BLM

Sonoran Valley Parkway Project

DRAFT Environmental Impact Statement

June 2013

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Phoenix District Office
21605 North 7th Avenue
Phoenix, Arizona 85027-2929
www.blm.gov/az/

In reply refer to:
DOI-BLM-AZ-P020-2011-013-EIS
AZA-34177

June 2013

Dear Reader:

Attached for your review and comment is the Draft Environmental Impact Statement (DEIS) for the Sonoran Valley Parkway (Parkway) for the Bureau of Land Management (BLM) Phoenix District Office, Lower Sonoran Field Office. This DEIS was developed in accordance with the National Environmental Policy Act of 1969 (NEPA), the Federal Land Policy and Management Act of 1976, implementing regulations, the BLM's NEPA Handbook (H-1790-1), and other applicable laws and policy. The BLM prepared this document in consultation with several cooperating agencies, including the Arizona Department of Transportation, Arizona Department of Game and Fish, Arizona State Land Department, Flood Control District of Maricopa County, City of Maricopa, and Maricopa Association of Governments; and takes or took into account public comments received during the scoping effort. The DEIS is open for a 45-day review period beginning the date the U.S. Environmental Protection Agency publishes the Notice of Availability of the DEIS in the *Federal Register*.

The DEIS is not a decision document. Rather, it is a document that will inform the BLM's final decision on whether to issue a ROW grant. The DEIS is being released to inform the public and interested parties of potential impacts associated with implementing Goodyear's proposal, as well as alternatives identified by the agencies. The BLM is seeking comments on the DEIS to establish the adequacy of the document so that it can prepare a Final Environmental Impact Statement (FEIS).

This DEIS has been prepared to analyze the potential impacts of granting a Right-of-Way (ROW) to the City of Goodyear for the purpose of constructing and operating a proposed two to six-lane, 15 to18-mile Parkway. The proposed Parkway would run from Goodyear to Mobile in Rainbow Valley, Maricopa County, Arizona, to connect residents of the annexed lands of Goodyear's Sonoran Valley Planning Area near the community of Mobile for fire, police, and emergency services. The total length of the proposed Parkway would depend on the Alternative and/or Sub-alternative selected and authorized by the BLM. The proposed Parkway would be built in three phases of two lanes each. The timeframe for the phased construction would be determined based on current and future growth in the area. The majority of the proposed Parkway would be located on the BLM lands administered by the Lower Sonoran Field Office, as well as on private and Arizona State Land Department lands. The public lands within the proposed Parkway area are managed under the BLM's Lower Sonoran Resource Management Plan.

The public was first provided a 45-day scoping period at the beginning of the DEIS process to identify potential issues and concerns associated with the Proposed Action. Scoping comments were used to help develop alternatives to the Proposed Action to guide the analysis of potential effects from the project, and to identify potential mitigations for inclusion in the DEIS.

The DEIS analyzes three Action Alternatives and two Sub-alternatives in addition to a No Action Alternative. The Sub-alternatives were developed to avoid a historic homestead site near the southern terminus of the proposed alignment in Mobile at State Route 238. The BLM has identified a modified Proposed Action, Alternative A, including Sub-alternative G as the the BLM Preferred Alternative route for the proposed Parkway, including best management practices and mitigation measures. Alternative A and Sub-alternative G have been identified as the BLM Preferred Alternative because these alternatives represent the greatest combination of resource protection measures that would fulfill the BLM's mission and responsibilities. It is anticipated the proposed Parkway, if constructed, would provide the BLM with improved management tools by enhancing opportunities to control vehicle entry into the Sonoran Desert National Monument from innumerable, unplanned primitive roads and wash vehicle route networks.

The BLM is seeking comments on the DEIS to establish the adequacy of the document so that it can prepare a Final EIS. Comments will be accepted for 45 calendar days following the U.S. Environmental Protection Agency's publication of the Notice of Availability in the *Federal Register*. All timely comments, received on the DEIS will be considered in the preparation of the FEIS, currently scheduled for release in Fall 2013. All substantive comments and information submitted will be summarized and addressed in the FEIS. Substantive comments are ones, that with reasonable basis:

- question the accuracy of the information in the DEIS;
- question the adequacy of, methodology for, or assumptions used for the environmental analysis;
- present new information relevant to the analysis; and
- present alternatives other than those analyzed and cause changes or revision in one or more of the alternatives.

Comments that are not substantive generally contain only opinion or preferences, but will be considered and included as part of the decision-making process. They will not, however, receive a formal response from the BLM. Comments that are not considered substantive include the following:

- comments in favor of or against the Proposed Action or alternatives that do not include reasoning that meets the criteria listed above;
- comments that only agree or disagree with BLM policy or resource decisions and that do not include justification or supporting data that meet the criteria listed above;
- comments that do not pertain to the project area or the project; or
- comments that take the form of vague, open-ended questions.

Your review and comments on the content of this document are critical to the success of this NEPA process. If you wish to submit comments on the DEIS, we request that you make your comments as specific as possible. Comments will be more helpful if they include suggested changes, additional sources, or alternate methodologies, and if they reference a section or page number.

Comments may be submitted electronically to: BLM_AZ_SVPP@blm.gov. Comments may also be submitted by mail to: Sonoran Valley Parkway Project, ATTN: Kathleen Depukat, Project Manager, Bureau of Land Management, Phoenix District Office, 21605 North 7th Avenue, Phoenix, Arizona, 85027-2929. To facilitate analysis of comments and information submitted, we strongly encourage you to submit comments in an electronic format.

Before including your address, phone number, e-mail address, or other personal identifying information with your comments, please be advised that your entire comment, including your personal identifying information, may be made publicly available at any time. Although you may ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Public meetings to provide an overview of the document, respond to questions, and take public comments will be announced through public notices, media releases, the BLM internet site, and/or public mailings at least 15 days in advance. Public meetings will be held in Goodyear and Maricopa, Arizona.

Copies of the DEIS have been sent to affected federal, state, and local government agencies and American Indian tribes, many of whom have been involved either as cooperating or consulting agencies. Copies of the DEIS are available for public inspection at the BLM Phoenix District Office at the above address. In addition, the DEIS can be viewed at libraries in the following locations:

Old Town Branch Library
328 West Western Avenue
Avondale, Arizona 85323
Phone: (623) 333-2665

Avondale City Library
495 East Western Avenue
Avondale, Arizona 85323
Phone: (623) 333-2665

Goodyear Branch Library
250 North Litchfield Road Suite 185
Goodyear, Arizona 85338
Phone: (602) 652-3000

Maricopa Public Library
41600 W. Smith-Enke Road, Building #10
Maricopa, Arizona 85138
Phone: (520) 568-2926

You may also access the document on the Internet at:

http://www.blm.gov/az/st/en/prog/lands___realty/svpp-eis.html

Thank you for your continued interest in the Sonoran Valley Parkway. We appreciate the information and suggestions you contribute to the EIS process. For additional information or clarification regarding this document or the EIS process, please contact: Kathleen Depukat, Project Manager, telephone 623-580-5681 at the above address; email kdepukat@blm.gov.

Sincerely,

Dorothea J. Boothe, Acting Manager
Lower Sonoran Field Office
Bureau of Land Management

ENVIRONMENTAL IMPACT STATEMENT

Sonoran Valley Parkway Project

U.S. Department of the Interior
Bureau of Land Management
Lower Sonoran Field Office
Phoenix, Arizona
June 2013

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Type of Action: ( ) Administrative Draft (X) Draft ( ) Final

Cooperating Agencies: Arizona Department of Transportation
Arizona Game and Fish Department
Arizona State Land Department
City of Maricopa, Arizona
Flood Control District of Maricopa County
Maricopa Association of Governments

Responsible Official: Dorothea Booth, Acting Lower Sonoran Field Manager

For Further Information Contact: Kathleen Depukat
BLM Phoenix District Office
(623) 580-5681

Abstract

This Draft Environmental Impact Statement (EIS) documents the analysis of potential environmental impacts of the City of Goodyear's (City) proposed Sonoran Valley Parkway (Parkway). In February 2008, the City submitted an application for permanent right-of-way (ROW) to the Bureau of Land Management (BLM) for the construction and operation of an approximately 15- to 18-mile-long Parkway (the length depends on the route alternative and/or sub-alternative authorized by BLM). The Parkway would be constructed in phases, beginning with a two-lane Parkway, with expansions to a four- and six-lane Parkway. The timeframe for the phased construction is unknown.

The application to BLM indicates the request for a 250-foot-wide ROW. Temporary construction easements and access roads for construction and staging will also be needed; these will be located within the 250-foot ROW. The 250-foot ROW width is proposed for the two-lane Parkway (Phase One) and temporary construction areas and also for the potential expansions of the Parkway into a four-lane (Phase Two) and six-lane (Phase Three) Parkway. Some areas of the proposed Parkway alignments and alternatives are located on either private or Arizona State Land Department (ASLD) land. Private lands will be obtained by the City through fee purchases and easements. An identical ROW easement would be requested from the ASLD for any portions of the proposed Parkway that would cross ASLD lands.

This Draft EIS describes the physical, biological, cultural, and socioeconomic resources in and around the proposed Parkway. The Draft EIS considers the impacts of three alternatives and two sub-alternatives, including the "No Action" Alternative. The focus for the impact analysis was based on resource issues and concerns identified during public scoping conducted for the proposed Parkway and by BLM Interdisciplinary Resource Team specialists.

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Chapter 1

PURPOSE AND NEED

1.1 INTRODUCTION

The U.S. Department of the Interior (DOI)[1] Bureau of Land Management (BLM) administers approximately 245 million acres of public land in the United States. This administrative responsibility consists of stewardship, conservation, and resource use. The mission of the BLM is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. The BLM is committed to managing, protecting, and improving public lands in a manner to serve public interest, building on the principles of multiple use and sustainability.

In February 2008, the City of Goodyear (City) submitted an application for a permanent right-of-way (ROW) to the BLM for the construction and operation of a two- to six-lane, approximately 15- to 18-mile-long parkway; the total length of the proposed parkway depends on the alternative or sub-alternative selected and authorized by the BLM (if a sub-alternative is selected, it would not add to the 15- to 18-mile-long total). Goodyear's application is for a 250-foot-wide ROW to allow for the construction, operation, and maintenance of up to a six-lane Parkway. Portions of the proposed Parkway would be located on BLM lands administered by the Lower Sonoran Field Office, as well as on private and Arizona State Land Department (ASLD) lands.

The National Environmental Policy Act of 1969 (42 United States Code [USC] 4321 *et seq.*) (NEPA) requires federal agencies, in their decision-making processes, to consider the impacts of their proposed actions on the human environment. NEPA also requires that a practical range of reasonable alternatives be considered and evaluated; these alternatives must meet the purpose of and need for the Sonoran Valley Parkway Project (SVPP) while minimizing or avoiding environmental impacts. The intent of NEPA analyses is to disclose the effects of federal actions and to inform agency decision makers. To meet NEPA requirements, federal agencies must prepare a detailed statement—in this case an environmental impact statement (EIS)—describing the direct, indirect, and cumulative effects of their proposed actions and alternatives to those actions on the human environment. The EIS must also describe 1) any unavoidable or residual (i.e., unable to be mitigated) adverse impacts that would result from implementing the Proposed Action or alternatives; 2) the relationship between the short-term uses of the land (i.e., the Proposed Action and alternatives) and the long-term productivity of the human environment; and 3) any irreversible and irretrievable commitments of resources that would result from implementing the Proposed Action or alternatives.

This EIS analyzes and discloses the environmental impacts of alternatives considered in detail, including the No Action Alternative (all alternatives are described in detail in Chapter 2). This EIS does not contain final decisions regarding the Proposed Action or other alternatives.

Decisions made regarding the project will be documented in a Record of Decision (ROD) signed by the authorized officer, the Field Manager for the BLM Lower Sonoran Field Office. The BLM decision will apply only to federal public lands.

[1] See Appendix A for list of acronyms and abbreviations.

1.2 BACKGROUND

The City of Goodyear is located in Maricopa County, approximately 20 miles west-southwest of Phoenix, Arizona. The City added to its Municipal Planning Area (MPA) an additional 95 square miles known as the Sonoran Valley Planning Area (SVPA) through Resolution 07-1113, passed on January 8, 2007. The 95 square miles that make up the SVPA consist of approximately 8.7% ASLD lands, 39.8% privately owned land, and 51.5% BLM lands. In May 2007, the City annexed 67 square miles of its MPA (about 70% of the SVPA) to include lands located adjacent to the City's existing southern planning area boundary. The SVPA is bounded to the northeast, east, and south by the Sierra Estrella Mountains (which divide Maricopa County to the west and Pinal County to the east), Estrella Mountain Regional Park, the Gila River Indian Community, and the city of Maricopa, respectively. The SVPA is bounded to the west and southwest by the Sonoran Desert National Monument (SDNM). The area was previously located within unincorporated Maricopa County. Figure 1-1 shows the SVPA (City 2007).

1.2.1 Sonoran Valley Planning Area

The City determined that because of current and continuing growth on lands in the SVPA, annexation of the area was necessary to better manage growth and development for current and future residents and address the need for public facilities and services in the SVPA. Annexation of BLM lands does not change jurisdictional ownership; therefore, newly annexed SVPA lands will remain under BLM management. The community of Mobile is located in the south end of the SVPA. The estimated population of the SVPA would be more than 200,000 residents at full build-out; proposed land uses within the SVPA are expected to generate more than 1 million trips on a typical weekday at full build-out (see the Reasonably Foreseeable Development [RFD] scenario presented in Appendix B). Build-out is defined as when the City's General Plan has been fully implemented. There is no set time frame for build-out, but it is generally assumed to be within the next 40 to 60 years (e.g., 2053–2073).

Planning for the SVPA will follow a master-planned approach, which allows for planning at a large scale and considers recommended zoning and land use strategies to guide future development. Planning and development of the SVPA anticipates a mix of residential, employment, and supportive land uses within the 67 square miles. To service the anticipated mix of residential, employment, and other land uses (e.g., open space, educational, etc.), a major arterial street or roadway would be needed for the SVPA to connect the newly annexed area to the balance of the City. The primary purpose of the proposed SVPP would be to provide residents of the SVPA with access to and from the city of Goodyear, which is now geographically separate (i.e., residents in the community of Mobile, Arizona), to facilitate traffic movement that would result from growth in the area, and to provide a transportation route that allows for timely emergency services (police, fire, ambulance) response to residents in the SVPA (City 2009a). The secondary purpose of the SVPP is to improve connectivity, along with other future roadway corridors, as identified by the Maricopa Association of Governments (MAG) in the regional transportation planning process (see the *Hidden Valley Transportation Framework Study* [MAG 2009]).

The proposed master-planned approach of the SVPA allows for the integration of mutually supportive land uses and allows for many of the trips to be internal to the SVPA, meaning that the majority of the trips generated by these land uses will have both the trip origin and destination within the SVPA.

1.2.2 Current Sonoran Valley Planning Area Mobility

Figure 1-1 shows the SVPA and Goodyear city limits and Municipal Planning Boundary; these are the areas that the SVPP would service. Currently, residents in and around the community of Mobile and the city of Maricopa have only two viable options for commuting to and from the municipal boundaries of

Goodyear: 1) an easterly route that uses State Route (SR) 238 east to SR 347 (Maricopa Road), SR 347 north to 51st Avenue, 51st Avenue to Interstate 10 (I-10), and I-10 west to Goodyear—a total distance of over 55.5 miles; or 2) a westerly route that uses SR 238 west to SR 85, SR 85 to I-10, and I-10 east to Goodyear—a total distance of about 68.0 miles. Recent population growth has created peak traffic volumes on area roadways that have significantly reduced the operating conditions on these roadways. Some residents of Mobile, as well as others from outside the community, have been using the unpaved El Paso Natural Gas (EPNG) pipeline maintenance road to travel to and from Mobile and the core areas of Goodyear. Such use is not recommended by the BLM because EPNG's authorization to use the ROW does not include public travel and creates safety concerns around buried pipelines.

The maintenance road runs northwest-southeast and generally parallels the eastern boundary of the SDNM. Four existing natural gas pipelines (three EPNG gas lines and one Transwestern gas line) are buried directly beneath the maintenance road, but in some places they lie only a few inches beneath the surface and pose a safety threat to the vehicles driving over them. Unauthorized vehicles using the maintenance road also exacerbate erosion problems. Moreover, the lack of alternate routes contributes to the need for a publicly available, safe route and contributes to the need for residents to travel along this unpaved road. This would thus alleviate safety concerns and significantly reduce continuing degradation of the EPNG maintenance road (personal communication, Krauss 2007). In addition, it is anticipated that availability of a direct paved route between the city of Goodyear and the community of Mobile would greatly reduce fugitive dust and unauthorized use of the EPNG pipeline maintenance road.

A major arterial street is designed with the primary purpose of vehicular mobility over moderate to extended trip lengths. Major arterial streets provide a low level of direct property access, with left-turn access restricted to a limited number of left-turn opportunities per mile. These streets typically carry between 24,000 and 48,000 vehicles per day and provide route continuity between neighboring areas. A major arterial is generally an at-grade roadway composed of up to six lanes, in addition to bike lanes and sidewalks, a raised median, and landscape tracts.

1.2.3 Future Sonoran Valley Planning Area Mobility

To accommodate growth within the SVPA, the City determined that a major arterial road (the Sonoran Valley Parkway) would be needed to provide more direct access to residents in the newly annexed area. The addition of a continuous, non-fragmented route would facilitate mobility and reduce the potential for a future transportation capacity deficiency.

The current population in Goodyear is approximately 65,000 (U.S. Census Bureau [Census Bureau] 2010) and is expected to reach more than 358,000 by 2035 and more than 511,000 at full build-out (MAG 2009). As previously discussed, build-out is defined as when the City's General Plan has been fully implemented. There is no set time frame for build-out, but it is generally assumed to be within the next 40 to 60 years (e.g., 2053–2073). Current population in the SVPA is approximately 100 individuals. At the present time, there is no viable or convenient network of roads to provide direct access from Goodyear to Mobile in the SVPA. Travelers and residents use a combination of SR 238, SR 85, SR 347, I-10, and other local roads for access, thus lengthening travel time and contributing to congestion on these roadways.

The purpose of the SVPP derives from a combination of regional and local planning documents that show a strong correlation between forecasted population growth and future transportation need within the SVPA. The development of transportation plans by metropolitan planning organizations, such as MAG, and municipalities, such as Goodyear, requires wide-ranging coordination and consultation with the public, government agencies, affected stakeholders, and tribes, in addition to quantitative population and employment forecasting models. These broad-based planning efforts establish a vision for the region's

future transportation system, define transportation goals and objectives for realizing that vision, and determine a time frame for implementation:

- The MAG 2010 Regional Transportation Plan Update (MAG 2010) accepts the SVPP as an "illustrative" corridor, according to the recommendations of the *Hidden Valley Transportation Framework Study* (MAG 2009), which shows the SVPP as a future parkway that is currently unfunded.
- In 2006, the City developed the Traffic Analysis Report for the SVPA, which provides an evaluation of expected traffic conditions based on trip generation estimates, given future land uses. The results of this report show more than 1 million trips being generated on a typical weekday, with the majority being home based, or generated by residential land uses.

The proposed project requires BLM approval of a permanent ROW for the construction, operation, and maintenance of an arterial roadway alignment across federal lands; thus, this project requires federal action. The BLM has determined that preparation of an EIS under NEPA is necessary to comprehensively analyze potential environmental impacts of this project.

The exact location of the proposed State Route Loop 303 (SR 303L) alignment (providing a north-south connection between the proposed I-11 Hassayampa Freeway and SR 30 in Maricopa, Arizona) is currently under study and has not been identified by the Arizona Department of Transportation (ADOT). As of December 2012, the proposed alignment of SR 303L south of I-10 is unknown; however, the planned roadway will ultimately have five lanes in each direction, in keeping with the typical freeway network throughout metropolitan Phoenix. A feasibility study of SR 303L is under development as of this publication date. In terms of scheduling, this portion of the SR 303L, from the Hassayampa Freeway to SR 30, was originally funded for fiscal years 2024 and 2025; however, as a result of the economic downturn, funding is no longer allocated in the Regional Transportation Plan Freeway Program. Therefore, the relevance of SR 303L to SVPP is remote and speculative since it is currently unfunded, in the initial stages of feasibility study, and would not provide a viable alternative transportation connection.

1.3 PURPOSE AND NEED

The BLM's purpose of and need for this action is to respond to the City's ROW application under Title V of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701 *et seq*.) for a ROW grant to construct, operate, and maintain a proposed two- to six-lane Parkway in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to the City for the proposed project.

1.3.1 Purpose of the Action

Specifically, the BLM's purposes in considering the project are as follows:

- To process ROW application AZA-34177 submitted by the City to construct a new, permanent, two- to six-lane, public major arterial road (Parkway) for year-round use from southern Goodyear to SR 238 near Mobile.
- To meet public needs for use authorizations, such as ROWs, permits, leases, and easements, while avoiding or minimizing adverse impacts to other resource values and locating the uses in conformance with land use plans.

1.3.2 Need for the Action

The BLM's need in considering the Proposed Action is to comply with Title V of FLPMA (43 USC 1761–1771). The BLM is authorized to grant ROWs for roads and trails and "such other necessary transportation or other systems or facilities which are in the public interest and which require rights-of-way over, upon, under, or through such lands."

1.4 SCOPE OF THE ANALYSIS

1.4.1 The EIS Decision Framework

NEPA requires federal agencies, in their decision-making processes, to consider the impacts of their proposed actions on the human environment and to consider reasonable alternatives to those actions. The intent of NEPA analyses is to disclose the effects of federal actions and to inform agency decision makers. To meet NEPA requirements, federal agencies must prepare a detailed statement—in this case an EIS—describing the direct, indirect, and cumulative effects of their proposed actions and alternatives to those actions on the human environment. The EIS must also describe 1) any unavoidable or residual (i.e., unable to be mitigated) adverse impacts that would result from implementing the Proposed Action or alternatives; 2) the relationship between the short-term uses of the land (i.e., the Proposed Action and alternatives) and the long-term productivity of the human environment; and 3) any irreversible and irretrievable commitments of resources that would result from implementing the Proposed Action or alternatives.

The preparation of an EIS is a process consisting of the following general steps:

- Issue the Notice of Intent (NOI) to prepare an EIS
- Conduct public and agency scoping
- Prepare, identify a preferred alternative, and issue the Draft EIS
- Conduct public review and comment on the Draft EIS
- Prepare and issue the Final EIS, including responses to comments
- Hold a 30-day waiting period
- Issue a ROD; the ROD explains the rationale for the selected alternative

This EIS analyzes and discloses the environmental impacts of the Proposed Action, the No Action, two action alternatives, and two sub-alternatives (all alternatives are described in detail in Chapter 2). It is intended to encourage public participation in the BLM's decision-making process. It provides an analysis of impacts that would result from the implementation of the Proposed Action and other alternatives, and it identifies mitigation measures to address environmental consequences. This EIS does not contain final decisions regarding the Proposed Action or other alternatives.

The analysis contained in Chapters 3 and 4 of this EIS is organized by resource and resource use. Each resource or resource use is geographically bounded by a unique analysis area, which is defined at the beginning of each resource section in Chapter 3.

1.4.2 Decisions to Be Made Through this EIS

Decisions made regarding the Proposed Action and alternatives will be documented in a ROD signed by the authorized officer, the Field Manager for the BLM Lower Sonoran Field Office. The BLM decision will apply only to federal public lands.

In the ROD, the BLM Lower Sonoran Field Manager will determine the following:

- Whether the analysis contained in this EIS is adequate for the purposes of reaching an informed decision regarding the ROW application.
- Whether to approve the Proposed Action, select a different alternative, select a combination of alternatives, or deny the ROW request.
- Whether the Proposed Action and alternatives are in conformance with applicable land and resource management plans.
- What the appropriate terms and conditions are (including mitigation and monitoring requirements), if the ROW is approved.

Further, a plan of development (POD) and constituent plans will be referenced in the ROD and attached as an appendix to the ROD.

1.5 REGULATORY AUTHORITY AND RESPONSIBILITY

The BLM's planning process is governed by the FLPMA (43 USC 1701 *et seq*. and 43 Code of Federal Regulations [CFR] 1600), which governs the administrative review process for most BLM decisions. Land use plans ensure that BLM-administered public lands are managed in accordance with the intent of Congress as stated in FLPMA and under the principles of multiple use and sustained yield. As required by FLPMA, public lands must be managed in a manner that 1) protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; 2) where appropriate, preserves and protects certain public lands in their natural condition and provides food and habitat for fish and wildlife and domestic animals; and 3) provides for outdoor recreation and human occupancy and use by encouraging collaboration and public participation throughout the planning process. In addition, public lands must be managed to help meet the nation's needs for domestic sources of minerals, food, timber, and fiber from public lands.

Land use plans are the main mechanism for guiding BLM's activities to achieve the mission and goals outlined in the DOI's *GPRA Strategic Plan, Fiscal Years 2007–2012* (Strategic Plan) (DOI 2007).

The *Lower Sonoran Resource Management Plan* (Lower Sonoran RMP) (BLM 2012a) is the current land use plan for the project area.

1.6 LEAD AND COOPERATING AGENCIES

The BLM is the lead federal agency responsible for preparing this EIS and the associated analyses. The Lower Sonoran Field Office is the lead office, responsible for consultations required by Section 7 of the Endangered Species Act of 1973 (ESA), as amended, and Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

Cooperating agencies include those federal, state, or local agencies that have jurisdiction by law and/or special expertise. Those with jurisdiction by law will make their own decisions to approve or deny all or part of the SVPP. Those with special expertise or information have assisted and will continue to assist in the development of the analysis. Chapter 5 includes a list of agencies invited to participate as "cooperating agencies;" six agencies have accepted. The six cooperating agencies for this project include the Arizona Game and Fish Department (AGFD), ADOT, MAG, ASLD, Flood Control District of Maricopa County (FCDMC), and the City of Maricopa.

1.7 RELATIONSHIP TO POLICIES, PLANS, AND PROGRAMS

This EIS was prepared in accordance with NEPA and in compliance with Council on Environmental Quality (CEQ) implementing regulations (40 CFR 1500–1508) and DOI requirements (43 CFR 1600, Department Manual 516, guidelines listed in the BLM NEPA Handbook H-1790-1 [BLM 2008a], and the BLM Land Use Planning Handbook H-1601-1 [BLM 2005a]).

1.7.1 Conformance with Existing BLM Resource Management Plans

The Proposed Action would be located in the Lower Sonoran Planning Area. The original ROW application was filed in 2008, at which time the *Lower Gila South Resource Management Plan/Environmental Impact Statement* (1988 Lower Gila South RMP/EIS) (BLM 1988, as amended BLM 2005b) was the managing RMP for the Lower Sonoran Field Office. Currently, this planning area is managed under the Lower Sonoran RMP, approved in September 2012. The Lower Sonoran RMP provides guidance for the management of over 930,000 acres in south-central Arizona.

1.7.2 Conformance with Lower Sonoran RMP

The Lower Sonoran RMP directs management of the federal surface and mineral estate managed by the Lower Sonoran Field Office, primarily within Maricopa County but also including portions of Pinal, Pima, Yuma, and Gila Counties. The RMP allows for multiple uses of public lands and does not prohibit the development of transportation systems on public lands.

Although the Proposed Action and alternatives are not specifically mentioned in the Lower Sonoran RMP, they are consistent with the plan's objectives, goals, and decisions (see discussion below in Chapter 2, Section 2.2.2.2). BLM completed the Lower Sonoran RMP conformance analysis on May 11, 2012. An RMP conformance analysis consists of a cross-check with the Proposed Action (i.e., constructing and operating a Parkway on BLM lands) and BLM management prescriptions that would occur on the BLM lands where the Proposed Action would be located (e.g., grazing allotments and land uses). No alternatives that would conflict with the Lower Sonoran RMP have been considered.

The proposed Parkway is not specifically mentioned in the Lower Sonoran RMP; however, the proposed project is consistent with the plan's objectives, goals, and decisions and would not require a plan amendment. As specified in the Lower Sonoran RMP and in Section 2.2.2.2 below, linear transportation projects are not required to be located within a designated utility corridor but are allowed to be located within a utility corridor.

The Proposed Action and alternatives are partially located within the EPNG multi-use corridor (Figure 1-2). The EPNG multi-use corridor was designated a Section 368 Corridor by the Energy Policy Act of

2005. The Lower Sonoran RMP does not prohibit major linear land use authorizations (LUAs), such as a Parkway, within the EPNG multi-use utility corridor.

1.7.3 Conformance with Statutes and Regulations

The following is a summary of selected statutes, regulations, and executive orders (EOs) applicable to a project such as the proposed SVPP.

American Antiquities Act of 1906. This act seeks to protect historic and prehistoric ruins, monuments, and objects of antiquity and scientific interest on lands owned or controlled by the federal government by imposing misdemeanor-level criminal penalties.

American Indian Religious Freedom Act. The American Indian Religious Freedom Act (AIRFA) says that on and after August 11, 1978, "it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites." This law is designed to protect American Indians rights of religious freedom. It does not mandate that American Indian concerns are paramount but requires that the federal government consider such concerns in its decisions.

Arizona Native Plant Law. The Arizona Native Plant Law (ANPL) states that "a person shall not take, transport or possess any protected native plant taken from the original growing site in this state without possessing a valid permit issued by the Arizona Department of Agriculture [ADA]" (Arizona Revised Statutes [ARS] 3-906). The ANPL applies to listed plants that are naturally occurring, but not to landscaped or planted individuals. Native plants that are protected by the ANPL include all cacti, yucca, agave, and many leguminous tree species such as paloverde, mesquite, and ironwood.

Archaeological Resources Protection Act of 1979, as amended. This act provides for protection of archaeological resources on federal lands. The act requires permits for the excavation or removal of federally administered archaeological resources and encourages cooperation between federal agencies and private individuals in identifying and protecting important resources. In addition, the act invokes penalties for excavating, removing, damaging, or defacing any archeological resources older than 100 years on public or Indian lands.

Clean Air Act of 1963, as amended. The Clean Air Act (CAA) requires any federal entity engaged in an activity that may result in the discharge of air pollutants to comply with all applicable air pollution control laws and regulations (federal, state, or local). This act directs the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS) for six different criteria pollutants: carbon monoxide (CO), ozone (O_3), particulate matter (PM), sulfur oxides, nitrogen oxides (NO_x), and lead. Maricopa County Air Quality Rules (MCAQR) outline measures to be incorporated into construction specifications to minimize potential dust emissions. Rules 310 and 310.01 of the MCAQR include work practice standards to ensure that emissions from fugitive dust sources, such as open areas, vacant lots, unpaved parking lots, and unpaved roadways, are minimized to the extent practicable. An earthmoving permit and a dust control plan are required for any operations that disturb a total surface area greater than or equal to 0.10 acre.

Clean Water Act of 1977, as amended. Section 404 of the Clean Water Act (CWA) identifies conditions under which a permit is required for construction projects that result in the discharge of fill or dredged material into waters of the U.S. (WUS). There are some jurisdictional WUS within the project area; once an alternative is selected by the BLM, the City will submit the necessary jurisdictional delineations to the U.S. Army Corps of Engineers (USACE) and obtain the required permits prior to any discharge into WUS. Section 402 of the CWA identifies conditions under which a permit is required for the discharge of

pollutants from a point source into WUS. The National Pollutant Discharge Elimination System (NPDES) stormwater permitting rule requires all operators of construction activity that disturbs 5 or more acres of land to apply for an NPDES stormwater permit.

Endangered Species Act of 1973, as amended. Section 7 of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that undertaking, funding, permitting, or authorizing an action is not likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat, as defined under the act, exists only after USFWS officially designates it. Critical habitats are 1) areas within the geographic area that have features essential to the conservation of the species and that may require special management consideration or protection; and 2) those specific areas outside the geographic area occupied by a species at the time it is listed that are essential to the conservation of the species.

Energy Policy Act of 2005, Public Law (PL) 109-58 (House Rule 6), enacted August 8, 2005. The Energy Policy Act of 2005 directs the Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior to designate under their respective authorities federal land for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors).

Executive Order 11988, Floodplain Management, May 24, 1977. EO 11988 requires federal agencies to avoid to the extent possible both long- and short-term adverse impacts associated with occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

Executive Order 11990, Protection of Wetlands, May 24, 1977. EO 11990 requires federal agencies or federally funded projects to restrict uses of federal lands for the protection of wetlands through avoidance or minimization of adverse impacts. The EO was issued to "avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands whenever there is a practicable alternative."

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994. This EO directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health and environmental effects of their programs, policies, and activities on minority populations and low-income populations.

Executive Order 13007, Indian Sacred Sites, May 24, 1996. This EO requires that all Executive Branch agencies (including BLM) having responsibility for the management of federal lands will, where practicable, permitted by law, and not clearly inconsistent with essential agency functions, provide access to and ceremonial use of Indian sacred sites by Indian religious practitioners and will avoid adversely affecting the integrity of such sacred sites. The EO also requires that federal agencies, when possible, maintain the confidentiality of sacred sites.

Executive Order 13112, Invasive Species, February 3, 1999. This EO seeks to improve coordination between federal agencies in efforts to combat invasive plant and animal species. EO 13112 established the National Invasive Species Council as a high-level, interdepartmental federal advisory panel to provide leadership and planning in the prevention and control of invasive species nationwide.

Executive Order 13274, Environmental Stewardship and Transportation Infrastructure Project Reviews, September 18, 2002. The goal of this EO is to promote environmental stewardship in the nation's transportation system and to streamline the environmental review and development of transportation infrastructure projects. An interagency task force monitors the environmental reviews of certain high-priority projects.

Farmland Protection Policy Act of 1994. This act is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. For the purpose of the act, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland does not have to be currently used for cropland to be subject to the act's requirements. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

Federal Land Policy and Management Act of 1976. Section 1701 of the FLPMA mandates that the BLM manage public lands on the basis of multiple use and sustained yield. The FLPMA recognizes grazing as a valid use of the public lands and requires BLM to manage livestock grazing in the context of public use.

Fish and Wildlife Coordination Act of 1934, as amended. This act requires coordination with federal and state wildlife agencies (USFWS and AGFD) for the purpose of mitigating losses of wildlife resources caused by a project that impounds, diverts, or otherwise modifies a stream or other natural body of water.

Migratory Bird Treaty Act of 1918, as amended. The Migratory Bird Treaty Act (MBTA) provides for the protection of migratory birds and prohibits their unlawful take or possession. The act bans "taking" any native birds; "taking" can mean killing a wild bird or possessing parts of a wild bird, including feathers, nests, or eggs. Exceptions are allowed for hunting game birds and for research purposes, both of which require permits.

National Environmental Policy Act of 1969, as amended. NEPA requires federal agencies to take into consideration the environmental consequences of proposed actions as well as input from state and local governments, Indian tribes, the public, and other federal agencies during their decision-making process. The CEQ was established under NEPA to ensure that all environmental, economic, and technical considerations are given appropriate consideration in this process.

National Historic Preservation Act of 1966, as amended. Major federal projects must comply with Section 106 of the NHPA, which mandates that potential impacts to significant historic properties be considered prior to approval of such projects. Significant historic properties are defined as sites, districts, buildings, structures, and objects eligible for the National Register of Historic Places (NRHP). Consideration of these resources is to be made in consultation with the relevant State Historic Preservation Office (SHPO) and other interested agencies and parties.

Native American Graves Protection and Repatriation Act of 1990. This act requires protection and repatriation of Native American cultural items found on, or taken from, federal or tribal lands and requires repatriation of cultural items controlled by federal agencies or museums receiving federal funds. Should previously unidentified cultural resources, especially human remains, be encountered during construction, work will stop immediately at that location and BLM's cultural resources staff will be notified to ensure proper treatment of these resources.

Noise Pollution and Abatement Act. This act requires that all federal agencies establish mechanisms for setting emission standards for source of noise, including motor vehicles, aircraft, etc. The act also enables local governments to address noise mitigation in land use planning efforts.

Noxious Weed Act of 1974, as amended. This act requires that all federal agencies develop a management program to control undesirable plants on federal lands under the agency's jurisdiction; establish and adequately fund the program; implement cooperative agreements with state agencies to coordinate management of undesirable plants on federal lands; and establish integrated management systems to control undesirable plants targeted under cooperative agreements.

Public Range Improvement Act of 1978. This act established a federal grazing fee formula.

Safe Drinking Water Act of 1974, as amended. Section 1424 of this act regulates underground injection into an aquifer that is the sole or principal drinking water source for an area.

Taylor Grazing Act of 1934, as amended. Section 315 and 315b of this act established grazing districts and grazing permits and fees. The act recognizes grazing as a valid use of the public lands and requires BLM to manage livestock grazing in the context of public use.

Title 43 CFR Part 4100. This governs regulations for grazing administration on public lands.

Wild and Scenic Rivers Act of 1968. This act requires consideration of wild and scenic rivers in planning water resource projects. Developing water resource projects is prohibited on any river designated for study as a potential component of the national wild and scenic river system.

1.7.4 Conformance with State Plans

The AGFD's *Arizona State Wildlife Action Plan: 2012–2022* (SWAP) (AGFD 2012) was a multi-year, multi-agency effort that allows for real-time management of the data that drive AGFD and partners' decision-making process and facilitates adaptive management of wildlife. The SWAP includes the implementation of HabiMap Arizona, a database of map layers that include statewide coverage. Wildlife linkages prescribed in the Lower Sonoran RMP include SWAP management considerations.

1.7.5 Conformance with County and Local Plans

The City (2007a) *Sonoran Valley Planning Area Proposed Major General Plan Amendment: City of Goodyear, Arizona* (City General Plan Amendment); City of Maricopa (2008) *Regional Transportation Plan*; MAG (2000) *Valley Vision 2025* and (2009) *Hidden Valley Transportation Framework Study*; *Pinal County Regionally Significant Routes for Safety and Mobility*, *Access Management Manual* (2008); and *Rainbow Valley Area Drainage Master Plan* (2010) were reviewed to determine the conformance of the proposed project with local planning goals and objectives. Applicable land use planning documents for the ASLD also were reviewed to determine project conformance. Throughout the study process, representatives from state and local jurisdictions and agencies have been actively involved with the project through monthly stakeholder meetings. Overall, the proposed project is, or will be, in conformance with established county and local land use plans.

The MAG (2010) *Regional Transportation Plan, Final 2010 Update* (MAG Regional Transportation Plan) includes the proposed ROW location as a ROW area of preservation. Coordination with MAG would continue throughout the design and implementation of the proposed project.

1.8 FEDERAL PERMITS, LICENSES, AND OTHER ENTITLEMENTS

Issuance of the proposed Sonoran Valley Parkway ROW would be authorized under the FLPMA (Title V [43 USC 1761–1771]). Table 1-1 lists all permits and approvals required for the proposed SVPP; this list includes permits and approval for federal and non-federal agencies.

Table 1-1. Summary of Permits and Approvals Required for the Sonoran Valley Parkway Project

Permit/Approval	Granting Agency
Permits Required by the ROD	
ROW grant issued to the City	BLM
Temporary use permit (for temporary construction areas)	BLM
CWA Section 404 Permit	USACE
Section 7 Consultation	USFWS
Cultural Resource Concurrence	Arizona SHPO
Permits Required for Road Construction	
ROW acquisition	Private landowners
ROW easement	ASLD
Arizona Pollutant Discharge Elimination System	Arizona Department of Environmental Quality
Dust Control Permit	Maricopa County Air Quality Department
Construction Permit (for ROW within Goodyear city limits)	City
Construction Permit (for ROW in unincorporated areas)	Maricopa County Department of Transportation
Floodplain Use Permit (for ROW within Goodyear city limits)	City (FCDMC outside of Goodyear city limits)
Construction Permit (for ROW in unincorporated areas)	City

1.9 PUBLIC PARTICIPATION PROCESS

1.9.1 Pre-scoping

The BLM and the City hosted three pre-scoping, informational meetings on March 11 and 12, 2008, to notify the public about the project. A summary of the meeting dates and locations is provided below:

- Tuesday, March 11, from 6:00–8:00 p.m. at Goodyear City Hall, 190 North Litchfield Road, Goodyear;
- Wednesday, March 12, from 3:00–5:00 p.m. at the Global Water Conference Center, 22590 North Powers Parkway, Maricopa; and
- Wednesday, March 12, from 6:00–8:00 p.m. at the Mobile Elementary School, 42798 South 99th Avenue, north of SR 238.

An open-house format was used. Several informational posters were on display that described potential alternative alignments. The informational meetings were advertised on the City website and via a press release to local media and newspapers 2 weeks before their scheduled dates. Members of the public were afforded opportunities to interact with City and BLM staff.

1.9.2 Scoping

The BLM has conducted internal, agency, and public scoping to solicit input and to identify the environmental concerns and issues associated with the SVPP. An NOI was published in the *Federal Register* on April 2, 2008. The BLM then prepared scoping information materials and provided copies to federal, state, and local agencies; Native American tribes; and members of the general public. Upcoming meetings and opportunities to comment were announced in various local news media. The BLM

conducted open houses to disseminate information, answer questions, and ask for comments on May 28, 2008, in Goodyear and on May 29, 2008, in Maricopa and Mobile. The BLM also provided opportunities for comments to be submitted through U.S. Postal Service mail and via email.

The purpose of the public participation (scoping) process is to provide an opportunity for members of the public to learn about the proposed project and to share any concerns or comments they may have. Input from the public scoping process was used to help the City identify a range of alternatives with which to consult and collaborate with BLM within the context of the ROW process and NEPA. In addition, the scoping process helps identify any issues that are not considered major and that can therefore be eliminated from detailed analysis in the Draft EIS. The list of stakeholders and other interested parties is also updated and generally expanded during the scoping process.

The City and BLM Lower Sonoran Field Office hosted three scoping meetings on May 28 and 29, 2008, to provide the public with an opportunity to learn about the project and provide comments. A summary of the meeting dates and locations is provided below:

- Wednesday, May 28, from 6:00–8:00 p.m. at Goodyear City Hall, 190 North Litchfield Road, Goodyear;
- Thursday, May 29, from 3:00–5:00 p.m. at the Global Water Conference Center, 22590 North Powers Parkway, Maricopa; and
- Thursday, May 29, from 6:30–8:30 p.m. at the Mobile Elementary School, 42798 South 99th Avenue, north of SR 238.

An open-house format was used to encourage two-way dialogue and to encourage discussions about issues to be addressed in the SVPP EIS; concerns with the process; and development of the range of alternatives to be analyzed in the Draft EIS. Several informational posters were on display that described potential alternative alignments. A 30-day scoping comment period was provided to submit written comments related to SVPP EIS issues.

The scoping meetings were advertised in the *Federal Register* and the *City of Goodyear InFocus Newsletter*, as well as in a postcard mailing to the BLM stakeholder mailing list, 2 weeks before their scheduled dates. Members of the public were afforded opportunities to comment during the scoping period, including being given comment forms, a telephone number, and an email address. A total of 17 individuals and organizations had commented at the close of the comment period.

1.9.2.1 Additional Public Outreach

As noted above, scoping meetings were held in 2008. Additional data gathering was conducted during 2009 and 2010, and alternatives development was conducted during 2011 and 2012. A brief project newsletter was developed and posted to the BLM website in fall 2012 to update the public on the status of the project. A postcard with the BLM contact information and website link was also mailed to stakeholders on January 28, 2013.

1.9.2.2 Public Issues

The following table provides a summary of environmental and other issues identified by members of the public and by groups who submitted comments during the scoping period (April 2, 2008, through June 13, 2008) for the SVPP EIS (Table 1-2).

Table 1-2. Summary of Public Issues Identified during Scoping

Alternatives	Alignment should not preclude future development of proposed SR 303L and/or Hassayampa Freeway.
	Consider alternative that connects to the existing Estrella Parkway.
	Initially construct the Sonoran Valley Parkway as an unpaved road to provide quick access.
	Consider mass transit alternative.
Air Quality	The Sonoran Valley Parkway will exacerbate air quality problems in area.
Cultural Resources	Record historical sites found and display artifacts in a local museum.
Livestock Grazing Management	Mitigation for livestock grazing interests and range improvement projects should be provided by the City.
Noise	Traffic noise should not be audible to recreationists in North Maricopa Mountains Wilderness Area.
Public Health and Safety	The Sonoran Valley Parkway is essential to provide timely emergency services (i.e., fire, police, and ambulance) to residents of Mobile.
	There is a current potentially dangerous situation driving along EPNG maintenance road between Mobile and Goodyear.
	Pollution (O_3) from traffic presents major danger to public health. The Sonoran Valley Parkway would lead to increased O_3 in the Phoenix metropolitan area.
Recreation	The Sonoran Valley Parkway would lead to an increase in unauthorized recreational off-highway vehicle traffic in the SDNM, which would be harmful to sensitive soils, plant life, and animals.
Social and Economic Conditions	The Sonoran Valley Parkway would provide a viable transportation route for students from Mobile to attend high school in the City of Buckeye schools (Buckeye Union High School District), thus providing higher-quality education options.
Transportation and Access	The Sonoran Valley Parkway should function in concert with future high-capacity roadways in the region.
	The Sonoran Valley Parkway would contribute to increased suburban sprawl and traffic congestion.
Vegetation	The Sonoran Valley Parkway would harm sensitive plant species.
Visual Resources	The Sonoran Valley Parkway would increase refuse along the Parkway from garbage trucks traveling to/from the landfill.
Wildlife	The Sonoran Valley Parkway would adversely affect wildlife; critical wildlife movement would lead to increased road kills, fragmentation of habitat, and reduction in biodiversity.
	The Sonoran Valley Parkway would lead to increased noise, light, air, and water pollution from traffic and would increase the risk of introduction of non-native species, diseases, and parasites.
	Water diversions and future infrastructure needs would further degrade sensitive habitat.

1.9.2.3 Agency Management Concerns

The following table provides a summary of agency management issues identified during the scoping period (April 2, 2008, through June 13, 2008) for the SVPP EIS (Table 1-3).

Table 1-3. Summary of Agency Management Issues Identified during Scoping

Air Quality	Phoenix metropolitan area is currently in non-attainment for 8-hour O_3 and PM_{10} as promulgated by the NAAQS.
	Air quality issues could include increased traffic congestion, construction-related impacts, and long-term usage along alternative routes.
	BLM should coordinate with Maricopa and Pinal Counties and State of Arizona to ensure consistency and compatibility with State implementation plan.
Cultural Resources	The EIS must consider the Congressionally designated Juan Bautista de Anza National Historic Trail and other historic trails within same corridor.
Livestock Grazing Management	The EIS should include an evaluation of the effect on existing grazing allotments.
Land Use	The EIS should include an evaluation of the use of the designated utility corridor for transportation purposes in light of projected future utility infrastructure needs.
	The EIS should include an evaluation of the effect of the proposed road on current and future BLM realty actions.
Noise	Implementation of any action alternative would lead to increases in noise in project area, both in the long and short term. Evaluate presence/absence of sensitive noise receptors and analyze duration and severity of noise impacts.
Recreation	The EIS should include an evaluation of the recreational off-highway vehicle (OHV) use on lands designated closed to such use in the vicinity of the SDNM.
	The EIS should include an evaluation of the potential impacts to outdoor and wildlife-related recreation as a result of any changes to public access of public lands that may result from the SVPP.
	The EIS should include an evaluation of the potential damage to resources in the monument from OHV use, such as compaction of desert soils, increased erosion and runoff, and added threats to public health and safety.
Social and Economic Conditions	The EIS should include an evaluation of development-related changes in population and demands for public transportation, education, and healthcare services.
	The EIS should include an evaluation of the additional connecting roads between the community of Mobile and the city of Maricopa, which may fuel growth and development in a rural area; will this result in changes to the social dynamics of the local rural population?
	The EIS should include an evaluation of the impact to minority populations.
	The EIS should include an evaluation of the changes in real estate property values, infrastructure and commercial development, recreation activities, and tourism.
Transportation and Access	The EIS should include an evaluation of the roadway alignments, existing and future traffic demands, and cumulative impacts to surrounding communities and public lands between the city of Goodyear and newly annexed portions to the south.
Visual Resources	The EIS should include an evaluation of the direct impacts to visual resources both from the road itself and from the sight of traffic along the road related to recreationists hiking or otherwise exploring the eastern portion of the SDNM.
	The EIS should include an evaluation of BLM Visual Resource Management objectives; the EIS should identify Key Observation Points and use these factors to analyze visual impacts.
Water Resources and Soils	The EIS should include an evaluation of the impacts to water resources and soils, including potential erosion effects associated with this project and the potential for runoff pollutants from vehicles (e.g., oil, gas, and other vehicle fluids) to infiltrate soils and potentially affect both surface water and groundwater.
Wildlife	The EIS should include an evaluation of the potential impacts to special-status species, Arizona Species of Greatest Conservation Need (*Arizona State Wildlife Action Plan: 2012:2022* [AGFD 2012]), and riparian areas, to include desert wash systems.
	The EIS should include an evaluation of the wildlife movement corridors that cross proposed project alternatives, including road design and placement, arch span design and placement, identification of natural movement corridors, habitat loss, and maintenance of genetic diversity among existing bighorn sheep, mule deer, and other wildlife populations.

The scoping process and public comments summary and analysis are documented in the April 2009 *Proposed Sonoran Valley Parkway Project Environmental Impact Statement Scoping Report* (BLM 2009b).

1.10 ISSUES FOR ANALYSIS

The internal and public scoping process determined the scope and key issues for analysis (40 CFR 1501.8) for this EIS. Issues raised and identified during scoping, including those issues that are not addressed in detail in this EIS, are summarized in the following sections.

1.10.1 Key Issues Carried Forward for Analysis

1.10.1.1 Air Resources

Commenters indicated that if constructed, the SVPP could exacerbate air quality problems in the area, both from vehicle exhaust and increased particulates. Additionally, one commenter noted that the Phoenix metropolitan area is currently in non-attainment for 8-hour O_3 and PM_{10}, as promulgated by the U.S. Environmental Protection Agency's (EPA's) NAAQS. As such, commenters indicated that issues related to air quality could include increased traffic congestion, construction-related impacts, and long-term usage along alternative routes. One commenter suggested that development of the EIS should be coordinated with Maricopa County, Pinal County, and the State of Arizona to ensure consistency and compatibility with the State Implementation Plan (SIP).

1.10.1.2 Cultural and Heritage Resources

Commenters suggested that any historical sites found in the area (particularly those in the Lower Sonoran RMP–identified Special Cultural Resource Management Area) need to be recorded by a professional archaeologist and requested that any artifacts found be displayed in a local museum. Additionally, commenters indicated that the EIS must consider and protect the Congressionally designated Juan Bautista de Anza National Historic Trail (NHT) and other historic trails within the same corridor that would be impacted by incompatible developments as a result of the road and its associated infrastructure.

1.10.1.3 Paleontological Resources

Commenters suggested that any paleontological resources (i.e., fossils) found in the area need to be inventoried and recorded by BLM paleontologists and requested that any artifacts that may be found be displayed in a local museum. Additionally, the Lower Sonoran RMP includes goals and objectives for managing paleontological resources.

1.10.1.4 Soil Resources

Commenters indicated that the proposed SVPP may impact desert terrain (i.e., biological soil crusts). Additionally, the Lower Sonoran RMP includes goals and objectives for managing soil resources.

1.10.1.5 Vegetation Resources

Commenters expressed concern that construction of the SVPP could harm sensitive plant species.

Commenters suggested that riparian areas in the Sonoran Desert and in the project vicinity can be important habitat for wildlife. Because the proposed Parkway potentially crosses numerous washes and drainages, there is the potential for construction of the Parkway to adversely impact these resources and reduce critical habitat.

1.10.1.6 Visual Resources

Commenters suggested that measures be taken to prevent the inadvertent scattering of plastic bags and other refuse along the Parkway from garbage trucks that may travel to and from the Mobile landfill.

Another commenter suggested that implementation of any action alternative could, to a greater or lesser degree, result in a direct impact to visual resources, both from the road itself and from the sight of traffic along the road, particularly for recreationists hiking or otherwise exploring the eastern portion of the SDNM, including the North Maricopa Mountain Wilderness Area. The commenter indicated that the EIS must evaluate BLM Visual Resource Management (VRM) objectives that would be affected by the proposed Parkway, identify key observation points (KOPs), and use these factors to analyze visual impacts.

1.10.1.7 Water Resources

Commenters suggested that the EIS evaluate impacts of the proposed roadway on water resources and soils, including potential erosion effects associated with this project and the potential for runoff pollutants from vehicles (e.g., oil, gas, other vehicle fluids) to infiltrate soils and potentially affect both surface water and groundwater.

Commenters also suggested given the geomorphology of the area, the washes and drainages are very fragile. Any Parkway crossing this area will inevitably create significant changes in these washes by diverting and concentrating flows, leading to the formation of new incised channels with substantial erosion and sedimentation.

1.10.1.8 Wildland Fire Management

Internal scoping suggested the proposed SVPP consider the effects on BLM wildland fire management. Additionally, the Lower Sonoran RMP includes goals and objectives for wildland fire management.

1.10.1.9 Wildlife and Special-Status Species

Commenters expressed concern that construction of the SVPP could harm sensitive wildlife in the area. In addition to direct impacts such as road kills, it would divide a critical wildlife movement corridor and lead to habitat fragmentation and a reduction in biodiversity. Other adverse effects on wildlife would include noise, light, air, and water pollution from traffic using the Parkway, along with the increased threat of introduction of non-native species into the area, diseases, and parasites. Water diversions (e.g., culverts and bridges across washes) and future utility infrastructure needs (e.g., electricity and natural gas lines) would further degrade sensitive habitat.

Another commenter indicated that wildlife movement corridors that cross the proposed project alternatives have been identified by the AGFD and the BLM's Lower Sonoran RMP. The commenter further suggested that some preliminary issues related to the corridors include Parkway design and placement, identification of natural movement corridors, habitat loss, and maintenance of genetic diversity among existing bighorn sheep, mule deer, and other wildlife populations.

1.10.1.10 Lands and Realty

Commenters suggested that the appropriateness of use of a designated utility corridor for transportation purposes be evaluated, particularly in light of projected future utility infrastructure needs in the same geographic area. Commenters requested that a complete assessment be made of how the presence of the proposed road would affect current and future BLM realty actions.

1.10.1.11 Livestock Grazing

Commenters indicated that the proposed road must be evaluated in terms of how it would affect existing grazing allotments. Namely, there was concern over how each of the alternatives would divide the Beloat and Conley grazing allotments and what mitigation would be necessary under each alternative to compensate for lost grazing lands, complete range improvement projects (wells, fences, tanks), and reduce conflicts between the public and livestock. Particularly, concerns on the potential for existing allotment Animal Unit Months (AUMs) to be reduced; mitigation for potential losses to range improvements; and mitigation for constructing BLM-approved fences along the proposed Parkway to prevent livestock–vehicle collisions.

1.10.1.12 Recreation Management

Commenters suggested that the presence of the SVPP would lead to an increase in unauthorized, recreational off-highway vehicle (OHV) traffic into the SDNM, which would be harmful to sensitive soils, plant life, and animals within the monument. Commenters also expressed concern that illegal recreational OHV use on lands designated closed to such would become an increasing problem; issues related to the proposed Parkway could include potential additional damage to resources in the monument from OHV use, such as compaction of desert soils, increased erosion and runoff, and added threats to public health and safety. In addition, commenters expressed concerns for the potential of the SVPP to result in changes to public access of the public lands for hunting and other outdoor recreational pursuits.

