relocations) would be subject to changes as design would be further refined. Changes resulting from such design refinement would not diminish the value of the comparative analyses presented in this chapter. Typically, such refinements would occur when ADOT and FHWA determine that such refinements would result in cost savings and/or reductions in identified impacts.

Mitigation measures presented throughout the chapter would be effective in avoiding, reducing, or otherwise mitigating impacts from action alternatives.

Specific to the Western Section, noteworthy observations related to impacts among the action alternatives are:

- The W59 (Preferred) Alternative would result in the fewest residential displacements (733) when compared with either the W71 or W101 Alternative (the W71 Alternative would cause 825 displacements and the W101 Alternative would cause between 926 and 1,304 residential displacements).
- Implementation of the W59 Alternative would displace a greater number of businesses (41) than would implementation of either the W71 or W101 Alternative. The W71 Alternative would displace 22 businesses. The W101 Alternative would displace 14 to 30 businesses, and it would potentially displace the most employees, suggesting that relocation mitigation measures associated with the businesses affected by the W101 Alternative would be the greatest among the action alternatives in the Western Section.
- Each action alternative would cause property and sales tax revenue losses because of the conversion of taxable property to a public transportation use (a nontaxable property). Overall, the action alternatives' effects on the overall tax base for affected municipalities (the Cities of Phoenix, Avondale, and Tolleson) would be negligible, with one exception: Implementation of the W101 Alternative would reduce the City of Tolleson's tax base by between 14 and 17 percent annually. The reduction would be a substantial impact and would hinder the City's ability to provide public services.
- Implementation of any of the action alternatives would be consistent with the intent of the RTP by virtue of completing the southwestern leg of SR 202L. Because it most closely approximates the alignment adopted in the RTP, the W59 Alternative is the alternative most consistent with the adopted plan.
- The degree, magnitude, intensity, and context of impacts from implementation of any of the action alternatives in the Western Section would be comparable for air quality, noise environment, water resources, floodplains, jurisdictional waters, biological resources, topography, geology, soils, hazardous materials, visual resources, cultural resources, and social conditions. In all instances, the magnitude of impacts from implementation of any of the action alternatives in the Western Section would be negligible with respect to the overall quality and robustness of the resources.
- With implementation of any of the action alternatives in the Western Section, adverse impacts would occur on populations protected under Title VI and the environmental justice Executive Order; impacts would not, however, be disproportionately high or cause undue hardship when compared with such impacts on the general population.

In the Eastern Section, a comparative analysis of action alternatives was not undertaken because only one action alternative, the E1 (Preferred) Alternative, is under detailed study. Notable conclusions from the analyses of the E1 Alternative are:

- The alignment would pass south of Ahwatukee Foothills Village (replacing the existing four-lane Pecos Road) and would result in 138 residential displacements.
- While unlikely to substantially alter the community character and cohesion of Ahwatukee Foothills Village, the E1 Alternative would increase visual and noise intrusions into the area.
- Existing drainage patterns from the South Mountains involve the release of runoff onto Community land; these patterns and the timing of runoff releases would be altered. Where drainage currently enters Community land through a series of natural washes, detention basins as part of the proposed freeway's design would capture runoff and meter releases onto Community land.

- Implementation of the E1 Alternative would adversely affect recreational, visual, natural, and cultural values of resources in the South Mountains. Although such impacts would directly affect less than 1 percent of the SMPP acreage, the intensity of the impact would vary, depending on the resource. In some instances, it would not be possible to avoid resources, or impacts on resources, nor would it be possible to reduce or otherwise mitigate impacts.
- The E1 Alternative would alter topography through the South Mountains. Specifically, the freeway would cross the mountains through severe cuts through three mountain ridges.

With consideration of the content of this entire chapter [and the following Chapter 5, *Section 4(f) Evaluation*] and in consideration of recurring concerns expressed by the public, the key issues of concern regarding the primary function of the analyses in Chapter 4 relate to economic impacts, displacements and relocations, societal impacts relating to community character and cohesion, cultural resources impacts, South Mountains impacts, air quality impacts, and secondary and cumulative impacts. Table S-3, *Environmental Impact Summary Matrix, Proposed Action*, in the *Summary* chapter, further highlights similarities and differences among the alternatives. Table S-4, *Proposed Mitigation Measures, Arizona Department of Transportation, Action Alternatives*, also in the *Summary* chapter, presents a comprehensive list of measures proposed to mitigate impacts presented in this chapter.