1.10.1.13 Travel Management

Commenters indicated that the SVPP should be constructed to function in concert with future high-capacity roadways in the region. Commenters also suggested that construction of the Sonoran Valley Parkway could contribute to increased suburban sprawl and traffic congestion.

Another commenter indicated that the primary purpose of the Parkway would be to provide transportation to and from the newly annexed portions of Goodyear that currently have limited access. Preliminary issues related to transportation include Parkway alignments, existing and future traffic demands, and cumulative impacts to surrounding communities and public lands.

1.10.1.14 Special Designations

Commenters expressed concern that construction of one of the project alternatives could negatively impact nearby wilderness areas and the SDNM, particularly in regards to wildlife in these areas.

1.10.1.15 Noise

Commenters expressed concern that construction of one of the project alternatives could increase the ambient noise in the nearby wilderness areas and the SDNM.

1.10.1.16 Hazardous Materials and Public Safety

Commenters suggested that there could be hazardous material concerns along the proposed Sonoran Valley Parkway if waste management trucks from the Butterfield Station Landfill in Mobile inadvertently spread non-biodegradable litter along the road.

Some commenters expressed support for the proposed SVPP because they believe it is essential to providing timely emergency services (fire, police, ambulance) to the residents of Mobile. Commenters also indicated that residents of Mobile as well as others from outside the community have been using the existing, unpaved EPNG maintenance road to travel between Mobile and Goodyear. Because the natural gas pipelines are buried so close beneath the surface of this road, this is a potentially dangerous situation. Commenters stated that the Sonoran Valley Parkway needs to be completed soon to discourage drivers from using the gas pipeline road.

Commenters indicated that traffic-related noise from the proposed Parkway could be audible to recreationists and others in the North Maricopa Mountains Wilderness Area. Additionally, implementation of any action alternative would lead to increases in noise in the project area, both short term during road construction and long term as a result of traffic along the Parkway. Commenters suggested that the EIS must evaluate the presence or absence of sensitive noise receptors that may be affected by the proposed road and analyze the duration and severity of noise impacts. Commenters also indicated that Maricopa County is already a nonattainment area for O_3 and that O_3 pollution presents a significant danger to public health; it can damage lung tissue, causing pulmonary inflammation, impair lung development in young children, and contribute to the suffering of those who have asthma. Commenters expressed concern that traffic using the Sonoran Valley Parkway would lead to an increase in O_3 exceedances in the Phoenix metropolitan area.

Commenters suggested that the EIS evaluate the potential for increased incidence of fire from overheated vehicles spreading into areas adjacent to the proposed Parkway, including the SDNM, destroying resources and also posing a threat to public health and safety.

1.10.1.17 Social and Economic Conditions

Commenters indicated that the SVPP will be necessary to provide a viable transportation route for students from Mobile to attend high school in the city (Buckeye Union High School District). Schools in the Buckeye Union High School District are considered to be of higher quality than other options.

Another commenter noted that the Phoenix metropolitan area is one of the fastest-growing urban areas in the United States. Population growth has exceeded projections and is expected to continue along an upward trend into the future. Social concerns include development-related changes in population and demands for public transportation, education, and healthcare services. Additional road(s) connecting to the community of Mobile and the city of Maricopa will fuel growth and development in a rural area and a developing small town. Changes to social dynamics of the local rural populations may be extensive. Minority populations may be impacted. Economic concerns center on real estate property values, infrastructure and commercial development, recreation activities, viability of livestock grazing operations, and tourism.

1.11 ISSUES NOT ANALYZED IN DETAIL

Miscellaneous comments were dominated by themes of support or disagreement with the Proposed Action and action alternatives. Some commenters expressed explicit support for the proposed Parkway,

whereas others felt that public lands (State Trust or BLM) should not be used for the project. The following issues were not analyzed in detail.

1.11.1 Wild Horses and Burro Management

The nearest wild horse and burro management area is located at Painted Rock Reservoir, approximately 35 miles west of the project area. No wild horses or burros are located within or adjacent to the ROW corridor.

1.11.2 Wilderness Characteristics

Commenters suggested the effects of the proposed SVPP could extend beyond the ROW corridor, including the wilderness characteristics of the SDNM. The Lower Sonoran RMP includes goals and objectives for lands managed to protect wilderness characteristics. There are no lands managed to protect wilderness characteristics within or adjacent to the ROW corridor. The nearest lands managed to protect wilderness characteristics are located over 20 miles south of the project area (in addition to federally designated wilderness areas).

1.11.3 Mineral Resources

The project area surface and subsurface mineral rights are managed by the BLM. No active material pits, excavations, or explorations are currently being pursued within or adjacent to the ROW corridor.

1.12 CONSULTATION AND COORDINATION

During April 2012, BLM initiated Memorandum of Understanding (MOU) invitations to local municipalities and agencies, whose purpose would be to establish a formal SVPP cooperating agency partnership.

CEQ regulations (40 CFR 1508.5) define a cooperating agency as any federal agency (other than the lead agency) and any state or local agency or Indian tribe with jurisdictional authority or special expertise with respect to any environmental impact involved in a proposal. Because of the size and nature of the SVPP and the resources potentially affected by the proposed SVPP or alternatives, six agencies (federal, state, tribal, county, and local) with jurisdictional authority and/or applicable special expertise cooperated in the development of this Draft EIS.

The cooperating agencies assisted with Draft EIS preparation in a number of ways, including providing up-to-date and relevant studies and inventories, reviewing public involvement documents, identifying issues, assisting with the formulation of alternatives, and reviewing Administrative Draft EIS text and other Draft EIS materials (as specified in 40 CFR 1501.6[b]). Not all of the cooperating agencies participated in all aspects of the EIS preparation. As lead agency, BLM is responsible for the content of the EIS.

1.12.1 Arizona Department of Transportation

ADOT is responsible for statewide transportation planning, building, and operating a state highway system, and building and maintaining bridges. ADOT's statewide role is to assist policymakers by

providing objective information that helps them decide the best solutions to connect communities across Arizona with the full range of resources available.

While the Sonoran Valley Parkway, if constructed, would not become an ADOT-managed roadway (generally, Parkways are locally constructed, maintained, and managed), the Sonoran Valley Parkway would likely have a cumulative effect on other existing and future ADOT-managed roadways in the SVPA. Therefore, ADOT's expertise in new road construction and access to conceptual plans and designs of future roadways (namely, the future SR 303L and I-11 Freeway) provided an invaluable resource for the BLM and City during the SVPP NEPA process.

1.12.2 Arizona Game and Fish Department

In Arizona, the AGFD has jurisdictional authority over fish and wildlife conservation and management, as well as public uses and recreation relating to fish and wildlife conservation and management, including OHV use. AGFD is tasked with conserving, enhancing, and restoring Arizona's diverse wildlife resources and habitats and therefore has special expertise with respect to Arizona's wildlife. The AGFD participated in the public scoping process and collaborated with the BLM during pre-NEPA wildlife connectivity analysis. Because the SVPP has the potential to impact wildlife within Rainbow Valley and the SVPA, AGFD is a cooperating agency for this Draft EIS.

1.12.3 Arizona State Land Department

Approximately 105.3 acres of ASLD State Trust land would be located within the Sonoran Valley Parkway project area (as specified in Chapter 3, Lands and Realty analysis area). Although the ASLD lands would not be subject to BLM NEPA review, the City would nonetheless be required to have ASLD ROW authorization for any ASLD land that would be needed to construct, operate, and maintain the Sonoran Valley Parkway. Therefore, because of their special expertise regarding the resources within these lands and the State's interest in maximizing revenue from its trust lands, ASLD has been designated a cooperating agency.

1.12.4 Arizona Historic Preservation Office

BLM consults with the SHPO in accordance with Section 106 of the NHPA when BLM actions may affect cultural properties. Consultation has been initiated by letter in March 2013. After an inventory of the APE has been prepared, BLM will seek concurrence from SHPO on eligibility for the National Register of Historic Places (NRHP) and effect of the project activities. A treatment plan will then be prepared and submitted to the SHPO for review and comment. An approved treatment plan will be fully implemented prior to any surface-disturbing activities.

1.12.5 Maricopa Association of Governments

As the designated Metropolitan Planning Organization (MPO) for the Maricopa County Region, MAG is a metropolitan planning organization and the designated transportation planning authority for Maricopa County. The MAG Regional Transportation Plan (MAG 2010) is a comprehensive, performance-based, multimodal, coordinated RTP that provides a blueprint for transportation planning in the MAG region up to fiscal year (FY) 2026. Additionally, the RTP's transportation program maintains consistency with state and local planning growth patterns.

Included in the RTP are plans for SR 303L, a major transportation corridor with four general-purpose lanes and one high-occupancy-vehicle lane in each direction that would further the regional connectivity to other existing commuter roads. The City has provided recommendations to extend SR 303L from SR 30 south to connect with I-8. Depending on the final alignment of the southernmost portion of SR 303L, the SR 303L will likely serve as an important connection to and from the Sonoran Valley Parkway within the regional transportation network.

Similarly, but farther in the future than the SR 303L, I-11 (or Hassayampa Freeway) would connect Casa Grande, Arizona, to Las Vegas, Nevada, and is currently undergoing conceptual alignment studies, a portion of which would occur within the BLM-administered corridor that parallels the northeastern border of the SDNM. Therefore, because of their involvement in future transportation planning within the SVPA and region, MAG has been designated a cooperating agency.

1.12.6 Flood Control District of Maricopa County

FCDMC is responsible for overseeing the development and implementation of comprehensive flood hazard control measures in Maricopa County. One mode in which FCDMC performs its duties is through the preparation and implementation of Area Drainage Master Plans. FCDMC recently completed the *Rainbow Valley Area Drainage Master Plan* (FCDMC 2011), which encompasses the BLM lands in which the SVPP would be located if a ROW were granted. In addition, Waterman Wash, the major drainage of Rainbow Valley, serves as the drainage to the Gila River and would be crossed or paralleled by the SVPP, depending on the alternative implemented if a ROW were granted by BLM. Because of Waterman Wash's relatively natural and undisturbed state, identification as a wildlife corridor by AGFD and the BLM, and the fact that FCDMC has committed a substantial effort to the *Rainbow Valley Area Drainage Master Plan*, FCDMC has been designated as a cooperating agency.

1.12.7 Native American Tribes

The BLM consults with Native American tribes to identify cultural values and religious beliefs that may be affected by BLM actions. The NHPA is the basis for tribal consultation provisions. The BLM used a two-phase approach to fulfill the objective of consultation with Native American tribes and identification of any traditional cultural properties (TCPs) within the project area. Tribal consultation has occurred throughout the EIS process. In June 2008, Native American consultation letters were sent to five tribes initiating consultation under NEPA, NHPA, and AIRFA. The Gila River Indian Community, Salt River Pima–Maricopa Indian Community, Tohono O'odham Nation, Ak-Chin Indian Community, and Hopi Tribe were included in this consultation effort. The Hopi Tribe sent a response letter in August 2008.

In April 2012, a letter updating the status of the project was sent to the tribal chairs and associated cultural staff. Follow-up telephone calls will be made in order to provide information and solicit comments on the project or areas affected. The following tribal governments were sent letter updates: Gila River Indian Community, Salt River Pima–Maricopa Indian Community, Tohono O'odham Nation, Ak-Chin Indian Community, and Hopi Tribe. The Hopi Tribe sent a response letter in May 2012.

1.12.8 U.S. Fish and Wildlife Service

The USFWS is the federal agency with jurisdictional authority concerning listed threatened and endangered, proposed, and candidate species, conservation agreement species, and critical habitat under the ESA; bald and golden eagles under the Bald and Golden Eagle Protection Act of 1940, as amended; and migratory birds under the MBTA.

During the Draft EIS process, the role of USFWS is to provide input and recommendations regarding the special-status species and critical habitat that could be impacted by the proposed SVPP. The ESA requires all federal agencies to participate in the conservation of endangered species. Specifically, Section 7 of the ESA charges federal agencies to aid in the conservation of listed species and to ensure that their activities are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitat. In addition, the BLM cannot undertake actions that will lead to the listing of a species under the ESA. Because of the potential for the SVPP to impact listed threatened and endangered, proposed, and candidate species, BLM will conduct Section 7 consultation with USFWS; however, USFWS declined invitations to become a designated cooperating agency.

1.12.9 City of Maricopa

The city of Maricopa is located approximately 8 miles east of the community of Mobile on SR 238. The City of Maricopa has been intimately involved with RTP public involvement, county-level planning, and ADOT transportation planning. Currently, Maricopa includes two points of access from the greater Phoenix metropolitan area: one from the northeast and one from the west. The SVPP, if constructed, would provide a vital third access point connection to the greater metropolitan Phoenix area. Therefore, the City of Maricopa has been designated as a cooperating agency.

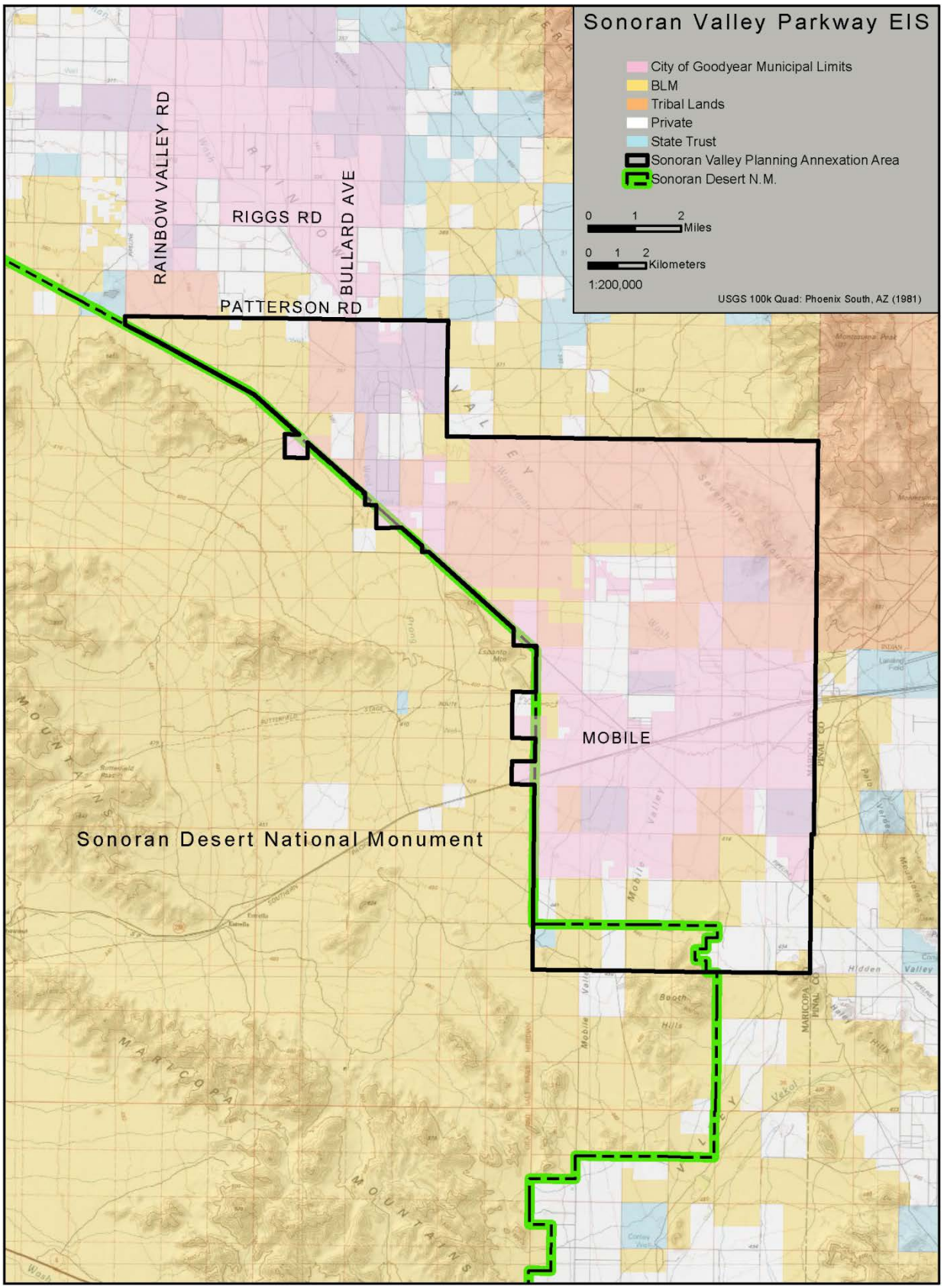

Figure 1-1. Sonoran Valley Planning Area vicinity map.

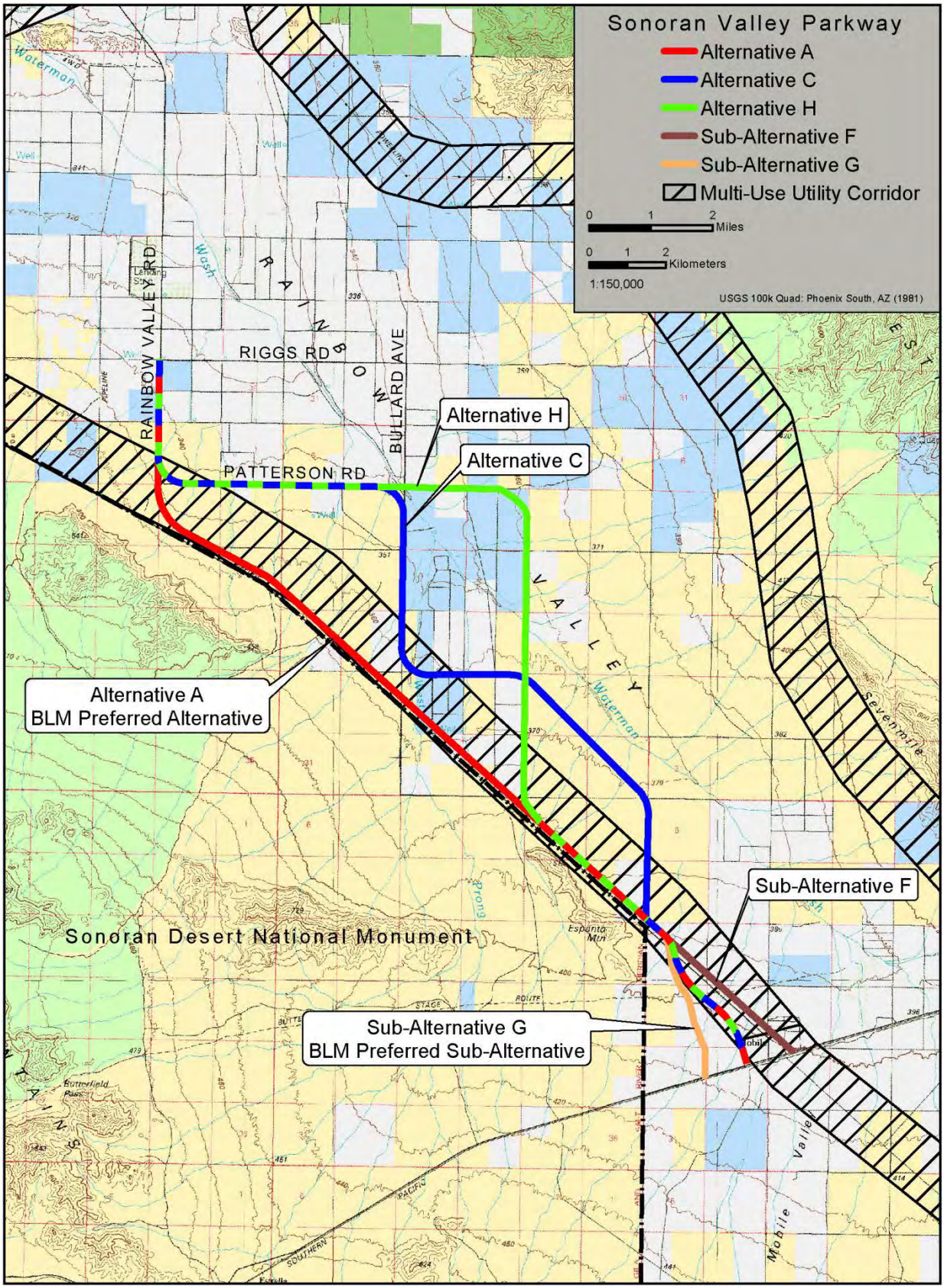

Figure 1-2. Overview of existing utility corridor, Proposed Action, and alternatives.

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Chapter 2

ALTERNATIVES

2.1 INTRODUCTION

NEPA and the Council on Environmental Quality (CEQ) implementing regulations direct the BLM to "study, develop, and describe appropriate alternatives to recommend courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources" and to "rigorously explore and objectively evaluate all reasonable alternatives."

2.2 DEVELOPMENT OF ALTERNATIVES

This practical range of reasonable alternatives is formulated to address issues and concerns raised by the public and agencies during scoping. The alternatives represent other means (e.g., methods, processes, locations, times, sequences, etc.) of satisfying the stated purpose of and need for the federal action. Reasonable alternatives are defined by the CEQ as those that are technically, economically, and environmentally practical and feasible. NEPA also requires that a No Action Alternative be evaluated for comparison with the other alternatives analyzed in the EIS. If unreasonable alternatives or alternatives that do not meet the purpose and need are suggested, a detailed analysis of these alternatives is not required. However, the rationale for eliminating them from detailed analysis must be explained.

This chapter presents the No Action Alternative, three action alternatives, and two sub-alternatives that were considered in detail for this EIS:

- The No Action Alternative
- Alternative A, the BLM Preferred Alternative
- Alternative C
- Alternative H
- Sub-alternative F
- Sub-alternative G, the BLM Preferred Sub-alternative

The Proposed Action (Alternative A, the BLM Preferred Alternative), action alternatives (Alternatives C and H), sub-alternatives (Sub-alternatives F and G [the BLM Preferred Sub-alternative]) (Figures 2-1 through 2-5), and No Action Alternative are analyzed in detail. Other alternatives that were initially considered but subsequently eliminated from detailed analysis are also described in this chapter. Compliance with best management practices (BMPs) and mitigation measures will be mandatory for each of the action alternatives.

Also considered during the development of alternatives was the rationale used in the regional transportation planning process to identify the need for a six-lane Parkway. Included in the regional transportation planning process is the SVPP, which is discussed in Section 2.8.2. A critical component of transportation planning is preparing for anticipated growth and providing transportation connections that encourage efficient and sustainable connections. As further described in Chapter 1 and Appendix B, Reasonably Foreseeable Development, the Sonoran Valley Parkway (the Alternative A alignment) is currently referenced as part of the regional transportation network as a Parkway providing a connection through the city of Goodyear's annexed SVPA, an area expected to experience major growth within the next two decades (MAG 2010). Using projections for 2035, MAG provided population forecasts for Goodyear's resident population, showing an increase from 65,178 in 2010 to 358,565 in 2035, while the SVPA population would increase from approximately 100 in 2010 to 60,629 in 2035 (MAG 2009).

According to MAG studies (e.g., *Hidden Valley Transportation Framework Study*, MAG 2009) for population and economic growth, the build-out of this area is expected within the next 40 to 60 years (when the General Plan is fully implemented) and is estimated to grow to more than 200,000 residents and 57,000 jobs within the SVPA alone. The city of Goodyear is also expected to grow to 511,000 residents at build-out. Thus, the need for phased construction of a six-lane Parkway that will accommodate traffic volumes resulting from exponential growth in the area was recognized, and the Parkway was included in the regional transportation planning. Additionally, the development of alternatives for this EIS included the consideration of phased construction in two-lane increments (two, four, and six lanes).

The Proposed Action (Alternative A, the BLM Preferred Alternative) represents the alignment originally requested by the project proponent in the February 2008 ROW Standard Form 299 (SF 299) application. Alternative C was developed to avoid as much federal land as possible. Alternative H was developed to maximize access to private lands and be located away from SDNM. All three alternatives would include the same construction methods and techniques, with the primary difference being the proposed Parkway length and route. In addition, two sub-alternatives were developed for the alignment at the south end of the SVPP. Sub-alternative F was developed to minimize surface disturbance and to confine the south end of the SVPP to the existing Komatke/Gas Line Road alignment. Sub-alternative G was developed to avoid cultural and historic resources, as well as to locate the southern terminus of the SVPP farther west of Mobile.

Several other alternatives were identified and considered but were eliminated from detailed analysis. These alternatives are described in Section 2.4, which provides the rationale for eliminating them from detailed analysis.

Under the No Action Alternative, the City's ROW application to construct the Sonoran Valley Parkway would not be approved. The SVPP would not be developed, and existing land uses in the project area would continue in their current condition.

2.3 FEATURES AND CONSIDERATIONS IN DEVELOPING ALTERNATIVES

As described in Chapter 1, the City applied for the ROW in February 2008, submitting a POD, along with the SF 299 application, as required by BLM (43 CFR 2800). Because of the scope of the Proposed Action and the potential for environmental impacts, the BLM determined the project to require an EIS, which requires the proponent to provide the BLM with multiple alternatives and analysis on which to base its decision. The formulation of the alternatives was guided by the following: the purpose of and need for the SVPP; land use objectives of the Lower Sonoran RMP; public and agency scoping; the need to comply with federal, state, and local laws, regulations, and policies; technical and practical feasibility; economic and practical feasibility; and environmental reasonableness (resource considerations).

During the process of developing alternatives, the BLM reviewed a reasonable range of potential alternatives to the Proposed Action. A variety of factors was examined during the development of the alternatives for this EIS. Consideration was given to avoidance and/or minimization of effects on water (surface water and groundwater), riparian zones, vegetation, wildlife, special-status species, range/livestock, cultural resources, public safety, and visual resources. Section 2.2.2 discusses the considerations made by the BLM during alternatives development and screening.

Figure 2-1 illustrates the Proposed Action (Alternative A, the BLM Preferred Alternative), along with the action alternatives and sub-alternatives to the Proposed Action. In addition, Figures 2-2 through 2-5 show the individual alignments of the Proposed Action, action alternatives, and sub-alternatives.

2.4 APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Under all action alternatives, the City would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would obtain and meet the requirements of all needed permits discussed in Sections 1.5 and 1.6 of Chapter 1. Because LORS are generally specific to a resource, most will be presented in Chapter 3, which describes the current environment and its management. Where specific permit requirements would affect the environmental consequences of a particular resource, those requirements are discussed in Chapter 4.

All action alternatives and sub-alternatives would incorporate applicable BMPs and standard operating procedures (SOPs) from the Lower Sonoran RMP (BLM 2012a). BMPs are land and resource management techniques determined to be the most effective and practical means of maximizing beneficial results and minimizing conflicts and negative environmental impacts form management actions. SOPs are procedures carried out daily during proposal implementation that are based on laws, regulations, EOs, BLM planning manuals, policies, instruction memoranda, and applicable planning documents. These are described in Table 2-1. These stipulations would be included in the conditions of approval for any ROW approved by BLM and would be binding in the event that the Parkway were transferred to or operated by another entity.

Table 2-1. Lower Sonoran RMP Best Management Practices and Standard Operating Procedures

Cultural Resources	SOP: Ensure that all proposed undertakings and authorizations are reviewed and conducted in compliance with Section 106 of the NHPA, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.
	SOP: Comply with Section 106 of the NHPA: 1. All undertakings will be subject to thorough cultural resources inventory in order to identify all cultural resources that lie within the APE. 2. All identified cultural resources within the APE will be evaluated for NRHP eligibility. 3. All undertakings shall be scrutinized for ways to design or redesign proposed projects to avoid cultural resources.
	SOP: Mitigate those cultural resources within the APE that have characteristics that would make them eligible for the NRHP using appropriate treatment strategies, in order to reduce the intensity of the impacts to the lowest level possible.
	SOP: Complete Class II (sample) and Class III (intensive) field inventories to identify cultural resources and evaluate the conditions of sites, in accordance with Section 110 of the NHPA. Use the information obtained through these surveys to allocate sites to proper use categories, develop protection measures, and integrate survey results into research designs and interpretation efforts. Determine priorities for inventory based on resource use and area's or site's protection priority.
Paleontological Resources	SOP: For all authorized surface-disturbing activities, conduct inventories on a case-by-case basis, as deemed necessary by the authorized officer, for each proposed surface-disturbing activity to ensure maintenance or integrity of paleontological values.
Soil Resources	BMP: BMPs would be applied to vegetative or surface disturbances to limit soil loss and erosion and protect water quality.
	BMP: Minimize disturbance to surface resources when constructing new developments or reconstructing existing facilities. Mitigation plans would be developed, disturbed surfaces would be restored, and soils would be stabilized in accordance with restoration objectives.
Visual Resources	SOP: Scenic Quality: Employ measures to mitigate potential visual impacts, such as the use of natural materials, screening, painting, project design, location sighting, and restoration.
Wildlife Resources	BMP: Construct fences to comply with applicable wildlife fence standards (Fences – BLM Manual Handbook H-1741-1). Existing fences that impede big-game movement or that otherwise conflict with wildlife may be modified to comply with applicable wildlife fence standards on a case-by-case basis.

Table 2-1. Lower Sonoran RMP Best Management Practices and Standard Operating Procedures (Continued)

Lands and Realty	SOP: Collocate transportation routes, whether interstate, intrastate, or local, with utilities in designated corridors to the maximum degree possible to minimize impacts to public lands.
Livestock Grazing	SOP: Compensate for a loss of range improvements in accordance with 43 CFR 4120.3-6.
	SOP: Construct and maintain fences following guidance provided in BLM Handbook 1741-1, Fencing.
Travel Management	BMP: Emphasize the use of existing roads (through continued use or reconstruction) to minimize new road construction.
Special Designations	SOP: Areas of Critical Environmental Concern: Design all authorized uses with mitigation to minimize surface disturbance.
	SOP: Areas of Critical Environmental Concern: Design fences to reduce adverse impacts to wildlife movement using specifications in BLM Manual 1747, local directives, or subsequent guidance. Existing fences in wildlife habitat that do not meet BLM specifications would be modified appropriately when scheduled for replacement maintenance.
Socioeconomics	SOP: Evaluate all actions for hazardous materials, waste minimization, and pollution prevention. Appropriate mitigation will be identified for surface-disturbing and disruptive activities associated with all types of hazardous materials and waste management and all types of fire management.

Source: Lower Sonoran RMP (BLM 2012a).

2.5 CRITERIA FOR SCREENING THE ALTERNATIVES

After the initial identification and formulation of alternatives, criteria were developed by the interdisciplinary team to screen the alternatives considered in the Draft EIS for their ability to meet or not meet established criteria. Comparing alternatives with the screening criteria is the process used to reduce the number of alternatives subject to detailed environmental evaluation in the EIS. As described in Section 2.2, screening criteria include the following:

- Consistency with the purpose and need (Chapter 1)
- Ability to meet the land use objectives of the Lower Sonoran RMP
- Ability to respond to public and agency scoping
- Ability to comply with federal, state, and local laws, regulations, and policies
- Ability to be technically and practically feasible
- Ability to be economically and practically feasible
- Environmental reasonableness (resource considerations)

2.5.1 Consistent with Purpose and Need

The first screening criteria for the alternative's ability to meet the purpose and need is used to determine whether the project would or would not satisfy the purpose and underlying needs driving the alternative. The BLM's purpose of and need for this action is to respond to the City's ROW application under Title V of the FLPMA (43 USC 1701 *et seq*.) for a ROW grant to construct, operate, and maintain a proposed two- to six-lane Parkway in compliance with the FLPMA, BLM ROW regulations, and other applicable federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to the City for the Proposed Action, action alternatives, or sub-alternatives.

Specifically, the BLM's purposes in considering the project are as follows:

- To process ROW application AZA-34177 submitted by the City to construct a new, permanent, two- to six-lane, public road (Parkway) for year-round use from Goodyear proper to the annexed portions of southern Goodyear (SR 238 near Mobile).
- To meet public needs for use authorizations, such as ROWs, permits, leases, and easements, while avoiding or minimizing adverse impacts to other resource values and locating the uses in conformance with land use plans.

The BLM's need in considering the Proposed Action is to comply with Title V of FLPMA (43 USC 1761–1771). The BLM is authorized to grant ROWs for roads and trails and "such other necessary transportation or other systems or facilities which are in the public interest and which require rights-of-way over, upon, under, or through such lands." The action alternative must satisfy the above in order to meet the purpose and need. Therefore, the Proposed Action, action alternatives, and sub-alternatives would meet the purpose and need.

2.5.2 Ability to Meet the Land Use Objectives of the Lower Sonoran RMP

The second screening criterion is used to determine whether the alternative would meet the land use objectives of the Lower Sonoran RMP. The Lower Sonoran RMP includes objectives for LUAs, which includes the construction of roads. According to the Lower Sonoran RMP, the areas in which the Proposed Action, action alternatives, and sub-alternatives would be located if implemented are not identified as LUA exclusion or avoidance areas. Therefore, the Proposed Action, action alternatives, and sub-alternatives would meet the land use objectives of the Lower Sonoran RMP.

2.5.3 Ability to Respond to Identified Public and Agency Scoping

Formal scoping began on April 2, 2008, with the publication of the NOI in the *Federal Register*, followed by Goodyear newsletters, along with postcards mailed to BLM stakeholders. Three formal scoping meetings were held in late May, and the public was encouraged to submit their comments and concerns (via email, comment forms, or mailed letters) to the BLM. Seventeen comments were submitted. The resource issues identified after scoping included air quality, cultural resources, grazing, hazardous materials, lands and realty, noise, public health and safety, recreation, riparian areas, socioeconomics, special designations, travel management, vegetation, visual resources, wildlife, and water resources. Each of these identified resource issues was used in the screening of alternatives (discussed below in Section 2.2.3), and the potential effects on the resource issues are the subject of Chapter 4, Environmental Consequences. Therefore, the Proposed Action, action alternatives, and sub-alternatives respond to public and agency concerns/issues identified during scoping.

2.5.4 Ability to Comply with Federal, State, and Local Laws, Regulations, and Policies

As discussed in Sections 1.5 and 1.6 of Chapter 1, the Proposed Action, action alternatives, and sub-alternatives would need to comply with existing federal, state, and local laws, regulations, and policies. No alternative that would be outside existing federal, state, and local laws, regulations, and policies was proposed. Therefore, the Proposed Action, action alternatives, and sub-alternatives meet the need to comply with federal, state, and local laws, regulations, and policies.

2.5.5 Ability to Be Technically and Practically Feasible

The screening criteria for the ability of the Proposed Action, action alternatives, and sub-alternatives to be constructed, operated, and maintained in a technical and practical manner are used to determine whether the action alternative can be realistically and technically realized in today's current market using today's current construction technology and equipment. The Proposed Action, action alternatives, and sub-alternatives could all be constructed in a technically and practical manner in today's market using the current construction technologies. There are no obstacles in Rainbow Valley that would hinder technical and practical construction, operation, and maintenance. Connections to existing roads exist at the north and southern termini for the Proposed Action, action alternatives, and sub-alternatives. Therefore, the Proposed Action, action alternatives, and sub-alternatives are all technically and practically feasible.

2.5.6 Ability to Be Economically and Practically Feasible

The screening criteria for the ability of the Proposed Action, action alternatives, and sub-alternatives to be constructed, operated, and maintained in an economic and practical manner are used to determine whether the action alternative can be financed for the life of the project, which would be in perpetuity. The City has constructed numerous roadways, including major arterial streets, and continues to upgrade its existing roadways to meet federal, state, and local roadway standards as needed. As specified in the POD, the City has the finances to construct, operate, and maintain the Proposed Action in an economical and practical manner. Therefore, the Proposed Action, action alternatives, and sub-alternatives are all economically and practically feasible.

2.5.7 Environmentally Reasonable (Resource Considerations)

The ability for the Proposed Action, action alternatives, and sub-alternatives to be environmentally reasonable is the subject of Chapter 4 of this EIS. No elements of the Proposed Action, action alternatives, and sub-alternatives were developed with intentional environmental impacts to resources. The ability for the Proposed Action, action alternatives, and sub-alternatives to be environmentally reasonable would be measured according to the impact analysis. In many cases, the environmental reasonableness will be determined by the application of BMPs, management objectives, and mitigation measures. Therefore, the Proposed Action, action alternatives, and sub-alternatives analyzed in detail would be environmentally reasonable, subject to mitigation, as specified in Chapter 4.

2.6 ALTERNATIVE SCREENING

The BLM NEPA Handbook (Handbook H-1790-1 [BLM 2008a]) indicates that the agency may eliminate an action alternative from detailed analysis for any of the following reasons:

- It is ineffective (e.g., would not respond to the purpose and need).
- It is technically or economically infeasible, considering whether implementation of the alternative is likely, given past and current practice and technology. This does not require cost-benefit analysis or speculation about an applicant's costs and profits.
- It is inconsistent with the basic policy objectives for the management of the area.
- Its implementation is remote or speculative.
- It is substantially similar in design to an alternative that is analyzed.
- It would have substantially similar effects to those of an alternative that is analyzed.

The following matrix of screening results (Table 2-2) provides a summary and rationale of the alternatives for the SVPP and the alternative's ability to 1) meet the above purpose and need;[2] 2) respond to public and agency scoping; 3) be constructed in a technically and feasible manner; 4) be constructed in an economically practical and feasible manner; and 5) meet the previous four criteria in an environmentally reasonable manner.

Table 2-2 describes the Proposed Action (the BLM Preferred Alternative), action alternatives, and sub-alternatives that are analyzed in detail (Alternatives A, C, and H and Sub-alternatives F and G) and their ability to meet the criteria described above.

2.7 ALTERNATIVES CONSIDERED FOR DETAILED ANALYSIS

In this section, the alternatives that met the screening criteria and that were carried forward for environmental analysis are described. The No Action Alternative and Alternatives A, C, and H and Sub-alternatives F and G are considered for detailed analysis.

2.7.1 No Action

Under the No Action Alternative, the City's ROW application to develop the Sonoran Valley Parkway would not be approved. The SVPP would not be developed within BLM lands, and existing land uses in the project area would continue in their current condition. The No Action Alternative forms the baseline against which the potential impacts of the action alternatives are compared. Thus, it includes current actions and activities in the project area. No additional actions are assumed to occur in the absence of approval of any of the action alternatives.

A public road for the purposes of meeting traffic demand resulting from the expected development within the City's new MPA annexation would not be constructed under the No Action Alternative. The existing EPNG pipeline road would continue being used as it is currently.

The SVPP is included in regional transportation planning goals to provide a transportation connection within an area identified for major growth within the next 30 to 60 years by MAG. A No Action Alternative would be in conflict with the regional transportation recommendations stated in the MAG Regional Transportation Plan (2010), which provides for a Parkway corridor to meet travel demand from southern Goodyear to the Sonoran Valley annexed lands near SR 238. A No Action Alternative would not fulfill recommendations for regional transportation planning based on projections that indicate substantial population and employment growth by 2035 and beyond. The projected increase in traffic volumes that would occur on area roadways such as SR 85 and SR 238 without the project, which serve as the only other viable options to connect southern Goodyear to the SVPA and Mobile community, would result in reduced operating conditions and travel times, forcing drivers to use alternate routes, including an unpaved EPNG pipeline maintenance road that is in very poor condition and is dangerous for drivers. Under the No Action Alternative, traffic volumes on existing roads would continue to increase. Projected growth would occur, and an alternative to the current transportation network would not be available to populations. Thus, access for emergency services, residents, and commuters would remain unchanged, limited, and unimproved.

[2] Includes the ability to meet the land use objectives of the Lower Sonoran/SDNM RMP and the ability to comply with federal, state, and local laws, regulations, and policies.

Table 2-2. Screening Results: Alternatives Analyzed in Detail

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
No Action	No, because the No Action Alternative would not enable the City to construct a Parkway on BLM lands as applied under AZA-34177.	No, because the No Action Alternative would not consider environmental issues and concerns raised during public and agency scoping.	Yes, because no construction would take place.	Yes, because no construction would take place.	Yes, because no construction would take place and environmental resource considerations would remain in their current condition.
Alternative A (the BLM Preferred Alternative)	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would mostly be located on, adjacent to, or near existing roadways and would not involve topographic or engineering constraints. Technical Considerations: • Would require new ground disturbance • Does not cross Waterman Wash • Relatively straight alignment • Would require a more substantial barrier than just 4-strand barbed wire along SDNM boundary • Coordination between the City, Transwestern, and EPNG required • Would provide an improved access road for EPNG maintenance purposes	Yes, because this alternative would have the least environmental, topographic, or engineering constraint impacts of all the action alternatives analyzed.	Yes, because this alternative uses existing roadways or primitive roads. Resource Considerations: • Within existing corridor • Reduces surface disturbance • Decreases visual contrast • Reduces wildlife habitat and grazing allotment fragmentation • Reduced curves and turns • Provides better management of travel and access into SDNM • Does not cross Waterman Wash • Lessens manageability of the BLM public land north of SDNM (potential increased illegal dumping, off-road driving) • Higher potential for increased noise impacts on northern areas of SDNM • Would intersect the designated wildlife linkage at its narrowest point • Divides the Beloat allotment at the SDNM boundary and creates access-to-range improvements and water issues. • Would intersect with the greatest amount of Category I Sonoran desert tortoise habitat of all action alternatives

Table 2-2. Screening Results: Alternatives Analyzed in Detail (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Alternative C	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would mostly be located on, adjacent to, or near existing roadways and would not involve topographic or engineering constraints. Technical Considerations: • Would require new ground disturbance • Near Waterman Wash • Approximately six “curves and/or turns”	Yes, because this alternative would have less environmental, topographic, or engineering constraint impacts than Alternative H.	Yes, because this alternative would use mostly existing roadways. However, this alternative would parallel Waterman Wash within 0.5 mile through the wildlife linkage area on BLM lands. Resource Considerations: • Includes the greatest amount of ASLD State Trust land and private land • Avoids SDNM and gas pipeline corridor • Takes advantage of existing road ROWs and reduces new surface disturbance • Includes less acreage of BLM public lands than the Proposed Action • Does not cross Waterman Wash • Divides the Beloat allotment into small pastures and creates access-to-livestock-waters issues • Intersects 3 miles of wildlife linkage

Table 2-2. Screening Results: Alternatives Analyzed in Detail (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Alternative H	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purposes of the multiple-use principles of BLM lands and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would mostly be located on, adjacent to, or near existing roadways and would not involve topographic or engineering constraints. Technical Considerations: • Approximately five “curves and/or turns” • Crosses Waterman Wash at two locations and tributaries in numerous locations	Yes, because this alternative would have limited environmental, topographic, or engineering constraint impacts.	Yes, because this alternative would use mostly existing roadways. Resource Considerations: • Uses existing ROWs • Since this route is on existing roads, provides the fewest impacts to vegetation • Includes less acreage of BLM public lands than the Proposed Action • Provides the best access to BLM lands that are planned for disposal • Decreased impacts to high-quality Sonoran desert tortoise habitat, compared with Alternative A • Preserves continuity of Conley allotment due to the alignment following existing roads, but divides the Beloat allotment into smaller pastures that would be separated by the proposed Parkway

Table 2-2. Screening Results: Alternatives Analyzed in Detail (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Sub-alternative F	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would mostly be located on, adjacent to, or near existing roadways and would not involve topographic or engineering constraints. Technical Considerations: • Would require more surface disturbance than the southern alignment common to Alternatives A, C, and H and Sub-alternative G • Exact location of this alternative will need to be field examined to determine how to avoid the greatest number of cultural sites	Yes, because this alternative would have limited environmental, topographic, or engineering constraint impacts.	Yes, because this alternative would avoid most sensitive cultural resources. Resource Considerations: • Could become a sub-alternative of all action alternatives, as it represents a complete realignment of the southernmost alignment only • Would avoid the known homestead cultural sites • Follows an existing road • Needs access to the Butterfield Overland Stage Route and Juan Bautista de Anza NHT; mitigation should include a pull-off with interpretative signs and parking

Table 2-2. Screening Results: Alternatives Analyzed in Detail (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Sub-alternative G (the BLM Preferred Sub-alternative)	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative not involve topographic or engineering constraints. Technical Considerations: • Would require the same surface disturbance as the southern alignment common to Alternatives A, C, and H and less than Sub-alternative F • Exact location of this alternative will need to be field examined to determine how to avoid the greatest number of cultural sites	Yes, because this alternative would have limited environmental, topographic, or engineering constraint impacts.	Yes, because this alternative would avoid most sensitive cultural resources. Resource Considerations: • Could become a sub-alternative of all action alternatives, as it represents a complete realignment of the southernmost alignment only • Would avoid the known homestead cultural site • Needs access to the Butterfield Overland Stage Route and Juan Bautista de Anza NHT; mitigation should include a pull-off with interpretative signs and parking

Common to All Action Alternatives

- Designed in accordance with Arizona Parkway specifications (Maricopa County Department of Transportation 2010).
- 4-strand barbed wire (wildlife standard fence) along the entire length in accordance with BLM and AGFD specifications.
- At the south end of the alignment (for all action alternatives), would require access to the Butterfield Overland Stage Route and Juan Bautista de Anza NHT in the form of a pull-off that provides parking spaces and interpretative signs that lead to a footpath for each trail.
- Everywhere there is a designated BLM road, a pull-off with gate or cattle guard would be needed. (An “apron,” in accordance with MAG standards.)
- All alternatives create impacts to range/livestock that will need to be addressed.
- All alternatives that affect Category I Sonoran desert tortoise habitat will need to provide a 5:1 compensation for habitat loss (BLM 1991).
- Facilitate wildlife movement within designated wildlife linkage corridors.
- Provide opportunity for land purchase/disposal for private inholdings within the boundary of SDNM.
- The development of a treatment plan will lay out mitigation strategies for any/each cultural site impacted since the south end of the Parkway (Alternatives A, C, and H) will all likely impact cultural sites and the Butterfield Overland Stage Route and Juan Bautista de Anza NHT.

* Includes the ability to meet the land use objectives of the Lower Sonoran RMP and the ability to comply with federal, state, and local laws, regulations, and policies.

2.7.2 Alternative A, the BLM Preferred Alternative

Alternative A was developed by the proponent and represents the Proposed Action. BLM has identified Alternative A as the BLM Preferred Alternative.

The CEQ regulations at 40 CFR 1502.14(e) and Department of Interior regulations at 43 CFR 46.425 direct that an EIS "identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference." According to CEQ, the agency's preferred alternative "is the alternative that the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors" (CEQ 1981). Alternative A has been identified as the BLM Preferred Alternative because this alternative represents the greatest combination of resource protection measures that would fulfill the BLM's mission and responsibilities. It is anticipated the Parkway, if constructed, would provide BLM with a better management approach and enhanced opportunities for managing vehicle entry into the SDNM from innumerable, unplanned primitive roads and wash vehicle route networks. The proposed Parkway would straddle and break up these existing ad-hoc route networks through design and fencing. Constrained access through well-administered entry points would provide BLM the opportunity to contact users with appropriate messaging and OHV user information, more effectively protect monument objects, and assist effective Park Ranger and Law Enforcement Ranger enforcement.

Alternative A represents the action alternative with the straightest alignment. Alternative A would total 15.7 miles; it would start at Riggs Road at the north end of the project area, go south for approximately 2.5 miles along Rainbow Valley Road, then go southeast for 10.4 miles, roughly paralleling the EPNG pipeline road. This alignment would parallel the northeastern boundary of SDNM (approximately 800 feet separates the proposed Alternative A ROW from the northeastern boundary of SDNM). The alternative would be located within an existing utility corridor (the EPNG multi-use utility corridor), identified in the Lower Sonoran RMP. Alternative A ends at SR 238. There are two sub-alternatives, described below, for the last approximately 2 miles of Alternative A.

Alternative A is located in Sections 34 and 35, Township 2 South, Range 2 West; Sections 2, 3, 10, 11, 13, and 14, Township 3 South, Range 2 West; Sections 18–20, 28, 29, 33, and 34, Township 3 South, Range 1 West; Sections 2, 3, 11, and 12, Township 4 South, Range 1 West; and Sections 7, 18–20, and 29, Township 4 South, Range 1 East (see Figure 2-2).

Alternative A would cross approximately 9.5 miles of BLM-administered land, 1.6 miles of ASLD land, and 4.7 miles of private land. A permanent 200-foot-wide ROW, plus an additional 25-foot-wide grading and drainage easement, is requested on both sides of the ROW centerline, for a total width of 250 feet. A grant for identical ROW and drainage easements would be requested from ASLD for those portions of the Parkway that would cross State Trust land. Private lands necessary for this project's ROW generally would be obtained as fee purchases and easements by the City. Public input generated from the scoping meeting(s) indicated support for Alternative A, which would provide the most direct and efficient connection to the newly annexed Sonoran Valley area while providing the greatest distance from Waterman Wash. In addition, comments emphasized the importance of an efficient connection, which is essential for emergency services.

2.7.2.1 Parkway Design

The Parkway concept and design discussed in long-range transportation plans for the region were identified to meet the need for non-freeway restricted access facilities that can support significantly greater travel capacity than major urban arterial roadways. Alternative A follows the alignment identified

within the MAG and ADOT long-range transportation plans and would be compatible with the Maricopa County Department of Transportation (MCDOT) Parkway design recommendations.

Characteristics of the Alternative A alignment include the following:

- Allows posted speeds of up to 55 miles per hour (mph) because of few curves in the alignment
- Provides for widely spaced traffic interchanges and left turns, resulting in less traffic conflict and safer traveling conditions
- Supports Parkway-to-Parkway at-grade intersection treatments to support future transportation connections
- Represents the most efficient and direct route to connect southern Goodyear to the Sonoran Valley (SR 238 near the community of Mobile, Arizona)

2.7.2.2 Intersections with Existing Roads

The Alternative A alignment would provide a primary connection from the Rainbow Valley Road alignment at the northern terminus and SR 238 at the southern terminus. Final engineering and design would determine the exact configuration of the traffic interchanges at these termini to accommodate average daily entering volumes from existing roads.

Additionally, each traffic interchange would be evaluated in terms of level of service (LOS) and anticipated average daily intersection entering volumes. Figure 2-9 shows a schematic of a typical parkway interchange.

Currently, there are approximately four potential traffic interchanges along the Alternative A alignment (not including the beginning of the SVPP at Rainbow Valley Road and the terminus at SR 238):

- Patterson Road (east interchange)
- South Bullard Avenue (north and south interchange)
- West Komatke Road (east interchange)
- 107th Avenue (west interchange)

Alternative A would terminate at SR 238. The traffic interchange would be designed to accommodate the existing traffic, as well as anticipated new traffic flowing onto the existing roadway. MCDOT has developed six traffic interchange options for parkways. Final alignment for connection to SR 238 and potential connections to SR 303L would be explored during final design.

2.7.2.3 Wash Crossings and Temporary Construction Easements

As shown in Table 2-3, 39 wash crossings are anticipated for Alternative A, the Proposed Action. Wash crossings will be designed as either a low-water crossing (dip section), standard culvert (typically, a cylindrical aluminum corrugated pipe), or an arch span-type culvert. The arch span-type culverts are intended to facilitate wildlife movement and maintain existing drainage patterns. Details on facilities designed to accommodate wildlife movement are included in Appendix C, AGFD Design Recommendations. The wash crossings are based on preliminary engineering (30%) plans. The exact location and dimensions of wash crossings would be determined by the City during final engineering, in accordance with BLM standards.

Table 2-3. Alternative A (the BLM Preferred Alternative): Low-water Crossings and Culverts, Arch Span-Type Culverts, and Temporary Construction Easements

Feature	Amount proposed	Approximate Dimensions
Low-water Crossing	19	200–1,600 linear feet
Culvert	17	2- to 6-foot openings
Arch Span-Type Culvert (Wildlife Crossing)	3	Minimum of 12 feet high
Temporary Construction Easements	2	250 × 250 feet

2.7.3 Alternative C

Alternative C was developed by the proponent as an alternative to the Proposed Action. Alternative C's primary purpose is to locate the Parkway so that it would not be adjacent to the SDNM. Alternative C would total 18.1 miles; it would start at Riggs Road at the north end and go south for approximately 1.8 miles along Rainbow Valley Road. The proposed road would then go directly east along Patterson Road for approximately 6 miles. The next section would proceed south along the Bullard Avenue alignment for approximately 5 miles before finally going east-southeast for 5.4 miles. Alternative C ends at SR 238, and shares a common alignment with Alternative A for approximately the last 2 miles of the alignment. There are two sub-alternatives, described below, for the last approximately 2 miles of Alternative C.

Alternative C is located in Sections 34 and 35, Township 2 South, Range 2 West; Sections 2, 3, 11, and 12, Township 3 South, Range 2 West; Sections 7, 8, 15–17, 22, 23, 25, 26, and 36, Township 3 South, Range 1 West; Section 31, Township 3 South, Range 1 East; Sections 1 and 12, Township 4 South, Range 1 West; and Sections 6, 7, 18–20, and 29, Township 4 South, Range 1 East (see Figure 2-3).

Alternative C would cross approximately 10.1 miles of BLM-administered land, 2.1 miles of ASLD land, and 5.9 miles of private land. Alternative C was developed to follow the existing Patterson Road and Bullard Avenue alignments as much as possible in order to eliminate the need for new construction on ASLD lands and private inholdings. Under this alternative, a permit for ROW for State Trust land would be required. Also, the proposed Alternative C route would provide a buffer between the Parkway and the SDNM. Design and construction standards of the Parkway would be functionally identical to those described for Alternative A; only the route and the placement of drainage structures would differ substantially.

Public comment indicated concerns regarding the construction of an alignment that could harm sensitive wildlife or riparian areas. Alternative C would avoid several of these concerns by using existing ROW and reducing surface disturbance.

Characteristics of the Alternative C alignment include the following:

- Allows posted speeds of up to 55 mph
- Provides opportunities for improved access to the Estrella Mountains and improved travel and access to BLM public lands
- Removes the sights and sounds of the Parkway because it does not parallel the northern areas of SDNM
- Creates a separate pasture to the southwest that could be managed for livestock with the installation of a well as mitigation

2.7.3.1 Parkway Design

The Alternative C alignment contains multiple sharp turns and curves because the alignment is designed to avoid resources. Additional safety measures such as signage and barriers would be included in the final design and engineering of the Parkway.

2.7.3.2 Intersections with Existing Roads

The Alternative C alignment would provide a connection from the West Patterson Road alignment at the northern terminus and SR 238 at the southern terminus. Final engineering and design would determine the exact configuration of the traffic interchanges at these termini to accommodate average daily entering volumes from existing roads.

Additionally, each traffic interchange located along the alignment would be evaluated in terms of LOS and anticipated average daily intersection entering volumes.

Currently, there are five potential traffic interchanges along the Alternative C alignment (not including the beginning of the SVPP at Rainbow Valley Road and the terminus at SR 238):

- South Bullard Avenue (at West Prong Wash) (east interchange)
- 135th Avenue (north interchange)
- 115th Avenue alignment (east interchange)
- 107th Avenue (west interchange)

All interchanges under Alternative C would be designed to accommodate the anticipated new traffic flowing to and from each roadway. MCDOT has developed six traffic interchange options for parkways. Final alignment for connection to SR 238 and potential connections to the SR 303L would be explored during final design.

2.7.3.3 Wash Crossings and Temporary Construction Easements

As shown in Table 2-4, 44 wash crossings are anticipated for Alternative C. Wash crossings will be designed as either a low-water crossing (dip section), standard culvert (typically, a cylindrical aluminum corrugated pipe), or an arch span-type culvert. The arch span-type culverts are intended to facilitate wildlife movement and maintain existing drainage patterns. Details on facilities designed to accommodate wildlife movement are included in Appendix C, AGFD Design Recommendations. The wash crossings are based on preliminary engineering (30%) plans. The exact location and dimensions of wash crossings would be determined by the City during final engineering, in accordance with BLM standards.

Table 2-4. Alternative C: Low-water Crossings and Culverts, Arch Span-Type Culverts, and Temporary Construction Easements

Feature	Amount proposed	Approximate Dimensions
Low-water Crossing	30	200–1,200 linear feet
Culvert	12	2- to 6-foot openings
Arch Span-Type Culvert (Wildlife Crossing)	2	Minimum of 12 feet high
Temporary Construction Easements	2	250 × 250 feet

2.7.4 Alternative H

Alternative H was developed by the BLM. Alternative H represents an alignment that provides a mixture of characteristics from the Proposed Action and Alternative C. Alternative H's alignment provides access to the private holdings and BLM lands that have been identified for disposal or exchange by the BLM. In addition, Alternative H would not parallel Waterman Wash and would be removed from SDNM where possible. Alternative H would total 18.3 miles. Alternative H would travel south along Rainbow Valley Road for approximately 1.9 miles to Patterson Road. Alternative H would then turn east and follow Patterson Road for approximately 5.5 miles to the Dysart Avenue alignment (there currently is no Dysart Avenue roadway at this location), where the alignment would turn due south for approximately 5 miles and extend to the SDNM boundary, and then follow the SDNM boundary for approximately 5.9 miles in a southeasterly direction, terminating at SR 238. Alternative H shares a common alignment with Alternatives A and C for approximately the last 2 miles of the alignment. There are two sub-alternatives, described below, for the last approximately 2 miles of Alternative H.

Alternative H is located in Sections 8–10, 14, 23, 26, and 35, Township 3 South, Range 1 West; Sections 2 and 12, Township 4 South, Range 1 West; and Sections 7, 18–20, and 29, Township 4 South, Range 1 East (see Figure 2-4).

Alternative H would cross approximately 8.4 miles of BLM-administered land, 1.5 miles of ASLD land, and 8.4 miles of private land. Under this alternative, a permit for ROW for State Trust land would be necessary. Also, the proposed Alternative H route would provide a buffer between the Parkway and the SDNM. Design and construction standards of the Parkway would be functionally identical to those described for Alternative A; only the route and the placement of drainage structures would differ substantially.

Characteristics of the Alternative H alignment include the following:

- Allows posted speeds of up to 55 mph
- Located on the smallest amount of BLM public lands
- Provides the best access to BLM lands identified for disposal
- Avoids paralleling the biological and hydrologic resources of Waterman Wash and its tributaries

2.7.4.1 Parkway Design

The Alternative H alignment contains multiple sharp turns and curves because the alignment is designed to avoid resources. Additional safety measures such as signage and barriers would be included in the final design and engineering of the Parkway.

2.7.4.2 Intersections with Existing Roads

The Alternative H alignment would provide a connection from the West Patterson Road alignment at the northern terminus and SR 238 at the southern terminus. Final engineering and design would determine the exact configuration of the traffic interchanges at these termini to accommodate average daily entering volumes from existing roads.

Additionally, each traffic interchange located along the alignment would be evaluated in terms of LOS and anticipated average daily intersection entering volumes.

Currently, there are six potential traffic interchanges along the Alternative H alignment (not including the beginning of the Sonoran Valley Parkway at Rainbow Valley Road and the terminus at SR 238):

- South Bullard Avenue (north interchange)
- 135th Avenue (north and south interchange)
- Unnamed primitive road (east interchange)
- West Komatke Road (east interchange)
- 107th Avenue (west interchange)

All interchanges under Alternative H would be designed to accommodate the anticipated new traffic flowing to and from each roadway. MCDOT has developed six traffic interchange options for parkways. Final alignment for connection to SR 238, and potential connections to SR 303L would be explored during final design.

2.7.4.3 Wash Crossings and Temporary Construction Easements

As shown in Table 2-5, 40 wash crossings are anticipated for Alternative H. Wash crossings will be designed as either a low-water crossing (dip section), standard culvert (typically, a cylindrical aluminum corrugated pipe), or an arch span-type culvert. The arch span-type culverts are intended to facilitate wildlife movement and maintain existing drainage patterns. Details on facilities designed to accommodate wildlife movement are included in Appendix C, AGFD Design Recommendations. The wash crossings are based on preliminary engineering (30%) plans. The exact location and dimensions of wash crossings would be determined by the City during final engineering, in accordance with BLM standards.

Table 2-5. Alternative H: Low-water Crossings and Culverts, Arch Span-Type Culverts, and Temporary Construction Easements

Feature	Amount proposed	Approximate Dimensions
Low-water Crossing	29	200–1,200 linear feet
Culvert	8	2- to 6-foot openings
Arch Span-Type Culvert (Wildlife Crossing)	3	Minimum of 12 feet high
Temporary Construction Easements	2	250 × 250 feet

The sub-alternatives described below have been developed to determine the specific alignment for the terminus of the Sonoran Valley Parkway on the south end.

2.7.5 Sub-alternative F

Sub-alternative F was developed by the BLM. Sub-alternative F would provide a different alignment, and if chosen, effectively replace approximately the last 2 miles of Alternative A, C, or H. Sub-alternative F's alignment was developed to decrease the amount of surface disturbance and to avoid known historic and cultural resources; it would be confined to the existing Komatke/Gas Pipeline Road alignment, which is pre-existing. Sub-alternative F would be approximately 2.8 miles long. Sub-alternative F would not be located on the pipeline itself but approximately 200 feet to the east. Sub-alternative F is a sub-alternative that would only apply to the southern portions of the Parkway. Sub-alternative F's total length is not included in Alternative A, C, or H. Sub-alternative F would begin approximately 3 miles north of SR 238 at the Komatke/Gas Pipeline Road and would follow the existing roadway to SR 238 in order to confine

all project activities (construction, operation, and maintenance) to previously disturbed surfaces. Sub-alternative F would require access to the Butterfield Overland Stage Route and Juan Bautista de Anza National Historic Trail.

2.7.6 Sub-alternative G, the BLM Preferred Sub-alternative

Sub-alternative G, the BLM Preferred Sub-alternative, was developed by the BLM. The CEQ regulations at 40 CFR 1502.14(e) and Department of Interior regulations at 43 CFR 46.425 direct that an EIS "identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference." According to CEQ, the agency's preferred alternative "is the alternative that the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors" (CEQ 1981). Sub-alternative G has been identified as the BLM preferred sub-alternative because this sub-alternative represents the greatest combination of resource protection measures that would fulfill the BLM's mission and responsibilities.

Sub-alternative G would provide a different alignment, and if chosen, effectively replace approximately the last 2 miles of Alternative A, C, or H. Sub-alternative G's alignment was developed to avoid the Komatke/Gas Pipeline Road and to avoid known historic and cultural resources; it would be located farther to the west of these. Sub-alternative G was also developed to move the future SVPP interchange with SR 238 away from the Mobile area, farther to the west. Sub-alternative G would be approximately 2.4 miles long. Sub-alternative G would only apply to the southern portions of the Parkway. Sub-alternative G's total length is not included in Alternative A, C, or H. Sub-alternative G would begin approximately 3 miles north of SR 238 at the Komatke/Gas Pipeline Road. Sub-alternative G would leave the existing roadway and travel in a southwesterly direction across undeveloped BLM land in order to avoid a historical homestead site. Sub-alternative G would intersect with SR 238 approximately 1 mile west of the Proposed Action's terminus. Sub-alternative G would require access to the Butterfield Overland Stage Route and Juan Bautista de Anza National Historic Trail.

2.8 DESIGN FEATURES COMMON TO ALL ACTION ALTERNATIVES

The following section describes the common features of the proposed Parkway, as well as activities that are anticipated to occur before and during project construction and throughout operation and maintenance of the Parkway. Compliance with the mitigation measures listed at the end of this section will be required for the implementation of any action alternative.

The Sonoran Valley Parkway is based on the Arizona Parkway concept, which was identified in long-range transportation planning documents for Maricopa and Pinal Counties and is a critical component of the region's ultimate transportation network, designed to serve build-out conditions (with build-out being assumed for a 40- to 60-year time frame).

The Sonoran Valley Parkway is cited in the MAG Hassayampa and Hidden Valley Transportation Framework Studies (MAG 2007a, 2009) to meet the need for a non-freeway, enhanced arterial connection between southern Goodyear and the Sonoran Valley (SR 238 near Mobile). Design features of a Parkway as determined by MCDOT will be common to each action alternative. The Parkway design and construction as described in the following sections is based on MCDOT guidance and represents generalized minimum requirements for a Parkway.

2.8.1 Parkway Design Features

The Arizona Parkway concept described in MAG's long-range transportation planning documents was selected as the best type of transportation facility to service urban-rural transition areas with anticipated high traffic volume. The Parkway being studied by the City, the Sonoran Valley Parkway, was identified within the MAG Regional Transportation Plan (MAG 2010) as a Parkway candidate road because of its location and the functional need in this area. The functional roadway characteristics of a Parkway include higher vehicle capacity, faster travel times, better gas mileage for vehicles, reduced air emissions, and less potential for accidents due to limited traffic conflict points (e.g., turn-bays, traffic intersections, etc.).

Parkway design features are based on MCDOT Design Guidance Recommendations, Enhanced Parkway Study, and the Arizona Parkway Intersection/Interchange Operational Analysis and Design Concept Study guidance (MCDOT 2008a). For the purposes of this EIS, general parkway design guidance was used to assist in alternatives screening and decision-making. MCDOT's Parkway design guidance outlines minimum standards and recommendations for parkways that have not been built yet. Actual parkway design may require departure from MCDOT's parkway design guidance because of site-specific requirements or environmental conditions (e.g., topography, drainage conditions, engineering constraints, etc.). At this time, detailed engineering and design have not been performed; however, the general parkway design features common to all alternatives are described to further illustrate the components of a parkway within the existing environment.

The Arizona Parkway is designed to be a hybrid of a freeway and an arterial road for enhanced traffic flow, safety, capacity, and access in urban-rural transition areas. Generally, the Parkway would include signalized intersections and prohibited left turns at cross-street intersections. Left turns would be made through indirect U-turns at crossovers located immediately beyond the intersection. Parkway design also allows for enhanced traffic safety and increased intersection capacity by limiting intersections and traffic stops and eliminating acceleration and deceleration lanes and turn bays. Generally, the major features of a parkway are similar to an arterial road; however, the parkway is designed to accommodate a greater volume of faster-flowing traffic by reducing the number of intersections and dedicated turn lanes. Additionally, parkways include a landscaped median that provides an increased aesthetic appeal in urban-rural transition areas through vegetative shielding and ground cover.

2.8.2 The Sonoran Valley Parkway

The Sonoran Valley Parkway would be constructed in three phases (two, four, and six lanes), contingent upon funding and growth. The two-lane Parkway would be located within the 250-foot-wide ROW but would function as a traditional major arterial road. As additional lanes are added, design characteristics of a parkway will be included. Figure 2-6 shows a cross section of how the Parkway would function as a two-lane parkway. Figures 2-7 and 2-8 show a typical parkway cross section for a four- and six-lane parkway, which includes 14-foot-wide travel lanes in both directions, as well as parkway amenities such as a landscaped median, edge treatments, and shoulders.

The Sonoran Valley Parkway, at full build-out, would accommodate approximately 72,000 vehicles per day at LOS C. The LOS is based on the number of lanes, functional classification of the Parkway, and desired capacity. Each LOS is given a letter designation from A to F, with A representing the best traffic conditions and F the worst. LOS C is anticipated because of the rapid growth anticipated for urban, suburban, and rural areas within the region (MCDOT 2009). The Parkway is also designed to accommodate a faster flow of traffic. Design speed of a Parkway depends, in part, upon terrain and topography, as well as sight distance for stopping, intersection sight distance, horizontal and vertical curvature, and geometrics of turning.

2.8.2.1 Intersections and Cross-Overs

Figure 2-9 shows a typical parkway intersection in accordance with MCDOT Parkway design guidance. Final design and engineering based on specific Parkway conditions for the Sonoran Valley Parkway will determine the exact configuration of the Parkway intersection(s). Intersection configuration design would also be contingent upon access, traffic flow, and Parkway-to-arterial connections.

Generally, the Parkway would include signalized intersections and prohibited left turns at cross-street intersections. Left turns would be made through indirect U-turns at crossovers located immediately beyond the intersection.

2.8.2.2 Drainage

Drainage design for the Parkway would be based on recommendations from the *Drainage Policies and Standards for Maricopa County, Arizona* (Maricopa County 2007) and the *Roadway Design Manual* (MCDOT 2004). Typically, Parkway drainage structures would be completed in final engineering, based on drainage conditions and patterns, peak flows, topography, and impacts to floodplains and wash crossings.

According to the *Sonoran Valley Road Final Drainage Report* (Final Drainage Report) (V3 Companies of Arizona, Ltd. [V3] 2007), the project area is located in an area that receives shallow sheet flow and channelized runoff during large storm events. Discussions between V3, the City, BLM, and MCDOT determined that to the extent possible, the Alternative A Parkway alignment should preserve the existing energy conditions of the watershed by maintaining a shallow sheet flow condition. In maintaining the sheet flow conditions, the major and minor washes in this area should not experience a major change in velocity and scour conditions, which could adversely impact the waterways.

In order to manage the off-site flows directed to the site from the south, two types of crossings have been incorporated into the proposed vertical alignment of Sonoran Valley Parkway. The first crossing type consists of a dip section in the proposed vertical alignment. These crossings are typically used in areas in which water crosses the Parkway in a shallow sheet flow type of conveyance that does not have a well-defined stream or channel associated with the flow. The dip sections were analyzed as a weir and are designed to have a weir crest length long enough to keep the 100-year peak discharge at a maximum depth of 0.50 foot above the pavement. By keeping the depth across the pavement at 0.50 foot, an all-weather crossing can be maintained in these dip section crossings. The dip sections are constructed so that they protect the Parkway from being undermined by the crossing flow. A 2-foot-wide concrete apron, followed by 10 feet of riprap erosion protection, is incorporated on the upstream and downstream side of the Parkway in order to provide both infiltration and deceleration of sheet flow entering and exiting the pavement.

The second type of crossing is located at the more defined washes, which convey the more concentrated and higher-magnitude flows. These crossings incorporate the use of concrete culverts into the vertical alignment of Sonoran Valley Parkway. At these locations, the peak discharges for the 100-year storm event are conveyed beneath the Parkway with a maximum of 0.50 foot of overtopping.

Detailed locations of these dip sections and culvert locations are presented in Tables 2-3, 2-4, and 2-5 in Section 2.3 above.

2.8.2.3 Lighting

Surface lighting for the Parkway may be included in the final design in accordance with City recommendations. All surface lighting would be designed to be in keeping with the Maricopa County Dark Sky Ordinance as stated in Section 1112 of the Maricopa County Zoning Ordinance (Maricopa County 2012) and Article 10 of the City of Goodyear's Zoning Ordinance (City 1999).

2.8.2.4 Traffic Control and Signalization

Signing is a critical element of Parkway design, particularly in instances where directional crossovers occur (i.e., non-signalized U-turns). U.S. Department of Transportation standards recommend multiple regulatory signs at each crossover, major intersections, approaches, traffic interchanges, and Parkway-to-arterial connections.

A detailed signing configuration in keeping with the American Association of State Highway and Transportation Officials (AASHTO) and MCDOT requirements for Parkways will be included in the final design and engineering. Signal length, spacing, and progression will be included in the final design and engineering. However, Parkways are characterized by fewer signals (spaced 0.5 mile or more) to allow greater traffic speeds and improve traffic flow. Signalized (versus signed) directional crossovers may be considered in final design.

2.8.2.5 Curbing/Gutters

Curbs are typically used on the edges of Parkways in urban settings, whereas rural areas typically do not require curbing but rather a thickened edge treatment. Maricopa County design standards require 2-foot shoulders with edge treatments on rural roads. AASHTO recommends non-vertical curb (or gutter) on facilities with a design speed of greater than 45 mph. At final build-out, the six-lane Parkway will likely have curbing along the median except for at the directional crossovers.

2.8.2.6 Right-of-Way Fencing

Fencing along the Parkway will be developed by the City and approved by the BLM, depending on requirements for wildlife, livestock, safety, and restrictions for access. Standard BLM ROW fencing would be applied.

Table 2-6 provides a summary of the Sonoran Valley Parkway design characteristics and criteria, which are based on MCDOT Parkway design guidelines.

Table 2-6. Sonoran Valley Parkway Design Characteristics and Criteria

Parkway length	Alternative A (the BLM Preferred Alternative): 15.72 miles total, including the chosen Sub-alternative Alternative C: 18.12 miles Alternative H: 18.28 miles Sub-alternative F: 2.8 miles Sub-alternative G (the BLM Preferred Sub-alternative): 2.38 miles
ROW width	Total ROW = 250 feet (200 feet plus 25-foot-wide drainage easements on both sides of ROW centerline)

Table 2-6. Sonoran Valley Parkway Design Characteristics and Criteria (Continued)

Parkway width	Two lanes Total Parkway width = 44 feet (28-foot-wide paved surface with 8-foot-wide graded shoulders) Four lanes Total Parkway width (including median) = 200 feet (Two 28-foot-wide paved surfaces [two lanes in each direction] with 8-foot-wide graded shoulders separated by a 112-foot median) Six lanes Total Parkway width (including median) = 200 feet (Two 42-foot-wide paved surfaces [three lanes in each direction] with 8-foot-wide graded shoulders separated by a 84-foot median)
Parkway material and structural section	Asphalt over aggregate base per geotechnical engineer's recommendations
Parkway design speed (all action alternatives)	65 mph
Parkway posted speed (all action alternatives)	55 mph
Drainage design criteria	In accordance with BLM, City, ASLD, and MCDOT requirements
Parkway longitudinal slopes	2.0% maximum 0.3% minimum
Parkway cross slope	5.0% maximum 2.0% minimum
Temporary construction easements*	Alternative A: 1.38 acres Alternative C: 1.38 acres Alternative H: 1.38 acres

* Temporary construction easements are proposed in areas that would be common to Alternatives A, C, and H.

2.8.2.7 Wildlife Crossings within the Estrella Mountains to SDNM Wildlife Movement Corridor

The Lower Sonoran RMP (BLM 2012a) designated the Estrella Mountains to SDNM Wildlife Movement Corridor. Wildlife-enabled arch span-type culverts would be constructed within the Estrella Mountains to SDNM Wildlife Movement Corridor to facilitate roadway permeability for larger mammals such as mule deer and bighorn sheep. Dimensions and measurements of the wildlife-enabled arch span-type culverts would be determined during final design. The selection of an action alternative will determine the precise location within the Estrella Mountains to SDNM Wildlife Movement Corridor.

2.8.2.8 Wildlife Crossings outside of the Estrella Mountains to SDNM Wildlife Movement Corridor

As shown in Tables 2-2, 2-3, and 2-4, there are numerous culverts proposed for the SVPP. Many of these drainage culverts may function as a crossing for terrestrial wildlife species and will be designed to maximize roadway permeability for small to medium-sized mammals, reptiles, and amphibians. Culverts that are intended to facilitate roadway permeability for wildlife are discussed below in the Applicant-Committed Mitigation Measures in Table 2-7 in Section 2.9.

2.8.2.9 Wildlife Funnel Fencing

Funnel fencing (exclusion fences) will be included on all wildlife crossings. All arch span-type culvert and underpasses will include exclusion fences in order to be effective. A minimum height of 7 feet from ground level to the top of the fence would be required to accommodate all mammals of the area.

The funnel fencing would be the extent of the highway that passes through suitable mule deer or bighorn sheep habitat within lands included in the linkage area; the length of the funnel would be determined on a case-by-case basis. All exclusion fences would include small mammal–sized fencing material on the lower portions of the fence.

2.8.3 Construction Activities

Construction of the Parkway would be phased in three parts, beginning with two bidirectional lanes being built within the 250-foot ROW that would function as a traditional arterial roadway. Additional lanes would be constructed in two-lane increments as funding becomes available, culminating in a six-lane bidirectional Parkway with a landscaped median. Figure 2-10 below illustrates how the phased construction of the two-, four-, and six-lane construction will occupy the requested 250-foot ROW. Construction of two lanes of roadway would be conducted within a 12- to 24-month time frame. Completion of the entire six-lane Parkway could be finalized within a 60- to 72-month time frame but is contingent upon available funding and future development of the Rainbow Valley. A draft POD was submitted to BLM in April 2009. The POD will be finalized prior to the granting of the ROW and start of construction.

2.8.4 Construction of Two Lanes

The first phase of construction (two lanes) includes building the outside curb and gutter and constructing the traffic lanes with the appropriate edge treatments and shoulders. The two bidirectional lanes would be constructed on the easternmost portion of the corridor. No U-turn crossovers would be constructed at this time. The two-lane Parkway would remain in place and functional until additional phases of construction occurr.

2.8.4.1 Earthwork and Paving

Construction activities would include earthwork grading; excavation; installation of drainage structures; placement of asphalt pavement, gravel, and decomposed granite; clean up; and site reclamation.

During construction, heavy equipment would be used to clear the site, build the lanes, and haul and lift materials. Excavators, bulldozers, load graders, compactors, water trucks, dump trucks, forklifts, scrapers, trenchers, line-up trucks, and pick-up trucks would likely be used in construction.

After initial grading, areas within the ROW that require additional fill would be filled as crews would begin construction of the Parkway subgrade. Road base would be placed along the established Parkway and graded to plan. Graders, scrapers, and bulldozers would be used to obtain the necessary grade and alignment. Once the prescribed grade and center line of travel are constructed to plan, pavement would be placed.

2.8.4.2 Construction Access

Access to the construction site would be either from the intersection of Rainbow Valley and Riggs Roads, or from the proposed intersection of Sonoran Valley Parkway and SR 238. Access to the project area from Rainbow Valley Road and Riggs Road would be via a 20-foot-wide construction road located in the south and west halves of the ROW. Access to the project area from SR 238 would be via the same 20-foot-wide construction road located in the south and west halves of the ROW. This temporary roadway would remain in use during the entire project. After all phases have been completed, the construction road would

be hydroseeded with a mixture of mulch and native seed mix. The goal is to allow the temporary roadway to return to a natural state.

2.8.4.3 Construction Staging

Because of the length of the project corridor, construction would be phased into 3- to 4-mile-long segments. Assuming that construction starts at SR 238, working north, the construction staging areas would be located at the north end of each phase. Placement of temporary-use construction staging areas at the ends of each phase would allow the staging areas to be used for two phases at one location. Earthwork for each phase would be designed so that the amount of earth excavated from the high points would be used to fill in the low points; if additional fill is needed to build the road bed, it would be purchased from local material source brokers and trucked to the site. No borrow pits are planned for any federal lands; specific material source brokers have not been identified at this time. All excess dirt that may be generated would be stored on-site within the ROW for use during future phases.

Preparation of the construction corridor would involve topographic survey of the ROW to establish final road bed grade and staking of the center line of travel. The clearing of some natural vegetation may be required; however, selective clearing would be performed only when necessary for surveying, construction, and maintenance operations. Construction staging would avoid or minimize impacts within the wildlife linkage areas. In addition, construction staging areas would include design features intended to minimize impacts to wildlife, such as exclusion fencing, pit and open trench avoidance, and employee awareness. The contractor would not disturb areas outside the ROW without prior written permission from the appropriate land managing agency or individual owner. A Native Plant Removal/Restoration Plan detailing native plant identification, removal, and restoration would be prepared prior to the start of construction.

2.8.4.4 Construction Activities

Construction sites, material storage yards, and access roads (identified on the 30% civil engineering plans in Appendix D) would be kept in an orderly condition throughout the construction period. Refuse and trash, including stakes and flags, would be removed from the sites and disposed of in an approved manner at an approved refuse facility such as the Butterfield Station Landfill in the community of Mobile. Totally enclosed containment would be provided for all trash and hazardous materials. All construction waste, including trash, litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials. To prevent the spread of invasive or noxious weeds, the project would comply with the *Phoenix District Integrated Weed Management Environmental Assessment* (BLM 2011) in coordination with the BLM, prior to the start of construction. Noxious weed control would be incorporated into the POD.

No construction equipment oil, antifreeze, or fuel would be drained on the ground. Oils or chemicals would be hauled to an approved site for disposal. No open burning of construction trash would be allowed on BLM-administered lands. No unauthorized use would be permitted on the construction access road during the project.

Following construction and cleanup, reclamation would be completed. The disturbed surfaces would be restored to the original contour of the land surface to the extent determined by BLM. During rehabilitation, the topsoil material would be spread evenly over the disturbed areas.

2.8.4.5 Restoration and Landscaping

A Native Plant Removal/Restoration Plan detailing native plant identification, removal, and restoration would be prepared in coordination with the BLM. Appropriate site-specific seed mixes would be used. Salvaged native plants will be used for revegetation of disturbed areas, if appropriate, along with seeding using BLM-recommended seed mixes. Preferably, seed would be planted between the months of November and January following the Parkway construction. Seed would be planted using straw mulching or hydromulching as directed by BLM; mulch would need to be sterilized or certified “weed free” to prevent increased spread or establishment of non-native weed species.

A construction contingency plan would be prepared prior to the start of construction. The plan would include methods for soil screening, segregation of potentially contaminated soil, soil sampling and analysis, soil disposal and reuse, and a site health and safety plan. The construction contingency plan would minimize removal of xeroriparian vegetation during construction within the wildlife linkage areas at wash crossings. Restoration and revegetation of xeroriparian vegetation will be conducted post-construction at the approaches to wildlife crossing structures.

Landscaping would occur on both sides of the two-lane road where feasible, with the final landscape design to occur during the construction of the six-lane Parkway.

2.8.5 Construction of Four Lanes

The second phase of construction (total of four lanes) would be added as warranted by funding and would include two additional lanes of traffic that functioned as an arterial roadway. Funding would become available as community growth, expansion, and increased traffic volume furthers the need for an expanded Parkway. The four-lane scenario includes the addition of two lanes and a median (see Figure 2-10). Construction of this portion of the Parkway would be on the opposing side of the median and the existing two-lane roadway. The four-lane roadway configuration would include a space for the median, but intersection U-turn crossovers would not be completed until the final (six-lane) construction.

2.8.5.1 Earthwork and Paving

The construction process for earthwork, excavation, grading, and installation of drainage structures would be the same as used for the construction of the two-lane scenario.

2.8.5.2 Construction Access

Access to the construction site and ROW for staging would be the same as used for the two-lane scenario (i.e., the 20-foot-wide temporary construction road that would be built parallel to the western and southern sides of the two-lane Parkway).

2.8.5.3 Construction Staging

Construction phasing would be similar to the two-lane scenario; however, staging and temporary use areas would already be established. Earthwork for each phase would be designed so that the amount of earth excavated from the high points would be used to fill in the low points; if additional fill is needed to build the road bed, it would be purchased from local material source brokers and trucked to the site. No borrow pits are planned for any federal lands; specific material source brokers have not been identified at this time. All excess dirt that may be generated would be stored on-site within the ROW for use during future phases.

Preparation of the construction corridor would also be similar to the two-lane scenario and would involve topographic survey of the ROW to establish final road bed grade and staking of the center line of travel.

The clearing of some natural vegetation may be required; however, selective clearing would be performed only when necessary for surveying, construction, and maintenance operations. The contractor would not disturb areas outside the ROW without prior written permission from the appropriate land managing agency or individual owner.

2.8.5.4 Construction Site

Construction sites used for the construction of the two-lane road could be used for construction of the four-lane road, as appropriate. Depending on the timeframe, the construction sites may require additional vegetation clearing and blading if natural revegetation occurs in between Phase One (two lanes) and Phase Two (four lanes). New construction sites, material storage yards, and access roads (identified on the civil engineering plans in Appendix D) would be kept in an orderly condition throughout the construction period. Refuse removal and containment would be the same as in the two-lane scenario.

Following construction and cleanup, reclamation would be completed. The disturbed surfaces would be restored to the original contour of the land surface to the extent determined by BLM. During rehabilitation, the topsoil material would be spread evenly over the disturbed areas.

2.8.5.5 Restoration and Landscaping

The Native Plant Removal/Restoration Plan used for the two-lane scenario would also be used for the four-lane scenario. A Native Plant Removal/Restoration Plan detailing native plant identification, removal, and restoration would be prepared in coordination with the BLM.

Landscaping would occur on both sides of the four-lane road where feasible. The four-lane scenario will have a median; however, final landscaping and revegetation may occur during construction of the six-lane Parkway, when median crossovers and left turns are constructed.

2.8.5.6 Drainage

Drainage structures will be constructed the same as for the two-lane scenario, based on drainage conditions specific for the Parkway under construction.

Detailed locations of these dip sections and culvert locations are presented in Tables 2-3, 2-4, and 2-5.

2.8.6 Construction of Six Lanes

The third and final phase of construction (six lanes), or the Parkway at build-out, would be three lanes in each direction, with a center median and non-signalized U-turns spaced along the corridor. This phase of construction would include the addition of non-signalized U-turns that cross the median and allow left-turn movements strategically placed along the Parkway. Determination of placement of the left-turn movements would be dependent on traffic patterns and access at that time. The fifth and sixth lanes would be added to the inside of the existing four lanes adjacent to the median sides of the Parkway. Access management for traffic operations on the Parkway would be implemented to create and maintain a high level of roadway safety, as well as to reduce vehicle stops and increase traffic capacity.

Currently, there is no time frame for build-out of the six-lane Parkway, as construction is contingent upon future funding. Funding would become available as community growth and expansion furthers the need

for an expanded Parkway. According to MAG studies for population and economic growth (e.g., *Hidden Valley Transportation Framework Study*, MAG 2009), build-out of the area is anticipated to occur within the next 40 to 60 years. Thus, the need for construction of the six-lane Parkway scenario due to population growth and travel demand is anticipated within this time frame.

BLM would require stipulations prior to the construction of additional lanes (both the four-lane and six-lane construction) that a notice to proceed (NTP) and additional NEPA analysis may be needed due to the likelihood of major environmental conditions in the area changing over a 40- to 60-year period.

2.8.6.1 Earthwork and Paving

The construction process for earthwork, excavation, grading, and installation of drainage structures would be the same as used during the construction of the two-lane and four-lane scenarios.

2.8.6.2 Construction Access

Access to the construction site and ROW for staging would be the same as used for the two-lane scenario (i.e., the 20-foot-wide temporary construction road that would be built parallel to the western and southern sides of the two-lane Parkway). The addition of the third lane to each direction would provide access to the interior median along the length of the action alternative.

2.8.6.3 Construction Staging

Construction staging would be similar to the four-lane scenario; however, staging and temporary use areas would already be established. The clearing of some natural vegetation may be required but would likely be minimal. The contractor would not disturb areas outside the ROW without prior written permission from the appropriate land managing agency or individual owner.

2.8.6.4 Construction Site

The construction site for the six-lane road would be adjacent to the existing four-lane road. New construction sites, material storage yards, and access roads would not be necessary. Refuse removal and containment would be the same as in the two- and four-lane scenarios.

2.8.6.5 Restoration and Landscaping

At this time, the final Parkway landscaping design plan would be implemented and would likely include clusters of vegetation spaced in 300- to 500-foot spans along the Parkway. Temporary use construction areas and staging and storage sites would also be restored to preconstruction conditions.

2.8.6.6 Drainage

Drainage structures will be constructed the same as for the two- and four-lane scenarios, based on drainage conditions specific for the Parkway under construction.

Detailed locations of these dip sections and culvert locations are presented in Tables 2-3, 2-4, and 2-5.

2.8.7 Parkway Operation and Maintenance

The City would be responsible for the operation and maintenance of the Sonoran Valley Parkway. An intergovernmental agreement for operation and maintenance responsibilities between the City and MCDOT may be necessary if, at the completion of construction, there are portions of the Parkway that still lie in unincorporated areas of Maricopa County. The City would exercise their option to contract with MCDOT or conduct operation and maintenance responsibilities themselves.

2.8.7.1 Operations

The City would be responsible for the Parkway operation, including information dissemination regarding road closures, delays, or detours, traffic management, temporary incident management, lane control, variations in speed, and road closures. Additionally, MCDOT has incorporated a variety of Intelligent Transportation Society (ITS) innovations into roads throughout the valley, such as vehicle-to-infrastructure communications that relay traffic information to control the phase and timing of traffic signals in order to avoid vehicle congestion at intersections. ITS innovations improve Parkway safety and efficiency and would be considered during final design and engineering of the two-lane Parkway based on the final Parkway configuration (similar innovations would be considered during future construction of the four- and six-lane Parkway construction).

2.8.7.2 Maintenance

City Public Works staff would be responsible for maintaining and monitoring the condition of the Parkway periodically. The City is responsible for landscaping, street sweeping, curb and gutter maintenance, signage, storm drains, and emergency cleanup.

Routine maintenance will include regrading gravel shoulders and cleaning the paved Parkway surface as frequently as necessary (typically following major rainfall events), along with periodic maintenance of the Parkway surface, such as seal coating and freshening up the Parkway paint markings.

Occupational Safety and Health Administration (OSHA) safety regulations would be enforced for this project. The City is responsible for ensuring compliance with OSHA regulations.

The City would manage the handling of industrial waste and toxic substances in full accordance with all applicable federal, state, and local regulations. Regulated hazardous materials would be managed in an appropriate manner that protects workers and the public and prevents accidental releases to the environment. In the event that any such materials were to be released to the environment in excess of the reportable quantities defined under any relevant federal or state regulations, the required notifications would be made, and required reports would be completed and submitted to the appropriate agencies. In such an event, the BLM would be provided with copies of any such reports, along with the designated recipient agencies.

Events such as natural and human-caused forest or brush fires may also damage or cause loss of vegetation cover and underbrush, resulting in exposed soils that are susceptible to erosion. Any wildland fires along the Parkway within the project ROW would be responded to by the City Fire Department. Periodic inspection and/or annual maintenance of the Parkway would be conducted over the life of the project. Maintenance activities would be conducted as needed.

2.9 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

The following applicant-committed environmental protection measures were developed by BLM and the City to ensure that Parkway construction and operation does not result in unnecessary or unreasonable environmental degradation. Applicant-committed environmental protection measures are actions, practices, or design features that are part of all action alternatives and would be implemented by the proponent (the City). Under all alternatives, the applicant-committed environmental protection measures listed in Table 2-7 would be implemented to minimize adverse impacts of the SVPP to sensitive environmental resources. These would be included as conditions of approval and would be binding in the event that the Sonoran Valley Parkway were transferred to or operated by another entity.

Table 2-7. Applicant-committed Environmental Protection Measures and Best Management Practices

TOPOGRAPHY AND SOILS	
Topography	Once the appropriate grade is reached, the road would be paved. A geotechnical engineer would develop specifications for this effort during the final design. Cut and fill slopes would be designed such that the maximum slope will be 3:1 (3 horizontal feet for each 1 vertical foot).
Soils	According to the Natural Resources Conservation Service (2007), soils within the project area limits have a low to medium shrink-swell potential; therefore, no special design considerations would be needed to stabilize the subgrade. Subgrade stabilization would consist of over-excavating 14 inches measured from rough grade, adding water, and compacting the soil. Erosion control on slopes would be achieved by “cat tracking.” This process would be conducted by driving a bulldozer perpendicular to the slope, leaving track impressions in the soil; impressions would fill with water and reduce stormwater runoff and erosion. Other erosion and sediment control activities can include use of straw wattles, silt fences, or similar methods to prevent erosion and sediment loading, as necessary. The BLM would be consulted and have final approval on the specific techniques and materials to be used for soil stabilization. Many of these controls would likely be left in place until full stabilization of the Parkway is complete. A stormwater pollution prevention plan (SWPPP) would be developed prior to construction and would more fully elaborate erosion, sediment control, and stabilization methods and would be included in the POD. A variety of safety-related plans and programs would be developed and implemented to ensure safe handling, storage, and use of hazardous materials (e.g., Hazardous Material Business Plan). Project personnel would be supplied with appropriate personal protective equipment (PPE) and would be properly trained in the use of PPE and the handling, use, and cleanup of hazardous materials used during the project, as well as procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials would be stored on-site.
AIR QUALITY	
Dust abatement	Dust abatement using an approved dust suppression coating and other air quality protection measures would be implemented during construction, according to BLM, the City, and County Air Quality Control Districts, to ensure compliance with federal and regional air quality standards.
CULTURAL RESOURCES	
Cultural and/or historic sites	Measures will be incorporated to avoid sites through project design.
WATER RESOURCES	
Stormwater	Stormwater flows for the Proposed Action, action alternatives, and sub-alternatives are based on the FCDMC *Rainbow Valley Area Drainage Master Plan* (Rainbow Valley Drainage Study) (Maricopa County Flood Control District 2011). Major stormwater flows, greater than 500 cubic feet per second, were used to design Parkway crossings that used either box culverts or a depressed, or dipped, pavement profile. Minor stormwater flows would be addressed during final design. Arch span-type culverts are typically located in incised washes, while dipped profiles are located in areas where the existing ground is flat. Dipped crossings are designed so that the depth is less than 6 inches to accommodate safe crossing by emergency vehicles.

Table 2-7. Applicant-committed Environmental Protection Measures and Best Management Practices (Continued)

WATER RESOURCES, continued	
Clean-up and site reclamation	Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Approved enclosed refuse containers would be used throughout the SVPP. Refuse and trash would be removed from the sites and disposed of in an approved manner. Oils or chemicals would be hauled to a disposal facility authorized to accept such materials. Open burning of construction trash would not be acceptable. All post-construction ROWs would be restored, as required by the BLM. All practical means would be made to restore the land to its original natural drainage patterns. Since revegetation would be difficult in many areas of the SVPP because of low amounts of precipitation, all practicable measures would be taken to minimize disturbance during construction.
Reclamation of temporary disturbance	All temporarily disturbed areas would be reclaimed to as close to their preconstruction conditions as possible, as required by the BLM. BLM-approved seed mixes and/or transplants would be applied to temporarily disturbed areas, as required. No fertilizer would be used during stabilization or rehabilitation activities unless authorized by the BLM. When construction of stormwater management structures is complete, contours would be carefully restored to the extent feasible.
VEGETATON AND WILDLIFE	
Vegetation	Blading and removal of vegetation over the entire road bed and the temporary construction access road would be required for each phase of the construction (two lanes, four lanes, and six lanes). Rehabilitation and reclamation of the disturbed areas would consist of recontouring these areas to blend into the surrounding terrain, or as requested by the BLM. The area would be reseeded using seed mixtures approved by the BLM; all seed mixtures would be certified as noxious weed–free, as specified in *DOI-BLM-AZ-P000-2011-001-EA*. All rehabilitation and reclamation would be conducted to BLM standards. The use of fertilizer is not expected at this time. Transplants of native species may be required by BLM.
Wildlife	Consultation on wildlife mitigation designs and siting during development of the final engineering plans and construction phases will be conducted with AGFD, in coordination with the BLM.
Wildlife	In terms of designing for wildlife crossings for larger mammals, recommendations in *Arizona Missing Linkages: Gila Bend–Sierra Estrella Linkage Design* (Beier et al. 2008) indicate that wildlife crossings would be needed in three distinct corridors. As a result, fill slopes adjacent to the wildlife crossings would extend beyond the proposed ROWs, and temporary construction easements would be needed in these locations. Dimensions and measurements of the wildlife-enabled arch span-type culverts would be determined during final design. The selection of an action alternative will determine the precise location within the Estrella Mountains to SDNM Wildlife Movement Corridor.
Wildlife	Design culverts and dip sections with at-grade natural substrate bottoms and avoid use of large riprap in front of or adjacent to culverts and dip sections; and/or backfill with topsoil and stabilize with vegetation to optimize movement of barrier sensitive species such as Desert tortoise. Design culverts and dip sections to avoid sharp dropoffs and scour at the downstream end. Outside the Linkage Zone use box culvert designs for medium-sized mammals at additional locations that will facilitate wildlife movement into future plans for open space within the city of Goodyear. Use small pipe, box culvert, and/or pipe culvert designs for small mammals, at a minimum, for all other drainage crossings that will need flood control structures within and outside the Linkage Zone. Refer to Appendix C for AGFD wildlife crossing design specifications.
Wildlife	Construction staging and temporary construction easements would avoid or minimize impacts within the wildlife linkage areas.
Wildlife	Minimize removal of xeroriparian vegetation during construction within the wildlife linkage areas at wash crossings. Restoration and revegetation of xeroriparian vegetation will be conducted post-construction at the approaches to wildlife crossing structures.
VISUAL RESOURCES	
Lighting system	Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be shielded and oriented to focus illumination on the desired areas and minimize additional nighttime illumination in the site vicinity.

Table 2-7. Applicant-committed Environmental Protection Measures and Best Management Practices (Continued)

TRAVEL MANAGEMENT	
Road maintenance	Road maintenance would be performed as needed. Paved roads would be swept, sealed, and/or overlaid as needed. Grading and drainage would be maintained for gravel and earth roads. Dust palliatives would be applied, as required, to limit fugitive dust.
Access to existing primitive roads	Public access to primitive roads that are currently open for motorized use would be maintained and would include either a traffic interchange, cattle guard, or gate.
GRAZING MANAGEMENT	
Fencing	The contractor would install temporary fencing along the ROW in order to limit off-road access and keep cattle and wildlife from gaining access to the Parkway during construction. No construction vehicle movement shall occur on BLM-administered lands outside the approved project ROW limits. When the initial two-lane highway is complete, the City would install permanent fencing and crossings, in accordance with BLM stipulations.
Range Improvements	Any range improvements, such as fences, wells, stock tanks, etc., will be mitigated appropriately at the expense of the City.
SPECIAL DESIGNATIONS	
Obstacles for preventing illegal access into SDNM	Raised curb: Discourages users from pulling off the shoulder of the proposed road. Fencing: Discourages users from crossing into undeveloped land located outside the designated ROW. Guardrails: Discourages users from crossing into undeveloped land located outside the designated ROW. Locked gate: Helps prevent unauthorized users from entering SDNM. Concrete pedestals at washes: Prevents small OHVs or all-terrain vehicles from driving into SDNM via wash crossings.
Provide hiking and equestrian access to the Juan Bautista de Anza NHT	The City will provide public hiking and equestrian access to the Juan Bautista de Anza NHT and historic trail corridor. This may be an overpass, underpass, or access route to a trailhead.
HAZARDOUS MATERIALS AND SOLID WASTE	
Hazardous Materials	All hazardous materials used during construction and operation would be stored on-site in storage tanks/vessels/containers that are specifically designed for the characteristics of the materials to be stored; as appropriate, the storage facilities would include the needed secondary containment in case of tank/vessel failure. All secondary containment would meet OSHA requirements and would be sized to contain 110% of full tank/vessel volume.
Hazardous Materials	An update to the Phase I Environmental Site Assessment (SWCA 2007, 2009c, 2009d) would be required as per ASTM 1527.00, an additional Phase I ESA upon the approval of the POD.
Hazardous waste recycling	To the extent possible, construction-phase hazardous wastes would be recycled (oil and grease). Transport of the wastes and contaminated containers would be contracted to a qualified waste transporter, and the wastes would be taken, under manifest, to a permitted local landfill or treatment and disposal facility.
SOCIAL AND ECONOMIC CONDITIONS	
Workforce	Where possible, the City would hire local construction workers for the construction of the SVPP.
PUBLIC HEALTH AND SAFETY	
Construction access restriction	In order to protect human health and safety, temporary construction easements would be fenced appropriately to restrict public access during construction.
WILDLAND FIRE	
Emergency Response	The City Fire Department would respond to any wildland fires along the Parkway, within the project ROW.

The effectiveness of potential mitigation measures is disclosed in the subsequent discussion of residual impacts, which are those impacts that would remain after the implementation of all potential mitigation measures.

The ROD will summarize the requirements for mitigation monitoring and enforcement to ensure compliance with the decision, in accordance with BLM NEPA Handbook H-1790-1 and 40 CFR 1502.2(c).

2.9.1 Potential Mitigation Measures

All applicant-committed environmental protection measures, management stipulations, and LORS provided in Table 2-7 would be incorporated into the ROD as terms and conditions of the ROW grant. Potential mitigation measures are discussed following the impact analysis for each resource or resource use (see Chapter 4) and could also be selected in the ROD as terms and conditions of the ROW grant. Potential mitigation includes additional means, measures, or practices not incorporated into the action alternatives that would further reduce or eliminate impacts. These mitigation measures are specific to each resource section and thus are considered following the impact analysis in Chapter 4. These mitigation measures will be considered as possible terms and conditions of the ROD.

2.10 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

This section describes project alternatives that were initially considered for analysis in the EIS but were subsequently eliminated because they did not satisfy the screening criteria discussed above. Table 2-8 describes the alternatives and sub-alternatives that are not analyzed in detail (Alternatives B, D, and E and Sub-alternatives H1 and H2) and provides explanations for why the alternative or sub-alternative does not meet the screening criteria. Figure 2-11 illustrates the alternatives eliminated from further analysis.

2.10.1 Rainbow Valley Road Connection

Rainbow Valley Road is an existing, rural arterial roadway that serves the Rainbow Valley area; it is paved from Elliott to Riggs Roads. The Rainbow Valley Road connection would utilize the existing dirt roadway from Riggs Road south to Rainbow Valley Road, is within the existing roadway ROW, and is of sufficient width to accommodate the planned improvements for a two-lane Parkway only. The Rainbow Valley Road Connection does not include the Parkway design features as specified by the MCDOT Design Guidance Recommendations, Enhanced Parkway Study, and the Arizona Parkway Intersection/Interchange Operational Analysis and Design Concept Study guidance (MCDOT 2008a). Therefore, the Rainbow Valley Road Connection would not accommodate expansion to a four- and six-lane Parkway. In addition, roadway straightening would be required at the current 90-degree intersections at Bullard Avenue and Patterson Road to accommodate the proposed 55-mph speed. None of the other roads, with the possible exception of portions of Bullard Avenue and Patterson Road, have existing ROW available for use as of this publication date. Acquisition of ROW would add to the cost of the project and possibly delay the project if ROW had to be obtained through the use of eminent domain, or could result in the overall abandonment of the project by the City because the costs associated with acquiring private land could make it economically infeasible. Therefore, this alternative was not carried forward for detailed analysis because it would be technically and economically infeasible. Furthermore, it is substantially similar in design to Alternatives A and C and would not have environmental benefits beyond the Proposed Action alternatives.

Table 2-8. Screening Results: Alternatives Not Considered for Detailed Analysis

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Rainbow Valley Road Connection	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would not involve technical constraints.	No, because Rainbow Valley Road ends at Patterson Road. This alternative is economically infeasible because it would require extensive design features to facilitate the extension construction of Rainbow Valley Road, which does not currently have any design, plans, or mobility objectives in place.	No, because this alternative would result in conflicts with ongoing feasibility-level only studies.
SR 303L Connection	No. Although this alternative would enable the City to construct a Parkway as applied under AZA-34177, and it would be in conformance with the purpose of the utility corridors and with the Lower Sonoran RMP, this alternative does not meet the purpose and need of the SVPP because it would provide a freeway connection to I-11 and would not provide an arterial Parkway connection between Goodyear and the SVPA.	Yes, because this alternative would consider the issues that were identified during scoping.	No, because this alternative would involve technical constraints. Technical Considerations: • SR 303L alignment is currently unknown and unfunded • Unknown future Rainbow Valley development	No, because the SR 303L study is underway and not yet completed by ADOT. Therefore any design and engineering would be speculative. The City is not the responsible agency for SR 303L; ADOT is the responsible agency.	No, because this alternative would rely on feasibility-level only studies and would require speculation for assessing the physical surface disturbances.
Gas Line Road	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	No, because this alternative would involve technical constraints. Technical Considerations: • Existing underground utilities • Existing ROW permittees • Existing ROW stipulations	No, because the costs of designing, locating, and relocating existing utilities would render this alternative economically infeasible due to the amount of work required to prepare the Gas Line Road for Parkway construction. In addition, the City would be responsible for covering the costs of reissuing existing ROW permits.	Yes, because this alternative would limit all construction to areas that have previously been disturbed.

Table 2-8. Screening Results: Alternatives Not Considered for Detailed Analysis (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Co-locating SVPP with future planned roads	No. Although this alternative would enable the City to construct a Parkway as applied under AZA-34177, and it would be in conformance with the purpose of the utility corridors and with the Lower Sonoran RMP, this alternative does not meet the purpose and need of the SVPP because it would not provide an arterial Parkway connection between Goodyear and SVPA as the SR 303L and I-11 future planned roads would be freeway connections within a regional and interstate transportation system.	Yes, because this alternative would consider the issues that were identified during scoping such as co-locating or bundling transportation corridors to minimize environmental impacts.	No, because future freeways such as SR 303L and I-11 are in the initial conceptual or feasibility planning stages, and the SVPP is further along in the planning process. Additionally, the Sonoran Valley Parkway is intended to provide a local connection between Goodyear and SVPA while the SR 303L and I-11 are being studied as high-capacity freeway systems (rather than local arterial/Parkway connections).	No. The Sonoran Valley Parkway is a locally funded Parkway, whereas SR 303L is currently unfunded in the MAG Regional Transportation Plan and I-11 is also unfunded and is in the conceptual phases of development, which also includes a study of funding alternatives.	No. SR 303L currently is in the feasibility stages in which Gila River crossings have not been determined.

Table 2-8. Screening Results: Alternatives Not Considered for Detailed Analysis (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Alternative B	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would not involve topographic or engineering constraints. Technical Considerations: • Would require new ground disturbance • Near Waterman Wash • Approximately five "curves and/or turns" • Redundant with Alternative C; all resource design elements would be accomplished under Alternative C	No, because this alternative would be located close to Waterman Wash and would require extensive design features to facilitate surface water, wildlife corridors, flood prevention designs, and engineering constraints. Alternative B is redundant with Alternative C, and all resource design elements would be accomplished under Alternative C. Additionally, Alternative B has multiple substantial curves and turns and would not necessarily provide better management of travel and access despite the extensive design features, resulting in an economically infeasible alternative.	No, because this alternative would result in the greatest impact to the environmental resources of Waterman Wash due to Alternative B "paralleling" Waterman Wash for approximately 8 miles and would not accomplish anything beyond what Alternative C already does. Resource Considerations: • Avoids SDNM and gas pipeline corridor • Increases surface disturbance, compared with Alternative A • Increased "curves and turns," compared with Alternative A • Does not necessarily provide better management of travel and access into SDNM since Alternative B would split management apart rather than keeping in same footprint; there would be isolated BLM land between Alternative B and SDNM • Does not cross Waterman Wash but would parallel Waterman Wash to a greater extent than other alternatives (approximately 8 miles) due to the proximity to Waterman Wash

Table 2-8. Screening Results: Alternatives Not Considered for Detailed Analysis (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Alternative D	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purposes of the multiple-use principles of BLM lands and would be in conformance with the Lower Sonoran RMP.	No, because this alternative would not consider all of the public land issues that were identified during scoping since much of this alternative would not be located on BLM lands.	No, because this alternative would include the greatest amount of non-BLM lands and would require extensive acquisition of easements and land. Technical Considerations: • Would require new ground disturbance • Would require the most extensive construction since it is the most remote • Longest Parkway overall length of all action alternatives. • Crosses Waterman Wash at two locations	No, because this alternative would involve large amounts of new surface disturbance, would involve the longest overall distance to construct, and would require the greatest amount of equipment, supplies, and manpower. In addition, this alternative would include the largest amount of non-BLM lands and would require extensive acquisition of easements and land, thus resulting in economically infeasibility.	No, because this alternative would result in the greatest amount of new surface disturbance and the longest overall distance to construct, resulting in vegetation removal, soil removal, loss of recreation opportunities, loss of forage, and visual contrasts. Resource Considerations: • Provides opportunities for improved access to the Estrella Mountains and improved travel and access to the BLM public lands • Removes the sights and sounds of the Parkway because it is farthest from the northern areas of SDNM • Far removed from biological and hydrologic resources of Waterman Wash and its tributaries, except at crossings • Divides the Beloat allotment into small pastures and creates access-to-livestock-waters issues • Creates a separate pasture to the southwest that could be managed for livestock with the installation of a well as mitigation

Table 2-8. Screening Results: Alternatives Not Considered for Detailed Analysis (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Alternative E	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would not involve topographic or engineering constraints. Technical Considerations: • Would require new ground disturbance • Fewer "curves and turns" than Alternatives B, C, and D • Near Waterman Wash • Relatively straight alignment • Redundant with Alternative C; all resource design elements would be accomplished under Alternative C	No, because this alternative would be located close to Waterman Wash and would require extensive design features to facilitate surface water, wildlife corridors, flood prevention designs, and engineering constraints. Alternative E is redundant with Alternative C, and all resource design elements would be accomplished under Alternative C. In addition, this alternative would include the large amounts of non-BLM lands and would require extensive acquisition of easements and land, thus resulting in economically infeasibility.	No, because this alternative may result in major impacts to the environmental resources of Waterman Wash and would not accomplish anything beyond what Alternative C already does. Resource Considerations: • Avoids SDNM and gas pipeline corridor • Increases surface disturbance • Does not cross Waterman Wash
Sub-alternative H1	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative would not involve topographic or engineering constraints. Technical Considerations: • Would require new ground disturbance • Near Waterman Wash	No, because this alternative would be located close to Waterman Wash and would require extensive design features to facilitate surface water, wildlife corridors, flood prevention designs, and engineering constraints. Additionally, this alternative would not necessarily provide better management of resources despite the extensive design features, resulting in an economically infeasible alternative.	No, because this alternative would not accomplish anything beyond what Alternative C already does, yet would require more surface disturbance than Alternative C. Resource Consideration: • Divides the Beloat allotment into small pastures and creates access-to-livestock-waters issues

Table 2-8. Screening Results: Alternatives Not Considered for Detailed Analysis (Continued)

Alternative Name	Screening Criteria for Alternatives				
	Consistent with Purpose and Need*	**Responds to Public and Agency Scoping**	**Technically Practical and Feasible**	**Economically Practical and Feasible**	**Environmentally Reasonable (Resource Considerations)**
Sub-alternative H2	Yes, because this alternative would enable the City to construct a Parkway as applied under AZA-34177; it would be in conformance with the purpose of the utility corridors and would be in conformance with the Lower Sonoran RMP.	Yes, because this alternative would consider the issues that were identified during scoping.	Yes, because this alternative not involve topographic or engineering constraints. Technical Considerations: • Would require new ground disturbance • Near Waterman Wash	No, because this alternative would be close to Waterman Wash and would require extensive design features to facilitate surface water, wildlife corridors, flood prevention designs, and engineering constraints. Additionally, this alternative would not necessarily provide better management of resources despite the extensive design features, resulting in an economically infeasible alternative.	No, because this alternative would not accomplish anything beyond what Alternative C already does, yet would require more surface disturbance than Alternative C. Resource Considerations: • Divides the Beloat allotment into small pastures and creates access-to-livestock-waters issues

2.10.2 State Route 303L Connection

A connection to SR 303L was not considered because the exact location of the SR 303L alignment is currently under study and has not been identified by ADOT. As of December 2012, the proposed alignment of SR 303L is undetermined and was eliminated from MAG's Regional Transportation Freeway Program due to lack of funding. As of 2011, ADOT initiated a feasibility study and public involvement process to identify a preferred corridor and river crossing for SR 303L between the future Hassayampa Freeway (I-11) and SR 30.