The purpose of this conclusions section is not to summarize all the data and analyses presented throughout the chapter (such summary information can be found in Tables S-3 and S-4). It also is not intended to make a determination regarding the environmentally preferred alternative. Other factors—such as operational performance, design parameters, public and political acceptability, and conceptual construction, operation, and maintenance cost estimates—functionally interact with environmental conditions and play a role in the EIS process. Those factors, along with the content of this chapter, have led to the identification of a Preferred Alternative as described in Chapter 3, *Alternatives*.

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[1] includes Foothills Club West

[2] personal communication, representative of Holsum Bakery, 2004

[3] personal communication, representative of Bay State Milling Company, 2005

[4] The sampling of the residential data was stratified but random—stratified in the sense that houses of similar size and relatively new vintage were examined, but random in the sense that no consideration was given to the neighborhoods from which these samples were drawn. If the house was located in a lower socioeconomic part of town, it was weighted equally as one located in a higher socioeconomic neighborhood. Overall, this could bias the results downward because most neighborhoods in the Study Area are newly developed and are likely considered more desirable than average. As a result, the project team assumed residential values were adjusted upward to reflect this.

[5] Because of inflation, the value of a dollar now is greater than a dollar in the future. The discounted present value is the value *now* of a dollar in a future year (for this analysis, in 2035), discounted at a constant percentage rate to reflect its annual loss in value attributable to projected inflation. For this analysis, a discount rate of 3 percent per year was used.

[6] U.S. Environmental Protection Agency. "National Ambient Air Quality Standards." Agency Web site, <epa.gov/ttn/naaqs/>.

[7] Arizona Department of Environmental Quality. "Air Quality Monitoring: Air Quality Monitoring Links." Department Web site, <www.azdeq.gov/environ/air/monitoring/links.html>.

[8] U.S. Environmental Protection Agency. "Criteria Pollutants." Agency Web site, <www.epa.gov/oar/oaqps/greenbk/o3co.html>.

[9] correspondence with L. Seals, Maricopa County Air Quality Department, on September 9, 2010

[10] U.S. Environmental Protection Agency. "Ozone—Good Up High, Bad Nearby." Agency Web site, <www.epa.gov/oar/oaqps/gooduphigh/good.html>.

[11] U.S. Department of Labor, Occupational Safety and Health Administration. "Acrolein and/or Formaldehyde." Department Web site, <www.osha.gov/dts/sltc/methods/organic/org052/org052.html>.

[12] U.S. Environmental Protection Agency. "Acrolein." CAS#107028. Agency Web site, <www.epa.gov/ttn/atw/hlthef/acrolein.html>.

[13] U.S. Environmental Protection Agency. "Benzene TEACH Chemical Summary." <www.epa.gov/teach/chem_summ/BENZ_summary.pdf>.

[14] U.S. Environmental Protection Agency. 2006. "Control of Hazardous Air Pollutants from Mobile Sources; Proposed Rule." *Federal Register* 71(60):15803–963.

[15] Agency for Toxic Substances and Disease Registry. "Medical Management Guidelines for 1,3-Butadiene." Agency Web site, <www.atsdr.cdc.gov/MHMI/mmg28.html>.

[16] U.S. Environmental Protection Agency Integrated Risk Information System. "1,3-Butadiene (CASRN 106990)." Agency Web site, <www.epa.gov/iris/subst/0139.htm>.

[17] U.S. Environmental Protection Agency. 2006. "Control of Hazardous Air Pollutants from Mobile Sources; Proposed Rule." *Federal Register* 71(60)40:15803–963.

[18] California Office of Environmental Health Hazard Assessment. "Health Effects of Diesel Exhaust." Department Web site, <www.oehha.ca.gov/public_info/facts/dieselfacts.html>, Sacramento, California.

[19] U. S. Environmental Protection Agency. "Technology Transfer Network Air Toxics Web Site. Formaldehyde." <www.epa.gov/ttn/atw/hlthef/formalde.html>.

[20] Agency for Toxic Substances and Disease Registry. "Toxicological Profile for Formaldehyde (CAS# 5000)." Agency Web site, <www.atsdr.cdc.gov/toxprofiles/tp111.html>.