This alternative has been dismissed from future analysis because connecting the Sonoran Valley Parkway to SR 303L does not meet the proposed purpose and need for the project (see Section 1.2), which is to provide a Parkway from the core areas of the city to the newly annexed areas of the city for current and future residents of the city, as well as for timely emergency services to residents within the new annexation. Planning for the SR 303L is in the early stages, and based on the current funding schedule, it would not meet the project's need. In addition, the SR 303L is planned as a freeway with four general-purpose lanes plus one high-occupancy-vehicle lane in each direction, with the exact traffic interchange location currently unidentified. Thus, the SR 303L, depending on the ultimate location of the freeway and interchange, may not provide a viable transportation alternative for traffic seeking a connection from the City to SVPA. Therefore, this alternative is ineffective.

2.10.3 Combining SVPP with Future Planned Roads

AGFD asked that an alternative for SVPP be developed that combines the proposed SVPP with other major transportation projects in the Rainbow Valley area in order to minimize impacts to habitat connectivity. Future transportation projects under consideration in the Rainbow Valley area include SR 303L (south of I-10) and I-11(Hassayampa Freeway). ADOT is currently evaluating the SR 303L; however, the project is in the feasibility planning stages and is currently unfunded. Nevada Department of Transportation and ADOT have begun the 2-year study of I-11 and the Intermountain West Corridor, which is a high-level visioning exercise that will also consider potential funding mechanisms for implementation of the I-11. Both the SR 303L and I-11 projects are currently in the conceptual stages of planning, and unlike the proposed SVPP, no specific ROW or alignments have been identified for analysis. Because of the uncertainty of timing and funding for SR 303L and I-11, an alternative that combines these transportation projects would not be technically or economically feasible.

2.10.4 Gas Line Road

An alternative that would use the existing gas pipeline road was suggested by a member of the public during scoping. The Gas Line Road Alternative would consist of upgrading the existing EPNG pipeline maintenance road by regrading and paving the roadway to create a newer, safer road. This alternative was not deemed feasible because of significant safety concerns with ground disturbance and excavation near the existing pipeline. Therefore, this alternative was not carried forward for detailed analysis because of increased risks to public health and safety. Additionally, most resource design elements would be accomplished under Alternative A.

2.10.5 Alternative B

Alternative B was developed by the proponent. Alternative B was reviewed by the BLM interdisciplinary team and was subsequently eliminated from detailed analysis. The primary reason for dismissing this alternative from detailed analysis comes from the potential impacts this alignment would have on water

resources, vegetation, riparian areas, and wildlife. Alternative B would require new ground disturbance and is located near Waterman Wash. This alternative would require extensive design features to facilitate surface water, wildlife corridors, flood prevention designs, and engineering constraints. Alternative B is redundant with Alternative C, and all resource design elements would be accomplished under Alternative C. Additionally, Alternative B has multiple substantial curves and turns and would not necessarily provide better management of travel and access to SDNM. In addition to the potential impacts to resources, Alternative B was also eliminated because it would not provide any environmental benefits that are not already included in Alternative C.

2.10.6 Alternative D

Alternative D would include the largest amount of non-BLM lands and would require extensive acquisition of easements and land. Alternative D would also have the longest overall distance and would require the greatest amount of equipment, supplies, and construction effort. Because of its length, Alternative D would have the greatest amount of new surface disturbance and the longest overall distance to construct, resulting in vegetation removal, soil removal, loss of recreational opportunities, loss of forage, and increased visual contrast. Alternative D crosses Waterman Wash at two locations. In addition to the economic and technical infeasibility of Alternative D, the potential effects would be substantially similar to Alternative C, yet would not provide additional benefits.

2.10.7 Alternative E

Alternative E would be located close to Waterman Wash and would require extensive design features to facilitate surface water, wildlife corridors, flood prevention designs, and engineering constraints. Alternative E would also require new ground disturbance and is redundant with Alternative C. In addition to the potential impacts to riparian, wildlife, and water resources, Alternative E was also eliminated because it would not provide any environmental benefits that are not already included in Alternative C.

2.10.8 Sub-alternative H1

Sub-alternative H1 is a sub-alternative that would only apply to the southern portion of the Alternative H alignment. Sub-alternative H1 would begin approximately 5.3 miles north of SR 238 and approximately 1.3 miles east of the Komatke/Gas Pipeline Road. Sub-alternative H1 provides a direct route to privately owned land and would travel along the eastern boundary of the private parcel before rejoining the Komatke Road/Gas Pipeline Road alignment. Sub-alternative H1 was eliminated from detailed analysis because it would be substantially similar in design to Alternative H and would have substantially similar effects as Alternative H.

2.10.9 Sub-alternative H2

Sub-alternative H2 is a sub-alternative that would only apply to the southern portion of the Alternative H alignment. Sub-alternative H1 would begin approximately 5.3 miles north of SR 238 and approximately 1.3 miles east of the Komatke/Gas Pipeline Road. Sub-alternative H2 would traverse an existing unnamed road to the 115th Avenue alignment, where it would then turn south to privately owned land and would travel along the eastern boundary of the private parcel before rejoining the Komatke Road/Gas Pipeline Road alignment. Sub-alternative H2 differs from Sub-alternative H1 because Sub-alternative H2 would include less surface disturbance by following existing roadways rather than cutting across undeveloped BLM land. Sub-alternative H2 was eliminated from detailed analysis because it would be substantially similar in design to Alternative H and would have substantially similar effects as Alternative H.

2.11 SUMMARY OF EFFECTS

Table 2-9 presents a summary comparison of resources potentially affected by each alternative. The information presented in this table is a summary comparison of the data presented in detail in Chapters 3 and 4 of this EIS. The effects identified in this table also assume that applicant-committed BMPs and mitigation measures will have been implemented. The comparison of effects also includes effects that are common to all action alternatives to demonstrate the relative effect of each alternative.

Table 2-9. Summary of Effects

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
AIR RESOURCES						
	No change to existing conditions anticipated.	Anticipated to meet the stated goals and objectives of the City General Plan Amendment (City 2007), the MAG Regional Transportation Plan (MAG 2003), and the State Implementation Plan via federal statute (40 CFR 51). Construction activity may generate a temporary increase in Mobile Source Air Toxics (MSAT) emissions. The impact for potentially sensitive receptors would be long-term but negligible. The operation of Alternative A, C, or H and Sub-alternative F or G may result in indirect air quality impacts to existing and planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local CO and PM_{10} concentrations.				
CULTURAL AND HERITAGE RESOURCES						
	No change to existing conditions anticipated.	Under Alternative A, the BLM Preferred Alternative, up to 220.1 acres (permanent) and 39.4 acres (temporary) would be disturbed during the construction of the SVPP. Alternative A would directly and indirectly impact the three known historic properties (Lung Homestead, AZ T:15:94[ASM], and the Butterfield Overland Stage Route), as well as the Juan Bautista de Anza NHT corridor and Management Area. Measures for mitigating the adverse effects to the Lung Homestead, AZ T:15:94(ASM), and the Butterfield Overland Stage Route may include such options as data recovery, artifact analysis, archival research, interpretative signage, Parkway crossovers, and vehicle parking for trail access; measures for the adverse effects to the Juan Bautista de Anza NHT corridor may include interpretative signage, Parkway crossovers, and vehicle parking for trail access.	Under Alternative C, up to 254.5 acres would be disturbed by the construction of the SVPP. There would be no impacts to AZ T:15:94(ASM). Direct and indirect impacts to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A, because Alternative C shares the same corridor through those resources.	Under Alternative H, ground disturbance (permanent and temporary) from the Phase Three six-lane Parkway would total 437.2 acres. Direct and indirect impacts for the six-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A because Alternative C shares the same corridor through those resources.	Under Sub-alternative F, total ground disturbance would be 106 acres (96.8 acres permanent and 9.2 acres temporary). Sub-alternative F was designed to avoid impacts to the Lung Homestead and consists of 2.8 miles diverting around the site; therefore, there are no impacts to the Lung Homestead. Sub-alternative F would also not impact AZ T:15:94(ASM); however, both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area would be impacted by Sub-alternative F.	Under Sub-alternative G (the BLM Preferred Sub-alternative), up to 79.2 acres (72.0 acres permanent and 7.2 acres temporary) would be disturbed. Like Sub-alternative F, Sub-alternative G was designed to avoid impacts to the Lung Homestead and consists of 2.4 miles diverting around the site; therefore, there are no impacts to the Lung Homestead. Like Sub-alternative F, Sub-alternative G would also not impact AZ T:15:94(ASM); however, both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area would be impacted by Sub-alternative G.
PALEONTOLOGICAL RESOURCES						
	No change to existing conditions anticipated.	As stated in Section 3.4, the entire analysis area has a Potential Fossil Yield Classification (PFYC) rating of 2. This rating suggests that the geologic units present in the analysis area are unlikely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. A PFYC 2 does not require construction monitoring due to the low probability of encountering fossils. Because the low PFYC rating of the analysis area means that the presence of paleontological resources is unlikely, there would be no anticipated direct or indirect impacts to paleontological resources associated with construction of the SVPP under any alternative and regardless of the number of lanes constructed.				

Table 2-9. Summary of Effects (Continued)

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
SOIL RESOURCES						
	No change to existing conditions anticipated.	Direct or indirect impacts to the general topography of the project area, such as elevation and overall slope, would not occur under any variant of the project alternatives. The project area does not cross hills that would need to be cut or graded down, or valleys that would need to be filled. Microtopography would necessarily be altered within the project area, to build the road bed, provide fill for culvert and wildlife crossings, and maintain consistent grades. Similarly, construction and operation of the project would not directly or indirectly affect local geology and geologic events under any variant of the project alternatives. Under Alternative A, short-term disturbance would occur along a 15.7-mile corridor, and would total 39.4 acres. Short-term disturbance would result in a conversion from natural soils (as well as dirt roads and a small amount of farmland) to a graded and otherwise disturbed construction corridor. Direct impacts would result from clearing of vegetation, grading, and compaction. Much of the area disturbed during construction would be reclaimed, resulting in long-term impacts to a corridor between 44 and 116 feet wide (depending on the phase) comprising paved Parkway and graded median and shoulders within a 250-foot-wide ROW. Impacts would result from the clearing of vegetation, grading, compaction, and from construction of the Parkway. Long-term impacts to soils would include the loss of soil productivity within the transportation corridor due to preclusion of access to the soil.	Qualitatively, the short-term and permanent, direct and indirect impacts to soils under Alternative C would be substantially the same as described under Alternative A. However, at 18.1 miles in length, the corridor of Alternative C is approximately 15% longer than that of Alternative A and the area of soil disturbed would be commensurately larger.	Qualitatively, the short-term and permanent, direct and indirect impacts to soils under Alternative H would be substantially the same as described under Alternative A. At 18.3 miles in length, the corridor of Alternative H is approximately the same length as that of Alternative C, but is 16% longer than that of Alternative A. The area of soil disturbed would be commensurately larger.	Qualitatively, the short-term and permanent, direct and indirect impacts to natural soils under Sub-alternative F would be substantially the same as the segment it would replace. However, at 2.8 miles in length (versus 2.4 miles for the segment it would replace), the corridor of Sub-alternative F is approximately 16% longer and the area of soil disturbed thus commensurately larger. The impact would occur wholly on private lands.	Qualitatively, Sub-alternative G's short-term and permanent, direct and indirect impacts to natural soils would be substantially the same as the segment it would replace. However, at 2.4 miles in length (versus 2.4 miles for the segment it would replace), the corridor of Sub-alternative G is approximately the same and the area of soil disturbed thus the same. The impact would occur wholly on private lands.
VEGETATION RESOURCES						
	No change to existing conditions anticipated.	The impact would include 474.3 acres of vegetation removal, including 467.6 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.7 acres of xeroriparian vegetation community types. The impacts to ANPL-protected plant species from the implementation of Alternative A would include 474.3 acres of vegetation removal, which could affect individuals and/or their habitat. The impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative A is quantified as the 474.8-acre ROW perimeter.	The impacts would include 546.1 acres of vegetation removal, including 539.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.4 acres of xeroriparian vegetation community types. The impacts to ANPL-protected plant species from the implementation of Alternative C would include 546.1 acres of vegetation removal, which could affect individuals and/or their habitat. The impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment is quantified as the 548.5-acre ROW perimeter.	The impacts would include 550.0 acres of vegetation removal, including 541.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 8.1 acres of xeroriparian vegetation community types. The impacts to ANPL-protected plant species from the implementation of Alternative H would include 550.0 acres of vegetation removal, which could affect individuals and/or their habitat. The impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment is quantified as the 553.9-acre ROW perimeter.	The impacts would include 96.4 acres of vegetation removal, including 95.4 acres of Lower Colorado River Valley Sonoran Desertscrub and 1.0 acre of xeroriparian vegetation community types. The impacts to ANPL-protected plant species from the implementation of Sub-alternative F would include 96.4 acres of vegetation removal, which could affect individuals and/or their habitat. The impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment is quantified as the 96.8-acre ROW perimeter.	The impacts would include 71.8 acres of vegetation removal, including 71.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.6 acre of xeroriparian vegetation community types. The impacts to ANPL-protected plant species from the implementation of Sub-alternative would include 71.8 acres of vegetation removal, which could affect individuals and/or their habitat. The impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment is quantified as the 72.0-acre ROW perimeter.

Table 2-9. Summary of Effects (Continued)

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
VISUAL RESOURCES						
	No change to existing conditions anticipated.	The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from spots within the SDNM to the west. Alternative A would be visible from selected KOPs in the Rainbow Valley and contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. The level of change to the characteristic landscape would be consistent with the objectives of VRM Class IV objectives for the 284.6 acres of BLM land within the project area.	The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from spots within the Rainbow Valley. Alternative C would be visible from selected KOPs in the Rainbow Valley. Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. The level of change to the characteristic landscape would be consistent with the objectives of VRM Class IV objectives for the 319.4 acres of BLM land within the project area.	The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from spots within the Rainbow Valley. Alternative H would be visible from selected KOPs in the Rainbow Valley. Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. The level of change to the characteristic landscape would be consistent with the objectives of VRM Class IV objectives for the 308.1 acres of BLM land within the project area.	The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the Rainbow Valley. Sub-alternative F would be visible from three KOPs in the Rainbow Valley (i.e., the town of Mobile, Juan Bautista de Anza National Historic Trail, and Sierra Estrella's Quartz Peak). Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Sub-alternative F is located entirely outside of BLM lands.	The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the Rainbow Valley. Visibility of Sub-alternative G would be evident from three KOPs in the Rainbow Valley (i.e., the town of Mobile, Juan Bautista de Anza National Historic Trail, and Sierra Estrella's Quartz Peak). Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Sub-alternative G is located entirely outside of BLM lands.
WATER RESOURCES						
	No change to existing conditions anticipated.	A total of 39 wash crossings would be constructed for Alternative A, resulting in a total of 2.5 acres of temporary and/or permanent impact to washes that could possibly be jurisdictional. This constitutes 0.5% of the total project area and less than 0.0009% of the total Waterman Wash watershed. There are 25 acres of floodplains that would be temporarily and/or permanently impacted under Alternative A as a result of the installation of culverts and low-water crossings. The water demand for the SVPP ranges from 3.0 to 3.5 acre-feet per year, which is 0.04% or less of the estimated recharge for the sub-basin. Because total water demands for SVPP are very minimal and because the Rainbow Valley sub-basin has recently experienced a decline in groundwater pumping and rise in water levels, impacts to groundwater quantity are considered negligible under all alternatives and sub-alternatives.	Alternative C will require construction of the most wash crossings, with a total of 44 resulting in direct impacts of 3.3 acres of temporary and/or permanent impact to washes that could possibly be jurisdictional and 44.2 acres of impacts to floodplains. This constitutes 0.6% of the total project area and less than 0.001% of the total Waterman Wash watershed.	The type and magnitude of direct impacts to surface water for Alternative H are the same as for Alternative A, with slight differences in total impacts. A total of 4.2 acres of temporary and/or permanent impacts to washes would occur that could possibly be jurisdictional. This constitutes 0.8% of the total project area and less than 0.002% of the total Waterman Wash watershed. There are 50.0 acres of floodplains that would be temporarily and/or permanently impacted under Alternative H.	A total of 0.8 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional would occur. This constitutes 0.8% of the total project area and less than 0.0003% of the total Waterman Wash watershed. There are 22.4 acres of floodplains that would be temporarily and/or permanently impacted under Sub-alternative F.	A total of 0.2 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional would occur. This constitutes 0.3% of the total project area and less than 0.0001% of the total Waterman Wash watershed. There are no impacts to floodplains under Sub-alternative G.
WILDLAND FIRE						
	No change to existing conditions anticipated.	The removal of this vegetation during clearing activities would lower the fuel load further within the ROW of the alternative alignments; however, the removal of trees and shrubs (fuel load) would likely increase the amount of herbaceous (grasses and forbs) fuel loads. The potential for an increase in herbaceous fuel load directly adjacent to the proposed Parkway would be further increased due to water infiltration and ponding next to the impenetrable (i.e., pavement or asphalt) surfaces. Therefore, there would be a direct impact to the fuel loads within the analysis area by the vegetation clearing. The impact would be temporary during the construction of the Parkway before landscaping activities return the vegetation levels in the non-Parkway areas of the ROW to near-existing conditions. An increase in the number of lanes (from two to four or six) would decrease the amount of land within the ROW that would be available to landscape and subsequently revegetate. An increase in traffic would lead to an increase of human presence within the analysis area; however, only vehicle travel would be permitted within the ROW and there would be an anticipated increase in the continuity of herbaceous fuel loads. When combined with the anticipated increase in human presence, the existing ignition risk would increase. The Parkway would increase access and decrease response times to fires, should they occur, and therefore represent a beneficial impact to the risk of wildland fires starting and spreading to adjacent lands. The Proposed Action and action alternatives would not impact the BLM's current fuel and fire management Allocation 2 area classification for the lands within and immediately adjacent to the ROW.				

Table 2-9. Summary of Effects (Continued)

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
WILDLIFE AND SPECIAL-STATUS SPECIES						
	No change to existing conditions anticipated.	The impacts to general wildlife species from the implementation of Alternative A would include approximately 474.2 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area. The impacts to special-status wildlife species from the implementation of Alternative A would include 474.2 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 467.6 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 6.7 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 82.5 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. The impacts to general wildlife would include approximately 308.1 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 15.7-mile roadway.	The impacts to general wildlife species from the implementation of Alternative C would include approximately 546.1 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area. The impacts to special-status wildlife species from the implementation of Alternative C would include 546.1 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 539.7 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 6.4 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 25.9 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. The impacts to general wildlife species from the implementation of Alternative C would include approximately 377.9 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.1-mile roadway.	The impacts to general wildlife species from the implementation of Alternative H would include approximately 550.0 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area. The impacts to special-status wildlife species from the implementation of Alternative H would include 550.0 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 541.9 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 8.1 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 82.0 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. The impacts to general wildlife species from the implementation of Alternative H would include approximately 343.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.3-mile roadway.	The impacts to general wildlife species from the implementation of Sub-alternative F would include approximately 96.4 acres of general wildlife species habitat. The impacts to special-status wildlife species from the implementation of Sub-alternative F would include 96.4 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 95.4 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 1.0 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 10.8 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. The impacts to general wildlife species from the implementation of Sub-alternative F would include 55.2 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.8-mile roadway.	The impacts to general wildlife species from the implementation of Sub-alternative G would include approximately 71.8 acres of general wildlife species habitat. The impacts to special-status wildlife species from the implementation of Sub-alternative G would include 71.8 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 71.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area and approximately 0.6 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area (there is no BLM-designated Category I Sonoran desert tortoise habitat in this sub-alternative). The impacts to general wildlife species from the implementation of Sub-alternative G would include 47.3 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.4-mile roadway.
LANDS AND REALTY						
	No change to existing conditions anticipated.	No anticipated impacts to electrical transmission or oil/gas pipeline existing land use authorizations. Loss of approximately 475 acres of outdoor recreation opportunity. Direct loss to 20 and 33 acres to the Beloat and Conley allotments. No impact to mineral entry, commercial or industrial land uses, or airports. May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development.	No anticipated impacts to electrical transmission or oil/gas pipeline existing land use authorizations. Loss of approximately 549 acres of outdoor recreation opportunity. Direct loss to 48 and 13 acres to the Beloat and Conley allotments, respectively. No impact to mineral entry, commercial or industrial land uses, or airports. May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development.	No anticipated impacts to electrical transmission or oil/gas pipeline existing land use authorizations. Loss of approximately 554 acres of outdoor recreation opportunity. Direct loss to 43 and 20 acres to the Beloat and Conley allotments, respectively. No impact to mineral entry, commercial or industrial land uses, or airports. May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development.	No anticipated impacts to electrical transmission or oil/gas pipeline existing land use authorizations. Loss of approximately 97 acres of outdoor recreation opportunity. Direct loss to 11 acres to the Conley allotment. Sub-alternative F would pass directly through the Butterfield Station Landfill, an active municipal solid waste landfill, and would require major mitigations to relocate approximately 5 acres of occupied landfill. No impact to mineral entry or airports. May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development.	No anticipated impacts to electrical transmission or oil/gas pipeline existing land use authorizations. Loss of approximately 72 acres of outdoor recreation opportunity. Direct loss to 8 acres to the Conley allotment. No impact to mineral entry, commercial or industrial land uses, or airports. May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development.

Table 2-9. Summary of Effects (Continued)

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
LIVESTOCK GRAZING						
	No change to existing conditions anticipated.	Implementation of Alternative A would reduce the amount of acres of forage available for livestock grazing. Specifically, 33.2 acres (0.002% of the total allotment acreage of 174,080 acres) of the Beloat allotment would be removed from livestock grazing use for the life of the SVPP. Twenty acres of the Conley allotment (0.002% of the total allotment acreage of 116,234 acres) would also be removed from livestock grazing use for the life of the SVPP. The proposed alignment of the action alternatives and sub-alternatives are not expected to affect current fencing alignment within either of the grazing allotments; however, if the roadway alignment goes through a fence, BLM and Goodyear will work with the grazing allottee to determine methods to minimize impacts to the allotment. Though existing fencing alignments are not anticipated to change, the addition of the ROW fencing will effectuate new fencing alignments on both sides of the ROW.	The operational footprint of Alternative C would be 61.4 acres, which is 8.2 acres more than Alternative A. Alternative C would reduce acres available for grazing by 48.1 acres (0.002%) and 13.3 acres (0.001%) in the Beloat allotment and Conley allotments, respectively. Unmitigated, BLM lands available for grazing included in the Conley allotment west of the Alternative C alignment would be lost (approximately 712 acres), since the Alternative C alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 1% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.	The operational footprint of Alternative H would be 62.1 acres, which is 8.9 acres more than Alternative A. Alternative H would reduce acres available for grazing by 42.5 acres (0.002%) and 19.6 acres (0.001%) in the Beloat allotment and Conley allotments, respectively.	The operational footprint of Sub-alternative F would be 10.8 acres, wholly in the Conley allotment. This represents a reduction 0.001% of grazing land in the Conley allotment. Unmitigated, BLM lands available for grazing included in the Conley allotment west of the sub-alternative F alignment would be lost (approximately 320 acres), since the Sub-alternative F alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 0.5% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.	The operational footprint of Sub-alternative G would be 8.5 acres. This represents a reduction of 8.1 acres (0.001%) in the Conley allotment. Unmitigated, BLM lands available for grazing included in the Conley allotment west of the sub-alternative G alignment would be lost (approximately 320 acres), since the Sub-alternative G alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 0.5% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.
RECREATION MANAGEMENT						
	No change to existing conditions anticipated.	Under Alternative A, approximately 475 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%.	Under Alternative C, approximately 545 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%.	Under Alternative H, approximately 684 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%.	Under Sub-alternative F, approximately 148 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%.	Under Sub-alternative G, approximately 110 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%.

Table 2-9. Summary of Effects (Continued)

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
TRAVEL MANAGEMENT						
	No change to existing conditions anticipated. Motorists would be required to travel on dirt roads to access portions of the City's MPA.	During construction, traffic volume would increase along SR 238. At the peak of construction, construction-related vehicles would be commuting to and from the project area on a daily basis, and additional construction trucks per day would be making trips to and from the site. Once in operation, the proposed Parkway under Alternative A may continue to impact traffic volume on SR 238, because it is expected to increase from existing conditions as a result of greater access to the highway from the proposed Parkway. Approximately 2.5 miles of Maricopa County roads would be upgraded for use for Alternative A, as it would start at Riggs Road and head south along Rainbow Valley Road. Under this alternative, parts of Rainbow Valley Road also would be upgraded for use in the Parkway. Once the proposed Parkway is in operation under Alternative A, the use of these roads would provide beneficial long-term impacts to motorists and residents in the area as access to and from Rainbow Valley would be greatly improved during operation. The Alternative A alignment would provide mechanisms for BLM to control illegal OHV driving into the SDNM from the Parkway, primarily through the construction and maintenance of ROW fencing. Because Alternative A would parallel the EPNG pipeline maintenance road for approximately 10.4 miles, during operation, motorists would be less likely to continue using the unpaved utility road. There may be construction-related traffic delays, particularly on sparsely used BLM roads that provide legal access to the SDNM; however these would be short-term.	Under Alternative C, impacts to SR 238 would be the same as Alternative A. Alternative C would have the greatest impact on county roads as approximately 8.8 miles of county roads would be converted to Parkway under this alternative, including parts of Rainbow Valley and Patterson Roads, and Bullard Avenue. Construction of Alternative C may have adverse short-term impacts on residents living along Patterson Road due to construction-related traffic delays. However, access to these roads would be maintained at all times. During operation, the use of county roads would provide long-term benefits to residents as emergency response vehicles and utility-related traffic would have better access to this area. Under Alternative C, a total of 18.1 miles of the proposed Parkway would be located on BLM-administered lands (comprising 548.5 acres within the 250-foot-wide ROW, with 319.4 acres being BLM-administered, and 1.4 acres in a temporary construction easement). This would amount to an increase of 34.8 acres on BLM lands from Alternative A. Alternative C would not follow existing utility company roads. There may be construction-related traffic delays, particularly on sparsely used BLM roads that provide legal access to the Sierra Estrella Wilderness; however the impact would be short-term.	Under Alternative H, impacts to SR 238 would be the same as under Alternatives A and C. Under the Alternative H scenario, approximately 5.5 miles of county roads would be impacted (Patterson Road). Construction of Alternative H may have adverse short-term impacts on residents living along Patterson Road due to construction-related traffic delays. However, access to these roads would be maintained at all times. During operation, the use of county roads would provide long-term benefits to residents as emergency response vehicles and utility-related traffic would have better access to this area. Alternative H would not follow existing utility company roads. Under Alternative H, impacts to access from construction and operation would be the same as Alternative C.	Under Sub-alternative F, impacts to SR 238 would be the same as Alternative A. Sub-alternative F is located entirely on vacant private land and follows the existing EPNG pipeline road to its southern terminus at SR 238. Sub-alternative F is approximately 2.8 miles long. Construction of Sub-alternative F will likely result in few construction- or operation-related impacts because the alignment is located within an existing, unpaved access road ROW. Sub-alternative F does not include BLM land or BLM roads within the 250-foot-wide ROW. Sub-alternative F follows the existing unpaved EPNG pipeline maintenance road at its northernmost point to its terminus at SR 238. Sub-alternative F measures 2.8 miles, starting at the EPNG pipeline road at its north end, and then running south along this alignment to make its final connection with SR 238. Under Sub-alternative F, impacts on highway and road usage from construction and operation would be negligible, as no other existing roads or corridors are crossed. Under Sub-alternative F, impacts to access from construction and operation would be improved, since only limited access currently exists in this area.	Under Sub-alternative G, impacts to SR 238 would be the same as Alternative A. Sub-alternative G is located predominantly on vacant private land and follows about 0.5 mile of the existing 107th Avenue alignment to its southern terminus at SR 238. Sub-alternative G is approximately 2.4 miles long and does not cross BLM land. Construction of Sub-alternative G will likely result in few construction- or operation-related impacts as the alignment is located mostly on vacant lands. During operation, the use of 107th Avenue would be maintained. Sub-alternative G, totaling 2.4 miles of the proposed Parkway, would comprise 72 acres of private land within the 250-foot-wide ROW. One unpaved BLM road, the Butterfield Overland Stage Route would be intersected by Sub-alternative G. Existing legal public access would be retained. Sub-alternative G connects with the existing unpaved EPNG pipeline maintenance road at its northern terminus. Other than this intersection, Sub-alternative G will not follow existing utility company roads. Under Sub-alternative G, impacts to access from construction and operation would be improved, since currently no access exists in this area.

Table 2-9. Summary of Effects (Continued)

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
SPECIAL DESIGNATIONS						
	No change to existing conditions anticipated.	Conversion of the existing landscape from a natural setting to a high-contrast transportation corridor would have long-term adverse impacts to recreation opportunities and users of the adjacent areas of the SDNM. The impact would be limited to the areas of SDNM immediately adjacent to the alternative alignment, where the sights and sounds of the alternative alignment would change the existing viewshed and affect the solitude of SDNM. The North and South Maricopa Mountain Wilderness would experience the same impacts as described above for SDNM, under all action alternatives, since the wilderness areas would experience the same indirect impacts to the viewsheds and recreational settings and desired experiences that would indirectly impact SDNM. Because the Sierra Estrella Wilderness is 10 miles to the east of the proposed SVPP, this distance would reduce the effects of the view, and it is expected that the proposed Parkway would not stand out from the existing development in the area. Topography would also mitigate or eliminate (block) these effects in portions of the adjacent and nearby wilderness areas. The construction and operation of the SVPP under all action alternatives would create noise. The increase in construction-related noise would be noticeable from the northern and easternmost reaches of the North Maricopa Wilderness; however, the sound would quickly fade as visitors venture further into the wilderness. The color contrast the alternative alignments would impose upon the landscape during construction, operation, and maintenance would be highly noticeable throughout the day and the same throughout the year. Depending upon the engineering designs, the lights required for the SVPP at night would be noticeable. This would have an adverse impact on the recreation setting and experience of SDNM immediately adjacent to the alternative alignments and from mountain peaks with expansive vistas, because all action alternatives would alter the view of Rainbow Valley from a mostly natural, rural setting to a more developed rural setting. Under all action alternatives, there would be an increase of traffic in the local area during the construction and operation of the SVPP. Traffic would come primarily from Rainbow Valley Road and SR 238. This increase in traffic would cause both short-term and long-term adverse impacts to SDNM wildlife because of vehicle strikes and barriers to movement. Traffic would increase the risk of wildlife mortality and would contribute to the fragmentation of wildlife populations. There would also be adverse impacts to the recreational setting and experience due to the increase in traffic. Under all action alternatives and sub-alternatives, the proposed SVPP 250-foot ROW would intersect the Lower Gila Terraces and Historic Trails ACEC for an approximate distance of between 2.0 and 2.7 miles (between approximately 61 and 82 acres). The areas of the ACEC in which the proposed SVPP 250-foot ROW would intersect currently include existing dirt roads, transmission lines, and gas pipelines. The overall values for which the 82,500-acre ACEC were designated (cultural, archaeological, and Historic Trails) would not be lost if the SVPP were implemented; however, the conversion of the ACEC from the existing uses (including but not limited to dispersed recreation and livestock grazing) to a Parkway would adversely impact these values on between approximately 61 and 82 acres of the ACEC, less than approximately 0.1% of the entire ACEC.				
NOISE						
	No change to existing conditions anticipated.	The closest residential unit to Alternative A is approximately 2,800 feet, and the closest school is approximately 2,400 feet. The noise levels at 2,400 and 2,800 feet are anticipated to be less than 64 dBA for all Parkway designs (two-, four-, and six-lane). Due to the distance of potentially sensitive receptors from the roadway, it is anticipated that the increase in noise levels from existing noise levels is less than 15 dBA. The impact on noise levels for potentially sensitive receptors would therefore be long-term but negligible. The operation of Alternative A may result in indirect impacts to Category B land uses (residential) if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of Category B land uses to the improved roadway network in the project area.	The impacts to existing Category B land uses under Alternative C would be the same as described for Alternative A for all Parkway designs (two-, four-. and six-lane) except for a residential unit that would be approximately at the ROW. The noise level is anticipated to exceed 64 dBA, with a greater than 15 dBA noise level increase from existing noise levels, for this residential unit. The implementation of Alternative C would therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW. As with Alternative A, the future development from the operation of Alternative C would increase the proximity of receptors to the improved roadway network in the project area, resulting in indirect impacts to planned Category B land uses.	The impacts to existing Category B land uses under Alternative H would be the same as described for Alternatives A and C for all Parkway designs (two-, four-. and six-lane) except for residences located approximately at the ROW. The noise level is anticipated to exceed 64 dBA, with a greater than 15 dBA noise level increase from existing levels, for these residential units. The implementation of Alternative H would therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW. Alternative H's indirect impacts from future land uses would be the same as described for Alternatives A and C.	The closest residential unit to Sub-alternative F is located approximately at the ROW. Therefore, under all Parkway designs (two-, four-, and six-lane), the noise level is anticipated to exceed 64 dBA with a greater than 15 dBA noise level increase from background for this residential unit. Sub-alternative F would also move the Parkway to a distance of approximately 1,400 feet from the school. However, the noise level from the Parkway at this distance is still anticipated to be less than 64 dBA for the school, with a less than 15 dBA noise level increase from existing levels. The implementation of Sub-alternative F would therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW. Sub-alternative F's indirect impacts from future land uses would be the same as described for Alternatives A, C, and H.	The closest residential unit to Sub-alternative G, the BLM Preferred Sub-alternative, is approximately 7,500 feet, and the closest school is approximately 6,000 feet. Based on these assumptions, the noise levels at these distances are anticipated to be less than 64 dBA for all Parkway designs (two-, four-, and six-lane). Due to the distance of potentially sensitive receptors from the Parkway, it is anticipated that the increase in noise levels from existing noise levels would be less than 15 dBA. The impact on noise levels for potentially sensitive receptors would therefore be long-term but negligible. Sub-alternative G's indirect impacts from future land uses would be the same as described for Alternatives A, C, and H and Sub-alternative F.

Table 2-9. Summary of Effects (Continued)

Resource Section	No Action	Alternative A (the BLM Preferred Alternative)	Alternative C	Alternative H	Sub-alternative F	Sub-alternative G (the BLM Preferred Sub-alternative)
HAZARDOUS MATERIALS/PUBLIC SAFETY						
	No change to existing conditions anticipated. The City would not have safe access to its MPA.	With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, implementation of the SWPPP and SPP, and potentially the additional mitigation described in Section 4.17.3 for the Hamilton Homes and RM Cat Remediation sites, the construction and operation of Alternative A would not result in direct or indirect impacts from hazardous materials to surrounding soils, surface water, or groundwater. It is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of wider Parkways. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway. However, for the reasons stated in the previous paragraph, direct or indirect impacts from hazardous materials within the project area are not anticipated for any of the phases under this Alternative.	Alternative C's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except as described below. Because Alternative C is approximately 15% longer than Alternative A, construction activities would likely consume a comparably higher amount of hazardous materials and would generate a comparably higher amount of solid waste. The quantity of hazardous materials on the project area at a given time would likely be the same as for Alternative A, but would remain on-site for a longer period of time because construction would likely take longer.	Alternative H's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except as described below. Because Alternative H is approximately 16% longer than Alternative A, construction activities would likely consume a comparably higher amount of hazardous materials and would generate a comparably higher amount of solid waste. The quantity of hazardous materials on the project area at a given time would likely be the same as for Alternative A, but would remain on-site for a longer period of time because construction would likely take longer.	Sub-alternative F's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except as described below. While this Sub-alternative avoids the RM Cat Remediation site, and is the shortest and most direct route, it passes directly through the Butterfield Station Landfill, an active municipal solid waste landfill operated by Waste Management, Inc. Beyond the obvious logistical concerns of relocating over 5 acres of existing landfill contents to construct a Parkway, significant and costly additional mitigation measures would be required, such as extensively sampling the waste for contaminants, proper removal and disposal of the waste elsewhere, and re-engineering of existing landfill liner systems and leachate and methane collection systems. Direct impacts would include exposing potentially hazardous waste materials to the environment, and exposing personnel to the potentially hazardous waste materials. Existing landfill liners in the area would be removed, and could compromise adjacent liner material in the process. Landfills generally have setback requirements from public Parkways, and special variances from various state and federal agencies may be needed. Indirect impacts at the landfill could also include temporary disruption of existing leachate and methane collection systems, which could put the environment and personnel at risk.	Sub-alternative G's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except that this Sub-alternative avoids both the RM Cat Remediation site and the Butterfield Station Landfill.
SOCIAL AND ECONOMIC CONDITIONS						
	No change to existing conditions anticipated. Motorists would be required to travel on dirt roads to access portions of the City's MPA.	Under all action alternatives, project construction would occur on a phased schedule over the course of several years for each phase (the exact construction schedule has yet to be determined; each phase would add two additional through-lanes). The staffing for project construction would be expected to draw from the existing construction workforce in the region, including metropolitan Phoenix. Because of the availability of construction workers within the metropolitan Phoenix area, construction workers would commute to the SVPP from their local residences rather than relocate. The proposed project would provide income to construction workers, therefore impacts to income will be beneficial and short-term. The timeframe for construction of the proposed Parkway is currently unknown and will be dependent upon future transportation funding availability. Though direct and indirect economic impacts to income are largely unquantifiable, from a qualitative perspective, the operation of a new Parkway where one did not exist previously will provide access to new areas for residential and commercial development, thus providing more potential opportunities for income generation. Given the relatively small number of construction workers needed to build this 15.7-mile Parkway, cost of living is not expected to be affected. Because the construction workers are anticipated to commute rather than relocate to the project area, the proposed project is not expected to have any effect on property tax. In the long-term, increased access to the Rainbow Valley area may promote additional visitors and travelers to the area, thus increasing sales and lodging tax revenue. Additional improvement to the housing market in general is expected, and the addition of a Parkway for access to Rainbow Valley will likely improve the appeal of this area for prospective investors and residents, thus providing a long-term benefit for housing and property values. Changes to recreation-driven economic revenue would not occur as a result of the construction and operation of the Parkway, as no fee-generating activities (e.g., hunting, enthusiast events, etc.) occur in the Rainbow Valley area. Each alternative presented for the SVPP would change or reconfigure the livestock grazing allotment boundaries. Reconfiguring livestock grazing allotment boundaries would impact the livestock movement patterns, the allotment permittee, and the BLM. Reconfiguring livestock grazing boundaries may sever the ability for livestock to move in and out of the existing pasture in site-specific locations (as analyzed in Section 4.12, Livestock Grazing), require new grazing improvement construction, render grazing improvements unusable, and may decrease available acreage for grazing, which could decrease the AUMs and subsequent value of the allotment. In the long term, development of commercial and industrial centers are planned for Rainbow Valley, and so the Parkway would indirectly benefit employment conditions because it would provide improved access from residences to employment centers. The identified environmental justice communities are a minimum of 2 miles from the proposed Parkway, further reducing the chances of disproportionate impacts. It was also determined that the introduction of a Parkway on other environmental resources that could negatively affect environmental justice communities (such as air quality, noise, health and human safety, and visual resources) would also not result in a disproportionate or adverse impact on the environmental justice communities, since these impacts would largely be minor. The addition of a Parkway or transportation access that can also support public transportation would be a beneficial impact to environmental justice communities as currently no, or limited access exists in this area, and public transit provides a mobility option for those who do not own a vehicle. Changes to quality of life would be impacted by the construction and operation of the Parkway, and in some cases, the development of this transportation corridor would improve the quality of life for some local populations depending on destination and objective. Contrarily, for those seeking a rural and semiprimitive experience, the addition of urbanized features such as a Parkway, accompanied by increased traffic volume (i.e., the two-lane Parkway scenario would allow capacity of approximately 24,000 vehicles per day; four lanes would accommodate 48,000 vehicles per day; and six lanes would accommodate 72,000 vehicles per day) would deteriorate elements that define their quality of life.				

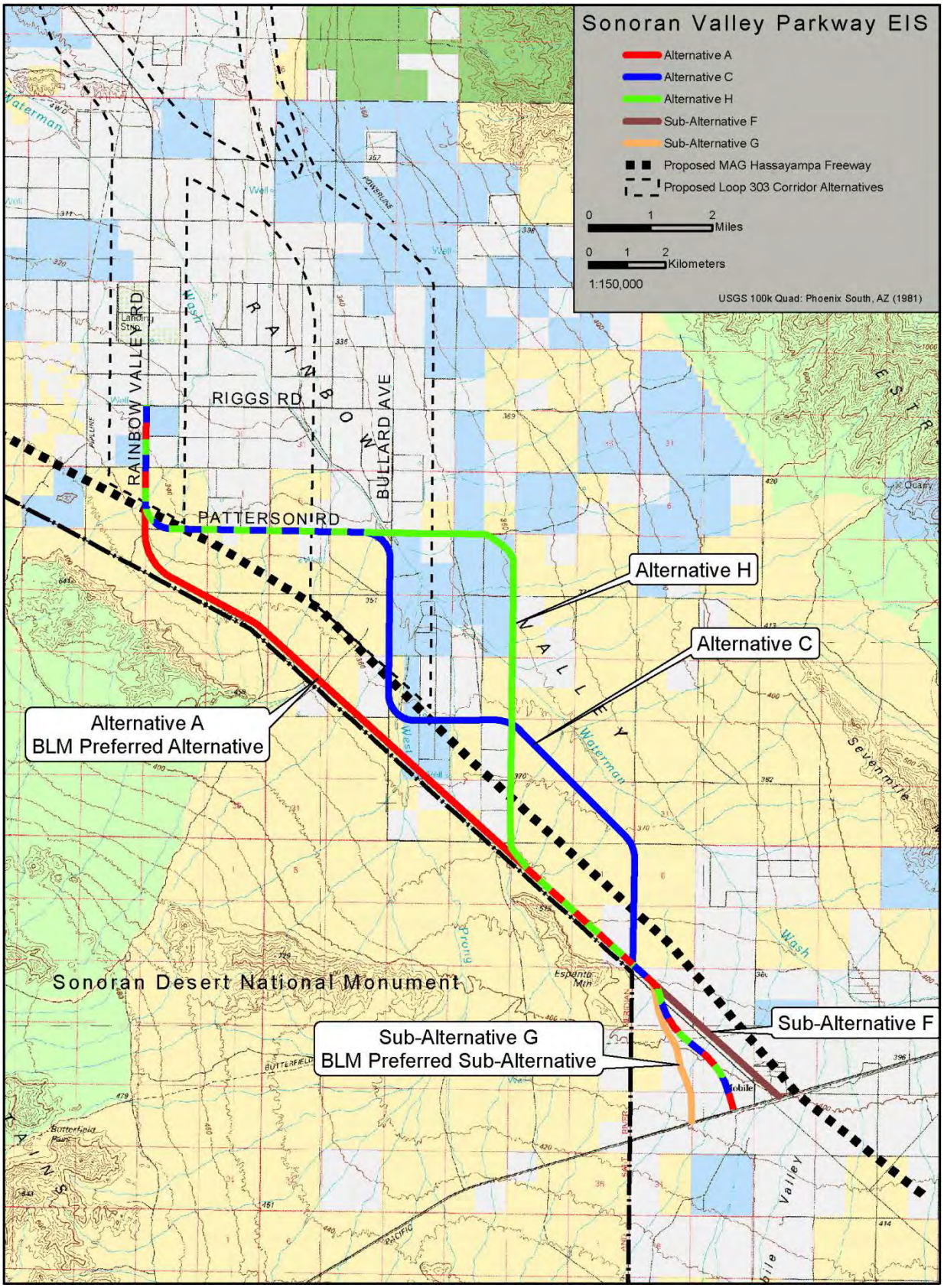

Figure 2-1. Proposed project alternatives.

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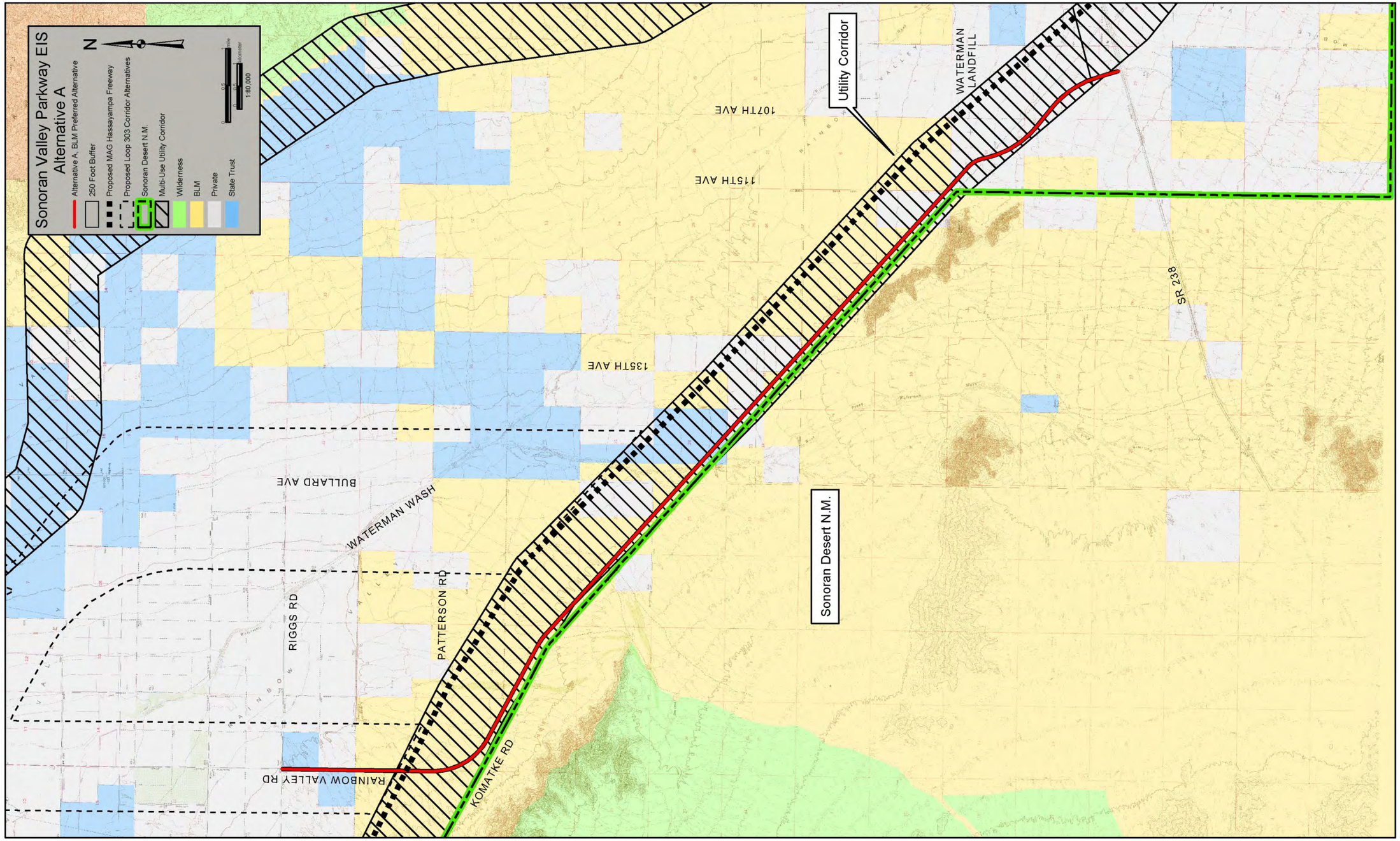

Figure 2-2. Alternative A, Proposed Action alignment.

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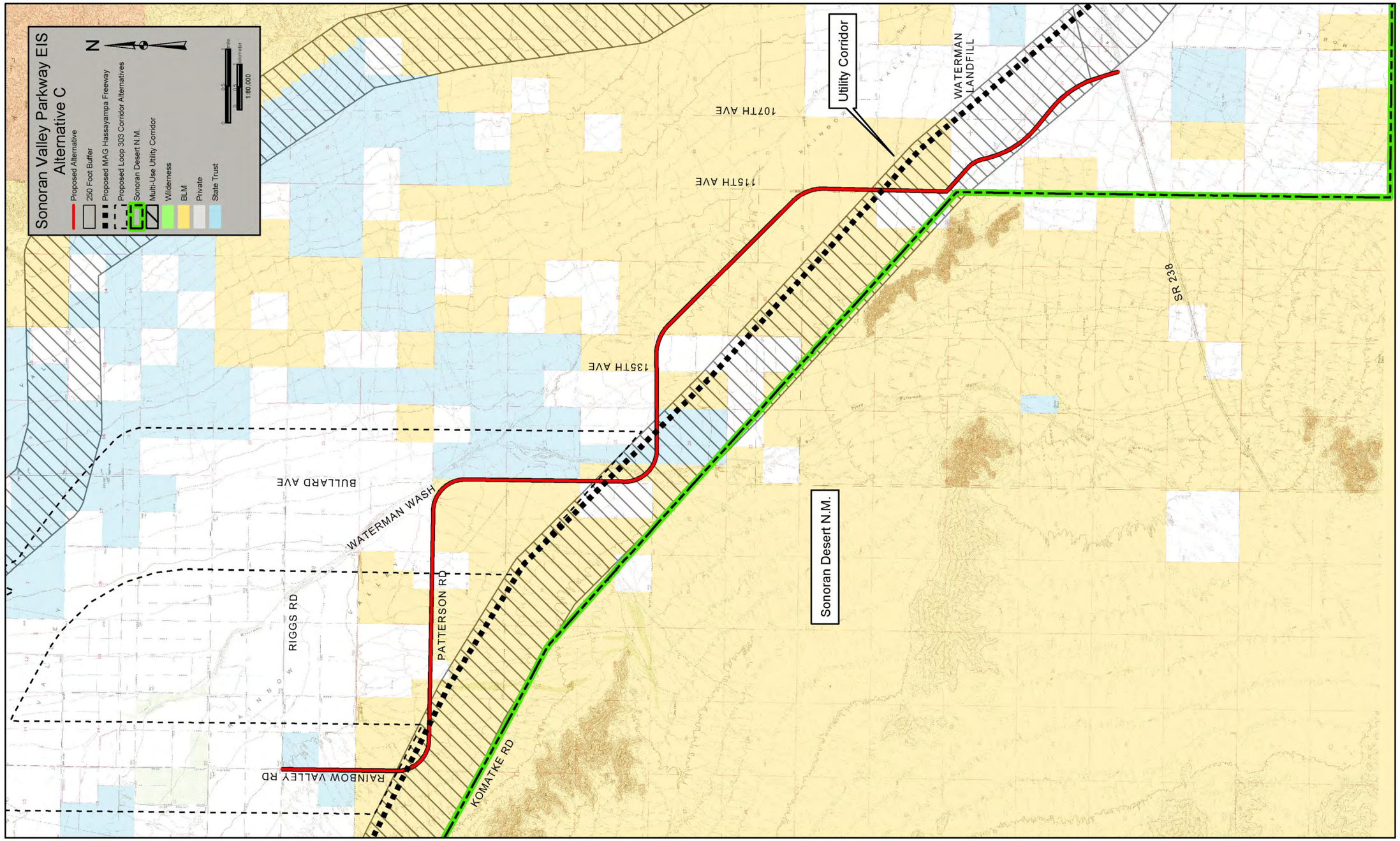

Figure 2-3. Alternative C alignment.

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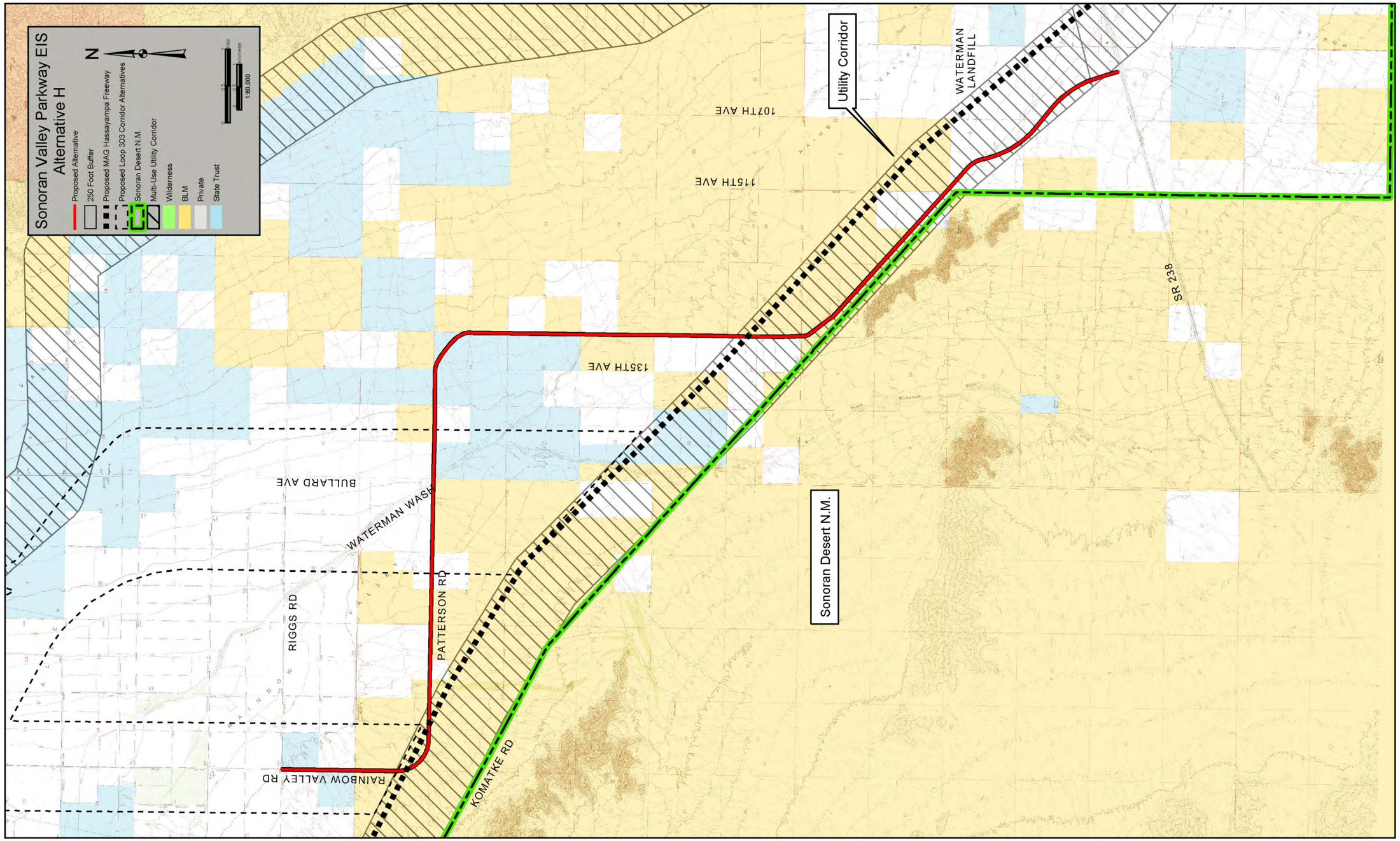

Figure 2-4. Alternative H alignment.

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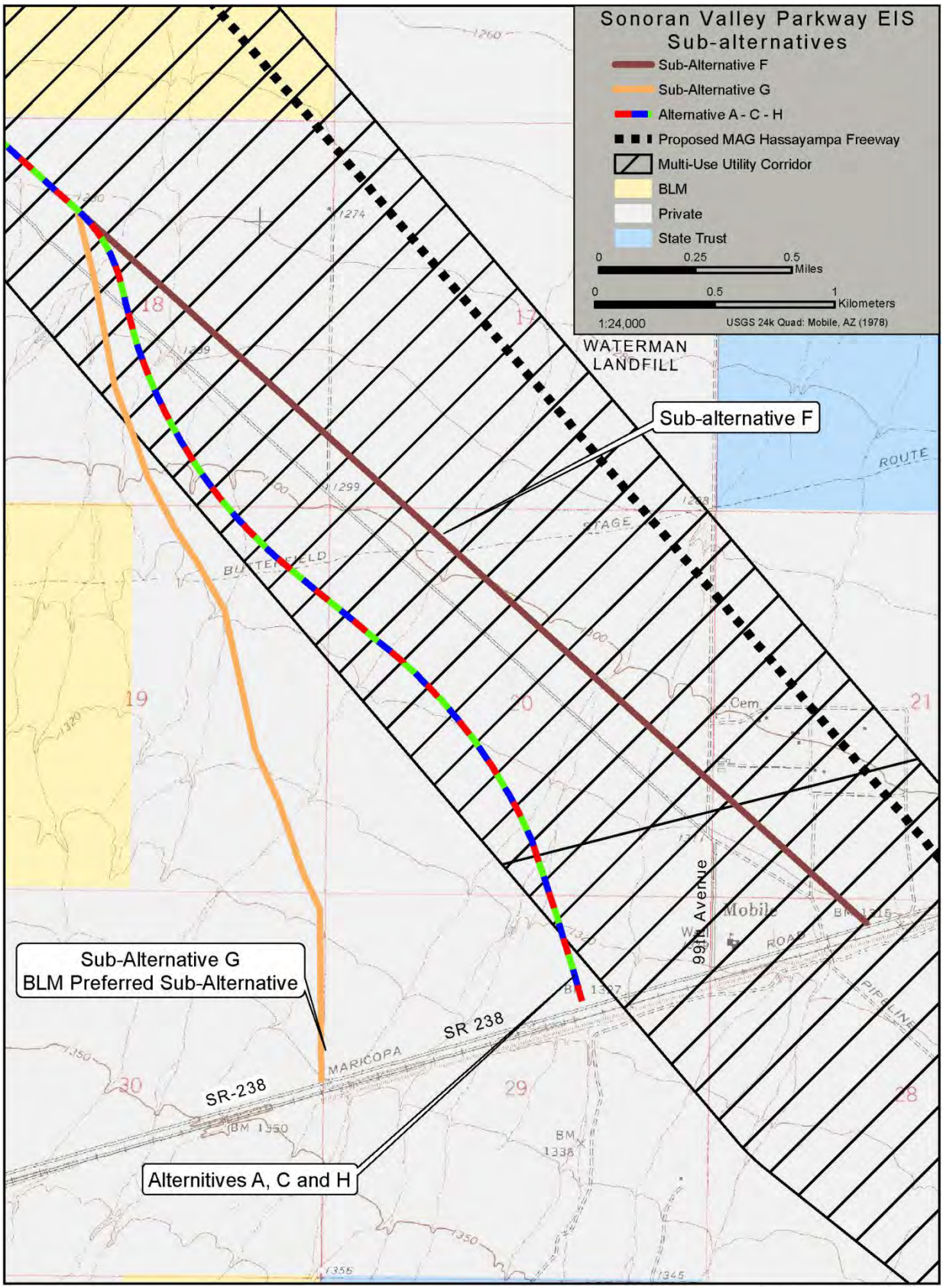

Figure 2-5. Sub-alternative F and Sub-alternative G alignments.

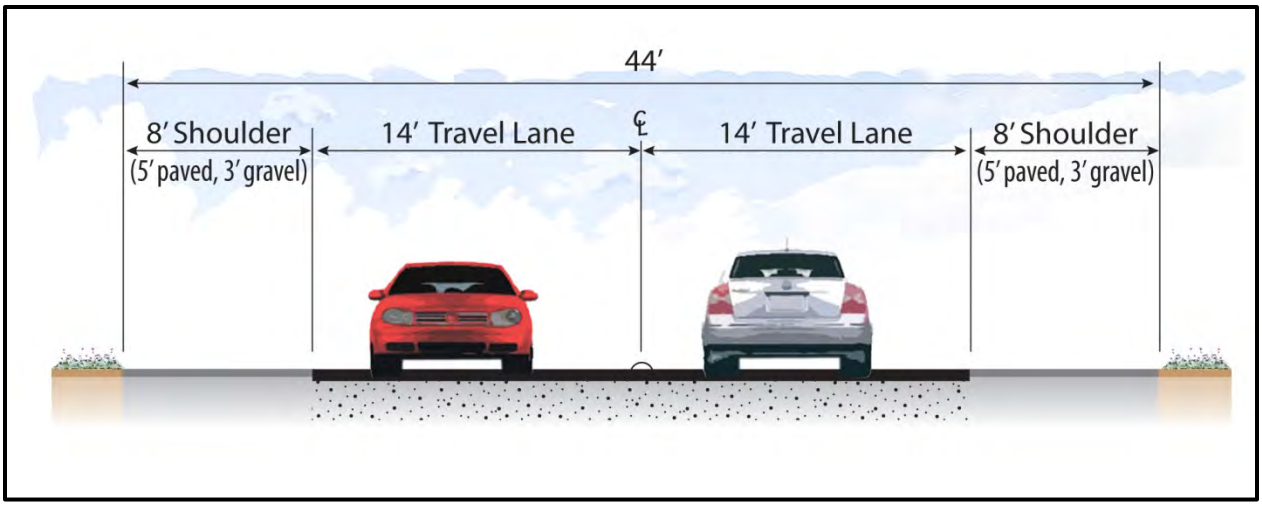

Figure 2-6. Two-lane Parkway typical cross section.

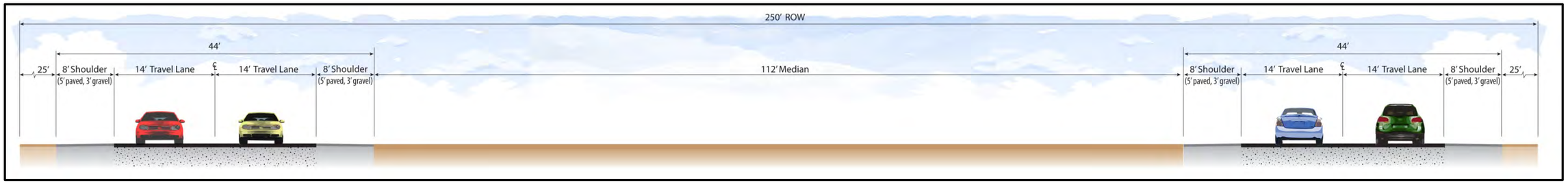

Figure 2-7. Four-lane Parkway typical cross section.

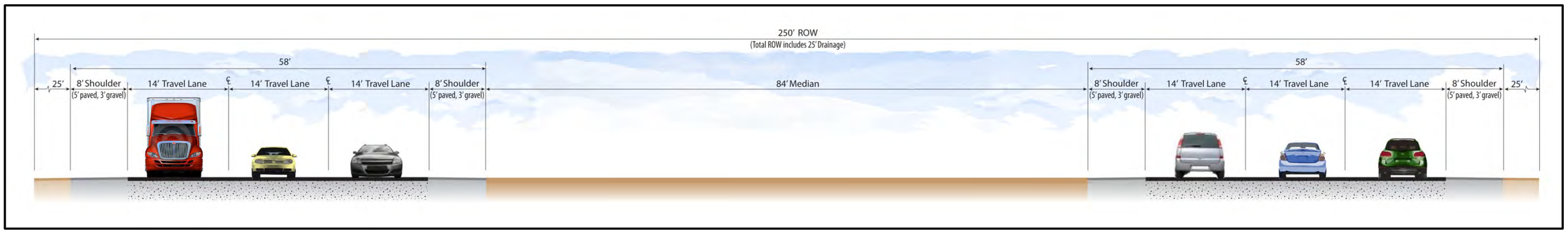

Figure 2-8. Six-lane Parkway typical cross section.

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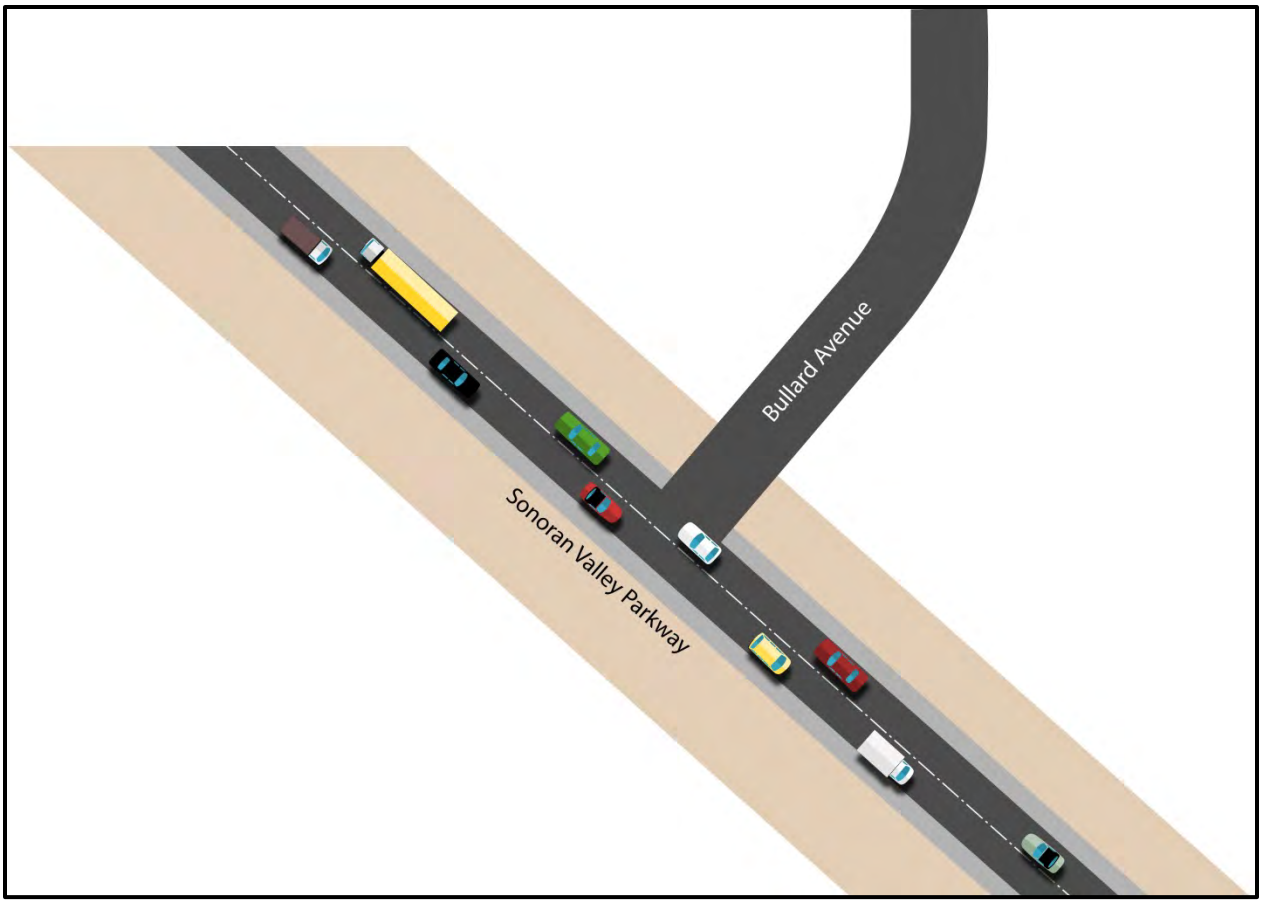

Figure 2-9. Typical Parkway intersection (two-lane scenario).

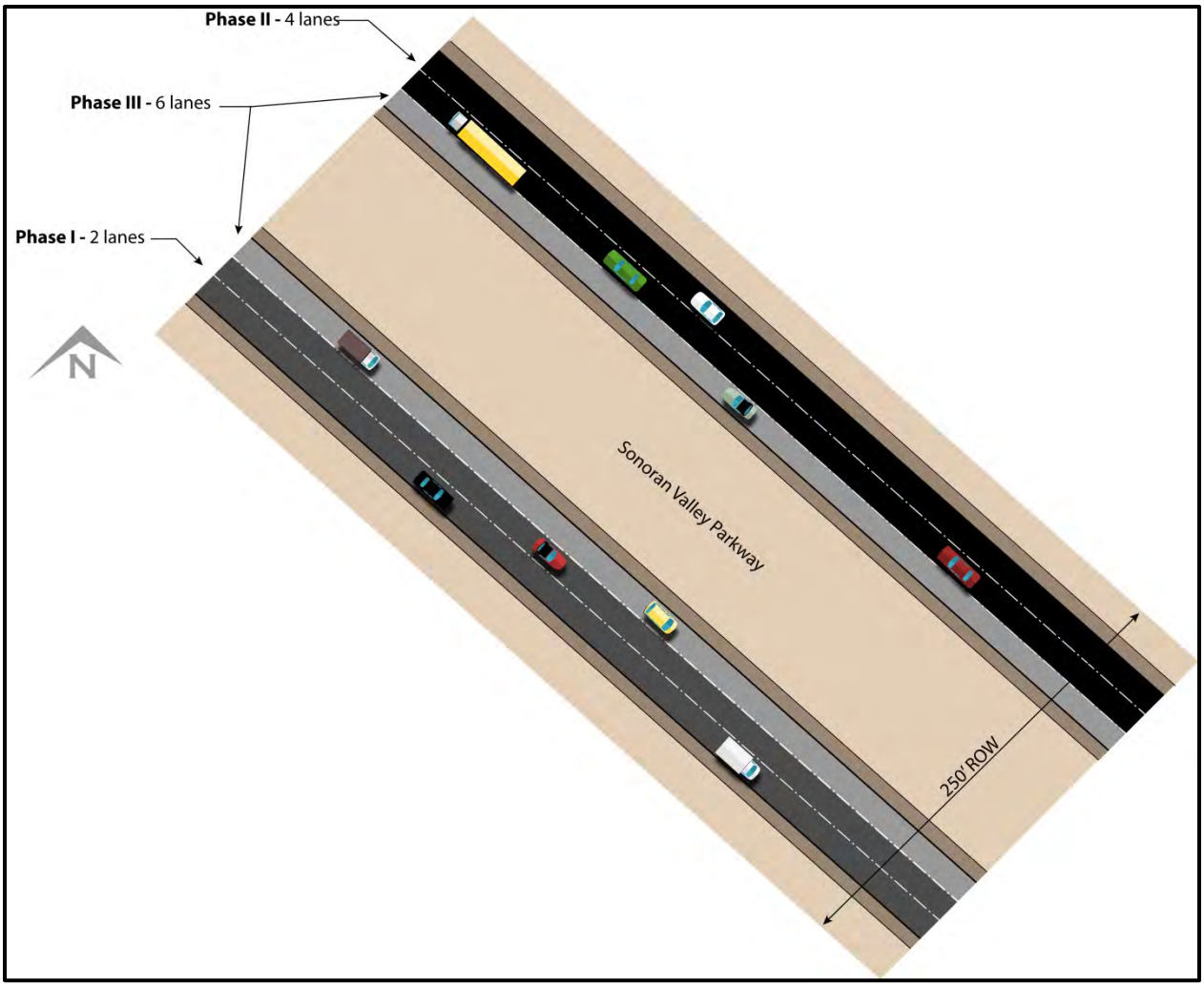

Figure 2-10. Overhead view of the two-, four-, and six-lane Parkway construction activities.

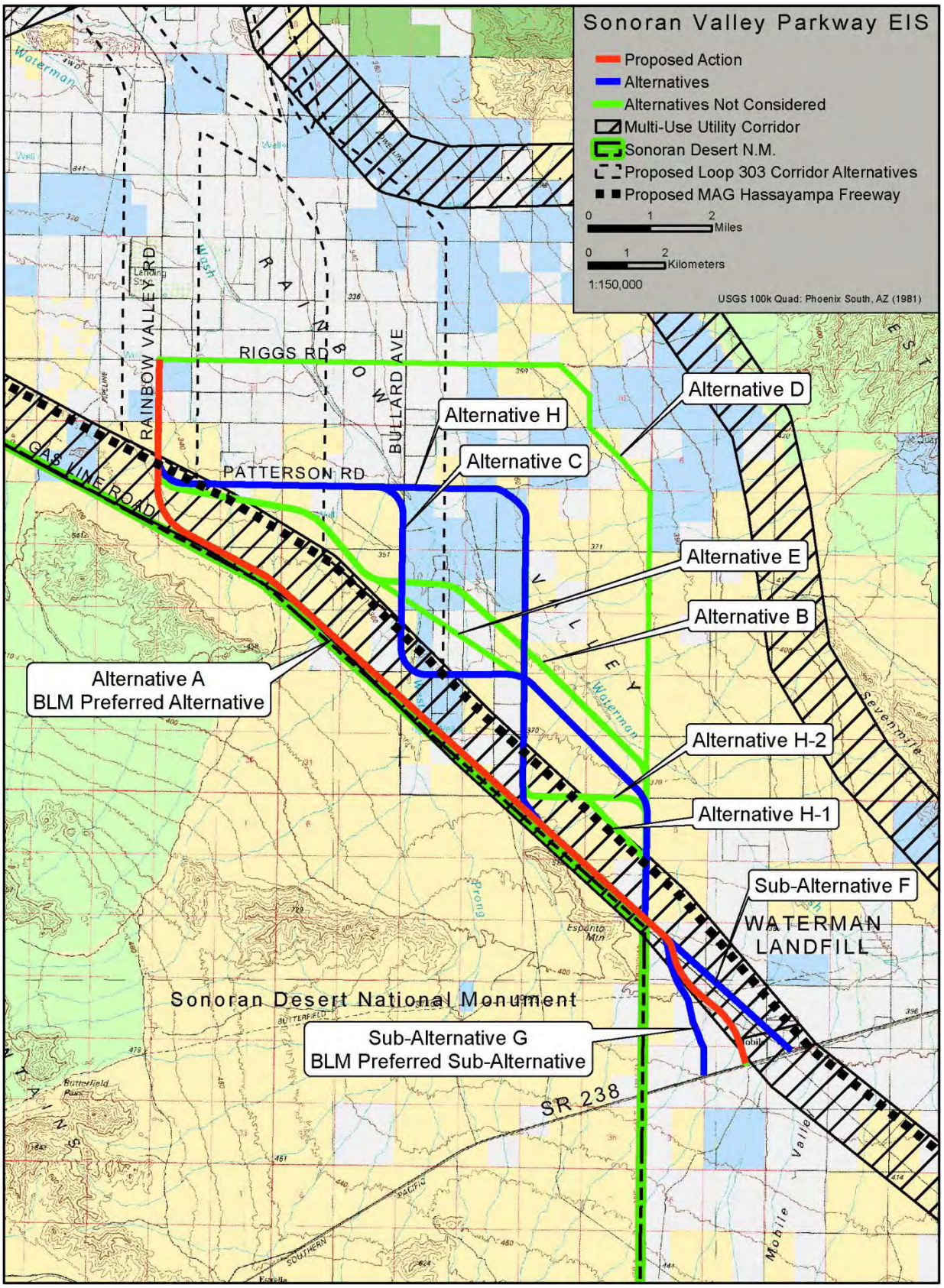

Figure 2-11. Alternatives considered but eliminated from further analysis.

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Chapter 3

AFFECTED ENVIRONMENT

This chapter identifies the affected environment and focuses on the existing resources and uses that have the potential to be affected by the proposed project. The affected environment is the baseline against which each project alternative is evaluated in terms of impacts to the human environment that would result from its implementation. The following sections endeavor to comprehensively present the human environment that may potentially be affected by the project alternatives, including both natural and physical resources in the area and the relationships of people to these resources (40 CFR 1508.14).

The affected environment discussed in this chapter consists of topography, geology and soils, air quality, water resources, biological resources (including vegetation and wildlife), cultural resources, visual resources, land uses, recreation, travel management, grazing management, special designations, noise, hazardous materials and solid waste, social and economic conditions (including environmental justice), and public health and safety. Relevant environmental conditions and human uses within the analysis area have been identified and described using geographic information system (GIS) data, literature searches, electronic searches, interviews, detailed field surveys, and information from BLM resource specialists.

3.1 GENERAL SETTING

The three action alternative and two sub-alternative locations for the proposed Parkway are completely within Maricopa County on 475 to 554 acres of BLM land (acreage is dependent on the action alternative). As described in Table 2-6 in Chapter 2, ASLD and private lands are also included in the alternatives and sub-alternatives. The project area stretches between southern Goodyear and Mobile, Arizona, through Rainbow Valley. The SDNM is directly southwest of the project alternatives. Rainbow Valley is a sparsely populated, undeveloped expanse of land with diverse land ownership, including the BLM, ASLD, and private land owners. Lands in the immediate vicinity of the analysis area are composed of undeveloped, relatively undisturbed desert across a flat, alluvial plain that is dissected by several drainages. Lands outside the SDNM are dominated by creosote flats, although some agricultural use exists in the region. There are several utility corridors in use, which include authorizations such as transmission lines, gas lines, and associated access roads.

3.1.1 Resources Values and Uses Brought Forward for Analysis

Based on internal (agency and cooperator) and external (public) scoping, or issue identification, a number of issues and concerns were identified for analysis in this EIS (see Chapter 1, Section 1.7). In order to analyze and respond to the issues and concerns, the resource values and uses of the affected environment must be identified and described. For this EIS analysis, the following resources and uses are brought forward for analysis and are presented in this chapter.

- Air Resources
- Cultural and Heritage Resources
- Paleontological Resources
- Soil Resources
- Vegetation Resources
- Visual Resources
- Water Resources
- Wildland Fire
- Wildlife and Special-Status Species
- Lands and Realty
- Livestock Grazing
- Recreation Management
- Travel Management
- Special Designations
- Noise
- Hazardous Materials and Public Safety
- Social and Economic Conditions

3.1.1.1 Analysis Area

The analysis area varies by resource value or use, depending on the geographic extent of the resource or use and the extent of the effects of the proposed action alternatives on a resource or use. In some cases, the analysis area is the project area (i.e., the 250-foot ROW of each alternative) because that is the anticipated extent of the effects of the project on the resource. In other cases, the analysis area is much larger, encompassing larger administrative or natural boundaries (e.g., Maricopa County or Rainbow Valley), because the effects on the resource extend beyond the project area boundary. The analysis area for each resource value or use is defined at the beginning of each resource section.

3.2 AIR RESOURCES

Air quality generally refers to the amount or level of pollutants found in the ambient air. Air pollution is defined as the presence in the atmosphere of natural and artificial substances that affect human health or well-being, or the well-being of any other specific organism. Air pollution also applies to situations in which contaminants impact structures and artifacts or esthetic sensibilities (such as visibility or smell). Pollutants are further defined as primary (emitted directly from a source) or secondary (formed in the atmosphere by reactions of primary pollutants).

3.2.1 Applicable Laws, Regulations, and Policies

The Clean Air Act of 1963 (PL 88-206) requires any federal entity engaged in an activity that may result in the discharge of air pollutants to comply with all applicable air pollution control laws and regulations (federal, state, or local). The original act established funding for the study and the cleanup of air pollution and a program for state and local research and control. The CAA was amended in 1965, 1967, 1970, 1977, and most recently in 1990.

The 1965 amendments established motor vehicle emissions standards. The 1967 amendments expanded the role of the federal government by establishing multi-state air quality control regions and initiating enforcement proceedings for interstate pollution control. The 1970 amendments (PL 91-604) required the attainment and maintenance of NAAQS for six different criteria pollutants: CO, O_3, PM, sulfur oxides, oxides of nitrogen, and lead. The amendments also established National Emissions Standards for Hazardous Air Pollutants and directed states to develop SIPs for attaining and maintaining the NAAQS. The 1977 amendments required the EPA to review the NAAQS every 5 years and update the standards for each criteria pollutant, as necessary. The amendments also mandated the prevention of significant deterioration within each designated attainment area, primarily to regulate point sources of air pollutants, such as smoke stack exhaust from power plants and industrial process facilities. Finally, the 1977

amendments established the Conformity Rule, which prohibits the participation of any federal agency in activities that do not meet the goals of the applicable SIP.

The most recent amendments to the CAA were promulgated in 1990 (PL 101-549). These amendments significantly increased the regulatory authority of the federal government and addressed the problems caused by smog and acid rain. The amendments established new and stricter standards for motor vehicle emissions, 1995 models and newer, and listed 188 air toxics or hazardous air pollutants. Title I, Part D, Section 176(c) of the 1990 CAA amendments expands on the 1977 CAA Conformity Rule:

> No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan after it has been approved or promulgated under section 110. No metropolitan planning organization designated under Section 134 of Title 23, United States Code, shall give its approval to any project, program, or plan which does not conform to an implementation plan approved or promulgated under Section 110…conformity to an implementation plan means—(a) conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and (b) that such activities will not (i) cause or contribute to any new violation of any standard in any area; (ii) increase the frequency or severity of any existing violations of any standards in any area; (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The conformity process provides the nexus between the federal regulation of criteria pollutants and state and local implementation of the federal standards. The SIP is an enforceable plan developed at the state and local level to comply with the NAAQS. States such as Arizona with air quality control regions that fail to meet or satisfy the NAAQS must submit their SIP to the EPA. The SIP is generally not a single document but rather a cumulative record of all air pollution strategies, state statutes, control strategies, state and local rules, and local ordinances aimed at attaining the NAAQS within each air quality control region. The Arizona SIP, originally drafted in 1972, includes all subsequent state transportation improvement plans, regional transportation plans, and other metropolitan planning organization transportation improvement plans.

The MAG Regional Transportation Plan (2010) indicated a need to establish a major arterial road (or Parkway) corridor to meet future needs in the newly annexed portion of the MPA. The City General Plan Amendment (City 2007) intends to deliver a means of access to core areas of the city of Goodyear and the greater Phoenix metropolitan area for timely emergency services (police, fire, ambulance) to newly annexed portions of the City. The City annexed a 67–square mile area within its 95–square mile MPA to accommodate the Sonoran Valley Parkway for this purpose and to provide a connection between the community of Mobile and the city. Because the analysis area for the proposed SVPP lies within the boundaries of non-attainment and maintenance areas for one or more criteria pollutants, conformity must be demonstrated prior to the selection and construction of an alignment for the action alternative unless the No Action Alternative is selected. The scope of design elements for the action alternative must be consistent with the approximately 15- to 18-mile-long, two-lane Parkway proposed in the City General Plan Amendment, and the requirements of Title I, Part D, Section 176(c) of the 1990 CAA amendments must be satisfied.

The Arizona Administrative Code (AAC) Title 18, Environmental Quality, Chapter 2, Department of Environmental Quality, Air Pollution Control, Section R18-2-614, effective July 18, 2005, prohibits visible dust emissions with opacity greater than 40% from any non-point source measured in accordance with the Arizona Testing Manual, Reference Method 9. In addition to rule R18-2-614, several additional

rules also require control of visible dust from open areas, road construction, material handling, storage piles, Parkway, and site clearing. These rules are outlined in Table 3-1.

Table 3-1. Applicable Air Quality Rules

Rule Number	Rule Description
R18-2-604	Construction on “open areas’” fugitive dust limitations
R18-2-605	Road construction fugitive dust limitations
R18-2-606	Material handling fugitive dust limitations
R18-2-607	Storage pile fugitive dust limitations
R18-2-614	Opacity limitation for non-point sources
R18-2-702	Visible emission limitations
R18-2-802	Off-road machinery opacity limitations
R18-2-805	Roadway and site-clearing opacity limitations

In addition to statewide rules governing emissions from construction, Maricopa County has outlined measures in the Maricopa County Air Quality Rules (MCAQR) to be incorporated into construction specifications to minimize potential dust emissions. Rules 310 and 310.01 (both revised in January 2010) of the MCAQR include work practice standards to ensure that emissions from fugitive dust sources, such as open areas, vacant lots, unpaved parking lots, and unpaved roadways, are minimized to the extent practicable. Under MCAQR Rule 310, the owner and/or operator of any dust-generating operation is required to conduct the following:

- Obtain a Maricopa County Air Quality Division (MCAQD) Dust Control Permit for all projects that will disturb more than 0.1 acre (4,356 square feet) of soil prior to beginning construction (Rule 310, Section 401).
- Submit to the Control Officer a dust control plan for approval with any application for a Dust Control Permit. Applicants shall describe, in a dust control plan, all control measures to be implemented before, after, and while conducting any dust-generating operation, including on weekends, after work hours, and on holidays (Rule 310, Section 402).
- For all areas with a Dust Control Permit that are larger than 5 acres, the owner and/or operator shall erect and maintain a project information sign (Rule 310, Section 308).
- Comply with the Dust Control Training Requirements (Rule 310, Section 309).
- For any site of 5 acres or more of disturbed surface area, at least one Dust Control Coordinator must be present at all times during primary dust-generating operations (Rule 310, Section 310).
- Implement contingency dust control measures when primary control measures are ineffective (Rule 310, Section 305).
- Require the owner/operator to maintain a daily written log recording the actual application or implementation of the control measures described in the approved dust control plan (Rule 310, Section 502).

3.2.2 Analysis Area

Typically, the analysis area for assessing air quality impacts of a future Parkway alignment is defined by the location of areas of frequent and extended exterior use, such as sidewalks, trails, bus and transit stops,

and in some cases residential backyards located adjacent to the proposed ROW for the project, especially in urban areas. For projects in rural settings, an acceptable approach to establishing the affected environment and assessing future environmental consequences is to include areas of frequent and extended exterior use that are located within 1,000 feet of the proposed ROW. Figure 3-1 shows the 1,000-foot perimeter around the 250-foot-wide ROW for each of the proposed action alternatives. Because of the sparse development in the analysis area, only four areas of potential frequent and extended exterior use are located within the 1,000-foot perimeter: three residences (one east of Bullard Avenue, one south of Patterson Road, and one north of Powhattan Road) and one park (the eastern boundary of the SDNM). Therefore, the analysis area is more appropriately set at the perimeter of each 1-mile section crossed by each of the three alignment alternatives.

3.2.3 Air Quality Conditions

The analysis area lies within the Salt River valley, a broad, oval, nearly flat plain surrounded by mountains. This area is characterized by extremely hot summers, mild winters, low annual rainfall, and a stable wind environment.

3.2.3.1 Temperature and Precipitation Data

A summary of historical temperature and precipitation data collected by the National Climatic Data Center weather station nearest the analysis area (Station #021026 in Buckeye, Arizona) is presented in Table 3-2. The historical average monthly temperature varies from a maximum of 107 degrees Fahrenheit (°F) in July to a minimum of 35°F in January. Precipitation averages approximately 8 inches per year. From November through March, storm systems from the Pacific Ocean cross the state. In the summer, rainfall begins in July and lasts until mid-September as a result of moisture-bearing winds from the Gulf of Mexico. Snowfall in the area is rare, with most accumulation occurring in higher mountains of the central and northern parts of the state.

Table 3-2. Summary of Climatology Data for Buckeye, Arizona

Month	Temperature (°F)			Precipitation (inches)	
	Average*	Average Monthly Maximum*	Average Monthly Minimum*	Average*	Historical Monthly Maximum*
January	51.22	67.8	34.6	0.82	4.30
February	55.45	72.5	38.4	0.78	6.46
March	60.43	78.4	42.4	0.75	3.88
April	67.50	86.6	48.4	0.28	2.07
May	75.45	95.0	55.8	0.10	1.34
June	84.15	104.2	64.0	0.07	1.45
July	90.74	107.1	74.4	0.87	4.10
August	89.39	105.2	73.6	1.13	6.89
September	83.04	100.8	65.3	0.77	5.00
October	70.94	89.9	52.0	0.50	3.10
November	58.83	76.9	40.9	0.62	5.01
December	51.56	68.1	35.0	0.90	4.68
Annual	70.08	87.7	52.1	7.70	21.80

Source: Western Regional Climate Center (2008).

* National Climatic Data Center period of record for Buckeye, Arizona: 1893–2003.

Meteorology directly affects air quality through the transport and dispersion of pollutants. Important factors include the speed and direction of surface winds, atmospheric stability, temperature inversion, solar insolation, and mixing depth.

3.2.3.2 Wind

For the Phoenix metropolitan area, the historical average wind speed recorded during this period is 5.21 knots (6 mph), and prevailing winds are to the east between January to August and to the west between September and December. Figure 3-2 is a wind distribution graph (wind rose plot) of wind speed vs. direction recorded at Phoenix Sky Harbor International Airport for the years 1961 to 1992 (WebMET 2008). Because local terrain can affect wind distributions, these historical data should be viewed only as a general indication of wind patterns in the analysis area.

Stability is defined as the tendency of the atmosphere to resist or enhance vertical motion. Stability is related to both the change of temperature with height in the atmosphere and wind speed. Stability is an indication of the ability of the atmosphere to promote vertical mixing of the air and, as a result, the mixing and diffusion of pollutants.

A stable atmosphere inhibits mechanical turbulence, an unstable atmosphere enhances mechanical turbulence, and a neutral atmosphere does not enhance or inhibit turbulence. A common method for determining atmospheric stability involves classification of different meteorological conditions characterized by wind speed and net solar radiation (during the day) and cloud cover during the night.

These stabilities are reported in terms of Pasquill-Gifford Stability Classes. These classes identify six gradations of stability, ranging from an extremely unstable condition, Stability Class A, to an extremely stable condition, Stability Class F. Classes B–E represent unstable, slightly unstable, neutral, and stable conditions, respectively. Stability Class A is the most conducive to diffusion; Class F represents the poorest diffusion conditions.

Stability data are not available for the analysis area. Historical data from the Phoenix Sky Harbor International Airport give an indication of stability conditions in the general area. These stabilities were determined using the Pasquill-Gifford method during the period from 2000 to 2005. Stability Classes A through D occurred approximately 60% of the time; Classes E and F occurred approximately 40% of the time (Western Regional Climate Center 2006).

3.2.4 National Ambient Air Quality Standards

Based on the adopted air quality standards, the CAA requires that states classify air basins (or portions thereof) as either *attainment* or *nonattainment* with respect to the criteria pollutants**Error! Bookmark not defined.**. The classifications are defined below.

- **Attainment Area:** This is a geographic or politically delineated air basin that meets the NAAQS for criteria pollutants.
- **Nonattainment Area**Error! Bookmark not defined.**:** This is a geographic or politically delineated air basin that does **not** meet the NAAQS**Error! Bookmark not defined.** for one or more pollutants. Nonattainment areas/states are required to formulate and submit SIPs to the EPA that outline the measures the state will implement to attain and maintain the NAAQS.
- **Serious Nonattainment Area:** All PM_{10} nonattainment areas were initially classified as moderate and were assigned an attainment date of December 31, 1994. A *moderate* nonattainment area can subsequently be reclassified as a *serious* nonattainment area if the EPA determines that the area

cannot "practicably" attain the PM_{10} NAAQS by the attainment date, or, following the passage of the original attainment date, if the EPA determines that the area has failed to attain the standard. The Maricopa County nonattainment area was reclassified as *serious* on May 10, 1996, because of a failure to attain the particulate standard by December 31, 1994.

- **Unclassifiable:** This is an area that lacks sufficient monitoring data. Unclassifiable areas are conservatively managed as though they are in attainment in order to maintain or improve existing air quality.
- **Maintenance Area:** This is an area that was previously classified as a nonattainment area and that has been demonstrated with recent data to have achieved attainment of the NAAQS.

A particular geographic region may be classified as an attainment area for some pollutants and as a nonattainment area for others. The Arizona Department of Environmental Quality (ADEQ) has designated all of Maricopa County as being either in attainment or unclassifiable with respect to the NAAQS for sulfur dioxide (SO_2) and nitrogen dioxide (NO_2). Progress in regional air quality improvement in recent years has allowed the county to be designated a maintenance area with respect to CO and 1-hour O_3 NAAQS. In contrast, most of Maricopa County is a serious nonattainment area for PM_{10}. Further, the ADEQ and EPA have designated nearly all of Maricopa County to be in nonattainment for the more recent NAAQS for 8-hour average O_3 and for both short- and long-term NAAQS for $PM_{2.5}$ (Figure 3-3).

In July 1997, the EPA tightened standards for PM_{10}, added standards for $PM_{2.5}$, and revised the method for determining an exceedance (*Federal Register* 62:38421). In January 2006, the EPA again proposed revising the NAAQS for PM (*Federal Register* 71:2620). The revisions included reducing the 24-hour standard for $PM_{2.5}$ from 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$ and eliminating the annual standard for PM_{10}. The NAAQS for particulates and the other five criteria pollutants are presented in Table 3-3.

Table 3-3. National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard $\mu g/m^3$ (ppm)*	Secondary Standard $\mu g/m^3$ (ppm)
CO	1-hour	40 (35)	N/A
	8-hour	10 (9)	N/A
NO_2	Annual	100 (0.05)	100 (0.05)
O_3	1-hour†	(0.12)	(0.12)
	8-hour	(0.075)	(0.075)
PM_{10}	24-hour	150	150
	Annual‡	50	50
$PM_{2.5}$	24-hour	65	65
	Annual	15	15
SO_2	3-hour	N/A	1,300 (0.5)
	24-hour	365 (0.14)	N/A
	Annual	80 (0.03)	N/A
Lead	Calendar quarter	1.5	1.5

Source: 40 CFR 50

* ppm = parts per million

† 1-hour standard revoked on June 15, 2005, in Arizona

‡ Annual standard eliminated in January 2006

3.2.5 Particulate Matter

PM is a collective term used to describe very small solid or liquid particles that vary considerably in size, geometry, chemical composition, and physical properties. Particulates contribute to visibility reduction, pose a threat to public health, and cause economic damage through soil disturbance. Health effects of particulates are determined by their size, shape, and chemical composition. Particles larger than 10 microns are deposited in the upper respiratory tract, particles from 2.5 to 10 microns (PM_{10}) are inhaled and deposited in the upper parts of the respiratory system, and particles smaller than 2.5 microns ($PM_{2.5}$) are deposited in the pulmonary tissues during exhalation.

Particles in the size range of 0.1 to 2.5 microns are most efficiently deposited in the alveoli, where their effective toxicity is greater than larger particles because of the higher relative content of toxic heavy metals, sulfates, and nitrates. Human health studies have shown causal relationships between particulates and excess mortality, aggravation of bronchitis, and small reversible changes in pulmonary function in children. Acidic aerosols have been linked to the inability of the upper respiratory tract and pulmonary system to remove harmful particles.

PM is produced by natural processes (wind erosion and pollen) and human activity. Coarse particulate emissions are mostly geological and are the result of three activities: the steady grinding (re-entraining) of dust from paved roads, driving on unpaved roads, and earth moving associated with construction. Soil dust from these sources and others contributes more than 70% of the coarse particulates in Phoenix. In other urban and rural areas, this mixture of sources will vary. Agricultural and mining areas, for example, will be more heavily influenced by emissions from these activities. On days with winds in excess of 15 mph, wind erosion of soil primarily contributes to emission levels.

Fine particulate ($PM_{2.5}$) emissions have a more diverse chemical composition and are produced by a larger number of sources in comparison to coarse particles. ADEQ receptor modeling in central Phoenix indicates gasoline and diesel engine exhaust account for more than two-thirds of the $PM_{2.5}$ emissions. Soil dust contributes another 10.5%. $PM_{2.5}$ concentrations are typically higher in the central portions of urban areas and diminish to background concentrations on the urban fringe. PM_{10} concentrations depend on the location of activities that generate them and have a greater spatial variation than $PM_{2.5}$; however, background concentrations tend to be about 40% of urban concentrations. Concentration of particulates in both size ranges are higher in the late fall and winter, when atmospheric dispersion is seasonally low. On a daily basis, particulate concentrations typically peak during hours of worst dispersion, which is from sunset to midmorning.

The Phoenix PM_{10} nonattainment area is an approximately 48 × 60–mile rectangular section of eastern Maricopa County plus a 6 × 6–mile section of Pinal County that includes the city of Apache Junction. The portion of Pinal County included in the non-attainment is Western Pinal County at the county line separating Pinal and Maricopa Counties (see Figure 3-3). The north end of each of the proposed SVPP alignment alternatives lies within the boundaries of the nonattainment area (see Figure 3-3). PM_{10} exceedances within the designated area occur primarily during stagnant, wintertime, morning conditions. The nonattainment area was initially classified as “moderate,” effective November 15, 1990. In 1996, the EPA issued a Final Rule that reclassified the nonattainment area for PM_{10} from “moderate” to “serious;” the effective date of this reclassification was June 10, 1996 (*Federal Register* 61:21372).

On April 13, 2000, the EPA proposed to approve provisions of the Revised MAG 1999 Serious Area Particulate Plan for the Maricopa PM_{10} non-attainment area and grant Arizona’s request to extend the CAA deadline for attaining the annual PM_{10} standard in the Phoenix area from 2001 to December 31, 2006 (*Federal Register* 72:65752). The EPA published a Final Rule on July 25, 2002, approving the Revised MAG 1999 Serious Area Particulate Plan for PM_{10}, including the request to extend the

attainment date. On June 6, 2007, EPA published in the *Federal Register* (72:31183) a Finding of Failure to Attain the PM_{10} standard by this deadline for Maricopa County. As a requirement of the Finding, MAG (2007c) submitted the *MAG 2007 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2007b) in December 2007. The report is a SIP revision to provide for attainment and 5% annual reductions in PM_{10} or PM_{10} precursor emissions until attainment is achieved, as required by CAA Section 189(d). The EPA published a notice of partial approval and partial disapproval of the MAG 2007 Plan on September 9, 2010. As a result, ADEQ voluntarily withdrew the MAG 2007 Plan on January 25, 2011. A new SIP revision, titled *MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2012) was submitted in May of 2012 to address the deficits identified by the EPA in the former plan. Although the SIP (which includes the non-attainment portions of Pinal County) has not been approved, its final requirements may be impacted by the SVPP and it is therefore included in the analysis.

Control measures such as Rules 310 and 310.01 of the MCAQR mainly target construction and maintenance operations known to generate particulates, although primary (freeway and major arterial) and secondary (collector) paved roads are included in the measures. On August 21, 2007, the EPA published in the *Federal Register* (72:43537) a Final Rule effective September 20, 2007, approving 77 Maricopa County rules and measures as best available control measures and most stringent measures. Efforts to reduce dust re-suspended from paved roads have concentrated on eliminating trackout from construction sites, curbing and stabilizing road shoulders, and investigating more efficient street sweepers. Secondary fine particulates have been reduced by vehicular emission controls, which have reduced their precursor gases, and by diesel engine replacement and retirement programs.

3.2.6 Carbon Monoxide

CO is produced in the incomplete combustion of fuels and vehicular emissions are a major source. About half of the CO emissions in Arizona's metropolitan areas come from on-road motor vehicles. A little less than half of the CO emissions come from off-road vehicles, construction equipment, and lawn and garden equipment. The remaining CO emissions come from point and area sources.

CO has low background levels, with the highest concentrations occurring next to busy streets, and elevated neighborhood concentrations in locations with significant amounts of emissions transported from upwind areas. CO concentrations peak from November to January because emissions are highest in cold weather, vehicle emissions vary inversely with temperature, and the surface layer of the atmosphere is most stable in wintertime. Hourly concentrations tend to be at their maximum during the morning rush hour and between 6 p.m. and midnight.

The analysis area lies within the current boundaries of the Phoenix CO Maintenance Area (see Figure 3-3). The Phoenix area was initially classified as a "moderate" nonattainment area, effective November 15, 1990. On September 22, 2003, the EPA found that the Phoenix metropolitan nonattainment area had attained the NAAQS for CO by the December 31, 2000, deadline; the Phoenix area had not had an exceedance of the standards since 1996. On March 9, 2005, the EPA approved the MAG Serious Area CO SIP and the MAG CO Redesignation Request and Maintenance Plan for the nonattainment area.

Controls have reduced CO emissions, and the standards have been achieved in metropolitan Phoenix over the past 15 years, in direct contrast to the first half of the 1980s, when more than 100 exceedances were recorded each year. Equipping vehicles with catalytic converters and electronic ignition systems has been the most effective control, and significant reductions can be attributed to the vehicle emissions inspection program (beginning in 1976) and oxygenated fuels (beginning in 1989).

3.2.7 Ozone

O_3 is a colorless, slightly odorous gas that increases respiratory rates, pulmonary resistance, and affects lung mechanics. In the stratosphere, O_3 blocks harmful ultraviolet radiation. In the urban atmosphere, its formation leads to concentrations harmful to people, animals, plants, and materials. O_3 is formed from the photochemical reaction (under sunlight) of volatile organic compounds (VOCs) and NO_x. Anthropogenic sources of O_3 precursors include vehicle emissions, motorized equipment, power plants, and service stations.

In 1979, the EPA lowered the level of the O_3 compliance standard from 0.12 to 0.08 parts per million (ppm). In July 1997, the method for the determining an exceedance was also revised by replacing the 1-hour standard with an 8-hour standard of 0.08 ppm. This standard was further revised in March 2008 with an 8-hour standard of 0.075 ppm.

The Phoenix metropolitan area was previously designated as non-attainment for the 1-hour standard and classified as "moderate" (*Federal Register* November 6, 1991). On May 19, 2000, the EPA proposed to determine that the Phoenix metropolitan serious O_3 nonattainment area has attained the 1-hour standard deadline required by the CAA (*Federal Register* May 19, 2000). The 1-hour O_3 standard was officially declared attained on May 16, 2001 (ADEQ 2004). On March 21, 2005, the EPA proposed to approve Arizona's request to redesignate the Phoenix metropolitan 1-hour O_3 non-attainment area to attainment.

On April 15, 2004, the EPA designated the greater Phoenix area, a large portion of Maricopa County, and a smaller portion of Pinal County as non-attainment for 8-hour O_3. At the same time the nonattainment area was classified as "marginal;" classification types are based on the ambient levels. Submittal to the EPA of a SIP to attain the 8-hour standard and demonstrate attainment by June 15, 2009, was required by June 15, 2007. MAG developed a plan for the designated area and submitted it to ADEQ on June 12, 2007. ADEQ submitted it to EPA on June 14, 2007, with the understanding that it would have to be supplemented after EPA responds to a court remand of its Phase I Implementation Rule (*South Coast Air Quality Management District, et al. v. U.S. EPA*, No. 04-1200, issued December 22, 2006).

On April 30, 2012, the EPA issued a final rule revoking the 1997 O_3 standard and implementing the proposed 2008 8-hour standard for O_3 of 0.075 ppm. The Phoenix-Mesa area continued the 2004 classification designation of marginal non-attainment. A SIP Plan revision, tentatively titled *Eight-Hour Ozone Plan for the Maricopa Nonattainment Area (2008 Standard)*, is pending from the MAG.

Controls to reduce the precursors of O_3 have been successfully implemented for years. NO_x and VOCs from vehicular exhaust have been reduced through engine modifications and three-way catalytic converters. Evaporative hydrocarbons (HCs) from vehicles have been reduced through better engineered fuel tanks and auxiliary plumbing combined with carbon absorption canisters. Additional reductions of vehicular VOCs have come through the ADEQ vehicle emissions inspection program, which tests all gasoline fueled vehicles for HCs in Phoenix and Tucson, through vapor capturing equipment for gasoline tankers, vapor recovery systems at retail gas stations (Phoenix area only), and cleaner burning gasoline (Phoenix area only).

3.2.8 Other Criteria Pollutants

NO_2 is a gas with a yellowish orange to reddish brown appearance that impairs respiratory system functioning, reduces visibility, and contributes to the photochemical formation of O_3 in the environment. In the Phoenix area, vehicular emissions are the dominant source of this pollutant, with major contributions from power plants (ADEQ 2008a). SO_2 is a colorless gas with a strong, irritating odor at high concentrations that affects the mechanical function of the upper airway, especially the nasal

passages. In Arizona, the principal source of SO_2 is smelting of sulfide copper ore (ADEQ 2008a). Other sources are the combustion of sulfur-containing fuels by vehicles and power plants. Lead and its compounds damage the cardiovascular, renal, and nervous systems. Sources of lead include lead-based paint, water from lead pipes, household dust and soil that come in contact with lead, and vehicular emissions associated with the use of leaded gasoline. The Phoenix metropolitan area is in attainment for these remaining criteria pollutants.

3.2.9 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates hazardous air pollutants. A hazardous air pollutant, also known as an "air toxic," is a pollutant that is reported to have the potential to adversely affect human health. Air toxics are primarily in gaseous form, but some occur in the atmosphere as particles or liquid droplets. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the CAA.

The EPA has assessed this expansive list of toxics and selected a group of 21 toxics that it considers MSATs. In 2002, the agency extracted a subset of this list of 21 that were considered to have the greatest impact to human health and developed what the EPA now labels the six priority MSATs: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Others are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA and the Federal Highway Administration (FHWA) are funding ongoing research into the contribution of MSATs to ambient levels and the development of analytical methods to forecast future emissions. The EPA is the lead federal agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (*Federal Register* 66:17229) on March 29, 2001, pursuant to Section 202 of the CAA.

In its rule, the EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline program, its national low emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA predicts that even with a 64% increase in vehicle miles traveled, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57% to 65% and will reduce on-highway diesel PM emissions by 87%, as shown in Figure 3-4.

The EPA issued a final rule on February 26, 2007, to control the emission of hazardous air pollutants from mobile sources (*Federal Register* 72:8428). Controls on gasoline, passenger vehicles, and portable fuel containers (primarily gas cans) are being adopted that will significantly reduce mobile source emissions of benzene and other hazardous air pollutants. The benzene content of gasoline will be limited to an annual refinery average of 0.62% by volume (currently 1.0% by volume), beginning in 2011. In addition, for gasoline, the final rule establishes a maximum average standard for refineries of 1.3% by volume beginning on July 1, 2012, which acts as an upper limit on gasoline benzene content when credits are used to meet the 0.62% by volume standard.

The rule also limits exhaust emissions of non-methane hydrocarbon, which include many MSATs, such as benzene, from new passenger vehicles when they are operated at temperatures colder than 75°F. This standard will be phased in from 2010 to 2015. For passenger vehicles, the EPA is adopting evaporative emissions standards that are equivalent to those currently in effect in California.

Finally, EPA is adopting an HC emissions standard for portable fuel containers beginning in 2009 that will reduce evaporation and spillage of gasoline from these containers. These controls will significantly reduce emissions of five of the six priority MSATs (excluding diesel PM), as well as naphthalene.

As a result of the new fuel benzene standards and HC standards for vehicles and portable fuel containers, the EPA expects a reduction in total emissions of air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. In 2030, it is anticipated that passenger vehicles will emit 45% less benzene, gas cans will emit almost 80% less benzene, and gasoline will have 38% less benzene overall. Mobile sources were responsible for more than 70% of benzene emissions in 1999. The reductions in MSATs emissions will reduce exposure and predicted risk of cancer and non-cancer health effects, including environments where exposure and risk may be highest, such as near roads, in vehicles, and in homes with attached garages.

In addition, the HC reductions from the vehicle and gas can standards will reduce VOC emissions (which are precursors to O_3 and $PM_{2.5}$) by more than 1.1 million tons in 2030. The vehicle standards will reduce direct $PM_{2.5}$ emissions by more than 19,000 tons in 2030 and will also reduce secondary formation of $PM_{2.5}$. Once the regulation is fully implemented, the EPA estimates that these PM reductions will prevent nearly 900 premature deaths annually.

3.2.10 Ambient Criteria Pollutant Levels in the Analysis Area

The MCAQD and the ADEQ maintain a network of air quality monitoring sites throughout Maricopa County; the majority of these sites are located in Phoenix and the surrounding communities. Monitoring sites are not necessarily identical; some may only monitor one or two of the criteria pollutants.

CO is monitored continuously with nondispersive infrared instruments that are deployed in urban neighborhoods and near busy roadways or intersections. In 2008, 14 monitors were in operation in greater Phoenix. Ultraviolet absorption instruments monitor O_3 continuously in urban neighborhoods for population exposure, areas downwind of urban areas for maximum concentration, and remote areas for background concentrations. In 2008, 42 reporting O_3 monitors were in operation throughout the state.

The most recent NAAQS monitoring data are reported in the *2009 Air Quality Annual Report* (ADEQ 2009a). Ambient concentrations of four criteria pollutants (CO, NO_2, O_3, and PM_{10}) are monitored at one location that is relatively close to the analysis area. MCAQD Buckeye Site (#21525) is located east of Maricopa County Road (MC) 85 and south of Monroe Avenue in Buckeye, Arizona. A summary of the most recent monitoring data collected at this site for CO, O_3, and PM_{10} is presented in Table 3-4; CO and O_3 are measured in ppm, whereas PM_{10} is measured in $\mu g/m^3$. This is a different station but in the same general location as the National Climatic Data Center weather station, although the MCAQD site does also record weather data. Because the Phoenix metropolitan area and the analysis area are in attainment for NO_2, the monitoring data for this criteria pollutant are not presented in Table 3-4.

As shown in the table, there were no exceedances of the NAAQS for CO or O_3 at the MCAQD monitoring site (see Figure 3-3). Compliance with the CO 1-hour and 8-hour standards is demonstrated because the highest of the second-highest monitored value in a given year for the most recent 2-year period (2006–2007) does not exceed the primary and secondary standards. The 1-hour and 8-hour CO compliance values from this monitor of 1.6 and 0.8 ppm, respectively, are well below the 1-hour and 8-hour CO NAAQS of 35 and 9 ppm, respectively.

Compliance with the O_3 standard is demonstrated because the 3-year average (2006–2008) of the annual fourth-highest monitored daily maximum 8-hour average concentration is less than the primary and secondary standards. The annual fourth-highest 8-hour O_3 value was 0.067 ppm in 2006, 0.064 ppm in 2007, and 0.068 ppm in 2008. The 3-year average of these annual fourth-highest 8-hour O_3 values of 0.066 is well below the 0.075 ppm 8-hour standard at this location.

Table 3-4. Carbon Monoxide, Particulate, and Ozone Monitoring Data (2006–2008)

Location*	Pollutants	Averaging Time	Average Concentration (ppm or µg/m^3)	Compliance Value	Number of Exceedances (for site)
Buckeye (26449 West 100th Drive)	CO	1 hour	1.6†	1.6†	0
		8 hours	0.8†	0.8†	0
	PM_{10}	24 hours	(230)‡	3§	9 (3)¶
		Annual	(50)**	50**	0
	O_3	8 hours	0.066††	0.066††	0

Note: Bold values indicate exceedance of the NAAQS for the listed criteria pollutant.

* Operated by MCAQD.

† Value represents the highest of the second-highest monitored value over the most recent 2-year period (2007–2008).

‡ Value represents the 3-year average of the highest yearly value over the most recent period (2006–2008).

§ Compliance value listed represents the 3-year average (2006–2008) expected rate of exceedances.

¶ Estimated number of exceedances of the NAAQS for this criteria pollutant for all three monitoring years (2006–2008), with the average estimated number of exceedances per year in parentheses.

** Value represents the 3-year average over the most recent period (2006–2008); as the annual NAAQS was eliminated in 2006, the compliance value is being compared with the historical standard.

†† Value represents the 3-year average of the annual fourth-highest monitored value over the most recent period (2006–2008).

PM_{10} data at the Buckeye station were collected using the tapered element oscillating microbalance instrument method. To demonstrate compliance with the PM_{10} 24-hour standard, the maximum 24-hour monitored average must not exceed the primary and secondary standards of 150 µg/m^3 more than once per year averaged over any 3 consecutive years. The monitored maximum 24-hour average ambient PM_{10} concentration at this station was 272 µg/m^3 in 2006, 195 µg/m^3 in 2007, and 223 µg/m^3 in 2008. These exceedances represent expected annual exceedances of 3.0 in 2006, 2.0 in 2007, and 4.0 in 2008, for an average of 3.0 expected exceedances per year for the 2006 to 2008 period. Therefore, this station has recorded more than an average of one expected exceedance per year averaged over any consecutive 3-year period and is in violation of the 24-hour standard.