[21] U.S. Environmental Protection Agency. 2001. "Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements." *Federal Register* 66(12):5001–93.

[22] U.S. Environmental Protection Agency. Technology Transfer Network. "1996 National-Scale Air Toxics Assessment." Agency Web site, <www.epa.gov/ttn/atw/nata/>.

[23] U.S. Environmental Protection Agency. Technology Transfer Network. "1996 National-Scale Air Toxics Assessment; Emissions Data Tables." Agency Web site, <www.epa.gov/ttn/atw/nata/tablemis.html>.

[24] Calculated from data in U.S. Environmental Protection Agency's *Inventory of Greenhouse Gas Emissions and Sinks, 1990–2009*.

[25] Calculated from data in U.S. Energy Information Administration's *International Energy Statistics, Total Carbon Dioxide Emissions from the Consumption of Energy*, <www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8>, accessed September 12, 2011.

[26] Calculated from data in U.S. Energy Information Administration's Figure 104, <205.254.135.24/oiaf/ieo/graphic_data_emissions.html>, and U.S. Environmental Protection Agency's Table ES-3, <epa.gov/climatechange/emissions/downloads11/US-GHG-Inventory-2011-Executive-Summary.pdf>.

[27] From <www.epa.gov/otaq/models/moves/index.htm>. EPA's Motor Vehicle Emissions Simulator model can be used to estimate vehicle exhaust emissions of carbon dioxide (CO_2) and other greenhouse gases (GHGs). CO_2 is frequently used as an indicator of overall transportation-related GHG emissions because the quantity of these emissions is much larger than

that of all other transportation-related GHGs combined, and because CO_2 accounts for 90 to 95 percent of the overall climate impact from transportation sources. The model includes estimates of both emissions rates and vehicle miles traveled; these were used to estimate the Arizona statewide highway emissions in Table 4-37.

[28] Arizona emissions represent a smaller share of global emissions in 2035 because global emissions increase at a faster rate.

[29] Selected to represent a "worst-case" for purposes of this comparison; the Preferred Alternative may have a smaller contribution.

[30] For example, Figure 114 of the U.S. Energy Information Administration's *International Energy Outlook 2010* shows that future emissions projections can vary by almost 20 percent, depending on which scenario for future economic growth proves to be most accurate.

[31] When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency is required make clear that such information is lacking (40 C.F.R. § 1502.22). The methodologies for forecasting GHG emissions from transportation projects continue to evolve, and the data provided should be considered in light of the constraints affecting the currently available methodologies. As previously stated, tools such as the U.S. Environmental Protection Agency's Motor Vehicle Emissions Simulator model can be used to estimate vehicle exhaust emissions of carbon dioxide and other GHGs. However, only rudimentary information is available regarding the GHG emissions impacts of highway construction and maintenance. Estimation of GHG emissions from vehicle exhaust is subject to the same types of uncertainty affecting other types of air quality analyses, including imprecise information about current and future estimates of vehicle miles traveled, vehicle travel speeds, and the effectiveness of vehicle emissions control technology. Finally, there presently is no scientific methodology that can identify causal connections between individual source emissions and specific climate impacts at a particular location.

[32] For more information on fuel economy proposals and standards, see the National Highway Traffic Safety Administration's Corporate Average Fuel Economy Web site: <www.nhtsa.gov/fuel-economy>.

[33] Secondary maximum contaminant levels (SMCLs) are guidelines that identify acceptable concentrations of contaminants that cause unpleasant tastes, odors, or colors in the water. As guidelines, they are not enforceable. SMCLs are for contaminants that will not cause adverse health effects.

[34] personal communication, D. Owsiany, U.S. Army Corps of Engineers, Phoenix/Nevada Area Office, December 31, 2003

[35] personal communication, Tom Hildebrandt, Wildlife Program Manager, Arizona Game and Fish Department, 2004

[36] <www.fws.gov/southwest/es/arizona/Yuma_Rail.htm>

[37] <www.mbr-pwrc.usgs.gov/id/framlst/i3870id.html>

[38] <www.fws.gov/midwest/eagle/viewing/eaglepix.html>

[39] personal communication, Kenneth Jacobson, Arizona Game and Fish Department Bald Eagle Management Coordinator, with HDR Engineering, Inc., on April 21, 2010

[40] The latest list of restricted routes in Arizona was published in *Federal Register*, 65(233), December 4, 2000.