The annual NAAQS for PM_{10} was eliminated in 2006; therefore, the monitoring data from the Buckeye station are compared against the historical primary and secondary annual PM_{10} standard of 50 µg/m^3, averaged over any consecutive 3-year period. The monitored average annual ambient PM_{10} concentration at this station was 53.0 µg/m^3 in 2006, 52.5 µg/m^3 in 2007, and 43.2 µg/m^3 in 2008, for a 3-year average value of 50 µg/m^3. Based on this 3-year average PM_{10} compliance value, this station is in compliance with the historical annual primary and secondary PM_{10} standard.

3.3 CULTURAL AND HERITAGE RESOURCES

Cultural resources are defined as specific locations of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. The term includes archaeological, historic, and architectural sites and structures, as well as places with traditional cultural or religious importance within a social or cultural group.

3.3.1 Applicable Laws, Regulations, and Policies

The proposed project is subject to a number of laws, regulations, and/or policies implemented by the federal government. As discussed in Chapter 1, decisions on the use and management of BLM lands is guided by FLPMA (43 USC 1701–1784), which requires that "public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values." Therefore, protection of cultural resources on public lands, which includes BLM land, is to be considered by the BLM for most proposed projects. Several acts and policies specific to cultural resources must also be taken into account for the proposed project. These include the following:

- American Antiquities Act of 1906, which protects archaeological sites and objects of antiquity on federal lands;
- Historic Sites Act of 1935, which created a national policy for the protection of "historic sites, buildings, and objects of national significance;"
- National Historic Preservation Act, as amended, which created policies for the preservation of historic properties throughout the nation, put in place the Section 106 review process (see below), and established the NRHP and the State Historic Preservation Officers;
- American Indian Religious Freedom Act of 1978, which, among other things, protects Native American access to sacred sites;
- Archaeological Resources Protection Act of 1979, which was designed to protect archaeological resources on federal and Indian lands;
- Native American Graves Protection and Repatriation Act of 1990, which "gives ownership and control" of Native American human remains and associated objects excavated on federal and Indian lands to Native Americans; and
- Executive Order 13007, Indian Sacred Sites, which was designed to protect, when practical, access to Native American sacred sites on federal land.

Most pertinent to the proposed project is Section 106 of the NHPA, which requires federal agencies to take into account the effects of their undertakings on historic properties, defined in 36 CFR 800.16(l) as any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP.

3.3.2 Analysis Area

The cultural and heritage resources analysis area for this project consists of the 250-foot ROW of each alternative.

3.3.3 Identification of Cultural Resources

Identification efforts included a records review of previously conducted cultural resources projects in and near the area of potential effects (APE) as described in the five alternatives, historical map research, pedestrian field survey of Alternatives A and C, and consultation with Native American tribes. Next, a cultural resources survey was conducted, and identified cultural properties were then evaluated using the criteria in 36 CFR 60.4 to assess whether they were eligible for listing in the NRHP.

The records review, map research, and in-field survey of Alternative A and C took place in 2008 and 2009 (Hedquist et al. 2009). The survey included conducting a record review to identify prior work and

previously recorded cultural resources in the area, followed by an in-field pedestrian survey of the ROW for each alternative. Six cultural sites were identified along the proposed Alternatives A and C corridors. Of these six cultural sites, three were found to have the characteristics required for listing in the NRHP. Two of the properties are located on private lands, and one is located on BLM lands: the Butterfield Overland Stage Route, the remnants of the Edison R. Lung Homestead, and a small prehistoric Hohokam food processing and procurement site. Two of the properties are located along Alternatives A and C. All three properties are located along Alternative A.

Alternative H and Sub-alternatives F and G have not been surveyed for cultural resources; however, it is known that the Butterfield Overland Stage Route crosses all the alternatives and sub-alternatives. For the purposes of the Draft EIS, it is assumed that no NRHP-eligible resources besides the Butterfield Overland Stage Route are located along those routes.

The Butterfield Overland Stage Route has been assigned Arizona State Museum (ASM) site number AZ T:15:32(ASM), and the SHPO has previously determined it eligible for listing in the NRHP. Within the APE, the route consists of a dirt road that shows minimal evidence of modern use. The Butterfield Overland Stage Route, as a route of communication, settlement, and transportation from St. Louis to San Francisco, is associated with the rapid settlement of California, Arizona, and other points in the West before and after the Civil War (Stein 1994). The Butterfield Overland Stage Route is currently undergoing a feasibility study by the National Park Service for consideration as a National Historic Trail.

Within the analysis area, the Butterfield Overland Stage Route follows the Mormon Battalion Route. The Mormon Battalion Trail was created when about 500 Mormons joined Kearny's Army of the West to help wrest the southwestern United States from Mexico. After taking Santa Fe, Kearny's Army was divided up into smaller task forces with different objectives and routes. The Mormons were assigned to Lieutenant Colonel St. George Cooke to march west to California behind Kearny. Cooke's Mormon Battalion was tasked with constructing a wagon road along the trail to California and making it passable for wheeled vehicles. Therefore, the route is also significant for its association with early American military roads in Arizona that secured a route to California. It may also be significant because of its potential to provide important information about early transportation, communication, and settlement along the route.

The Lung homestead has been assigned site number AZ T:15:11(ASM). This property has the potential to provide important information about the early settlement of Mobile and homesteading in the Little Rainbow Valley.

AZ T:15:94(ASM) is a small prehistoric artifact scatter of ceramics, flaked stone, and ground stone. This site may contain information on prehistoric use and subsistence in the Rainbow Valley.

In addition to the Butterfield Overland Stage Route and the remains of the Lung homestead, the Juan Bautista de Anza NHT also crosses the analysis area. This is a historic corridor that commemorates Anza's 1775–1776 expedition to lead settlers to the San Francisco area through what is now Arizona and California. Congress designated the trail as a National Historic Trail in 1990, as part of the National Trails System. The designated trail corridor crosses all of the project corridors just south of the Butterfield Overland Stage Route.

The purpose of the Anza's expedition was to establish a trail from Sonora to the San Francisco area so that the Spanish could successfully settle Alta California (Gough 2012). The 1775–1776 expedition was actually Anza's second expedition to cross the desert into California. His first expedition left Tubac, Arizona, for Monterey, California, in early 1774 and reached San Gabriel, California, in March (Gough 2012). Not long after his return from California, Anza was commissioned to travel once again to California, this time to establish a mission with settlers in the San Francisco area. Families were recruited

from towns in what is now Mexico. Anza and the settlers then traveled to Tubac to meet up with the two friars that would be establishing the mission. Two hundred forty people, including 153 women and children, set out from Tubac in October 1775. The members of the expedition encountered many hardships such as extreme cold weather, lack of water, treacherous terrain, and disease; however, they reached Monterey in March 1776 (Gough 2012). Anza returned to Mexico City not long after that; the settlers continued their journey to San Francisco, arriving in June. The Anza Trail was used by colonists journeying to California for several years and was crucial to the establishment of the Spanish in Alta California.

The National Park Service is the agency responsible for managing the trail in cooperation with local land managers and agencies. The BLM manages the portions of the trail that lie within its jurisdiction. The *Juan Bautista de Anza National Historic Trail Comprehensive Management and Use Plan* is the current guiding and managing document for the trail, which states the following vision:

> A traveler will be able to hike, ride horseback, bicycle, and drive on a marked route from Nogales to San Francisco and the loop in the eastern portion of San Francisco Bay. Along the way, the visitor can experience landscapes similar to those the expedition saw; learn the stories of the expedition, its members, and descendants; better understand the American Indian role in the expedition and the diversity of their cultures; and appreciate the extent of the accomplishments of Juan Bautista de Anza and his colonizers. (National Park Service 2006:7)

Discussion of the Juan Bautista de Anza NHT Key Observation Point can be found in Visual Resources (Section 3.7). The Juan Bautista de Anza NHT is also discussed in Special Designations (Section 3.15).

3.3.4 Native American Religious Concerns

The Little Rainbow Valley is within the cultural landscape of several Native American tribes. The Akimel O'odham have two reservations only a few miles to the east of the valley and consider this area part of their traditional territory. Several other tribal groups, including the Hopi, Pee Posh, and Tohono O'odham, have ancestral claims to the area.

Tribal consultation with the above-listed tribes is currently underway. Letters initiating consultation were sent in July 2008 to the Tohono O'odham Nation, Gila River Indian Community, Ak-Chin Indian Community, Salt River Pima-Maricopa Indian Community, and Hopi Tribe. The Hopi replied on July 28, 2008, requesting to review the cultural resources report and the treatment plan for mitigation of adverse effects if needed. In April 2012, a second set of letters was sent to update the tribes on the new alternatives. The Hopi replied in May 2012, requesting to review the cultural resources report for the new alternatives and the treatment plan for mitigation of adverse effects if needed. In March 2013, a third set of letters was sent that asked the tribes to consult regarding the cultural resources survey report and requested a response regarding any issues they might have in and around the analysis area that may be affected by the proposed undertaking.[3]

The BLM is in consultation with Native American Tribes on issues relating to Tribal concerns including traditional cultural properties (TCPs) and values. The BLM, as a governmental agency,

[3] Draft EIS NOTE: There is no formal response regarding traditional cultural properties (TCPs) or other landscape issues yet. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices.Information on TCPs will need to be updated once consultation is conducted.

will maintain special government-to-government relationships with federally recognized Indian Tribes. Potential TCPs identified by this Project will be assessed by the BLM Field Office (FO) in consultation with the Tribes. Tribal consultation may result in the identification of possible issues relating to Native American traditional cultural or sacred geographies, including TCPs. In this case, further analysis would need to be conducted to assess the impacts of each alternative to these geographies. As of March 2013, consultation has not resulted in the identification of any Native American traditional cultural or sacred geographies. Consultations with traditional communities/groups undertaken by ADOT for other nearby roadway projects have identified types of properties that are generally considered Native American–sensitive sites that could be TCPs. These sensitive sites hold high importance, including but not limited to song culture and traditional observance of travel.

3.4 PALEONTOLOGICAL RESOURCES

Paleontological resources consist of "vertebrate and invertebrate animal fossils, plant fossils, and trace fossils" or indications of animal presence such as footprints (BLM 2012a). Fossils have been found throughout Arizona, primarily in northern and southeastern Arizona. Because of the relative rarity of fossils in central Arizona, the BLM considers fossil discoveries in central Arizona as significant (BLM 2012a).

3.4.1 Applicable Laws, Regulations, and Policies

Laws, regulations, and policies other than NEPA and FLPMA that involve paleontological resources include the following:

- Antiquities Act of 1906 (16 USC 431–433) regulates "objects of antiquity," which includes fossils.
- Archaeological and Paleontological Salvage (USC 305) states that funds from federal highway projects can be used to salvage paleontological resources.
- EO 11593, Protection and Enhancement of the Cultural Environment (36 CFR 8921), states that a permit is needed to remove paleontological resources from lands under federal jurisdiction.

3.4.2 Analysis Area

The paleontological resources analysis area for this project consists of the 250-foot ROW of each alternative.

3.4.3 Potential for Paleontological Resources

The BLM uses the Potential Fossil Yield Classification (PFYC) system to determine the potential for the presence of fossils within certain geological formations. The PFYC was initially developed to provide guidance in predicting and assessing paleontological resources by the U.S. Forest Service (Forest Service) and was adopted by the BLM in 2007 (BLM 2007). The PFYC system classifies geological units "based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. The classification is applied to the geological formation, member, or other distinguishable unit, preferably at the most detailed mappable level" (BLM 2007). Table 3-5 defines each PFYC class.

Table 3-5. Potential Fossil Yield Classification Classes

Classification	Description	Management Concern
Class 1 – Very Low	Geological units that are not likely to contain fossils such as igneous, metamorphic, or Precambrian-age rocks.	Negligible or not applicable
Class 2 – Low	Sedimentary geological units that are not likely to contain vertebrate or significant invertebrate or plant fossils such as those younger than 10,000 years, recent eolian deposits, and those that have undergone physical or chemical changes.	Generally low
Class 3 – Moderate or unknown	Sedimentary units with variable fossil content and significance or units with unknown potential.	Moderate or cannot be determined
Class 4 – High	Geological units with known fossils but with variable occurrence and predictability. The units may be at risk from human disturbance.	Moderate to high
Class 5 – Very high	Geological units that consistently and predictably produce fossils of significant scientific value and are at risk of human disturbance.	High to very high

Source: BLM (2007).

Alternatives A, C, and H and Sub-alternatives F and G are located within Rainbow Valley, which is an alluvial sub-basin of the Salt River valley. Two geological units are found within the analysis area: undivided Quaternary alluvium (Q) and Holocene surficial deposits (Qy) (Figure 3-5). Both units are likely the result of erosion of the primarily Early Proterozoic granitic (Xg), metasedimentary (Xms), and metamorphic rock (Xm) of the surrounding mountains. The undivided Quaternary alluvium is middle to late Pleistocene in age (250,000 years before present [B.P.] to 10,000 years B.P.); the Holocene surficial deposits date to after 10,000 years B.P. The deposits themselves are primarily sandy to gravelly loam (see Section 3.5, Soil Resources, for further description).

Both the undivided Quaternary alluvium, which makes up the majority of the deposits in the analysis area, and the Holocene surficial deposits are assigned a PFYC classification level of 2 (Table 3-6). The alluvial materials that form both the undivided Quaternary alluvium and Holocene surficial deposits are regarded as having a low potential for fossil materials since they are continually subjected to erosion and movement from wind and water.

Table 3-6. Geological Units in the Analysis Area and their PFYC and Paleontological Potential Rating

Geological Unit	Age	PFYC	Paleontological Potential Rating
Younger alluvium (Qy)	Holocene	2	Low
Undivided alluvium (Q)	Pleistocene	2	Low

3.5 SOIL RESOURCES

Following is an overview of the physical features of the analysis area's topography and its underlying soils and geology. The scope of the analysis for topography, geology, and soils includes a review of available data relevant to the scope of the project within the analysis area.

3.5.1 Applicable Laws, Regulations, and Policies

Most policies relating to geology and soils are written for the mining, oil, and gas industries. In addition to the laws that provide general authorization and parameters, a number of laws authorize specific

program activities or activities in specific or designated areas. Geology and soil resources on BLM-administered land are currently managed under the Lower Sonoran RMP.

The FLPMA outlines functions of the BLM Directorate, provides for administration of public lands through the BLM, provides for management of the public lands on a multiple-use basis, and requires land use planning, including public involvement and a continuing inventory of resources. It is mandated by Section 302(b) of FLPMA (43 USC 1732[b] and 603[c]; 43 CFR 3802 and 3809) that all operations of any nature that disturb the surface of the mining claim or site require authorization.

NEPA requires the preparation of EISs for federal projects that may have a significant effect on the environment, which includes soils and geological resources.

The Soil and Water Resources Conservation Act of 1977 (16 USC 2001) provides for conservation, protection, and enhancement of soil, water, and related resources.

Soil erosion in Arizona is addressed by the NPDES program, a permitting system for the discharge of any pollutant (except for dredged or fill material) into WUS. This program is administered by the ADEQ under the Arizona Pollutant Discharge Elimination System (AZPDES) program. The ADEQ issues permits on behalf of the EPA for activities in Arizona, except on Indian lands, that could cause impacts to surface water and groundwater sources, including construction activities. As part of the AZPDES program, projects that would disturb more than 1 acre of land are required to obtain coverage under Construction General Permit (CGP) No. AZG2008-001. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation. The AZPDES program is discussed in Section 3.8, Water Resources.

3.5.2 Analysis Area

The soil resources analysis area for this project includes the alternative alignments' 250-foot ROWs for soils and the entire Rainbow Valley for geology.

3.5.3 Topography

The project lies entirely within the Rainbow Valley sub-basin, a large, valley-wide creosote flat. The project area slopes gently toward the north and northeast. The project area is nearly flat, with an approximate elevation variation of only 230 feet along the length of the project. Elevations range from approximately 1,100 to 1,330 feet above mean sea level (amsl). Numerous unnamed desert washes cross the project corridor from the southwest to northeast, flowing toward Waterman Wash, which then flows along Rainbow Valley toward the northwest, roughly parallel with the project. The project area is included in the area covered by the Mobile and Mobile Northeast, Arizona, 7.5-minute U.S. Geological Survey (USGS) topographic maps dated 1964 through 1983.

3.5.4 Geological Setting

The project is located in the valley between the Maricopa Mountains to the southwest and the Sierra Estrella Mountains to the northeast. In a larger context, the project is located in the western portion of the Salt River valley, which is a broad, northeast-southwest-trending alluvial basin characterized by varying degrees of subsurface consolidation (Hammett and Herther 1995). Depth to bedrock in the western Salt River valley ranges from less than 10 feet near the margins to more than 10,000 feet southeast of Gilbert (Arizona Department of Water Resources [ADWR] 1994). The predominant surface geology is late Cenozoic (quaternary) alluvial deposits.

The Salt River valley is bounded by steep mountain ranges composed of igneous, metamorphic, and sedimentary rocks of Precambrian (more than 600 million years old) to Tertiary (63 million to 2 million years old) age (Arizona Bureau of Mines 1960). The basin is filled primarily with unconsolidated to indurated Tertiary and Quaternary (1.5 million years ago to the present day) sedimentary deposits, with lesser amounts of intercalated evaporites and volcanic rocks.

No quaternary faults or folds are mapped in the vicinity of the project, and the project is mapped in an area of very low seismic hazard (USGS 2008). The project is located in an area in which the probability of an earthquake of magnitude 5.0 or greater within 100 years and 50 km is between 10% and 20% (USGS 2008, 2012). Appendix E, Geologic Maps, provides a seismic hazards map, a map of quaternary faults and folds, and an earthquake probability map.

In addition to earthquakes, subsidence and ground fissures also pose geological hazards that should be taken into consideration. Subsidence is the settling of the earth's surface. This effect can be caused by a variety of factors, including groundwater withdrawal, mineral extraction, and faulting. Land subsidence has been occurring across Arizona since the 1950s. Most of the time, there is no clear, identifiable sign that land subsidence has occurred in an area. Some areas in Maricopa and Pinal Counties have subsided more than 18 feet since 1950. Land subsidence in the basins of Arizona is generally the result of compaction of the alluvium, which is caused by lowering of the water table. As the water table declines, pores in the alluvium once held open by water pressure are no longer supported and collapse. Collapse and subsequent lowering in elevation of the land surface result in land subsidence that is generally not recoverable. If this subsidence occurs over areas of bedrock, differential subsidence can occur (ADWR 2012a; Arizona Geological Survey [AGS] 2012a).

Differential subsidence occurs when adjacent areas subside at different rates. Bedrock will not compress like the surrounding alluvium, which creates a subsurface platform. Differential subsidence occurs where shallow bedrock and deep bedrock are adjacent to each other, which creates a zone of differential change in surface elevation. Because of these differing amounts of subsidence, tension can build in the alluvium layer at this differential subsidence zone, which causes an earth fissure to form (AGS 2012b).

Mapping provided by the AGS Earth Fissure Mapping Program was reviewed to determine whether fissures have been reported or confirmed in the vicinity of the project. This mapping program also includes reported but unconfirmed fissures. Although the project is not located within one of the AGS (2012b) analysis areas, a review of the mapping indicates that ground fissures have not been reported or confirmed in the vicinity of the project. Appendix E, Geologic Maps, provides a fissure map generated by AGS (2012b).

Landslides are not expected to be a factor for this project. There are no steep slopes on or adjacent to the project, and there is an approximate elevation variation of only 230 feet along the length of the corridor.

3.5.5 Geological Hazards

Geological hazards generally include natural occurrences such as earthquakes, landslides, ground subsidence, and fissures. These geological factors need to be taken into consideration with regard to development in the area, in particular with respect to engineered structures.

Land subsidence is the lowering of the land surface resulting from changes that take place underground. The common causes of land subsidence from human activity are pumping water, oil, and gas from underground reservoirs; dissolution of limestone aquifers, causing sinkholes; collapse of underground mines; drainage of organic soils; and hydrocompaction caused by initial wetting of dry soils. Most subsidence occurs as a result of reduced hydrologic pressure from withdrawal of groundwater across the

area. Land subsidence events, depending on where they occur, can pose significant risks to health and safety or cause interruption of transportation and other services (ADWR 2012a). According to information from the ADWR's Geophysics and Surveying Unit, there is no measurable land subsidence occurring in the Rainbow Valley (Conway 2012). Figure 3-6 shows land subsidence in the analysis area.

Earth fissures are cracks, seams, or separations in the ground caused by tensional forces related to differential land subsidence that accompanies extensive groundwater pumping. Some common and potential hazards associated with earth fissures are cracked or collapsing roads, severed or deformed railroad tracks, broken pipes, damaged well casings or wellheads, broken canal liners, disrupted drainages, human injury, cracked foundation/separated walls, contaminated groundwater aquifer, and broken or disrupted utility lines (ADWR 2012a).

3.5.6 Soils

A review of soils data from the Natural Resources Conservation Service (NRCS) (2007) indicates that the project transects many low-slope, sandy to gravelly loam components. Existing NRCS soil surveys for the project area consist of the Gila Bend-Ajo Area (AZ653) and Maricopa County (AZ651). Soils in the project area are almost exclusively those formed in alluvial processes, including alluvial fans, fan terraces, stream terraces, basin and relict basin floors, and stratified stream and fan alluvium. This is consistent with the project's location within a broad valley. Some generalizations can be made about soils on the project area. Soils are dominated by very deep, well-drained soils. Deeper soils consist of gravelly sandy loams with depths to bedrock greater than 60 inches below the surface.

Table 3-7 provides a summary of the identified soil series transected by the project, and Figure 3-7 depicts the various soil associations overlaid on the SVPP analysis area.

Table 3-7. Soil Associations within the Sonoran Valley Parkway Project Analysis Area

Soil Series	Description	Notes
Agualt	Very deep, well-drained soils formed in stratified stream or fan alluvium.	N/A
Antho	Very deep, somewhat excessively drained soils formed in mixed and stratified alluvium. Antho soils are on alluvial fans and flood plains and have slopes of 0% to 5%.	N/A
Brios	Very deep, excessively drained soils that formed in mixed and stratified alluvium. Brios soils are on floodplains and alluvial fans and have slopes of 0% to 5%.	N/A
Carrizo	Very deep, excessively drained soils formed in mixed alluvium. Carrizo soils are on floodplains, alluvial fans, fan piedmonts, and basin floors. Slope ranges from 0% to 15%.	N/A
Coolidge	Very deep, well-drained soils formed in fan or stream alluvium. Coolidge soils are on fan terraces, stream terraces, or relict basin floors. Slopes are 0% to 5%.	N/A
Cuerda	Very deep, well-drained soils formed in stratified alluvium. Cuerda soils are on alluvial fans and floodplains and have slopes of about 1%.	N/A
Dateland	Very deep, well-drained soils formed in stream or fan alluvium and eolian deposits. Dateland soils are on stream terraces, fan terraces or relict basin floors. Slopes are 0% to 8%.	N/A
Denure	Very deep, somewhat excessively drained soils formed in fan or stream alluvium. Denure soils are on relict basin floors, stream terraces or fan terraces and have slopes of 0% to 8%.	N/A
Estrella	Very deep, well-drained soils that formed in stratified mixed alluvium. Estrella soils are on alluvial fans and have slopes of 0% to 5%.	N/A
Gilman	Very deep, well-drained soils that formed in stratified stream alluvium. Gilman soils are on floodplains and alluvial fans and have slopes of 0% to 3%.	N/A
Gunsight	Very deep, somewhat excessively drained, strongly calcareous soils that formed in alluvium from mixed sources. Gunsight soils are on fan terraces or stream terraces and have slopes of 0% to 60%.	N/A

Table 3-7. Soil Associations within the Sonoran Valley Parkway Project Analysis Area (Continued)

Soil Series	Description	Notes
Harqua	Very deep, well-drained soils formed in fan alluvium from mixed sources. Harqua soils are on relict basin floors, fan terraces, or stream terraces and have slopes of 0% to 10%.	N/A
Laveen	Very deep, well-drained soils that formed in mixed fan alluvium. Laveen soils are on fan terraces, stream terraces, and relict basin floors. Slopes are 0% to 3%.	N/A
Maripo	Very deep, somewhat excessively drained soils that formed in recent stratified stream alluvium. Maripo soils are on flood plains and alluvial fans and have slopes of 0% to 3%.	Maripo Sandy Loam is unique to Alternative H
Mohall	Very deep, well-drained soils formed in fan and stream alluvium from mixed sources. Mohall soils are on fan terraces, stream terraces, and relict basin floors and have slopes of 0% to 8%.	N/A
Perryville	Very deep, well-drained soils that formed in mixed alluvium. Perryville soils are on alluvial fans and terraces and have slopes of 0% to 3%.	N/A
Rillito	Very deep, somewhat excessively drained soils that formed in mixed alluvium. Rillito soils are on fan terraces or stream terraces. Slopes are predominantly 0% to 5% but range to 40%.	N/A
Torripsamments and Torrifluvents	Frequently flooded.	N/A
Tremant	Very deep, well-drained soils formed in fan alluvium, stream alluvium, and eolian deposits. Tremant soils are on fan terraces, stream terraces, or relict basin floors. Slopes are 0% to 5%.	N/A
Valencia	Very deep, well-drained soils formed in recent alluvium. Valencia soils are on floodplains and alluvial fans and have slopes of 0% to 2%.	N/A
Vecont	Very deep, well-drained soils that formed in alluvium from mixed sources. Vecont soils are on basin floors and have slopes of 0% to 1%.	Vecont Loam is unique to Alternative H
Why	Very deep, somewhat excessively drained soils formed in stratified fan alluvium. Why soils are on alluvial fans and floodplains and have slopes of about 1%.	N/A

Source: U.S. Department of Agriculture, Soil Conservation Service (1974).

For soils in the project area, soil series descriptions and their engineering and management characteristics were reviewed to determine whether sensitive soils were present. All soils reviewed exhibit slow or slow to medium runoff, and the hazard of erosion from water or wind is slight or slight to moderate. All soil reclamation efforts on the project will be limited by the region's dry climate. All soils in the project area are low in organic matter content and generally have poor tilth. Most soils in arid regions such as this contain soluble salts, and in places those salts are concentrated. Fertilizer is generally required to obtain better yields in local soils (NRCS 1977).

Areas in which soils are highly erodible or difficult to reclaim present special problems for surface-disturbing activities and may require additional stabilization and reclamation efforts. Sensitive soils include those with physical and/or chemical characteristics that could exacerbate the rate of soil erosion from disturbed areas and/or inhibit or limit successful stabilization and revegetation in the reclamation of areas disturbed by construction of roadways and staging areas. Both sensitive and non-sensitive soils require the application of appropriate reclamation/revegetation measures to ensure successful stabilization and revegetation of disturbed locations.

The capability classes and capability subclasses of soils in the project area were reviewed to identify potential limitations to reclamation efforts and sensitivity to erosion. Capability classes, which range from Classes I through VIII, are the broadest classification and indicate progressively greater limitations and narrower choices for practical use. All soils in the project area fall under capability Class VII, described as having "very severe limitations that make them unsuited to cultivation and that restrict their use largely

to pasture or range, woodland, or wildlife" (NRCS 1977). Capability subclasses indicate the main limitation of that soil, such as erosion or shallowness. Soils in the project area fall into a variety of capability subclasses, as indicated in Table 3-8.

Table 3-8 shows that the primary limitations on project area soils are being too shallow, droughty, or stony (capability subclass *s*); erosion (*e*); and being too dry (*c*). Although not listed as specific limitations, soils in the project area generally have limited depth of topsoil, low organic content, and a droughty nature. The effects of these limitations on soil resources would be increased potential for erosion and a much longer time required for revegetation to occur. Properly implemented BMPs for soil stabilization and a revegetation plan would serve to minimize these effects.

Table 3-8. Soil Capability Classes and Subclasses (non-irrigated) of Project Area Soils

Soil Series	VIIe	VIIc	VIIs	VIIw
Agualt			×	
Antho			×	
Brios			×	
Carrizo			×	
Coolidge			×	
Cuerda			×	
Dateland	×			
Denure	×			
Estrella		×		
Gilman	×	×	×	
Gunsight			×	
Harqua	×			
Laveen	×	×		
Mohall		×	×	
Perryville	×		×	
Rillito	×		×	
Torripsamments and Torrifluvents	×*			
Valencia		×		
Why				×

Sources: NRCS (1977, 1997); U.S. Department of Agriculture, Soil Conservation Service (1974).

Notes: Capability Class VII indicates soils with very severe limitations for cultivation and restricts their use largely to pasture, range, woodland, or wildlife. Subclasses indicate that the main limitation is as follows: *e* – risk of erosion; *c* – too cold or too dry; *s* – too shallow, droughty, or stony; or *w* – water in or on the soil interferes with plant growth or cultivation.

* Presumed based on soil characteristics.

Some surface areas within the project area may be covered with biological soil crusts, an intimate association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes that live within or on top of the uppermost millimeters of soil. Biological soil crusts are also known as cryptobiotic, cryptogamic, and microbiotic soil crusts (Rosentreter et al. 2007). Biological soil crusts are recognized as important features of desert ecosystems because of their ability to stabilize the soil; capture and retain atmospheric moisture, rainfall, and nitrogen; facilitate seed germination; and increase nutrient availability for plant growth (Belnap et al. 2001). Biological soil crusts in the Sonoran Desert ecosystem occur as a flat layer on the surface of the soil (Belnap et al. 2001). The removal of this type of biological

soil crust allows water to flow unimpeded over the soil surface, which reduces moisture infiltration into the soil and increases soil erosion (Belnap et al. 2001).

Biological soil crusts are a major component of vegetation communities in the Sonoran Desert (Belnap et al. 2001) and occur in the project area (Felton 2013). All project-related surface disturbance that removes or damages biological soil crusts would negatively impact vegetation communities. Biological soil crusts in desert ecosystems can require decades or centuries to recover. The lack of these soil organisms may slow vegetation reestablishment following disturbance or removal by reducing soil stability and by reducing the availability of moisture and nutrients to growing plants (Belnap et al. 2001). Disturbance that removes soil crust organisms would result in slower recovery of biological soil crust diversity and functioning than disturbance that leaves soil crust organisms and material in place (Belnap et al. 2001).

3.6 VEGETATION RESOURCES

This section describes the dominant vegetation communities and special-status plant species, including federally and State-protected species, as well as invasive and noxious weeds. Throughout this section, the term “analysis area” refers to a collective area that includes all alternative routes (Alternatives A, C, H, and Sub-alternatives F and G) analyzed for the SVPP (see Section 3.6.2 below).

The analysis area is located in the Rainbow Valley region within the southern portion of Maricopa County in central Arizona (see Figure 2-1). This alluvial valley is surrounded by mountainous areas, including the Sierra Estrella Mountains, approximately 10 miles to the north, northeast, and east; the Buckeye Hills, approximately 10 miles to the north and west-northwest; and the Maricopa Mountains, approximately 10 miles to the south and southwest. This entire region is a part of the Sonoran Desert, which is characterized by its distinctive bimodal precipitation pattern; this pattern allows for greater vegetative structural diversity than in other North American deserts (Brown 1994).

3.6.1 Applicable Laws, Regulation, and Policies

Four federal regulations pertain to plants in this region: 1) those plants listed by the USFWS under the ESA; 2) those plant species listed as Sensitive by the BLM under BLM Manual Section 6840; 3) EO 13112; and 4) the Plant Protection Act of 2000. These federal regulations are described below.

- The ESA, as amended, provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The law requires federal agencies, in consultation with the USFWS and/or the National Oceanic and Atmospheric Administration Fisheries Service, to ensure that actions authorized, funded, or carried out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Destruction on federal lands is illegal, plus import, export, interstate, and foreign commerce of listed plant species are all generally prohibited. Section 7 of the ESA requires federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.
- BLM Manual Section 6840 is a federal guidance document that outlines the criteria for listing species as Sensitive on BLM-administered lands and provides direction on management of those species. BLM Sensitive species are species that the USFWS currently has under status review; species whose populations are declining rapidly and may warrant federal protection in the future; species that have small, widely distributed populations; and species that are located in special or unique habitats. Additionally, Instructional Memorandum (IM) No. AZ-2006-002, Change 1,

dated September 30, 2006, provides an updated list of the species designated Sensitive by the BLM in Arizona.

- Federal agencies are directed by EO 13112, Invasive Species, to expand and coordinate efforts to prevent the introduction and spread of invasive plant species and minimize the economic, ecological, and human health impacts that invasive species may cause.
- The Plant Protection Act of 2000 (PL 106-224) replaced the Federal Noxious Weed Act of 1975 (PL 93-629) and is administered by the Animal and Plant Health Inspection Service of the U.S. Department of Agriculture. This federal program was enacted to protect the health and value of American agriculture and natural resources.

There are two State of Arizona regulations pertaining to plants that apply to this region: 1) the ANPL (ARS 3-904); and 2) Regulated, Restricted, and Prohibited Noxious Weeds (AAC R3-4-244 and R3-4-245). These state regulations are described below.

- The ANPL, as outlined in ARS 3-904, provides protection for nearly 200 native Arizona plant species. This law does not prevent the clearing of land but requires that the ADA be notified before beginning any land-clearing activities. Additionally, a permit is necessary in certain circumstances to remove those native plants. The State of Arizona has four categories for special-status plants; definitions of the categories, as provided under ARS 3-904, follow:
    - Highly Safeguarded (HS): This category includes those species of native plants and parts of plants, including the seeds and fruit, whose prospects for survival in the state are in jeopardy or which are in danger of extinction throughout all or a significant portion of their ranges, and those native plants that are likely within the foreseeable future to become jeopardized or in danger of extinction throughout all or a significant portion of their ranges. This category also includes those plants resident to the state and listed under the ESA and/or other special protection statuses.
    - Salvage Restricted (SR): This category includes those species of native plants to be afforded the exclusive protections involving the use of salvage permits, tags, and seals. This category includes those native plants that are not included in the HS category but are nevertheless subject to a high potential for damage by theft or vandalism.
    - Salvage Assessed (SA): This category includes those species of native plants to be afforded the exclusive protections involving the use of salvage tags and seals and annual salvage permits. This category includes those native plants that are not included in either the HS or SR categories but nevertheless have a sufficient value if salvaged to support the cost of salvage tags and seals.
    - Harvest Restricted (HR): This category includes those species of native plants to be afforded the exclusive protections involving the use of harvest permits and wood receipts. This category includes those native plants that are not included in the HS category but are subject to excessive harvesting or overcutting because of the intrinsic value of their byproducts, fiber, or woody parts.
- Through AAC R3-4-244 and R3-4-245, the State of Arizona addresses the control and eradication of noxious weeds and identifying specific species that fall under three noxious weed categories: regulated, restricted, and prohibited. The Plant Services division of the ADA is responsible for implementing these noxious weed regulations. Definitions of these three weed classes are as follows: 1) regulated noxious weeds are exotic plant species that are well established and generally distributed throughout Arizona; 2) restricted noxious weeds are exotic plant species that occur in Arizona in isolated infestations or very low populations; and 3) prohibited noxious weeds are exotic plant species with known qualities that do not currently exist in Arizona.

3.6.2 Analysis Area

The vegetation resources analysis area for this project includes the Rainbow Valley, bounded by SDNM to the west, SR 238 to the south, the Sierra Estrella Mountains to the east, and rural Goodyear to the north.

3.6.3 Vegetation Communities

There are five subdivisions of the Sonoran Desert; however, only one is present in the project area. The existing and dominant vegetation community of the project area is defined as the Lower Colorado River Valley (LCRV) subdivision of the Sonoran Desertscrub biotic community (Brown and Lowe 1994). The LCRV subdivision is present throughout the lower-elevation areas of the Rainbow Valley region and the project area, whereas the nearby Arizona Upland subdivision can be found at higher elevations within the surrounding mountain ranges but not within the project area (Figure 3-8). Within the project area, elevations range between approximately 1,100 and 1,330 feet amsl. Several ephemeral drainages are present within the project area; however, most of these washes have narrow channels, with minimal vegetation and infrequent flow. The exception is Waterman Wash, which drains the Rainbow Valley into the Gila River to the northwest and parallels the project area directly to the east. This drainage contains thick stands of xeroriparian vegetation along its banks. No large water features (i.e., lakes, perennial streams, or rivers) that could support broadleaf deciduous riparian vegetation communities, such as willow (*Salix* spp.), cottonwood (*Populus* spp.), or ash (*Fraxinus* spp.), are located within or near the project area.

3.6.3.1 Lower Colorado River Valley Subdivision

The LCRV subdivision represents the largest area of the Sonoran Desert and plays a vital role because it is in direct contact with all other subdivisions of the Sonoran Desert. The LCRV subdivision receives an average of 7 to 10 inches of precipitation annually, which makes it the driest of all Sonoran Desert subdivisions. The LCRV subdivision is characterized by broad alluvial valley floors dominated by creosotebush (*Larrea tridentata* var. *tridentata*) and triangle bursage (*Ambrosia deltodia*). Creosotebush communities strongly dominate in the valley bottoms and frequently predominate along mountain slopes. Although not a dominant part of this vegetation community, cacti species often include cholla (*Cylindropuntia* spp.), saguaro (*Carnegiea gigantea*), and barrel cactus (*Ferocactus* spp.).

In addition to the upland vegetation, xeroriparian vegetation can be found along ephemeral drainages in this community. The major tree species present in the project area include velvet mesquite (*Prosopis velutina*), blue paloverde (*Parkinsonia florida*), desert ironwood (*Olneya tesota*), and crucifixion thorn (*Castela emoryi*). Other non-dominant shrub species present include triangle bur ragweed (*Ambrosia deltoidea*), desert globemallow (*Sphaeralcea ambigua*), range ratany (*Krameria erectica*), big galleta (*Pleureaphis rigida*), and jimmyweed (*Isocoma* sp.).

Xeroriparian vegetation is present along the ephemeral drainages, including Waterman Wash, and these areas contain the majority of the tree species that exist in the project area. Xeroriparian vegetation is associated with an ephemeral water supply (ephemeral washes typically flow only briefly, usually in direct response to significant precipitation in the immediate vicinity). Typically, xeroriparian vegetation occurs as a linear corridor of sparse to dense shrubs and trees in areas with comparatively high soil moisture, such as washes and floodplains within the LCRV subdivision. These areas typically contain plant species that are also found in upland habitats; however, these xeroriparian plant species are commonly larger in structure and occur at higher densities than those in adjacent uplands. Common species in the areas of xeroriparian vegetation within the project area include velvet mesquite, catclaw

acacia (*Acacia greggii* var. *greggii*), and desert ironwood. A complete list of all plant species observed in the project area during field investigations is included in the biological evaluation (BE) prepared for this project (SWCA Environmental Consultants [SWCA] 2009a).

3.6.3.2 Supplemental Vegetation Community Data

In addition to the large-scale vegetation community descriptions described above, the project area was also evaluated in terms of the USGS Gap Analysis Program (GAP), which is a land cover data set of natural assemblages of plant species produced by the USGS and other partners (USGS 2004). Figure 3-8 depicts the GAP data within the project area and vicinity, of which four main vegetation communities are present: 1) agriculture; 2) North American Warm Desert Riparian Woodland and Shrubland; 3) Sonora-Mojave Creosotebush-White Bursage Desert Scrub; and 4) Sonora-Mojave Mixed Salt Desert Scrub. All alternatives contain portions of vegetation communities 1, 3, and 4, as described above. However, Alternative A also contains a small portion of vegetation community 2, as described above, which occurs along a tributary of Waterman Wash. Although the GAP vegetation data indicate that the project area is mostly composed of the Creosotebush-White Bursage series of the LCRV subdivision (which may be the result of GAP's mapping methods), during site visits, white bursage was only observed at the far south end of the project area. Additionally, saltbush species (*Atriplex* spp.) were not observed in the project area. Thus, site visits indicated that the project area appears to be composed of a fairly uniform, or homogeneous, stand of creosotebush. A detailed plant species inventory was not completed for this project, however. Nonetheless, the GAP vegetation data do appear to indicate that the majority of the project area is dominated by creosotebush. Descriptions of these four GAP vegetation community categories are provided below, excerpted from USGS (2004:129, 131, 197, 241).

> Agriculture: An aggregated landcover type that includes both pasture and hay: areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle, where pasture/hay vegetation accounts for greater than 20 percent of total vegetation, and Cultivated Crops: areas used for the production of annual crops, such as corn [*Zea mays*], soybeans [*Glycine max*], vegetables, tobacco [*Nicotiana tabacum*], and cotton [*Gossypium hirsutum*], and also perennial woody crops such as orchards and vineyards, where crop vegetation accounts for greater than 20 percent of total vegetation. This landcover type also includes all land being actively tilled. No agricultural land is administered by the BLM, but may be impacted by alternatives.

> North American Warm Desert Riparian Woodland and Shrubland: This ecological system is restricted to intermittently flooded washes or arroyos that dissect bajadas, mesas, plains and basin floors throughout the warm deserts of North America. Although often dry, the intermittent fluvial processes define this system, which are often associated with rapid sheet and gully flow. This system occurs as linear or braided strips within desert scrub- or desert grassland-dominated landscapes. The vegetation of desert washes is quite variable ranging from sparse and patchy to moderately dense and typically occurs along the banks, but may occur within the channel. The woody layer is typically intermittent to open and may be dominated by shrubs and small trees such as *Acacia greggii* [catclaw acacia], *Brickellia laciniata* [splitleaf brickellbush], *Baccharis sarothroides* [desert broom], *Chilopsis linearis* [desert willow], *Fallugia paradoxa* [Apache plume], *Hymenoclea salsola* [burrobrush], *Hymenoclea monogyra* [single-whorl burrobrush], *Juglans microcarpa* [little walnut], *Prosopis* spp.[mesquite], *Psorothamnus spinosus* [smoketree], *Prunus fasciculata* [desert almond], *Rhus microphylla* [littleleaf sumac], *Salazaria mexicana* [Mexican bladdersage], or *Sarcobatus vermiculatus* [greasewood]. This vegetation community is rare on BLM lands, but may occur on private and/or ASLD lands.

Sonora-Mojave Creosotebush-White Bursage Desert Scrub: This ecological system forms the vegetation matrix in broad valleys, lower bajadas, plains and low hills in the Mojave and lower Sonoran deserts. This desert scrub is characterized by a sparse to moderately dense layer (2-50% cover) of xeromorphic microphyllous [plant species with small leaves adapted to dry conditions] and broad-leaved shrubs. *Larrea tridentata* and *Ambrosia dumosa* are typically dominants, but many different shrubs, dwarf-shrubs, and cacti may codominate or form typically sparse understories. Associated species may include *Atriplex canescens* [fourwing saltbush], *Atriplex hymenelytra* [desertholly], *Encelia farinosa* [brittlebush], *Ephedra nevadensis* [jointfir], *Fouquieria splendens* [ocotillo], *Lycium andersonii* [Anderson's wolfberry], and *Opuntia basilaris* [beavertail pricklypear]. The herbaceous layer is typically sparse, but may be seasonally abundant with ephemerals. Herbaceous species such as *Chamaesyce* spp. [sandmat], *Eriogonum inflatum* [desert trumpet], *Dasyochloa pulchella* [fluff grass], *Aristida* spp. [three-awn grass], *Cryptantha* spp. [cryptantha], *Nama* spp. [fiddleleaf], and *Phacelia* spp. [phacelia] are common. BLM lands are primarily composed of this vegetation community.

Sonora-Mojave Mixed Salt Desert Scrub: This system includes extensive open-canopied shrublands of typically saline basins in the Mojave and Sonoran deserts. Stands often occur around playas. Substrates are generally fine-textured, saline soils. Vegetation is typically composed of one or more *Atriplex* [saltbush] species such as *Atriplex canescens* or *A. triplex polycarpa* [cattle saltbush] along with other species of *Atriplex*. Species of *Allenrolfea* [iodinebush], *Salicornia* [glasswort], *Suaeda* [seepweed], or other halophytic plants [a plant adapted to saline soil] are often present to codominant. Graminoid [grass] species may include *Sporobolus airoides* [alkali sacaton] or *Distichlis spicata* [saltgrass] at varying densities. This vegetation community is rare on BLM lands, but may occur on private and/or ASLD lands.

3.6.4 Special-Status Plant Species

This section provides a summary of the special-status plant species known to occur or that have the potential to occur in the project area. A more detailed analysis of these species is included in the BE (SWCA 2009a). Six plant species were evaluated for this project: Arizona cliffrose (*Purshia subintegra*), Acuña cactus (*Echinomastus erectocentrus* var. *acuñensis*), Arizona hedgehog cactus (*Echinocereus triglochiditus* var. *arizonicus*), Arizona-Sonoran rosewood (*Vauquelinia californica* spp. *Sonorensis*), Kota Mountain barberry (*Berberis harrisoniana*), and Tumamoc globeberry (*Tumamoca macdougalii*). These species include all plant species for this region that have ESA or BLM special-status designations. None of these species occur in the project area.

3.6.4.1 Arizona Native Plant Law Protected Species

The ANPL provides protection for native plants classified by the ADA. This law states that protected plants cannot be removed from any lands, including private lands, without permission and a permit from the ADA (ADA 2005). Six plant species that have protections under the ANPL were identified in the project area. Table 3-9 lists the ADA-protected plant species growing in the project area and the type of protection they are afforded under the law.

Table 3-9. Plants Observed within the Project Area that are Protected under the Arizona Native Plant Law

Species	Category of Protection
Saguaro (normal form)	Salvage Restricted
Saguaro (crested/fan-top form)	Highly Safeguarded

Table 3-9. Plants Observed within the Project Area that are Protected under the Arizona Native Plant Law (Continued)

Species	Category of Protection
Blue paloverde	Salvage Assessed
Velvet mesquite	Salvage Assessed; Harvest Restricted
Barrel cactus	Salvage Restricted
Crucifixion thorn	Salvage Restricted
Desert ironwood	Salvage Assessed; Harvest Restricted

3.6.5 Noxious Weeds and Invasive Species

Federal regulations, including the EO on Invasive Species and the Plant Protection Act, plus State regulations, including the ADA regulations on noxious weeds, require that the BLM address proposed actions on BLM land throughout the Lower Sonoran Field Office with respect to noxious weeds and the potential effects (Harper-Lore n.d. [2007]). Even though non-native plants were not observed in the project area, they are known to exist in the region; thus, the SVPP could allow the introduction of these species through soil disturbances. Within the Rainbow Valley region, past human disturbances, including agriculture, have provided the pathway for the introduction of numerous non-native plant species. Invasive species that are likely to be present in the Rainbow Valley region include black mustard (*Brassica nigra*), Saharan (Asian) mustard (*B. tournefortii*), buffelgrass (*Pennisetum ciliare*), Mediterranean grass (*Schismus barbatus*), Arabian grass (*S. arabicus*), red brome (*Bromus rubens*), prickly Russian thistle (*Salsola tragus*), Malta starthistle (*Centaurea melitensis*), puncturevine (*Tribulus terrestris*), and saltcedar (*Tamarix* spp.). Although not all of these species are listed as noxious weeds, all are non-native and invasive plant species that could have deleterious effects on the environment; hence, measures should be taken to prevent their introduction and establishment throughout the project area. Table 3-10 provides information on these non-native species that could potentially be introduced by the proposed project.

Table 3-10. Invasive Non-native Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Growth Form	ADA-Listed Noxious Weed Category
Black mustard	*Brassica nigra*	Annual forb	Not listed
Buffelgrass	*Pennisetum ciliare*	Perennial grass	Prohibited and Regulated
Saharan (Asian) mustard	*Brassica tournefortii*	Annual forb	Not listed
Mediterranean grass	*Schismus barbatus*	Annual grass	Not listed
Arabian grass	*Schismus arabicus*	Annual grass	Not listed
Red brome	*Bromus rubens*	Annual grass	Not listed
Prickly Russian thistle	*Salsola tragus*	Annual forb	Not listed
Malta starthistle	*Centaurea melitensis*	Annual/biennial forb	Not listed
Puncturevine	*Tribulus terrestris*	Annual forb	Prohibited and Regulated
Saltcedar	*Tamarix* spp.	Perennial shrub/Tree	Not listed

The invasion and establishment of non-native plant species are a threat to the overall health of the Sonoran Desert ecosystem. Not only do these species outcompete the native flora for resources, but the

presence of these invasive, non-native plants also increases the fuel load for wildfires. The flora present in the Sonoran Desert did not evolve with these non-native plants; thus, competition for resources, such as soil, water, and nutrients, is severe, and often the non-natives replace the natives throughout the landscape. In addition, these non-natives do not have natural control systems in a foreign environment; thus, they are able to become established and proliferate without natural ecosystem balances (Sheley and Petroff 1999). Furthermore, the dead stems of these non-natives provide an unnatural fuel load that promotes wildfires, which the Sonoran Desert and its native flora are not adapted to endure. Wildfire can cause rapid and profound changes in desertscrub habitats, both in the short and long term, because many desert plants are not well adapted to large disturbances by fire. In addition, fires now burn hotter and farther in desertscrub habitats, reducing the natural mosaic pattern (patchy distribution of plants and open space) typical of these communities (Esque et al. 2003).

The Arizona Wildlands Invasive Plant Working Group (AZ-WIPWG) developed a categorized list of *Invasive Non-native Plants that Threaten Wildlands in Arizona* (2005) to aid land managers and other stakeholders in addressing noxious weeds. This document provides detailed information on non-native species in Arizona and their level of threats. Table 3-11 provides information from the AZ-WIPWG analysis regarding the non-native plant species identified as occurring in this region with the potential to invade the project area.

Table 3-11. Level of Threat Posed by Non-native Plant Species

Non-native Plant Species	Ecological Impacts*	Invasiveness*
Arabian grass	B	B
Black mustard	Not evaluated	Not evaluated
Buffelgrass	A	A
Malta starthistle	B	B
Mediterranean grass	B	B
Prickly Russian thistle	B	B
Puncturevine	D	C
Red brome	A	B
Saharan (Asian) mustard	B	B
Saltcedar	A	A

Source: AZ-WIPWG (2005).

* Scores range from A to D. For ecological impacts, A represents high severity of ecological impacts, whereas D represents a negligible impact to the ecosystem. For invasiveness, A represents the greatest potential to invade an ecosystem, whereas D indicates a low potential of invasion.

3.7 VISUAL RESOURCES

The Visual Resources section focuses on the inventory and characterization of the affected environment. Methods of analysis for this evaluation were based on BLM Visual Resource Management guidance. The planning level Visual Resource Inventory (VRI) reported herein provides the BLM's inventory of visual resources as identified and reported in the Lower Sonoran RMP. The Lower Sonoran RMP analysis included an evaluation of scenic quality, sensitivity, and distance zones as well as visual resource management (VRM) classes. A project-level analysis, or site analysis was performed and included an inventory of scenery, viewing locations, and associated Key Observation Points (KOPs) or critical views within the study area. The elements of the landscape are described in terms of form, line, color, and texture. Typically, the more variety in terms of these elements a landscape has, the more interesting or

scenic the landscape becomes if the elements coexist harmoniously. The BLM manages landscapes that require varying levels of protection and modification, giving consideration to the uses and values of other resources and the scenic quality of the landscape. The visual resource analysis was conducted up to 10 miles from the proposed centerline of the alternatives. Critical viewpoints or KOPs were selected to represent critical viewing locations within the viewshed and are used to further assess the visual impacts to the viewing public from the construction and operation of the proposed Parkway. After the contrast rating evaluation and assessment of visual contrast were completed, the impacts to visual resource values were assessed. The visual resource values (e.g., scenic quality, sensitivity, and distance zones) were used to characterize and inventory the visual landscape and serve as the baseline for resource impact assessment and are further detailed in this section.

Public scoping comments revealed that there was general concern for maintaining the landscape and keeping it clear of refuse and negative visual consequences associated with SVPP development.

3.7.1 Applicable Laws, Regulations, and Policies

NEPA and FLPMA are the primary laws that require the BLM to address potential effects on visual resources. BLM has developed a system of evaluation specific to visual resources and uses a VRI system to inventory visual resources on public lands. VRI classes are visual ratings that describe an area in terms of visual or scenic quality and viewer sensitivity to the landscape (the degree of public concern for an area's scenic quality). The VRI system uses four classes to summarize the full range of visual values assigned to the landscape: Classes I and II are the most valued, Class III represents moderate value, and Class IV represents the least value. The VRI provides the basis for considering visual values in the resource management planning process (BLM 1992). VRM class designations are legally binding land use plan decisions under FLPMA and 43 CFR 1600.

3.7.2 Analysis Area

The visual resources analysis area extends approximately 10 miles from the centerline of all project alternatives, in order to represent a reasonable viewshed from which the project would be seen. This area of analysis was determined through the use of BLM VRM guidance for visual analyses as well as a project-level GIS delineation of the geographic area visible from the proposed alternatives, referred to as a viewshed delineation. For this evaluation, a viewshed analysis, selection of KOPs, and subsequent visual contrast assessment from each KOP was conducted. An inventory and characterization of the affected environment for all alternatives was completed through the documentation of landform, vegetation, and water features (scenery), identification of KOPs and critical viewing locations, and identification of BLM VRI and VRM classifications. Figures 3-9 and 3-10 illustrate the existing VRM classes and the location of KOPs within the study area, respectively.

3.7.3 Visual Resource Management

VRM classes are established through the resource management planning process. During the resource management planning process, the VRI class boundaries and assignments may be adjusted to reflect resource allocation decisions made in the RMPs. The BLM sets objectives for the management of landscape preservation and change. All lands are placed into one of four classes that identify the degree of acceptable landscape change or alteration, giving consideration to the scenic value of the landscape and other resource values and uses of the land, as described in Table 3-12. Class I objectives are established in areas where no landscape change is desired. Class IV objectives are set for landscapes where BLM manages for uses that will result in substantial landscape changes (e.g., mining, energy development,

wind farms). Classes II and III allow for varying degrees of landscape preservation and change in between Classes I and IV. The VRM objectives can then be used to analyze and determine the visual impacts of proposed activities and to gauge the amount of disturbance an area can tolerate before it exceeds the visual management objectives of its VRM class (BLM 1992).

Table 3-12. VRM Classes Defined

VRM Class	Definition
Class I Objective	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II Objective	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be very low. Management activities may be seen, but should not attract attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III Objective	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV Objective	The objective of this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating of the basic elements.

Since the overall VRM goal is to minimize visual impacts, mitigating measures should be prepared for all adverse visual contrasts that can be reduced. This requirement also includes reduction of visual contrast within projects that have met the VRM class objectives (BLM 1986a). In addition to mitigation measures and BMPs recommended by BLM, ADOT best management practices for Parkways were also used and are further detailed in Chapter 4.

VRM analysis involves determining whether the visual impacts of the elements of the proposed project would meet the management objectives established for the project area in the RMP. The BLM has established a visual contrast rating process to complete this analysis (BLM 1986a). The VRM class objectives for the SVPP were established in the Lower Sonoran and SDNM RMP (BLM 2012a). During this resource management planning process, the final VRM classes were adopted, indicating the amount of acceptable disturbance for BLM lands within the project area.

Lands in the analysis area have been allocated to VRM Classes I, II, III, and IV management objectives (see Figure 3-9). All BLM lands within the action alternatives are identified as VRM Class IV, which provides for management activities that require major modifications to the existing character of the landscape. These activities may dominate the view and may be the major focus of viewer attention. The action alternatives are also located upon private and state lands which are not subject to BLM VRM requirements for land modification. Other lands within the action alternatives (ASLD, private) are not subject to BLM VRM classifications.

Immediately west of the SVPP project area is the SDNM, which includes lands that have been designated VRM Classes I, II, and III. In addition, the Sierra Estrella Mountains, approximately 5 miles to the east of the project area, include VRM Class I lands. The objectives of Classes I, II, and III are, respectively, to preserve, retain, and partially retain, the existing character of the landscape (BLM 1986b).

3.7.4 Existing Visual Conditions

The project area lies in Rainbow Valley, within the incorporated boundaries of the city of Goodyear in Maricopa County, Arizona, between the Sierra Estrella Mountains to the east and SDNM to the west.

Scenic Quality and Landscape Character

Landscape character or scenery reflects the natural landscape where the project is located and is evaluated through an analysis of landform, vegetation, existence of water, scarcity, adjacent scenery, and cultural modifications. The elements of landscape character are combined and expressed in terms of Class A, B, and C, with Class A being the most unique landscape with a high level of visual appeal, and Class C being common, indistinct, and often homogenous appearance.

Rainbow Valley is an intermountain valley, generally surrounded by north-south-trending mountain ranges; the valley is bordered on the north by agricultural and rural development within the city of Goodyear, on the east by the Sierra Estrella Mountains, on the south by the town of Mobile, and on the west by the SDNM and North and South Maricopa Mountains. Generally, these mountain ranges rise between 1,500 and 4,500 feet above the floor of Rainbow Valley.

Rainbow Valley is generally flat, sloping to the southeast at a grade of less than 1%. The valley floor is formed by a series of coalescing alluvial fans and drainages. Waterman Wash and its tributaries form the active drainage system in the valley.

The project area is characterized by low, flat alluvial fans that are divided by relatively straight ephemeral washes that flow from the surrounding mountain ranges to Waterman Wash, which flows north to the Gila River. The project area is characterized as Sonoran Desertscrub; typical vegetation includes creosote-bursage scrub, paloverde, and cacti (see Section 3.6 for a full description of vegetation resources in the project area). Generally, the vegetation cover is sparse across the majority of the project area and is broken by dirt roads, utility corridors, and fence lines. The vegetation cover is most dense along the ephemeral washes.

Viewer Sensitivity and Concern Levels

Sensitive viewing locations, such as residences, roads, or trails, are examples of critical views that may be affected by visual modifications of the landscape. Typical sensitive viewpoints of the Rainbow Valley are from SDNM, the Sierra Estrella Mountains, local residences, the town of Mobile, and SR 238. These areas were determined to be areas which are sensitive to change and would be most likely to be viewed by local residents and visitors.

Concern levels relate to the importance of maintaining existing scenic quality and viewsheds associated with a specific viewing location, and are considered when assessing viewer impacts. The SDNM provides for views and viewing locations often associated with a high degree of viewer concern for maintaining scenic quality because the landscape setting is important. In contrast, a viewing location associated with a State Route, such as SR 238, would have a moderate concern level because viewers are traveling at a high rate of speed and are not seeking a recreational experience. Concern levels for each identified viewing location or KOP were assessed based on the following five criteria: volume of use, viewing duration, concern for visual quality, scenic or historic status, and special status of designations.

Distance Zones

Distance zones are defined as foreground/middle ground (0–5 miles), background (5–15 miles), and seldom seen (7–15 miles or screened). Five KOPs were selected to represent “typical” viewing conditions

for each of the three sensitive viewing locations—travel routes (two KOPs), recreation areas (two KOPs), and residences (one KOP)—and are described as follows:

- **Travel Routes**: highways and roads used by origin/destination travelers and designated scenic or historic byways and recreation destination roads (i.e., roads that provide access to designated recreation areas). Travel routes in the analysis area include the pipeline road, Riggs Road, Rainbow Valley Road, and SR 238.
- **Recreation Areas**: existing recreation sites used for picnicking, camping, hiking, scenic overlooks, rest areas, or other recreational activities. Viewpoints are in the SDNM**Error! Bookmark not defined.**, North Maricopa Wilderness**Error! Bookmark not defined.**, and Sierra Estrella Wilderness.
- **Residences**: single-family structures and permanent mobile homes or mobile home parks. One residence in Rainbow Valley was selected to represent typical residential views of the project area. Residences in the background distance zone that would be screened by topography occur in Buckeye, Estrella Mountain Ranch, Palo Verde, and Laveen.

3.7.5 BLM Resource Management Plan – Visual Resource Inventory

The VRM class objectives for the project area were established in the Lower Sonoran RMP (BLM 2012a). Lands in the SVPP area have been allocated to VRM Class I, II, III, and IV management objectives. All action alternatives are located on private, state, or BLM Class IV lands, with Class III directly adjacent to the alternatives. The objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic elements.

Scenic Quality

Scenic quality is represented by the character and diversity of landform, vegetation, water, color, and human-made features. Scenic quality measures the inherent visual appeal of the landscape in terms of Classes ranging from A (highest) to C (lowest).

According to the Lower Sonoran RMP, the scenic quality of Sonoran Desert views is generally made up of jagged and isolated mountain ranges that are often thickly vegetated along the flanks with “forests” of columnar cactus and scrubby trees and jut dramatically from vast, flat valleys. Valley floors typically are vegetated with unbroken expanses of low, growing, woody shrubs. Dominant colors range from dark browns to tans and gray, with textures ranging from coarse and broken in the mountain ranges to smooth on the valley floors. The colors and contrasts provided by permanent water usually are absent; however ephemeral drainage washes across the valley floors produce intricate, dendritic lines of greener vegetation that relieve the unbroken expanses. Modifications to landscape views in the form of residential developments and infrastructure have greatly increased during the last 15 years (BLM 2012a).

Sensitivity Level Rating Units

Sensitivity is the measure of public concern for change to the scenic quality of each scenic quality rating unit. Sensitivity is measured based upon user type, amount of use, public interest, adjacent land uses, and presence of special areas. Public concern and management concerns also are considered.

Viewer sensitivity to visual changes in dominant landscapes increases with residential growth. Although numerous factors fuel residential growth, the rugged and open nature of the Sonoran Desert landscape plays, in part, a role in attracting increased numbers of residents. Through public meetings and comments during the planning process, the BLM has learned that the interested public places high concern and value on open space, natural landscapes, and mountain views (BLM 2012a).

Distance Zones

Distance zones are used to establish the relative visibility of landscapes from major travel routes or observation points and are characterized by the foreground/middle ground, background, and seldom seen.

Distance zones may also be affected by residential growth as new and expanded subdivisions provide viewing locations from which additional landscape change may be noticeable to more residents. Distance zones may also be affected as new travel routes are constructed to accommodate increased population or as heavier traffic occurs on existing routes (BLM 2012a).

3.8 WATER RESOURCES

The following section describes the conditions of water resources in the analysis area surrounding the Sonoran Valley Parkway, including descriptions of surface water and groundwater resources, and also discusses water supply and demand in this region. The applicable laws, regulations, and policies are also detailed, as they guide management of surface water and groundwater resources in Maricopa County and in Arizona.

3.8.1 Applicable Laws, Regulations, and Policies

3.8.1.1 Federal

The CWA (33 USC 1251–1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” Important sections of the CWA are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity that may result in a discharge to WUS to obtain certification from the State that the discharge will comply with other provisions of the act.
- Section 402 establishes the NPDES, a permitting system for the discharge of any pollutant (except for dredged or fill material) into WUS.
- Section 404 establishes a permit program for the discharge of dredged or fill material into WUS. This permit program is jointly administered by the USACE and EPA.

As mandated by the Safe Drinking Water Act (PL 93-523), passed in 1974, the EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the visual acceptability of the water. The EPA regulates these types of contaminants through the development of national primary and secondary maximum contaminant levels for finished water. In Arizona, the ADEQ administers the Safe Drinking Water Act.

The current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) indicate that portions of the project alternatives are located in FEMA floodplains or pending floodplains as identified by the FCDMC (Appendix F, FEMA Maps). The FCDMC has submitted the delineation of the pending floodplains to FEMA; however, they have not been published and therefore are not currently being regulated by FEMA. Development in existing FEMA-regulated floodplains requires coordination with FEMA through a Letter of Map Change process. A Conditional Letter of Map Revision (CLOMR) must be requested following the design stages of a project, but prior to construction. The CLOMR serves as an assurance from FEMA that any proposed modifications to mitigate a flood hazard meet FEMA's requirements. Following construction, a Letter of Map Revision (LOMR) must be requested to remove the identified flood hazard areas from FEMA maps. FEMA must issue its own LOMR when pending floodplains are accepted. Development in pending floodplains also requires coordination with the FCDMC.

3.8.1.2 State

In Arizona, the NPDES program is administered by the ADEQ under the AZPDES program. The ADEQ issues permits on behalf of the EPA for activities in Arizona, except on Indian lands, that could cause impacts to surface water and groundwater sources, including construction activities. The ADEQ also administers water pollution control programs and water quality functions throughout the state. As part of the AZPDES program, projects that would disturb more than 1 acre of land are required to obtain coverage under construction general permit (CGP) No. AZG2008-001. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation.

As part of project implementation, a stormwater pollution prevention plan (SWPPP) must be developed and implemented to comply with conditions of the CGP. The SWPPP must include site-specific information on erosion and sediment controls and must list BMPs that will be installed to reduce pollutants and meet water quality standards. As part of the SWPPP, the applicant must implement BMPs to reduce or eliminate stormwater pollution. Dischargers must also comply with State water quality objectives, as defined in AAC Title 18, Chapter 11, Article 1.

ADEQ has developed surface water quality standards, including narrative limitations, to define water quality goals for Arizona's streams and lakes and provide the basis for controlling discharge of pollutants to surface waters. Beneficial uses for water bodies are identified in State water quality standards (AAC Title 18, Chapter 11, Article 1) and must be achieved and maintained as required under the CWA. Beneficial uses can include support of aquatic life, fish consumption, public water supply, and irrigation. The 303(d) list, as required by Section 303(d) of the CWA, is a list of water bodies that have a designated beneficial use that is impaired by one or more pollutants. Water bodies included on this list are referred to as "impaired waters." The State must take appropriate action to improve impaired water bodies by establishing total maximum daily loads and reducing or eliminating pollutant discharges.

ADWR implements the Groundwater Management Code of 1980 and manages groundwater supplies throughout the state. The goal of the Groundwater Management Code is to control groundwater depletion and provide a means for allocation. Areas of heavy reliance on groundwater have been identified and designated Active Management Areas (AMAs). Pursuant to the Groundwater Management Code, the five designated AMAs are required to comply with regulations and remain the primary focus of ADWR's long-term groundwater management and conservation efforts. The SVPP is in the Phoenix AMA.

3.8.1.3 Local

Development in floodplains within the jurisdictional area of Maricopa County is regulated and enforced by the FCDMC. FCDMC has delegated floodplain regulation and enforcement occurring within

Goodyear city limits to the City. The Floodplain Regulations for Maricopa County were adopted in 1986 and as amended comply with the directives in Sections 48-3603 and 48-3609 of the ARS pertaining to the National Flood Insurance Program. In accordance with the Maricopa County Floodplain Regulations, a Floodplain Use Permit would be required for any development in regulated and pending floodplains located in the project area. As a coordinated effort to minimize area flooding and cumulative effects on drainage characteristics from development, the FCDMC prepares comprehensive Area Drainage Master Plans for developable portions of the County. The Rainbow Valley Area Drainage Master Plan (2011) provides updated technical design information and recommended strategies for the Waterman Wash watershed. The FCDMC issues Floodplain Use Permits through a cooperative agreement with FEMA. The FEMA requirement includes federal lands; therefore, development on BLM land is not exempt from this process. A Floodplain Use Permit from the FCDMC will be required for any portion of this project occurring in unincorporated county within an effective mapped floodplain.

Within the city of Goodyear, stormwater management is regulated under the adopted Stormwater Pollution Ordinance and guided by the City's Stormwater Management Plan. The City's Engineering Department has developed design guidelines for stormwater management and participates in the SWPPP review process and compliance inspection related to construction site stormwater runoff control.

3.8.2 Analysis Area

The analysis area for surface water includes the Waterman Wash watershed, Waterman Wash, the West Prong, and the Gila River downstream of its confluence with Waterman Wash. This analysis area is defined for surface water because a portion of the precipitation that falls on the watershed flows in washes across the project area and discharges to either Waterman Wash or the West Prong and to the Gila River. The analysis area for groundwater resources evaluation includes the Rainbow Valley groundwater sub-basin, located in the West Salt River valley. This extended analysis area was chosen because groundwater from the local area has been identified as the water source that will serve this project.

3.8.3 Surface Water

The project area is in the southern part of the Phoenix AMA in the Rainbow Valley basin (Figure 3-11). The valley is bounded on the west by the Maricopa Mountains and on the east by the Sierra Estrella Mountains, and it is characterized by flat terrain that slopes gently to the northeast. The area consists primarily of undeveloped, creosote-dominated alluvial plains with unpaved roads near and intersecting the project area. Waterman Wash, an ephemeral wash that joins the Gila River near Buckeye, is in the northeast portion of the project area and is the primary drainage for Rainbow Valley. Agricultural fields are located within this area, mainly adjacent to Waterman Wash.

3.8.3.1 Surface Water Quantity Washes

No perennial surface water is present within the project area; however, numerous unnamed ephemeral washes that flow in response to rainfall form the Waterman Wash drainage basin. Two named washes fall within the project area: Waterman Wash and the West Prong, the confluence of which intersects the project area at approximately midpoint. Waterman Wash is a relatively straight channel that becomes incised along its upper reaches (URS Corporation 2011a) in the vicinity of the project area. Some preliminary field survey has been conducted for portions of the project area (SWCA 2009e, 2009f, 2009g). More exact estimates of the area of impact to jurisdictional WUS would be made as part of final design and CWA Section 404 permitting.

However, a complete jurisdictional delineation will need to be conducted prior to construction to support CWA Section 404 permitting, to minimize surface water impacts and to evaluate the extent to which washes within the project area exhibit characteristics the USACE may consider indicators of potentially jurisdictional WUS, thus requiring a permit under Section 404 of the CWA. The delineation would identify WUS that would be affected by the SVPP. Section 404 permitting, if required, would be conducted by the City, prior to construction.

3.8.3.2 Sheet Flow

Sheet flow is overland flow of water that is not concentrated into channels. Rain that is not absorbed in the soil will remain on the ground surface and can quickly run downstream as sheet flow with the potential to generate flooding. This flow process occurs in the Rainbow Valley, as wide shallow flow (URS Corporation 2011b) and large sheet flow areas were identified in the vicinity and within the project area (Kellogg 2010). Because the drainage pattern of sheet flow is wide and shallow, it can be a challenge to collect as concentrated flow and convey around or through planned development and recreate shallow sheet flow conditions downstream.

3.8.3.3 Floodplains

The SVPP alternatives are in an area that receives both shallow sheet flow and channelized flow during large storm events (V3 2007). The FEMA FIRMs for Maricopa County (panels 04013C2925G and 04013C2950G in Appendix F, FEMA Maps) show that portions of the project area are located in 100-year and 500-year floodplains as designated by FEMA (2009) and in pending floodplains as proposed by the FCDMC (Figure 3-12). For the most part, these floodplain areas occur where the project alternatives cross larger washes. Development within FEMA-designated and pending floodplains is strictly regulated by both the City and Maricopa County.

3.8.3.4 Surface Water Quality

No surface water exists in the project area vicinity. The nearest perennial surface water is located where Waterman Wash drains into the Gila River, approximately 12 miles north of the project alternatives. An approximately 14-mile reach of the Gila River, downstream of its confluence with Waterman Wash, has been designated an impaired water by ADEQ. It has been determined that pesticides are impairing the surface water quality to the degree that it is affecting the benefits of fish consumption along this reach of the Gila River (ADEQ 2009b).

3.8.4 Groundwater

Groundwater would be required for the first approximately 3.5 years of the SVPP during the construction phase only. The water source has yet to be identified, but will be purchased from an existing local source such as the City or private individual. Because the water source will be local, the analysis area for groundwater resource evaluation focused on the West Salt River valley and Rainbow Valley sub-basins.

3.8.4.1 Existing Conditions

In a regional context, the city of Goodyear is located in the western portion of the Salt River valley sub-basin, which is a broad, northeast-southwest-trending alluvial basin characterized by varying degrees of subsurface consolidation (Hammett and Herther 1995). Depth to bedrock in the West Salt River valley ranges from less than 10 feet near the margins to more than 10,000 feet southeast of Gilbert (ADWR 1994).

Regional data indicate that the deepest part is located in the central part of the basin and may exceed 9,600 feet (ADWR 1994). The main aquifer system is composed of basin-fill deposits that are divided into three distinct hydrogeologic units—the upper, middle, and lower alluvial units (Rascona 2003). Groundwater withdrawal in the West Salt River valley generally has exceeded recharge, creating localized areas of groundwater-level depression.

The project is located in the Rainbow Valley sub-basin. Here, withdrawal has been on the decline since 1972; however, a groundwater depression is still evident in the northwestern portion of the basin (Rascona 2003). This cone of depression is close to the Buckeye Hills, approximately 6 miles northwest of the northernmost section of the project. Although several wells in the vicinity of the project indicate that a rise in groundwater level has occurred between 1991 and 2003, most have seen a drop in groundwater levels (1- to 15-foot decline) for the same period (ADWR 2009). Depth to groundwater in Rainbow Valley ranges from 67 feet below ground surface (bgs) in the northwest to more than 400 feet bgs in the southeast (Rascona 2003).

There are 63 wells registered with ADWR within 1 mile of the project area (Figure 3-13). These wells are used mostly for irrigation and/or water production for domestic use (ADWR 2012b). The average depth of these wells is more than 650 feet bgs, with the deepest well being 1,504 feet bgs.

ADWR maintains a repository for statewide groundwater data known as the Groundwater Site Inventory (GWSI) database. The GWSI contains field-verified well and spring data collected by ADWR or USGS that are continually being updated. A review of GWSI data collected in 2011 and 2012 indicates that the average depth to water in the vicinity of the project is 370 feet bgs (ADWR 2012b).

3.8.4.2 Groundwater Recharge

Recharge to the regional aquifer occurs through both natural and artificial processes. Natural recharge occurs in ephemeral streams and along mountain fronts, whereas artificial recharge occurs from effluent discharge and managed underground storage facilities. No managed underground storage facilities are located within the Rainbow Valley; however, other sources of recharge in the basin include incidental recharge from agricultural irrigation.

3.8.4.3 Groundwater Flow

In the Rainbow Valley basin, groundwater generally flows northwest toward the Gila River (Figure 3-14). There is, however, an area in the northwestern portion of the basin where groundwater flows southeast toward a cone of depression located near the Buckeye Hills (ADWR 2009; Rascona 2003).

3.8.4.4 Groundwater Quality

Water quality data for wells in the vicinity of the project were reviewed. Samples collected from wells near the project between 1975 and 2004 indicate the general water quality is good, but there have been instances in which concentrations have equaled or exceeded drinking water standards for certain water quality parameters. In the majority of the wells, the parameter of concern was fluoride with an occurrence of nitrate/nitrite. In one well near the south end of the project area, the parameter exceedance was manganese and lead (ADWR 2009).

3.8.5 Water Supply and Demand

3.8.5.1 Water Supply

An important facet of the Parkway construction would be the use of water for both compaction and dust control in the ROW, along haul roads, and in construction staging areas. Construction water is mixed with soil to increase its strength and is also used as a palliative in dust control. Water would also be used during site reclamation. Water would be purchased from either the City or private individuals; these sources would be determined closer to the start of construction. Construction water would be delivered to the site by pumps through a plastic pipe and stored in a lined pond. The pond would be located within the ROW or on private land and moved as needed to keep pace with construction.

3.8.5.2 Demand Projections

Water demand for the project would occur during the construction phase, which is estimated to last for 43 months (approximately 3.5 years). Total water demand for the construction of the project is estimated to be approximately 250,000 gallons per mile. Table 3-13 provides a summary of the water that is estimated for the construction of each action alternative.

Table 3-13. Summary of Estimated Construction Water Use by Action Alternative

Action Alternative	Length (miles)	Estimated Total Water Use (acre-feet)	Estimated Water Use Per Year (acre-feet per year)
A	15.72	12.06	3.02
C	18.12	13.90	3.48
H	18.28	14.02	3.50
F	3.19	0.24	0.06
G	2.38	0.18	0.05

3.9 WILDLAND FIRE MANAGMENT

3.9.1 Applicable Laws, Regulations, and Policies

The Lower Sonoran RMP directs wildland fire management activities on BLM lands that the three Parkway alternatives cross. According to the Lower Sonoran RMP, “wildland fire is a general term describing any non-structure fire that occurs in the wildland. Wildland fires are categorized into two types: wildfires, which are unplanned ignitions or prescribed fires that are declared wildfires; and prescribed fires, which are planned ignitions (Wildland Fire Leadership Council [WFLC] 2009).” The Lower Sonoran RMP identifies three goals for Wildland Fire Management with specific objectives and management actions to attain these goals. The three goals for Wildland Fire Management are:

1. Ensure firefighter and public safety is the highest priority in every fire or fuels management activity.
2. Wildland fuels are managed to protect Wildland Urban Interface (WUI) areas and meet resource management objectives.
3. Limit the extent of wildfires and the impact of fire suppression efforts on wildlife, plant communities, and natural and cultural features.

3.9.2 Analysis Area

The wildland fire management analysis area for the SVPP includes the proposed Parkway alignments and immediately adjacent lands that are under the jurisdiction of the BLM's wildland fire management plans and activities.

3.9.3 Fire Ecology

Vegetation throughout the area, including all three alternative routes, is sparse and dominated by creosotebush flats. Cacti species, including barrel cactus and saguaro, are present within the analysis area but at low densities. Xeroriparian vegetation is present along the ephemeral drainages, including Waterman Wash, and these areas contain the majority of the tree species that are present within the project area. Tree species present in the project area include velvet mesquite, blue paloverde, desert ironwood, and crucifixion thorn. Other shrub species observed besides creosotebush include triangle bur ragweed, desert globemallow, and jimmyweed.

The existing vegetation type for all three alternative routes is consistent with the Lower Sonoran RMP's description of the fire ecology for sparsely vegetated areas:

> In natural desert scrub communities the distance between shrubs is too great for fire to spread, unless annual plant growth in the interplant spaces is sufficient to carry fire along between shrubs. As a result, such communities experience long fire-return intervals, with frequencies extending hundreds of years (McAuliffe 1995; Rogers and Steele 1981). Wildland fire is thus not a major natural process in the Sonoran Desert ecosystem, and associated vegetation types are not dependent on or adapted to fire (BLM 2002c). Wildfires, whether of human or natural causes, are relatively rare and typically do not exceed 1 or 2 acres before burning out naturally.

3.9.4 Fire and Fuels Management

All public lands within the Lower Sonoran RMP are assigned to one of the following allocations for fire management (BLM 2004b):

- Allocation 1: Management of wildland fire to meet multiple objectives (areas suitable for managing fires to achieve resource objectives) is allowed.
- Allocation 2: Initial action is suppression (areas not suitable for managing fires to achieve resource objectives). These lands are not typically fire adapted. Therefore, using wildfire to meet resource objectives is not an appropriate action on these lands.

The alternative Parkway alignments cross lands that are in Allocation 2 and consist of large areas dominated by desertscrub communities. Fire is not a part of the natural regime in these communities and is typically human caused.

The majority of the alternative Parkway alignments would cross undeveloped desert landscapes; however, small portions of the alignments cross WUIs that have specific wildland fire management goals. The WUI is defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (National Wildfire Coordinating Group [NWCG] 2008). These areas exist at the northern terminus of the proposed alignments in the city of Goodyear and at the southern termini of the proposed alignments near the community of Mobile. According to the Lower Sonoran RMP:

The goal of the Arizona BLM WUI Strategy is to implement an efficient and effective fuels reduction program. One of the BLM's fire-management goals is to collaborate with communities at risk for wildfire property loss within the WUI to develop plans for risk reduction. Fuels treatments within the Lower Sonoran, both WUI and non-WUI, focus on reducing the size and frequency of wildfires within the non-fire adapted Sonoran Desert ecosystems, as well as the residual, native riparian plant communities, with WUI fuels treatments being the priority. These treatments are conducted utilizing fire, mechanical equipment, manual, herbicide, and biological treatments (e.g., grazing). The desired resource condition is to maintain fuels at non-hazardous levels in WUI areas to provide for public and firefighter safety.

3.9.5 Fire Regimes and Condition Classes

A fire regime is a general characterization of the nature of the nature of fires occurring over long periods of time and their immediate effects that generally characterize an ecosystem (Brown 2000). "Fire regimes can be defined through the attributes of frequency, seasonality, size/spatial extent, rotation (or fire cycle), predictability (or variation in fire frequency), and magnitude (both intensity and severity) (Agee 1993; Morgan et al. 2001)." The Lower Sonoran RMP has classified the historical fire regimes on BLM-administered lands based on fire frequency, severity, vegetative communities, and the acres of the vegetative community. The proposed alternative Parkway alignments cross lands that are classified as Fire Regime V. This classification is defined as areas that have fire frequencies of greater than 200 years, have high severity, and are dominated by creosotebush-bursage, paloverde-mixed cacti, Sonoran-Mohave mixed salt desert scrub, and riparian vegetative communities.

Fire regime condition class is assessed by determining the departure of an area from its historical fire regime conditions. Condition Class (CC) 1 describes lands that are within or near historical ranges, CC2 describes lands where fire regimes have changed moderately from historical ranges, and CC3 are fire regimes significantly altered from historical ranges. This departure may have resulted from a number of factors, including fire exclusion or suppression, vegetation resources, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities (Hann et al. 2008). Based on the existing dominant vegetation community of creosotebush bursage and the Fire Regime V classification, the proposed alternative Parkway alignments cross lands that are considered CC1.

3.9.6 Fire History

As described by the Lower Sonoran RMP, "wildfire history is closely related to vegetation and climatic patterns in terrestrial ecosystems. Patterns of fire frequency, season, size, severity, and uniformity are functions of existing vegetation conditions, weather, elevation, physiographic features, ignition sources, and fire-suppression activities." Fire history on lands administered by the Lower Sonoran Field Office indicates that fires are infrequent, predominantly human caused near main travel corridors and rivers, and increasingly caused by activities associated with undocumented aliens and drug trafficking operations. Fires generally occur most often between the months of March and September, and the 20-year fire frequency average is four fires a year that burn approximately 4,610 acres in total. According to the Lower Sonoran RMP, the largest single fire that has occurred near the proposed alternative Parkway alignments was the Tracks Fire, which burned in the Maricopa Mountains of the SDNM during summer 1994 and grew to over 5,000 acres.

3.10 WILDLIFE AND SPECIAL-STATUS SPECIES

This section describes the occurrence and distribution of wildlife species within the analysis area, including endangered, threatened, special-status, and other sensitive terrestrial species. Throughout this section, the term "analysis area" refers to the collective area that includes all alternative alignments (Alternatives A, C, and H and Sub-alternatives F and G) analyzed for the SVPP (see Section 3.10.2 below). Threatened and endangered species are those species that are protected under the ESA or Arizona state law and include proposed and candidate species. Sensitive species include the BLM Lower Sonoran Field Office priority animal species list, which encompasses BLM Sensitive Species, USFWS Birds of Conservation Concern (BCC)/USFWS MBTA Focal Species, Game Species, and Raptor Species, and AGFD Species of Greatest Conservation Need (SGCN). Wildlife habitat and distribution data were obtained from existing resource data for the BLM Lower Sonoran Field Office, state resource agencies, and other studies. Relevant scientific literature and wildlife management reports were used as the sources for describing species ecology, habitat needs, distribution, and management guidelines.

3.10.1 Applicable Laws, Regulations, and Policies

Five federal regulations pertain to wildlife in this region: the ESA, MBTA, Bald and Golden Eagle Protection Act of 1940 (BGEPA), BLM Sensitive Species, and BCC. The ESA is covered in Section 3.10.4. The remaining four regulations are detailed below.

- The Migratory Bird Treaty Act of 1918, as amended, gives federal protection to all migratory birds, including nests and eggs. This law states that it is unlawful to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention …for the protection of migratory birds…or any part, nest, or egg of any such bird" (16 USC 703). More than 800 species of migratory birds are protected under this law. The MBTA includes protection for all raptor species. This regulation does not discriminate between live or dead birds, and it also grants full protection to any bird parts, including feathers, eggs, and nests.

  In order to relocate or destroy any nest and maintain compliance with the MBTA, it is necessary to obtain a permit from the USFWS, the responsible agency for regulating this law. Only those entities permitted by the USFWS can assist in the relocation of birds or nests. Section 1 of the USFWS Region 2 Interim Empty Nest Policy states that if the nest is completely inactive at the time of destruction or movement, a permit is not required in order to comply with the MBTA. If an active nest is observed during any activities related to the project, measures should be taken to protect the nest from destruction and to avoid a violation of the MBTA.

- The Bald and Golden Eagle Protection Act of 1940 (16 USC 668–668c), as amended, prohibits "taking" bald and golden eagles, including their parts, nests, or eggs, without a permit from the USFWS. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle…[or any golden eagle], alive or dead, or any part, nest, or egg thereof." The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." The USFWS defines "disturb" under the BGEPA as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with

normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

- The BLM Priority Species List for the Lower Sonoran Field Office and SDNM includes species that are federally protected under the ESA and MBTA, as well as species that are protected by state laws, including plant and animal species, game species, and migratory birds. These species need to be addressed because BLM policy (Manual 6840) dictates that the BLM must carry out management for the conservation of State-listed plants and animals in addition to species protected under the ESA. BLM Manual 6840 is a federal guidance document that outlines the criteria for listing species as Sensitive on BLM-administered lands and provides direction on management of these species. BLM Sensitive Species are species that the USFWS currently lists under status review; species whose populations are declining rapidly and may warrant federal protection in the future; species that have small, widely distributed populations; and species that are located in special or unique habitats.
- Birds of Conservation Concern, the 1988 amendment to the Fish and Wildlife Conservation Act, mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA." The overall goal is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of the USFWS. This assessment is derived from three major bird conservation plans: the Partners in Flight North American Landbird Conservation Plan, the United States Shorebird Conservation Plan, and the North American Waterbird Conservation Plan. Bird species considered include nongame birds; gamebirds without hunting seasons; and ESA candidate, proposed endangered or threatened, and recently delisted species. Assessment scores from all three bird conservation plans are based on several factors, including population trends, threats, distribution, abundance, and relative density. The goal of the USFWS regarding BCC species is to prevent or eradicate the need for additional ESA bird listings by implementing proactive management and conservation actions. The USFWS (2008) recommends that these lists be consulted in accordance with EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds.

The Arizona Game and Fish Department manages wildlife in the public trust, under the oversight of the Arizona Game and Fish Commission; and that mandate, for stewardship and responsibility, under Arizona Revised Statute Title 17, embraces all wildlife, including mammals, birds, reptiles, amphibians, mollusks, crustaceans, and fish. The AGFD has developed Arizona's State Wildlife Action Plan 2012-2022 (SWAP), a comprehensive wildlife conservation strategy for the State, to meet federal requirements for conservation funding eligibility. One of the core elements of the SWAP is an AGFD status listing defined as wildlife of conservation priority—described nationally as wildlife Species of Greatest Conservation Need (SGCN). As discussed in the AGFD's Comprehensive Wildlife Conservation Strategy, SGCN are species of vertebrates, crustaceans, and mollusks that rank high in the vulnerability category and have been identified for immediate action. Each species was assessed in terms of vulnerability and assigned as either a Tier 1a, 1b, or 1c ranking, with Tier 1a being the highest threat level. The AGFD also manages and protects all game species in Arizona (AGFD 2006). AGFD maintains a statewide database, the Heritage Data Management System (HDMS), which tracks records for federally listed species and other species of special concern (HDMS 2012). In addition, AGFD maintains a Point Observation Database, which contains data on recorded locations of special-status species, as well as an online tool called HabiMap™ Arizona (HabiMap), which contains data on SGCN and migratory birds. In addition to obtaining data from the aforementioned sources, SWCA also sent a special request to the AGFD HDMS Department in order to obtain data on the nearest recorded location of special-status species. The email response included a spreadsheet of special-status species recorded locations near the project area (AGFD 2012).

3.10.2 Analysis Area

The wildlife analysis area for this project includes the Rainbow Valley, bounded by SDNM to the west, SR 238 to the south, the Sierra Estrella Mountains to the east, and rural Goodyear to the north.

3.10.3 General Wildlife

3.10.3.1 Reptiles and Amphibians

Reptiles are well adapted to the dry conditions, extreme temperatures, and desertscrub habitats that are common throughout the analysis area. Most lizards in the Sonoran Desert are diurnal (active during the day), whereas snakes are primarily nocturnal (active at night). Amphibians are not as common throughout the analysis area; however, several of the riparian washes that occur throughout the area, primarily Waterman Wash and some of its tributaries, as well as stock tanks in the area, are likely to display ephemeral water flow and vegetation communities that support amphibian populations. Following is a discussion on non-listed or non-sensitive reptile and amphibian species that may be present within the analysis area; a discussion of additional endangered, threatened, and other sensitive reptile and amphibian species is presented in Section 3.10.3.

Snakes that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include the Arizona glossy snake (*Arizona elegans noctivaga*), variable sandsnake (*Chilomeniscus stramineus*), western shovel-nosed snake (*Chionactis occipitalis*), Sonoran whipsnake (*Coluber bilineatus*), red racer coachwhip (*Coluber flagellum piceus*), desert nightsnake (*Hypsiglena chlorophaea*), California kingsnake (*Lampropeltis getula californiae*), spotted leaf-nosed snake (*Phyllorhynchus decurtatus*), saddled leaf-nosed snake (*P. brownii*), Sonoran gophersnake (*Pituophis catenifer affinis*), long-nosed snake (*Rhinocheilus lecontei*), desert patch-nosed snake (*Salvadora hexalepis hexalepis*), Smith's black-headed snake (*Tantilla hobartsmithi*), checkered gartersnake (*Thamnophis marcianus*), Sonoran lyresnake (*Trimorphodon lambda*), Sonoran coralsnake (*Micruroides euryxanthus*), western threadsnake (*Leptotyphlops humilis*), western diamond-backed rattlesnake (*Crotalus atrox*), Sonoran sidewinder (*C. cerastes cercobombus*), speckled rattlesnake (*C. mitchellii*), black-tailed rattlesnake (*C. molossus*), Mohave rattlesnake (*C. scutulatus*), and tiger rattlesnake (*C. tigris*) (Arizona Partners in Amphibian and Reptile Conservation [AZPARC] 2008; HabiMap 2013). It should be noted that the majority of these species are not likely to occur within the project area, but are more likely to occur in the larger analysis area.

Lizards that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include Gila monster (*Heolderma suspectum*), western banded gecko (*Coleonyx variegatus*), Sonoran collared lizard (*Crotaphytus nebrius*), long-nosed leopard lizard (*Gambelia wislizenii*), desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), Goode's horned lizard (*Phrynosoma goodei*), desert horned lizard (*P. platyrhinos*), regal horned lizard (*P. solare*), desert spiny lizard (*Sceloporus magister*), long-tailed brush lizard (*Urosaurus graciosus*), ornate tree lizard (*U. ornatus*), common side-blotched lizard (*Uta stansburiana*), tiger whiptail (*Aspidoscelis tigris*), red-backed whiptail (*A. xanthonota*), and desert night lizard (*Xantusia vigilis*) (AZPARC 2008; HabiMap 2013). As noted for the snake species listed above, some of these species are likely to occur within the project area, and are likely present within the analysis area.

Other reptiles that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include the non-native pond slider (*Trachemys scripta*), Sonora mud turtle (*Kinosternon sonoriense*), and the introduced spiny softshell (*Apalone spinifera*) (AZPARC 2008). As noted for the

other reptiles listed above, the majority of these species are not expected to occur within the project area or analysis area, only in surrounding areas that contain permanent water.

Amphibians that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include the non-native Rio Grande leopard frog (*Rana berlandieri*), the introduced American bullfrog (*R. catesbeiana*), Sonoran Desert toad (*Bufo alvarius*), red-spotted toad (*B. punctatus*), Woodhouse's toad (*B. woodhousii*), and Couch's spadefoot (*Scaphiopus couchii*) (AZPARC 2008; HabiMap 2013). These species would most likely be present in areas with water present during the rainy monsoon season, such as drainages, stock tanks, and low-lying areas where water can pool. Thus, some amphibian species could be present within the project area but are more likely to be present within the analysis area.

3.10.3.2 Birds

Desertscrub, riparian habitats, and agricultural areas throughout and adjacent to the analysis area provide a variety of habitat for bird species. Common bird species that are associated with desertscrub habitat include greater roadrunner (*Geococcyx californianus*), horned lark (*Eremophila alpestris*), scrub jay (*Aphelocoma coerulescens*), common raven (*Corvus corax*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), black-throated sparrow (*Amphispiza bilineata*), and sage sparrow (*Amphispiza belli*). Game birds that use desert habitats include mourning dove (*Zenaida macroura*), white-winged dove (*Z. asiatica*), and Gambel's quail (*Callipepla gambelii*) (BLM 1988). Common bird species typically found in desert riparian habitat include yellow-rumped warbler (*Dendroica coronata*), verdin (*Auriparus flaviceps*), black-tailed gnatcatcher (*Poliptila melanura*), red-winged blackbird (*Agelaius phoeniceus*), mourning dove, and common yellowthroat (*Geothlypis trichas*). Numerous other species are thought to occur in the area, including house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), cactus wren (*Campylorhynchus brunneicapillus*), and various flycatchers, kingbirds, thrashers, and sparrows. Additional information on birds that may be present within the analysis area is provided in Sections 3.10.4 and 3.10.5.

3.10.3.3 Mammals

The analysis area and surrounding area support habitat for a variety of mammal species, including small and medium-sized mammals, carnivores, bats, and big-game species. Small and medium-sized mammals that are likely present in the region include black-tailed jackrabbit (*Lepus californicus*), antelope jackrabbit (*L. alleni*), desert cottontail (*Sylvilagus audubonii*), desert pocket mouse (*Chaetodipus penicillatus*), Arizona pocket mouse (*Perognathus amplus*), little pocket mouse (*P. longimembris*), cactus mouse (*Peromyscus eremicus*), house mouse (*Mus musculus*), round-tailed ground squirrel (*Spermophilus tereticaudus*), Harris' antelope squirrel (*Ammospermophilus harrisii*), badger (*Taxidea taxus*), raccoon (*Procyon lotor*), and various species of skunk. Carnivore species include mountain lion (*Puma concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), and kit fox (*Vulpes macrotis*) (HabiMap 2013).

Several bat species occur within the analysis area and include both common and sensitive species; additional information on endangered, threatened, and other sensitive bat species is presented in Section 3.10.3. Common bat species are likely to occur along drainages that contain standing bodies of water and adequate vegetative cover. Trees along these drainages may also provide roosting habitat for bats, as well as mines, caves, and other crevices that are present within the Maricopa Mountains along the western boundary of the analysis area. Common bat species that may be found in the desertscrub and wash habitats throughout the analysis area include the pallid bat (*Antrozous pallidus*), Western yellow bat (*Lasiurus xanthinus*), Yuma myotis (*Myotis yumanensis*), Mexican free-tailed bat (*Tadarida brasiliensis*), and western small-footed myotis (*Myotis ciliolabrum*) (HabiMap 2013).

Big-game species within the analysis area include desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus*), and collared peccary, or javelina (*Tayassu pecari*). Additional information on these species is presented in Sections 3.10.4 and 3.10.5.

3.10.3.4 Fishes

The analysis area does not provide suitable habitat for fishes because of the lack of a permanent water source.

3.10.4 Endangered, Threatened, and Other Special-Status Wildlife Species

3.10.4.1 Federally Listed Wildlife Species

Under the ESA, the USFWS lists 15 threatened, endangered, or candidate wildlife species that are known or suspected to occur or that have habitat in Maricopa County (USFWS 2012). Habitat requirements and the potential for occurrence for these 15 species are summarized in Table G-1 in Appendix G, Species Tables.

Of the 15 wildlife species listed by the USFWS, 10 are listed as threatened or endangered and are therefore protected under the authority of the ESA. The remaining five are listed by USFWS as candidate and currently receive no statutory protection under the ESA. Two candidate species, the Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) and the desert tortoise, Sonoran population (*Gopherus agassizii*), have the potential to occur in the analysis area. For the remaining 13 species, the analysis area is either clearly beyond the known geographic or elevational range of these species, or it does not contain vegetation or landscape features known to support these species, or both. Furthermore, the analysis area does not occur in or near any federally proposed or designated critical habitat; however, it does occur within the Sonoran pronghorn (*Antilocapra americana sonoriensis*) Nonessential Population 10(j) area, which is discussed in Table G-1 of Appendix G, Species Tables. The American peregrine falcon (*Falco peregrinus anatum*) and the bald eagle (*Haliaeetus leucocephalus* [desert population]) are delisted species under the ESA; thus, they are not currently afforded protection under the ESA. However, these species are listed as BLM priority species for the Lower Sonoran Field Office and are addressed as a special-status species. Detailed information on these species is provided in the BE (SWCA 2009a) and in Appendix G, Species Tables.

3.10.4.2 BLM Special-Status Species

The BLM Lower Sonoran Field Office identifies 67 priority animal species that have the potential to occur within the Field Office and SDNM region. The list of priority species includes the following:

- Selected endangered or candidate species as listed under the ESA;
- BLM Sensitive Species: a species proven to be imperiled in at least part of its range and documented or considered likely to occur on BLM lands;
- BCC: species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA (USFWS 2008);
- Game Species: species managed by AGFD and BLM; and
- Raptor Species: bird species protected under the MBTA and BGEPA.

Habitat requirements and the potential for occurrence for these 67 species are summarized in Table G-2 in Appendix G, Species Tables. Twenty-seven of the 67 priority wildlife species listed for Lower Sonoran Field Office and SDNM by the BLM have the potential to occur or are known to occur within the analysis area. For the remaining species, the analysis area is either clearly beyond the known geographic or elevational range of that species, or it does not contain vegetation or landscape features known to support that species, or both.

Of the 27 priority wildlife species, 11 are listed as BLM Sensitive species and have the potential to occur within the analysis area: Sonoran desert tortoise, Tucson shovel-nosed snake, California leaf-nosed bat (*Macrotus californicus*), cave myotis (*Myotis velifer*), golden eagle (*Aquila chrysaetos*), Great Plains narrow-mouthed toad (*Gastrophryne olivacea*), LeConte's thrasher (*Toxostoma lecontei*), lowland burrowing treefrog (*Smilisca fodiens*), Sonoran green toad (*Bufo retiformis*), Townsend's big-eared bat (*Corynorhinus* [=*Plecotus*] *townsendii*), and western burrowing owl (*Athene cunicularia hypugea*). These species are addressed in Table G-2 in Appendix G, Species Tables.

In addition, seven game species, which are also listed as BLM priority species, have the potential to occur within the analysis area: mountain lion, desert bighorn sheep, mule deer, javelina, Gambel's quail, mourning dove, and white-winged dove (*Zenaida asiatica*). The analysis area occurs within Game Management Unit (GMU) 39, which is divided roughly in half; the analysis area is within the east half of GMU 39. AGFD manages for stable to increasing game populations in GMU 39. There are hunts for deer (mule deer or white-tailed) and javelina; as well as small game, predators, fur-bearers and migratory birds within the analysis area (east half of GMU 39). These species are addressed in Table G-2 in Appendix G, Species Tables.

Furthermore, nine BLM priority species that have the potential to occur in the analysis area are also listed by the AGFD as SGCN. These include Sonoran desert tortoise, Tucson shovel-nosed snake, California leaf-nosed bat, crested caracara (*Polyborus plancus*), desert bighorn sheep, Great Plains narrow-mouthed toad, LeConte's thrasher, lowland burrowing treefrog, and western burrowing owl. However, SGCN are also categorized by vegetation type and for the LCRV vegetation classification, which the majority of the analysis area occurs within, there are 32 SCGN species listed for this portion of the Sonoran Desert Ecoregion. Fifteen of these species are addressed under other status listings. Of the 17 remaining, the analysis area is not within their geographic range; thus, they would not be expected to occur in the analysis area. The remaining two species, sage thrasher (*Oreoscoptes montanus*) and big free-tailed bat (*Nyctinomops macrotis*), could occur within the analysis area.

3.10.5 Migratory Birds

In order to promote the conservation of migratory birds, several additional species have been given specific consideration when analyzing the effects of proposed management actions. These species have been identified as priority species for conservation because of their declining abundance or distribution or because of their vulnerability to local and/or rangewide risk factors. Table G-2 in Appendix G, Species Tables, identifies BCC, game, and raptor species and species protected under the MBTA and BGEPA that are also listed by the BLM Lower Sonoran Field Office as priority species that have the potential to occur within the Lower Sonoran Field Office region and SDNM planning region. The species that have the potential to occur within the analysis area include Bell's vireo (*Vireo bellii*), Costa's hummingbird (*Calypte costae*), Crissal thrasher (*Toxostoma crissale*), crested caracara, Gambel's quail, golden eagle, great-horned owl (*Bubo virginianus*), LeConte's thrasher, long-eared owl (*Asio otis*), Lucy's warbler (*Vermivora luciae*), mourning dove, white-winged dove, western burrowing owl, and yellow warbler (*Dendroica petechia*). Arizona Partners in Flight also identifies Costa's hummingbird and LeConte's thrasher as indicators of desertscrub health and Lucy's warbler as an indicator of riparian health (Latta et al. 1999). Through an Arizona Breeding Bird Atlas (ABBA) query in AGFD's HabiMap (2013) of the

three USGS 7.5-minute topographic maps that cover the region, 47 bird species are noted as having confirmed, probable, or possible presence within the area. Many of these species are discussed above or in subsequent sections.

3.10.6 Wildlife Connectivity

New road construction has contributed to habitat fragmentation (Meffe and Carroll 1997), leading BLM and other agencies to establish wildlife connectivity linkages in order to reduce the impacts of habitat fragmentation. Two wildlife linkages have been identified within the analysis area: the Sierra Estrella–SDNM linkage zone (Arizona Wildlife Linkages Assessment Workgroup 2006) and a wildlife corridor identified by BLM, as adopted from the *Bighorn Sheep Management Plan* (AGFD 2007a), which incorporates a swath of BLM lands between the Sierra Estrella Mountains and Maricopa Mountains and is identified by AGFD as a possible bighorn sheep dispersal corridor. The Sierra Estrella–SDNM linkage was further modeled through GIS analysis to create a Linkage Design based on habitat suitability and optimal travel routes for a group of focal species representative of that linkage area (Beier et al. 2008). Focal species used to identify the linkage between the Sierra Estrella and Maricopa Mountains included the mountain lion, bobcat, bighorn sheep, mule deer, javelina, desert tortoise, and Gila monster; for each species a biologically best corridor was identified that represented the best route for a species to use as it traveled between large habitat areas (i.e., Sierra Estrella and Maricopa Mountains). Additional focal species for this linkage include the desert iguana, giant spotted whiptail lizard (*Cnemidophorus burti stictogrammus*), leopard chuckwalla (*Sauromalos obesus*), long-tailed lizard (*Urosaurus graciosus*), red-backed whiptail, regal ringneck snake (*Diadophis punctatus regalis*), desert rosy boa (*Lichanura trivirgata*), side-blotched lizard, tiger whiptail, tree lizard, Tucson shovel-nosed snake, zebra-tailed lizard, Sonoran Desert toad, Gambel's quail, roadrunner, burrowing owl, and night-blooming cereus (*Cereus sp.*) (Beier et al. 2008).

The results of the Linkage Design show four linkages between the Sierra Estrella and SDNM: three are linear linkages across Rainbow Valley, and a fourth heads south from the Sierra Estrella, crosses SR 347, and heads southwest to the SDNM (Figure 3-15) (Beier et al. 2008). Of the three linkages that cross Rainbow Valley, the northernmost linkage is entirely contained within the BLM-identified linkage. The central of the three linkages that cross Rainbow Valley overlaps the eastern and western portions of the BLM linkage. The southern Rainbow Valley linkage only overlaps the eastern portion of the BLM linkage at the southern tip of the Sierra Estrella. The central Rainbow Valley linkage is identified as the biologically best corridor for the bobcat, desert tortoise, Gila monster, javelina, and mule deer. The northern Rainbow Valley linkage is identified as the biologically best corridor for bobcat. The southern Rainbow Valley linkage is identified as the biologically best corridor for Gila monster and, to a limited extent, javelina. The biologically best corridor for bighorn sheep and mountain lion between the Sierra Estrella–SDNM linkage does not cross Rainbow Valley.

The overall connectivity goals for this region are to maintain wildlife movement corridors between the Gila Bend Mountains, Gila River Wildlife Area Complex, Buckeye Hills, Sierra Estrella Mountains, and the SDNM. The Rainbow Valley and Vekol Valley, to the south, have been identified as important core desert valley habitat for many reptile, amphibian, and mammal species, as well as a major landscape link between southern and northern Arizona. Waterman Wash and several of its east/west tributaries, which originate from the Sierra Estrella and Maricopa Mountains and flow to the Gila River, support xeroriparian habitat and ephemeral sources of water and are likely critical habitat and corridors for wildlife.

AGFD studies have identified several species crossing the EPNG pipeline road, which parallels the eastern border of the SDNM (AGFD 2008) and is located just west of the action alternatives. Track surveys have detected mule deer, kit fox, and javelina crossing the pipeline road (AGFD 2008).

3.11 LANDS AND REALTY

The following section discusses current conditions in terms of land ownership, land use planning, and current land uses, including existing ROWs. The analysis area for existing lands and realty includes the three proposed action alternatives and two sub-alternatives.

3.11.1 Applicable Laws, Regulations, and Policies

The following laws, regulations, and policies provide an overview of the direction guiding management of the BLM-administered lands in Arizona.

The primary legal basis for authorizing a ROW grant on BLM land is Section 501 of FLPMA. Under FLPMA, the Secretary of the Interior is authorized to grant, issue, or renew ROWs over, on, or through such land for utilities, roads, trails, highways, railroads, canals, etc. FLPMA provides the BLM with authority to issue ROW grants for the use, occupancy, and development of public lands. The regulations establishing procedures for processing these grants are found in 43 CFR 2800.

In addition to federal land plans, surrounding municipalities and governments have also passed laws, regulations, and policies that guide existing and future land use, municipal, and transportation planning. The City has proposed a major amendment to the *City of Goodyear General Plan 2003–2013* (City General Plan) (City 2003). The City General Plan Amendment (City 2007) guides future development of the SVPA area north of the community of Mobile. The area is located within the City's existing southern planning area (Patterson Road on the north extends approximately 2 miles south of SR 238 on the south), is coterminous with the Maricopa-Pinal County boundary on the east, and generally follows the SDNM boundary on the west. This amendment (City 2007) encompasses approximately 67 square miles of newly annexed land within Maricopa County.

MAG is a council of governments that serves as the regional agency for the metropolitan Phoenix area. MAG undertakes long-range planning and policy development on a regional scale, such as transportation, air quality, and human services. MAG has produced several regional transportation plans that include analysis and feasibility studies of a connecting route through the Rainbow Valley in the vicinity of the Sonoran Valley Parkway. Specifically, the MAG Hidden Valley Transportation Framework Study performed analysis and planning that would "define high capacity corridors, establish future principal arterial network(s), and recommend access management strategies" that would provide infrastructure to future development on newly annexed land (MAG 2009:2-1).

ARS 9-471 promulgates the responsibilities of Arizona municipalities for serving newly annexed land. It requires roads to be provided, basic municipal services to be offered, and public health and safety to be enforced on the annexed lands.

3.11.2 Analysis Area

The lands and realty analysis area for this project includes the 250-foot-wide ROW for each alternative alignment.

3.11.3 Land Ownership

The analysis area is located entirely within Maricopa County. Maricopa County covers approximately 5.9 million acres. Although Maricopa County is largely dominated by the Phoenix metropolitan area,

there are many rural, undeveloped desert lands within Maricopa County that are managed by federal, state, and local agencies. The land ownership of the proposed project includes BLM-administered land, ASLD State Trust land, and private land. Table 3-14 displays the land ownership acreages, and Figure 3-16 illustrates the land ownership within the analysis area for lands and realty.

Table 3-14. Sonoran Valley Parkway Project Planning Area Land Ownership

Land Ownership	Acreage	% of Total
Bureau of Land Management	824.5	70%
Arizona State Land Department	105.3	10%
Private	262.6	20%

For the portions of the proposed SVPP that are located on private lands, the City will need to acquire ROW from individual property owners. Private property owners will be compensated at market value for land that is acquired for the project ROW, in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended in 1987. For the portions of the proposed SVPP that are located on ASLD lands, the City will need to file applicable ASLD ROW applications, in accordance with ASLD Public Roadway Form (RW-RU) and ARS 37-281.02.

3.11.4 Land Use Planning

The project area and vicinity include several county and municipal land use planning areas that have set goals and policies to guide future land use and development. Chief among planning efforts is the City General Plan, as amended (City 2003, 2009b). Land use categories (or classifications) are generally determined by the local governments that have jurisdiction over the land. These categories are tools that provide standard language in the community planning process with which to derive a land use plan. The City has 17 land use categories, including residential, agricultural, and commercial classifications (City 2003).

The majority of the BLM-administered lands within the analysis area are within the planning area of the City General Plan Amendment (City 2007). In the City General Plan Amendment, the City describes the amendment necessary in order to enable the City the ability to provide southern vehicular access, emergency services, and mobility to the southern areas of its jurisdiction. In addition, the existing transportation system currently does not provide an outlet for the southern region of Goodyear. Although the corridor for SR 303L has been identified (to Riggs Road), the extension and outlet for this regional roadway have yet to be resolved (City 2007).

In addition to the City General Plan, the *City of Maricopa General Plan* (City of Maricopa 2006) is adjacent to the analysis area for lands and realty, located just southeast of the southern terminus for the SVPP. No land use planning prescriptions from the *City of Maricopa General Plan* would apply to the SVPP.

3.11.5 Current Land Uses

The Proposed Action (Alternative A) is located within an existing utility corridor (the EPNG multi-use utility corridor, as identified in the Lower Sonoran RMP), as shown on Figure 3-16. Figure 3-17 illustrates the existing uses of the EPNG multi-use corridor and their relationship to the Alternative A alignment. The 1-mile-wide, multi-use utility corridor runs roughly parallel to the northern boundary of the SDNM. Allowable uses within this multi-use utility corridor generally include roadways, transmission

lines, gas lines, and pipelines. This multi-use utility corridor has been identified by Section 368 of the Energy Policy Act of 2005 as a designated energy corridor, and the Lower Sonoran RMP acknowledges this designation.

Most of the BLM-administered lands in the analysis area are undeveloped. Some of these lands are encumbered by ROWs, leases, or permits. A ROW allows the use of a specific piece of public land for specific facilities and for a specific period. The majority of the ROWs are authorized under Title V of FLPMA, as amended, for structures, pipelines, and facilities to store and transport water, sewer, electrical, and communications systems; for flood control facilities; and for highways, roads, railroads, and other means of transportation. Other ROWs are also issued for natural gas pipelines under the Mineral Leasing Act of 1920, as amended (30 USC 181–287). The BLM's objective for ROW management is to meet public demand and reduce impacts to sensitive resources by providing an orderly system of development for linear projects and related facilities.

On January 17, 2001, President Clinton established the SDNM with Presidential Proclamation 7397. The Antiquities Act (16 USC 431) authorizes the President to "declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States." The SDNM area encompasses a functioning desert ecosystem with an extraordinary array of biological, scientific, and historic resources (Presidential Proclamation 7397 [66 *Federal Register* 14:7354–7358]). The SDNM is identified as an LUA exclusion area (BLM 2012a).

Government land records, such as master title plats, were reviewed to determine existing authorized uses of the public lands in the analysis area. Table 3-15 provides a list of existing ROWs and leases, with a brief description of each LUA. Table 3-16 provides a list of pending ROWs and leases for proposed uses of the analysis area for lands and realty.

Table 3-15. Existing Land Use Authorizations in the Analysis Area

Serial No.	Description	Legal Description (Township, Range, Section)
7397	Presidential Proclamation establishing SDNM	T2S, R2W, S34
AZA-24482	Road ROW	T3S, R2W, S3 T3S, R1W, S36 T4S, R1E, S6
A-21968	Oil/Gas pipeline ROW	T3S, R1W, S34
A-4287	Pipeline ROW	T3S, R2W, S14
AR-019018	Power line ROW	T3S, R2W, S14
AR-04860	Transmission line ROW	T3S, R2W, S2
PHX-086067	Gas pipeline ROW	T3S, R2W, S14
PHX-083253	Pipeline ROW	T3S, R2W, S14
AR-012431	Open land to mineral entry	T3S, R1W, S29
AZA-033350	Pipeline ROW	T3S, R1W, S29
A-1901	Transmission line ROW	T3S, R1W, S18
A-8459	Cathodic protection station	T4S, R1W, S3
AR-5-7	Open land to mineral entry	T4S, R1W, S2
PHX-027224	Railroad station ROW	T4S, R1E, S19
AR-04861	Transmission ROW	T2S, R2W, S35

Table 3-15. Existing Land Use Authorizations in the Analysis Area (Continued)

Serial No.	Description	Legal Description (Township, Range, Section)
AR-017896	Cathodic protection station	T3S, R2W, S11
AR-04502	Open land to mineral entry	T3S, R1W, S27
AR-5-12	Open land to mineral entry	T3S, R1W, S27

Source: BLM (2009a).

Table 3-16. Pending Land Use Authorizations in the Analysis Area

Serial No.	Description	Legal Description (Township, Range, Section)
AZA 034177	City of Goodyear	T3S, R2W, S10, 11
AZA 034117701	Alpha Geotechnical and Materials	T3S, R2W, S18–20, 28, 29, 33, 34

Source: BLM (2009a).

In addition to the authorized land uses identified in Table 3-15, lands in the analysis area are popular with residents and visitors to the area for outdoor recreation uses, including hunting, target shooting, back-country driving, mountain biking, natural and cultural resources study, and sightseeing. Agriculture, grazing, and transportation are also existing land uses within the project area.

Uses of notable lands adjacent to the analysis area influence how lands in the analysis area and vicinity will be used. In 2004, a large-scale, master-planned community entity, Amaranth Land, LLC, acquired land adjacent to the east and south of the analysis area with the intention of developing 10,000 acres. However, during the housing market recession of 2008 and 2009, the project was foreclosed on, and there are currently no development or construction plans by Amaranth Land, LLC, or any other known developers in the area.

3.11.6 Land Tenure

Land tenure refers to the actions that result in the disposal of public lands or the acquisition of non-federal land or interests. Since September 2008, real estate values and sales have decreased significantly in the analysis area for lands and realty (BLM 2012a).

The Lower Sonoran RMP identifies approximately 152 acres of BLM lands suitable for disposal within the EPNG multi-use utility corridor, near the center of the analysis area for lands and realty (see Figure 3-16). In addition, non-contiguous, mosaic-patterned BLM lands have been identified as suitable for disposal in the analysis area for lands and realty (see Figure 3-16).

3.12 LIVESTOCK GRAZING

3.12.1 Applicable Laws, Regulations, and Policies

Grazing Administration (43 CFR 4100) is the current guidance for administration of grazing on public lands, exclusive of Alaska.

The Taylor Grazing Act of 1934, as amended (43 USC 315–315r), was passed to prevent overgrazing and soil deterioration on public grazing land; to provide for their orderly use, improvement, and development; and to stabilize the livestock industry.

FLPMA requires that public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values and that, where appropriate, will preserve and protect certain public lands in their natural condition. It was passed to establish policy for managing BLM-administered public lands. To ensure long-term stability and use of BLM-administered public lands by the livestock industry, FLPMA authorized 10-year grazing permits and required a 2-year notice of cancellation. The act also directed grazing advisory boards (formed under the Taylor Grazing Act) to guide the BLM in developing allotment management plans and allocating range betterment funds.

The Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management were developed to achieve the four fundamentals of rangeland health outlined in the grazing regulations (43 CFR 4180.1), as follows: 1) watersheds are functioning properly; 2) water, nutrients, and energy are cycling properly; 3) water quality meets State standards; and 4) habitat for special-status species is protected.

The Public Rangelands Improvement Act of 1978 (USC 1901 *et seq*.) establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain, and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values, in accordance with management objectives and the land use planning process; charge a fee that is equitable for public grazing use.

Under Article 7-4 of the City of Goodyear Code, it is unlawful for livestock or other large animals to roam at large within the city limits north of Patterson Road. South of Patterson Road is open range, where livestock may roam freely, where permitted. An animal that is restrained within a fence is not considered at large. Therefore, areas used for livestock around the City should be fenced.

3.12.2 Analysis Area

The livestock grazing analysis area for this project includes the BLM Beloat and Conley authorized grazing allotments, which would be affected by the proposed project and alternatives.

3.12.3 Grazing Allotments

A large portion of the analysis area is classified by BLM as being able to support livestock grazing, and the majority of the land is currently under permit for livestock grazing. Livestock grazing on the analysis area is located within the Beloat and Conley grazing allotments on the Phoenix District of the Lower Sonoran Field Office. These allotments are depicted in Figure 3-18. An AUM refers to the amount of forage necessary to feed one animal unit for a period of 1 month. An animal unit is defined as one mature cow of approximately 1,000 pounds and a calf up to weaning age, usually 6 months, or their equivalent of other animals. Ephemeral authorization is in addition to the year-long grazing preference currently permitted in the 10-year grazing permit (USFWS 2001). The number of animals authorized for ephemeral use varies greatly between years and between allotments, depending on forage production, market conditions, and availability of steers.

The Beloat Allotment contains a combination of BLM, State, and private lands over approximately 176,652 acres, 101,111 acres of which is administered by the BLM. The allotment is designated as

perennial/ephemeral, which means that it may run a year-long livestock operation of approximately 280 cattle, but can apply to temporarily put out more livestock if climatic conditions produce abundant ephemeral forage. The Beloat Allotment is permitted for livestock grazing on both the SDNM and the Lower Sonoran Field Office portions of the allotment. However, there is currently no continuous fence along the pipeline to separate the Lower Sonoran Field Office portion from the SDNM portion. The SDNM portion of the Beloat Allotment consists of 33,600 acres of BLM lands available for grazing (BLM 2012b). Each of the alternatives would create a different pasture design and would include or exclude certain livestock water sources, depending on the alternative. Therefore, each alternative requires a different mitigation scenario (discussed in Section 4.12, Livestock Grazing).

The Conley Allotment contains a combination of BLM, State, and private lands over approximately 118,466 acres, 91,018 acres of which is administered by the BLM. Similar to the Beloat Allotment, the Conley is also designated as a perennial/ephemeral allotment. The portion of the Conley Allotment within the SDNM, consisting of 77,485 acres, was closed to livestock grazing in the 2012 SDNM RMP. However, livestock grazing is permitted on the Lower Sonoran Field Office portion of the Conley outside the monument boundaries and within the project area. Each of the alternatives would create a different pasture design but is unlikely to affect any livestock waters. Nevertheless, each alternative requires a different mitigation scenario (as discussed in Section 4.12, Livestock Grazing).

The actual year-long use on these two allotments varies from year to year, based on resource and livestock market conditions.

Vegetation throughout the area, including on all three alternative routes, is sparse and dominated by creosotebush and triangle bursage. Cacti species, including barrel cactus and saguaro, are present within the analysis area but at low densities. Xeroriparian vegetation is present along the ephemeral drainages, including Waterman Wash, and these areas contain the majority of the tree species that are present within the project area. Tree species present in the project area include velvet mesquite, blue paloverde, desert ironwood, and crucifixion thorn. Other plant species in the area include range ratany, white bursage, big galleta, and annual forbs and grasses.

3.12.4 Livestock Movement

Livestock movement within the Beloat and Conley allotments is currently controlled by pasture fencing and livestock waters. The pasture fencing is a permanent fence constructed of multiple strands of barbed wire and is intended to allow specific areas of pasture to be grazed while ensuring that other pasture areas rest and re-grow. To facilitate livestock movement, livestock waters can be turned on and off to draw the livestock to specific areas of the pasture to be grazed (personal communication, Lambeth 2009). Except for boundary fences, there is currently little pasture fencing within the project area on either the Beloat or the Conley allotments. Figure 3-18 shows the current range improvements, including fences and water sources. Most of the wells shown in Figure 3-13 are on private lands and are not available for livestock grazing.

3.13 RECREATION MANAGEMENT

The recreation opportunity and setting are provided and managed by local, state, and federal agencies on the public lands within and adjacent to all action alternatives and sub-alternative alignments for the SVPP. These recreation activities cover a broad spectrum of recreational pursuits, from dispersed and casual recreation to organized, BLM-permitted group uses. Typical recreation uses in the area of analysis include OHV driving, hunting, hiking, wildlife viewing, horseback riding, target shooting, camping, mountain biking, geocaching, picnicking, night-sky viewing, scenic driving, and photography. The analysis area's

proximity to metropolitan Phoenix enables large numbers of the public to access BLM and other public lands easily and conveniently.

3.13.1 Applicable Laws, Regulations, and Policies

Under Section 201 of FLPMA, the BLM has the authority to inventory resources or other values, including recreation. Section 201 of FLPMA states that "the secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including but not limited to outdoor recreation and scenic values), giving priority to areas of critical environmental concern" (43 USC 1711[a]). Section 202 of FLPMA provides the authority, through the land-use planning process, to consider management of lands for their recreation opportunities.

The analysis area lies within BLM-administered, ASLD State Trust, and private land. Most private land in the analysis area is dedicated to agriculture, but some private land is also used for dispersed recreation such as hunting. In these cases, users would require permission from the landowner to recreate on the land. ASLD State Trust land is also available for dispersed recreation; however, a recreation permit is required to camp, hike, or travel on State Trust land that is designated as open for recreation (ASLD 2009).

Presidential Proclamation 7397 required the preparation of "a management plan that addresses the actions, including road closures or travel restrictions, necessary to protect the objects identified." The required RMP for the SDNM was completed in September 2012.

The SVPP alternatives are consistent with the public lands not designated as recreation management areas (RMAs) described in the Lower Sonoran RMP (BLM 2012a). Public lands that are not designated as RMAs are managed to meet basic Recreation and Visitor Services and resource needs. Recreation is not emphasized; however, recreation activities may occur. The Recreation and Visitor Services resources are managed to allow recreation uses that are not in conflict with the primary uses of these lands.

The BLM OHV management regulations are guided by 43 CFR 8341.1(a). Hunting in the area of analysis is managed and enforced by the AGFD. The recreation management area of analysis includes GMU 39.

3.13.2 Analysis Area

The recreation management analysis area for this project includes the Rainbow Valley, bounded by SDNM to the west, SR 238 to the south, the Sierra Estrella Mountains to the east, and rural Goodyear to the north. Recreation occurs throughout the analysis area.

3.13.3 Recreation Management—Settings and Opportunities

There are a number of local recreation opportunities under federal, state, tribal, and local management in the vicinity of the proposed SVPP (Figure 3-19). In addition to the BLM Lower Sonoran Field Office, managing agencies include the Maricopa County Parks and Recreation, AGFD, USFWS, and local Tribal governments. However, only BLM, AGFD, and ASLD manage for recreation within the analysis area. The Maricopa County Parks and Recreation, USFWS, and local tribal governments that manage recreation in the vicinity are all located outside the recreation management analysis area.

3.13.3.1 BLM Recreation Areas

The BLM Lower Sonoran Field Office offers an abundance of both developed and dispersed recreation opportunities throughout the region surrounding Phoenix, as well as local areas neighboring the analysis area. BLM also issues special recreation permits on a case-by-case basis for certain activities that use BLM-administered land. Currently, there are no special recreation permits issued in the recreation management analysis area; however, multiple special recreation permits are issued adjacent to the analysis area in the SDNM.

BLM land is managed under multi-use mandates set forth in FLPMA. Accordingly, public users may use BLM land for recreation.

For the purpose of recreation management, the Lower Sonoran RMP identifies public lands by special recreation management areas (SRMAs), as required by IM 2011-004. Additional management areas such as recreation management zones (RMZs) or special management areas (SMAs) can also be prescribed on public lands. No RMZs or SRMAs are present within the recreation management analysis area.

SRMAs are areas for which more intensive recreation management is needed because of their high usage and for which recreation is a principal management objective. Public lands not designated as RMAs constitute all public lands outside SRMAs and other special designation areas. These include areas where recreation is nonspecialized and dispersed and does not require intensive management or developed facilities. Recreation may not be the primary management objective, and recreational activities are subject to fewer restrictions in public lands not designated as RMAs.

The BLM manages land in the analysis area as public lands not designated as RMAs. The Lower Sonoran RMP (BLM 2012a) describes recreation uses in public lands not designated as RMAs as providing dispersed recreational opportunities such as rock climbing, hiking, hunting, camping, sightseeing, rock collecting, and OHV use. The goals are to provide primitive facilities for resource protection, visitor safety, and/or improvement or increase of recreational opportunities. The total acreage of public lands not designated as RMAs in the Lower Sonoran RMP is approximately 550,800 acres. The total public lands not designated as RMAs acreage within the recreation management analysis area is approximately 824 acres. Generally, recreation settings are remote, and access is by unmaintained, primitive roads that require high-clearance, often four-wheel-drive, vehicles. Facilities are small and primitive, recreation use is dispersed over the landscape, and BLM staff rarely makes contact with visitors (BLM 2012a).

Chief among BLM recreation opportunities around the analysis area is the SDNM. Established in 2001, the SDNM provides users with opportunities for dispersed recreation in relatively undisturbed settings. Hiking, biking, horseback riding, camping, wildlife viewing, target shooting, hunting, picnicking, and night sky viewing are all popular recreational pursuits in SDNM. OHV use is also a very popular activity, but the SDNM limits OHV use in many areas, particularly wilderness areas and areas that have been degraded from misuse. The BLM Phoenix District office recently closed many routes temporarily in the SDNM to prevent further resource degradation (BLM 2008b). The majority of these closed routes were accessed via the pipeline road that parallels the northern/eastern boundary of SDNM, approximately 400 feet south of the location of the proposed SVPP Alternative A alignment. Cultural and historical interpretation is also a common recreational pursuit in the SDNM. The SDNM contains at least three historically significant national trails: the Juan Bautista de Anza NHT, Mormon Battalion Trail, and Butterfield Overland Stage Route.

BLM-administered land within the analysis area outside the SDNM (see Figure 3-19) is also widely used for recreational pursuits. Common activities include hunting, target shooting, OHV driving, and camping. Hunting is common in the agriculture fields, along canals, and near desert washes. Dove and quail

hunting is most common; however, varmint and small-game hunting also occurs (i.e., coyote, rabbit, and javelina). Big-game hunting for mule deer and desert bighorn sheep is limited in the analysis area but does occur in adjacent areas such as the Buckeye Hills and in the SDNM.

Target shooting is common in the analysis area, particularly in areas that provide a slope or backdrop to absorb ordnance such as hillsides or wash banks. It is the policy of the BLM to allow the safe use of firearms on public lands as long as such activity is permitted by federal, state, and local laws. There are no designated target shooting sites managed by the BLM within the analysis area. Shooting is strictly prohibited in some areas because of high public use and resource concerns. Target shooting is prohibited in areas within 0.25 mile of residences.

OHV driving is limited to open routes; cross-country travel is prohibited, as specified in the Lower Sonoran RMP. Refer to Section 3.14, Travel Management, for discussion of current open route use.

Dispersed camping is an allowable use throughout BLM-administered land, as long as it does not occur within 0.25 mile of a designated wildlife water source and does not cause or result in new damage to vegetation, soils, or other resources. To prevent damage to sensitive resources caused by continual use of any particular area, camping cannot occur for more than a period of 14 days within any 28-consecutive-day period. Most camping occurs in the eastern portion of the analysis area in the foothills of the Sierra Estrella Mountains.

The BLM compiles visitor-use statistics in accordance with IM No. 2003-245 in the Recreation Management Information System (RMIS). RMIS, in conjunction with separate studies and analysis, provides indicators for recreational use trends that aid the BLM in management decisions and prescriptions. RMIS data do not exist for BLM land within the area of analysis; however, there are RMIS data for the SDNM.

3.13.3.2 County Recreation Areas

The Maricopa County Parks and Recreation Department owns and operate two parks north of the analysis area. Buckeye Hills Regional Park is located approximately 5 miles northwest of the northern terminus of the analysis area, and Estrella Mountain Regional Park is located approximately 5 miles northeast of the northern terminus of the analysis area.

Estrella Mountain Regional Park is composed of 19,840 acres of desert mountainous terrain. The recreation setting varies from developed pavilions with electricity to remote, undeveloped backcountry trails. Located near the meeting of the Gila and Agua Fria Rivers, the park includes a large wetland, or riparian, area. The majority of the park remains pristine desert. Many amenities are available to visitors, including the only grass picnic area in the Maricopa County Park System (Maricopa County 2009). Most recreation opportunities in Estrella Mountain Regional Park consist of developed recreation—making use of the picnic areas, pavilions, and easily accessible walking paths.

Buckeye Hills Regional Park consists of 4,474 acres of natural desert. The recreation setting includes the rolling hills of pristine Sonoran Desert, with beautiful views of the Gila River riparian area. The park has restrooms, but currently no running water or electricity is available in the park (Maricopa County 2009). The recreation opportunities in Buckeye Hills Regional Park cater to dispersed recreation, such as hiking, hunting, wildlife viewing, and horseback riding.

3.14 TRAVEL MANAGEMENT

As previously discussed, in 2007 the City annexed 67 square miles of its MPA, south of the current city limits, to include an area bounded to the northeast and east by the Sierra Estrella Mountains, Estrella Mountain Regional Park, and the Gila River Indian Community and to the west and southwest by the SDNM. A large network of roadways serves the travel management needs within the city and Maricopa County, which are coordinated by the City, MAG, and, in some cases, MCDOT and ADOT. The City has determined that a major arterial road (the Sonoran Valley Parkway) is needed to provide more direct access to the greater Phoenix metropolitan area for traffic to and from the new MPA near the community of Mobile and the city of Maricopa.

From a transportation perspective, the proposed SVPP would enable the City to establish the necessary north-south corridors to move traffic efficiently in the region. The scope of the analysis for travel management resources includes a discussion of the current transportation network within the footprint of the action alternatives and also includes a 2-mile buffer area. The analysis describes the existing network in terms of state highways, county roads, municipal roads, BLM roads, utility company access roads, and other private roads, in addition to current highway and road usage, including traffic counts, roadway capacity, and level of service.

3.14.1 Applicable Laws, Regulations, and Policies

The BLM (2005a) Land Use Planning Handbook (H-1601-1) and BLM (2008a) NEPA Handbook (H-1790-1) specify that travel management resource issues must be considered for all BLM land use planning decisions and NEPA documents.

Because the south end of the proposed action alternative connects to SR 238, the legal responsibilities of ADOT, as established under 28 ARS 7, would apply. It is within the framework of these statutes that ADOT plans, constructs, and maintains a safe, efficient, and modern transportation system.

It is possible that small portions of the proposed Parkway would be located in unincorporated areas of Maricopa County at the time of construction. Accordingly, construction documents for those portions of the project lying within the county at the time of the final design phase will be processed through the MCDOT for review, approval, and issuance of construction permits. MCDOT provides county-wide transportation planning and roadway construction to resolve rural and urban transportation issues and provides maintenance of the Maricopa County transportation system. The MCDOT (2004) *Roadway Design Manual* contains the design standards that govern all construction and reconstruction of transportation facilities in the Maricopa County ROW.

Final design and engineering of the Sonoran Valley Parkway is not included in this EIS analysis and will occur at a later time, subsequent to the issuance of a BLM decision. The City Engineering Department is responsible for the design, review, and inspection of the City's capital infrastructure, including grading and drainage, water, sewer, storm drains, stormwater retention, and streets. The City Engineering Department reviews site plans, preliminary and final plats, rezoning requests, special use permits, construction drawings, and water, sewer, traffic, and drainage master plans. It also issues construction permits and easements and assigns street names and addresses (City 2009c).

3.14.2 Analysis Area

The analysis area for travel management was determined to be within 2 miles (either side) of the alternatives. The linear and often regional nature of roads and transportation corridors may result in the

effect that traffic could be discernible beyond 2 miles (e.g., traffic congestion); however, for the purposes of this study and given the relatively rural or exurban nature of the project area, a 2-mile buffer was determined to provide a sufficient area of analysis.

3.14.2.1 Highways and Road Descriptions

Following is a comprehensive list of all existing transportation systems within 2 miles of the project area. The systems described include state highways, county roads, BLM roads, utility company access roads, and other private roads in the SVPP analysis area.

State Highways

SR 238 is the only highway located within the analysis area. All three action alternatives (Alternatives A, C, and H) terminate at and connect with SR 238 near the community of Mobile. SR 238 is a state highway maintained and managed by ADOT that stretches roughly east-west across central Arizona. SR 238 connects the city of Maricopa with the town of Gila Bend, a distance of roughly 50 miles. SR 238 serves as a means of access to the SDNM and is a commonly used route for residents of the southern part of the Phoenix metropolitan area to travel to southwestern Arizona (Yuma, Arizona) and southern California (San Diego, California).

Maricopa County Roads

The Major Streets and Routes Plan Policy, used by MCDOT (2004) to classify county streets, includes six classifications, including expressways, principal arterials, minor arterials, major collectors, minor collectors, and local streets. Most recently, MCDOT, as well as other transportation planning entities within the region, have identified the need for a Parkway classification or a non-freeway restricted access roadway facility option to meet growing traffic capacity needs in rural and exurban areas. MCDOT has developed standards for Parkway design as well as general Parkway capacity measures as part of the functional roadway classifications (Enhanced Parkway Study, MCDOT 2007). Additionally, MCDOT has completed a further study of Parkway design standards in August 2008 titled, *Design Guideline Recommendations for the Arizona Parkway*. The proposed project area and analysis area are located within a sparsely developed network of existing roads (Figure 3-20). Within the analysis area, there are 11 roads classified by Maricopa County: Ocotillo, Chandler Heights, Riggs, Perryville, Rainbow Valley, Reems, Patterson, and Bullard Roads, Cotton Lane, and Sarival and 99th Avenues (MCDOT 2004: Map 14).

Riggs Road is the only road in the analysis area classified as a “principal arterial” road. A principal arterial road provides for long-distance traffic movement within Maricopa County or between Maricopa County and urban areas. Service to abutting land is limited. Access is controlled through frontage roads, raised medians, and the spacing and location of driveways and intersections. Opposing traffic flows are separated often by a raised median. Riggs Road, which runs east-west, is the northern terminus of all three action alternatives.

Bullard Avenue, Patterson Road, and 99th Avenue are classified as “minor arterials” within the analysis area. A minor arterial street provides for moderately long-distance traffic movement within Maricopa County or between Maricopa County and urban areas. Moderate access is provided to abutting land. Access is controlled through frontage roads, raised medians, and the spacing and location of driveways and intersections. A raised median or a continuous left-turn lane separates opposing traffic flows. Alternative C runs east-west along Patterson Road, then north-south along Bullard Avenue. Alternatives A and H bisect Bullard Avenue. Although 99th Avenue is located within the analysis area, none of the proposed action alternatives intersect it.

Ocotillo Road, Chandler Heights Road, Reems Road, Sarival Avenue, Cotton Lane, Rainbow Valley Road, and Perryville Road are classified as "minor collectors" within the analysis area. A minor collector road provides for short-distance (less than 3 miles) traffic movement, primarily functions to collect and distribute traffic between local streets and arterial streets, and provides direct access to abutting land. The spacing and location of intersections and driveways may control some access.

All three action alternatives run north-south along Rainbow Valley Road for approximately 1.5 miles at the north end of the project area. Although Ocotillo Road, Chandler Heights Road, Reems Road, Sarival Avenue, Cotton Lane, and Perryville Road are located within the analysis area, north of the action alternatives, none of the action alternatives intersect them.

Bureau of Land Management Roads

There are numerous routes in the analysis area that have been inventoried and mapped by the BLM (personal communication, Belke 2009). These routes vary from asphalt-paved roads to gravel, sand, or soil surfaces. There are more than 30 miles of BLM-inventoried roads within the analysis area (Figure 3-21). Most of these roads are unnamed, unpaved routes; however, several overlap City and County roads such as Riggs Road, South Road, 187th Avenue, 99th Avenue, SR 238, Patterson Road, 171st Avenue, and Bullard Avenue. Table 3-17 summarizes the total miles of roads within the analysis area.

Table 3-17. Miles of Roads in the Analysis Area, by Route Type

Route Type	Length (Miles)
Primary road paved	1.22
Primary road unpaved	1.65
Secondary road unpaved	8.21
Tertiary road unpaved	20.66
Reclaiming	0.81
Total	**32.55**

The following section describes the BLM road classifications found within the analysis area, according to the Arizona Route Inventory Data Dictionary (BLM 2003).

A "primary road paved" is a major/minor highway that provides access between major points and generally serves a large area, with many roads branching from the route. A "primary road unpaved" is a regularly maintained road wide enough for at least two vehicles that also provides access between major points, serves a large area, and has many roads that branch off of it.

A "secondary road unpaved" is generally a regularly maintained one-lane road, with other roads of lesser quality branching from it; this route type connects primary roads, and major points. A "tertiary road unpaved" usually consists of a two-track road that may or may not be usable by a two-wheel drive vehicle; formal maintenance is not typically performed on this type of route.

A "reclaiming" road has not been used enough and has intact woody vegetation growing in it that would be damaged by the passage of a vehicle. Erosion and vegetation may block the way, cause the vehicle to get stuck, and/or cause damage to the vehicle.

BLM routes in the analysis area are used for accessing agricultural fields, livestock operations, utility and communication facilities, and range and wildlife developments; they are also increasingly being used by the public for accessing recreation areas such as the Sierra Estrella Mountains and the SDNM. It is

important to note that of the 32.5 miles, 11.1 miles are located within the SNDM; motorized access on these roads is currently prohibited. Figure 3-21 illustrates where access to BLM roads would be retained if the Parkway is constructed, and is discussed in Section 4.14 Travel Management.

Utility Company Roads

There are three linear utilities located within the analysis area: the EPNG Line, Transwestern Pipeline, and El Paso Corporation (El Paso) Transmission Line (Salt River Project 500 kilovolts [kV]). Each of these utility lines is located between the SDNM and the proposed action alternatives; each line also has an associated unpaved access road that parallels the lines.

Some residents of Mobile, as well as others from outside the community, have been using the unpaved EPNG pipeline maintenance road to travel to and from Mobile and the greater Phoenix metropolitan area. The maintenance road runs northwest-southeast and generally parallels the eastern boundary of the SDNM; public use of this road is not authorized by EPNG. The unpaved Transwestern Pipeline access road and El Paso Transmission Line access roads are relatively new lines and access roads, but they also provide a degree of unauthorized access between Mobile and southern Goodyear. None of the action alternatives actually intersects these access roads; however, if one of the action alternatives is implemented, construction of the Parkway could alleviate some of the traffic concerns along these roads.

Other Private Roads

Private roads are owned and maintained by a private individual, organization, or company, rather than by a government. Consequently, unauthorized use of the road may be considered trespassing, and some of the usual rules of the road may not apply. No known private roads intersect any of the action alternatives. Most of the lands surrounding the action alternatives, within the analysis area, are BLM- and State-managed lands. Therefore, although there are several roads used to access private residences and agricultural lands, as well as the Butterfield Station Landfill, most of these roads are not privately owned.

Highways and Road Usage

Traffic volume is an important component for determining what improvements, if any, are required on a highway or street facility, as well as what traffic may result from a proposed Parkway, such as the proposed Sonoran Valley Parkway. Traffic volumes are often expressed in terms of average daily traffic or design hourly volumes. Hourly volumes may be used to calculate the service flow rate, which is typically used to evaluate design alternatives.

Existing Traffic Volume (Counts)

The following discussion focuses on existing traffic volume, based on average annual daily traffic (AADT). According to ADOT, AADT is the annualized average 24-hour volume of vehicles at a given point or section of highway. It is calculated by determining the volume of vehicles during a given period and dividing that number by the number of days in that period (ADOT 2009a). AADT is more commonly known as a traffic count and provides an accurate estimation of vehicular roadway use.

Table 3-18 lists 2008 AADT traffic volumes by vehicles per day (vpd) for SR 238, Rainbow Valley Road, and Bullard Avenue within the analysis area. No traffic counts are provided by ADOT or MCDOT for other analysis area roads. SR 238 has the highest traffic volume, particularly eastbound traffic between MC 85 (at SR 347) and Hidden Valley Road to the west.

Table 3-18. Existing Traffic Volumes

Route	Beginning	Ending	2008 AADT
SR 238	Maricopa Road (7 miles west of Mobile)	Hidden Valley Road	1,941 vpd*
SR 238	Hidden Valley Road	SR 347/Smith Enke Road	5,731 vpd*
Rainbow Valley Road	At Queen Creek Road	–	399 vpd†
Bullard Avenue	At Patterson Road	–	56 vpd†

* Source: ADOT (2009b).
† Source: MCDOT (2009).

Access

No continuous system of pedestrian, bicycle, or equestrian facilities currently exists within the proposed area of analysis. Currently, only one fixed route bus service exists within the analysis area (Ajo/Gila Bend to Phoenix Connector). No other bus routes operate within the limits of Maricopa or Mobile. Valley Metro operates the public transportation system (bus and light rail) throughout metropolitan Phoenix and surrounding cities such as Goodyear. Valley Metro operates buses within Goodyear but not in the SVPA. Paratransit is available as a complementary transportation service for qualified persons as required by the Americans with Disabilities Act. The closest paratransit service within the analysis area is the Ajo/Gila Bend to Phoenix Connector (Route 685). This bus route is a dial-a-ride service.

The closest Greyhound bus station is in Casa Grande, and the closest taxicab companies serve Maricopa and Mobile from Chandler or Casa Grande. One shuttle service operates on an on-call basis from the Maricopa Amtrak station to the metropolitan Phoenix area.

In general, the project ROW and analysis area are relatively inaccessible. Although there is a network of roads at the north end of the analysis area and another at the south end near Mobile, no formal access is available in this area. As previously discussed, the members of the public routinely use the area utility corridor access roads (EPNG gas line, Transwestern pipeline, and El Paso Transmission line) to access areas in southern Goodyear and in the city of Maricopa and for recreational pursuits in the region.

Further discussion of future and planned roadways within the analysis area is included in the Travel Management cumulative impacts analysis in Chapter 4, Environmental Effects.

A combination of highways, arterial streets, and BLM roads provide access to the BLM lands within and surrounding the analysis area. Multiple unpaved BLM roads provide access to SDNM, BLM lands available for dispersed recreation within Rainbow Valley, and the Sierra Estrella Wilderness.

3.15 SPECIAL DESIGNATIONS

The BLM, through previous inventory and land planning efforts, has identified areas of public land for special designation throughout the Lower Sonoran Field Office as part of the National Landscape Conservation System. Special designations include national monuments, wilderness areas, wilderness study areas, areas of critical environmental concern (ACECs), SRMAs, SMAs, backcountry byways, and national historic or scenic trails (BLM 2005b). The BLM established the National Landscape Conservation System in 2000 to increase public awareness of the scientific, cultural, educational, ecological, and other values present within certain special designations (BLM 2004a).

The overall acreages and summary of the resource values protected by each designation within the analysis area are presented in Table 3-19. No acreage values have been associated with the Juan Bautista de Anza NHT because the exact trail alignment is unknown in certain areas. Rather, a corridor identifies where the trail may have been. Acreages in Table 3-19 have been derived from the best available GIS data unless otherwise stated. As a result, there may be some variation from acreages in previous documents.

Table 3-19. Sonoran Valley Parkway Project Analysis Area: BLM Special Designations

Designation	Acreage	Purpose of Designation
Sonoran Desert National Monument	486,400	Landscape-scale protection of unique natural and cultural resources
North Maricopa Mountains Wilderness Area	63,200	Wilderness resources
South Maricopa Mountains Wilderness Area	60,100	Wilderness resources
Sierra Estrella Wilderness Area	14,400	Wilderness resources
Lower Gila Terraces and Historic Trails ACEC	82,500	Historic significance/interpretation
Juan Bautista de Anza NHT	N/A	Historic significance/interpretation

Source: BLM (2012).

3.15.1 Applicable Laws, Regulations, and Policies

The Lower Sonoran RMP (BLM 2012a) is the current guiding document for the BLM's Lower Sonoran Field Office. The Lower Sonoran RMP guides the management of all BLM-administered land in the project area.

Special designations on BLM-administered land are managed under a variety of laws, regulations, and policies (refer to Chapter 1, Relationship to Policies, Plans, and Programs). Wilderness areas are managed by law under 43 CFR 6300. National monuments are generally managed by the proclamation under which they were designated. Proclamation 7397 designated the SDNM in 2001. The BLM system of national trails is regulated under 43 CFR 8351.1.

3.15.2 Analysis Area

The special designations analysis area for this project includes three designated wilderness areas, one national monument, one national historic trail, and a trail corridor that follows the historic Butterfield Overland Stage Route and Mormon Battalion Trail (Figure 3-22), as specified in the Lower Sonoran and SDNM RMPs. The analysis area for special designations is not a defined polygon but rather any topographic point within the wilderness areas or SDNM where sights or sounds from the SVPP may be experienced by a visitor. Special designations included in this affected environment all occur within a 5-mile buffer surrounding the analysis area.

3.15.3 Sonoran Desert National Monument

The SDNM, located immediately west and south of the proposed Sonoran Valley Parkway (see Figure 3-22), was established by President Clinton via Presidential Proclamation 7397 on January 17, 2001. The SDNM RMP was completed in September 2012.

The SDNM contains more than 487,000 acres of Sonoran Desert landscape. The Sonoran Desert is the most biologically diverse of the North American deserts, and the SDNM exemplifies this desert setting. The most striking aspect of the plant community within the monument is the extensive saguaro cactus forest. The monument contains three distinct mountain ranges—the Maricopa, Sand Tank, and Table Top Mountains—as well as the Booth and White Hills, all separated by wide valleys. The monument is also home to three Congressionally designated wilderness areas, many significant archaeological and historic sites, and remnants of several important historic trails.

Although fairly remote, the SDNM is approximately 50 miles from the Phoenix metropolitan area and experiences a wide variety of uses, such as OHV use, hiking, horseback riding, and camping. Visitation to the SDNM is higher in the winter months because of the extremely high summer temperatures.

Management concerns have arisen in recent years as more and more visitors seek out the resources and resource uses the SDNM has to offer. As a response to the increased visitation and subsequent resource damage, the BLM has issued several route closures in the region surrounding the action alternatives. The BLM and its volunteers will begin to repair damaged roads, restore lands damaged from illegal off-road use, create undeveloped camping and parking sites, reseed vegetation, and install information signs, maps, and visitor information stands. As each area is restored, the temporary road closures will be opened in stages, starting in 2 to 3 years (BLM 2008b). The temporary road closure became necessary when increased popularity and abuse by some users led to persistent damage of the vegetation and the natural and cultural resources for which the SDNM was designated in 2001.

The SDNM RMP (BLM 2012b) provides the management planning goals, objectives, and resource management prescriptions for the SDNM.

3.15.4 Designated Wilderness Areas

The BLM in Arizona is responsible for 47 wilderness areas totaling 1.4 million acres. Congress established these areas through the Arizona Wilderness Act of 1984 and the Arizona Desert Wilderness Act of 1990.

There are three designated wilderness areas within the special designations analysis area for the proposed SVPP (see Figure 3-22); two are inside the SDNM immediately west of the three action alternatives and two sub-alternatives, and one is in the Sierra Estrella Mountains, east of the analysis area. BLM manages these wilderness areas in accordance with the *Maricopa Complex Wilderness Management Plan, Environmental Assessment, and Decision Record* (BLM 1995). These wilderness areas currently provide a standard of solitude and naturalness that ranges from good to outstanding. They contain little to no evidence of surface disturbance, other than former vehicle ways and scattered prospect pits, the majority of which appear in the North and South Maricopa Mountains wildernesses (BLM 1995).

3.15.4.1 North Maricopa Mountains Wilderness Area

The 63,200-acre North Maricopa Mountains Wilderness Area includes roughly the northern one-third of the North Maricopa Mountains. The North Maricopa Mountains Wilderness Area is located within the SDNM, west of the proposed Sonoran Valley Parkway (see Figure 3-22). The northern boundary is a combination of jeep trails, washes, grazing allotment division fences, and a prominent ridge. The southern boundary is on the historic Butterfield Overland Stage Route (see Section 3.13.4.2). The wilderness area is bounded by a 250-kV power line ROW to the west and by another jeep trail to the east. High-clearance and four-wheel-drive vehicles are required to access the North Maricopa Mountains Wilderness Area.

The North Maricopa Mountains are a jumble of long ridges and isolated peaks separated by extensive saguaro-studded bajadas and wide desert washes. Cholla, ocotillo, prickly pear, paloverde, ironwood, and Mexican jumping bean complement the thick stands of saguaro to form classic Sonoran Desert vistas. Commonly seen wildlife includes desert mule deer, javelina, desert bighorn sheep, coyote, desert tortoise, and numerous varieties of lizards and birds (BLM 2009a).

Most users approach the wilderness area from the west side of the SDNM, via MC 85 and the Gila Bend area. In June 2008, BLM closed many routes in SDNM surrounding the North Maricopa Mountains Wilderness Area to motorized use as a result of resource damage (BLM 2008b).

There are two designated trails within the North Maricopa Mountains Wilderness Area. Margie's Cove Trail is located in the heart of the North Maricopa Mountains Wilderness Area. Margie's Cove Trail follows a combination of former vehicle tracks and wide, unmarked desert washes. No trail signage or directional markers are available along the route; therefore, this trail is recommended only for experienced hikers skilled in reading topographic maps. Margie's Cove West Trailhead includes day-use parking for 10 vehicles, three campsites with picnic tables and steel fire rings, a vault toilet, and informational signage. Margie's Cove East Trailhead has day-use parking for five vehicles and informational signage. Access to Margie's Cove East is located north of SR 238 near the southeast corner of the Maricopa Mountains Wilderness Area. Margie's Cove Trail intersects the northern terminus of the Brittlebush Trail in the interior of the North Maricopa Mountains Wilderness Area.

The Brittlebush Trail follows a combination of former vehicle tracks and wide, unmarked desert washes. No trail signage or directional markers are available along the route; therefore, this trail is recommended only for experienced hikers skilled in reading topographic maps. The northern terminus of the Brittlebush Trail intersects the Margie's Cove Trail in the interior of the North Maricopa Mountains Wilderness Area. There is currently no motorized access to the area because of a temporary vehicle closure on the SDNM. Non-motorized access to hiking, bicycling, or horseback is available from SR 238 (BLM 2009a).

3.15.4.2 South Maricopa Mountains Wilderness Area

The 60,100-acre South Maricopa Mountains Wilderness Area includes roughly the southern one-third of the Maricopa Mountains range. This wilderness includes 13 miles of the Maricopa Mountains range, a low-elevation Sonoran Desert range, and extensive desert plains. Because access road conditions vary, high-clearance and four-wheel-drive vehicles are recommended. I-8 parallels the southern boundary of the wilderness area but offers no access to the wilderness. The northern boundary can be accessed from primitive dirt roads south of SR 238, but active railroad tracks and ROWs restrict public crossings. No roads lead to the western and eastern boundaries of the wilderness (Figure 3-22).

The eastern part of the wilderness has an isolated and screened mountainous interior, formed by long ridges and isolated peaks separated by plains and washes. The western part is dominated by desert flats that front the east-west-trending Maricopa Mountains ridgeline.

This area's large size, varied landforms, and wildness provide outstanding opportunities for solitude and primitive recreation. Hiking, backpacking, horseback riding, camping, wildlife observation, and photography are some activities both experienced and family-oriented outdoor enthusiasts can enjoy. Desert bighorn sheep, desert tortoise, coyotes, bobcat, fox, deer, Gambel's quail, and various raptors also inhabit the wilderness. Saguaro, cholla, and ocotillo, paloverde, and mesquite are among the many plant species there.

There are no designated trails within the South Maricopa Mountains Wilderness Area.

3.15.4.3 Sierra Estrella Wilderness Area

The 14,400-acre Sierra Estrella Wilderness Area includes roughly one-fourth of the Sierra Estrella Mountains. It is bounded on the north and east by the Gila River Indian Community. The western boundary is a combination of a power line ROW and a jeep trail. The southern boundary is a wash located at the toe of a steep ridge (see Figure 3-22). Four-wheel-drive vehicles are required to reach the Sierra Estrella Wilderness Area. The knife-edged ridgelines, steep slopes, and rough, rocky canyons provide challenges for hikers, backpackers, climbers, and hunters. Butterfly Mountain rises 2,600 feet above the desert plain to an elevation of 4,119 feet in just 2 miles. The Quartz Peak Trail goes to the summit of the Sierra Estrella Mountains.

The extreme differences in elevation have given rise to diverse plant and animal communities. Plants in lower areas include saguaro and cholla, ocotillo, paloverde, and elephant bush. Small, protected sites on top of the mountains have shrub-live oak and even juniper. A remnant herd of desert bighorn sheep roams the mountains, and Gila monster, desert tortoise, mountain lion, mule deer, coyote, javelina, giant spotted whiptail lizard, golden eagle, prairie falcon (*Falco mexicanus*), and Cooper's hawk (*Accipiter cooperii*) also inhabit the wilderness area.

The Quartz Peak Trail leads visitors from the floor of Rainbow Valley (1,550 feet amsl) to the summit ridge of the Sierra Estrella at Quartz Peak (4,052 feet amsl) in just 3 miles. Along the trail, visitors are treated to a variety of Sonoran Desert plants and wildlife, scenic vistas, and evidence of the area's volcanic history. The views from the summit are expansive—to the west is a dramatic panorama of rugged mountain ranges and desert plains, and to the east metropolitan Phoenix unfolds over the valley of the lower Salt River.

Quartz Peak Trail is extremely steep and difficult to follow in places and is recommended for experienced and well-conditioned hikers only. The trail begins at Quartz Peak Trailhead by following a closed four-wheel-drive track for approximately 0.25 mile. The trail is poorly marked in places and does not extend to the summit; the final 0.25 mile to Quartz Peak is a scramble over boulder and talus slopes that requires careful footing. Quartz Peak is a point on the spine of the Sierra Estrella Mountains capped with an outcrop of white quartz (BLM 2009a).

3.15.5 Areas of Critical Environmental Concern

The Lower Gila Terraces and Historic Trails ACEC consists of approximately 82,500 acres. The area of the ACEC that would intersect the SVPP is located at the south end of the Rainbow Valley, stretching from the Sierra Estrella Mountains west to the SDNM (see Figure 3-22). This ACEC was designated in 2012 under the Lower Sonoran RMP (BLM 2012a).

As specified in 43 CFR 1510.7-2, in order for an ACEC to meet relevance and importance criteria, "there shall be present 'significant' historic, cultural, or scenic value; a fish or wildlife resources or other natural system or process; or natural hazard." The Lower Gila Terraces and Historic Trails ACEC was designated to protect historic trail corridors and petroglyphs along the lower Gila River to Yuma County.

Specifically, the trails and landscapes in this ACEC have national significance, as they are part of an important story about the peoples that have lived in, traveled through, and influenced the trail area. The trails and landscapes within the Lower Gila Terraces and Historic Trails ACEC inform society about the broader story of southwestern and transcontinental settlement, communications, and development.

The occupation and use of the Gila River terraces and trails spanned thousands of years, as evidenced by extensive prehistoric village sites and petroglyph sites, as well as associated canals, farmsteads, intaglios,

small campsites, and trails. At least 250 sites have been recorded within the ACEC boundary. Many of the petroglyph panels of the ACEC are a unique and irreplaceable part of America's heritage. More recently, the area served explorers, emigrants, commercial mail and freight companies, 49er gold rush traffic, and the military during the eighteenth- and nineteenth-century western expansion.

The area of the ACEC that would intersect the SVPP encloses a historic travel corridor with portions of the Juan Bautista de Anza NHT, Butterfield Overland Stage Route, Mormon Battalion Trail, and the Gila Trail following the same course along the Gila River floodplain.

The Lower Gila Terraces and Historic Trails ACEC provides habitat for resident and migratory wildlife, but the overall contribution to wildlife habitat diversity is not the primary value of the ACEC. The Lower Gila Terraces and Historic Trails ACEC does provide some connectivity to upland habitats and movement up and down the Gila River, but not in the area of the ACEC that would intersect with the SVPP.

3.15.6 National Historic and Scenic Trails

3.15.6.1 Juan Bautista de Anza National Historic Trail

The Juan Bautista de Anza NHT was the first overland route established to connect New Spain (present-day Mexico) with San Francisco (National Park Service 2006). The central Arizona portion of the trail generally follows the Gila River, and an automotive route follows present-day SR 238, located at the southern terminus of the proposed Sonoran Valley Parkway (see Figure 3-22). The trail leaves the Gila River east of the Sierra Estrella Mountains and follows the modern-day SR 238, located approximately 3 miles south of the proposed action alternatives and directly adjacent to the southern terminus of the sub-alternatives of the proposed Sonoran Valley Parkway.

Other historic expeditions or events, including the Butterfield Stage, Mormon Battalion, and pioneer travelers to the 1849 gold rush, followed portions of the trail. The trail is described in more detail in Section 3.3, Cultural and Heritage Resources.

3.15.7 Tribal Lands

The Gila River Indian Community is approximately 5 miles east of the proposed action alternatives, east of the Sierra Estrella Mountains (see Figure 3-22). Established in 1939, the Gila River Indian Community encompasses approximately 374,000 acres. The Gila River Indian Community is composed of seven districts, including the Sacaton, Komatke, Santan, and Blackwater Districts, all occurring along the Gila River (Inter-Tribal Council of Arizona 2009).

The Ak-Chin Indian Community is located south of the city of Maricopa, approximately 5 miles east of the southern terminus of the proposed Sonoran Valley Parkway. Established in 1912, the Ak-Chin Indian Community encompasses 22,000 acres (Inter-Tribal Council of Arizona 2009).

3.16 NOISE

Sound is created when an object vibrates and radiates part of its energy as acoustic pressure or waves through a medium, such as air, water, or a solid object. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second, or hertz (Hz). Different vibration frequencies produce different tonal qualities for the resulting sound. Sound levels are expressed in units called decibels (dB).

Decibel scales are a logarithmic index based on ratios between a measured value and a reference value. In acoustics, decibel scales are based on ratios of the actual pressure fluctuations generated by sound waves, compared with a standard reference pressure value of 20 micropascals.

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hz, is less sensitive to higher and lower sound frequencies, and is least sensitive to sound frequencies below 250 Hz. Measured sound levels are adjusted or weighted to correspond to the frequency-response of human hearing capability and the human perception of loudness. Among several different frequency weighting schemes that approximate the way the human ear responds to noise levels, the "A-weighted" decibel scale (dBA) is the most widely used. The A-weighted scale significantly reduces the measured pressure level for low-frequency sounds while slightly increasing the measured pressure level for some mid-frequency sounds. Most wildlife species have a range of hearing broadly similar to human hearing. Some species, however, can hear sound frequencies above or below the range of human hearing. Most bird species have a range of hearing that is narrower than the human range of hearing.

Noise is generally defined as the undesired component of sound. Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (L_{eq}) are used to develop single-value descriptions of average noise exposure over various periods of time. L_{eq} values are not calculated as arithmetic averages but are based on a mean of the acoustic energy represented by a dB value. The mathematics of calculating L_{eq} values give greater weight to the higher noise level values than the lower noise level values. Average noise exposure ratings often include additional weighting factors for potential annoyance due to time of day or other considerations. Average noise exposure over a 24-hour period is often presented as a day-night average sound level (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10 p.m. to 7 a.m.) increased by 10 dBA to reflect the greater disturbance potential from nighttime noises.

Typical noise levels experienced by humans range from 40 dBA (equivalent to a quiet suburban area at night) to 85 dBA (the approximate noise level occurring 5 feet from a gas engine lawn mower). A 3 dBA change in noise level may be perceptible to most listeners, whereas a 10 dBA change may be perceived as a doubling of the noise level. Table 3-20 provides a summary of the range of dBA levels typically encountered in the environment and examples of various noise sources for each range listed.

Table 3-20. Typical dBA Levels

Characterization	dBA	Example Noise Conditions
Threshold of pain	130	Surface detonation, 30 pounds of TNT at 1,000 feet. Peak noise 50 feet behind firing position, M-16 and M-24 rifles.
	125	Mach 1.9 sonic boom under aircraft at 11,000 feet.
Possible building damage	120	Air raid siren at 50 feet.
Threshold of immediate NIPTS*	115	Commercial fireworks (5-pound charge) at 1,500 feet. F/A-18 aircraft takeoff with afterburners at 1,600 feet.
	110	Peak noise 50 feet behind firing position, .22 caliber rifle. Peak crowd noise, professional football game, inside open stadium.
	105	Emergency vehicle siren at 50 feet. Pile driver peak noise at 50 feet. Chainsaw (two-stroke gasoline engine) at 3 feet.
	100	Jackhammer at 10 feet. 1-mile-range fog horn at 30 feet.
Extremely noisy	95	Locomotive horn at 100 feet. 2-mile-range foghorn at 100 feet. Large wood chipper processing tree branches at 30 feet.

Table 3-20. Typical dBA Levels (Continued)

Characterization	dBA	Example Noise Conditions
8-hour OSHA limit	90	Leaf blower at 5 feet. Jackhammer at 50 feet. Dog barking at 5 feet.
Very noisy	85	Gas engine lawn mower at 5 feet. Bulldozer, excavator, or paver at 50 feet. Personal watercraft at 20 feet. Pneumatic wrench at 50 feet.
	80	Forklift or front-end loader at 50 feet. Motorboat at 50 feet. Table saw at 25 feet. Vacuum cleaner at 5 feet.
Noisy	75	Idling locomotive at 50 feet. Street sweeper at 30 feet. Ocean beach with medium wind and surf.
	70	Leaf blower at 50 feet. 1-mile-range foghorn at 1,000 feet. 300 feet from busy six-lane freeway.
Moderately noisy	65	Typical daytime busy downtown background conditions. Typical gas engine lawn mower at 50 feet. Ocean beach with light wind and surf.
	60	Typical daytime urban mixed-use area conditions. Normal human speech at 5 feet. Typical electric lawn mower at 50 feet.
Moderately noisy	55	Typical urban residential area away from major streets. Low noise electric lawn mower at 65 feet.
	50	Typical suburban daytime background conditions. Open field, summer night with numerous crickets.
Quiet	45	Typical rural area daytime background conditions. Suburban backyard, summer night with several crickets.
	40	Typical suburban area at night. Typical whispering at 1 to 2 feet.
	35	Quiet suburban area at night. Quiet whispering at 1 to 2 feet, low background noise conditions.
Very quiet	30	Quiet rural area, winter night, no wind. Quiet bedroom at night, no air conditioner.
	25	Quiet rural area, light wind
	20	Empty recording studio. Remote area, no audible wind, water, insects, or animal sounds.
	10	Audiometric testing booth.
Threshold of hearing, no hearing loss	0	

* NIPTS: noise-induced permanent threshold shift (permanent hearing damage).

Indicated noise levels are average dBA levels for stationary noise sources or peak noise levels for brief noises and noise sources moving past a fixed reference point. Average and peak dBA levels are not 24-hour L_{dn} values. Decibel scales are not linear. Apparent loudness doubles with every 10 dBA increase, regardless of the initial dBA level. Most adults have accumulated some hearing loss and have a threshold of hearing above 15 dBA. In occupational hearing conservation programs, a threshold of hearing between 20 and 30 dBA is considered normal.

3.16.1 Applicable Laws, Regulations, and Policies

The regulation of noise from transportation facilities is accomplished primarily at the federal level with states and municipalities responsible for enforcement. Controls address environmental or land use compatibility.

3.16.1.1 Federal Regulations

The Noise Pollution and Abatement Act of 1970 (Title IV of the CAA [42 USC 7627]) established an Office of Noise Abatement and Control within the EPA. The EPA was directed to investigate and identify the effects of noise levels on public health and welfare, including psychological and physiological effects on humans; effects of sporadic extreme noise as compared with constant noise; effects on wildlife and property; effects of sonic booms on property; and such other matters as may be of interest in the public welfare. Title IV of the CAA also requires other federal agencies and departments to consult with the EPA regarding methods for abating objectionable or nuisance condition noise impacts that result from activities they carry out or sponsor.

The federal Noise Control Act of 1972 (42 USC 4901 *et seq.*) established a requirement that all federal agencies must administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare. The EPA was given the responsibility for providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce (construction equipment; transportation equipment; motors and engines; and electrical or electronic equipment). States and political subdivisions of states retain the right to establish and enforce controls on environmental noise through the licensing, regulation, or restriction of the use, operation, or movement of products or combinations of products. The federal Noise Control Act also directed all federal agencies to comply with federal, state, interstate, and local noise control and abatement requirements to the same extent that any person is subject to such requirements.

Although the EPA can require other federal agencies to justify their noise regulations with respect to the policy requirements of the federal Noise Control Act, each federal agency retains authority to adopt noise regulations pertaining to agency programs.

The Federal Interagency Committee on Urban Noise (FICUN) was formed in 1979 to review various federal agency programs related to noise impacts on land use. The committee included representatives of the Department of Transportation, U.S. Department of Housing and Urban Development (HUD), EPA, Department of Defense, and Veterans Administration. The 1980 report issued by FICUN summarized federal agency noise policies and programs (FICUN 1980). In addition, it identified the L_{dn} noise metric as the most appropriate noise descriptor to use for evaluating noise in the context of land use compatibility issues. The 1980 FICUN report also included a chart of compatible and incompatible noise levels for various categories of land use.

The Federal Interagency Committee on Noise was formed in 1990 to review federal agency policies concerning the assessment of airport noise issues. Participating agencies included the Department of Transportation, Department of Defense, Department of Justice, HUD, EPA, Veterans Administration, and CEQ. The 1992 report prepared by the committee confirmed the use of the L_{dn} noise metric as the primary basis for assessing land use compatibility issues but also recognized that supplementary noise descriptors could be useful to further explain noise impacts on a case-by-case basis. For instance, the FHWA employs the equivalent noise level (L_{eq}) for peak activity periods.

Other federal agencies, such as the Federal Transit Administration (FTA) and the Federal Railroad Administration (FRA), have developed noise impact criteria that employ a sliding scale of noise levels, depending on both existing land use and noise levels. Some federal agencies, such as the National Park Service, Forest Service, and BLM, have not adopted any specific noise impact and vibration criteria or standards.

3.16.1.2 State and Local Regulations

State regulations focus primarily on noise from motor vehicles and aircraft, as well as equipment operation. Title 28 ARS 16, Section 955, regulates the use of mufflers on equipment and motor vehicles including motorcycles. The AAC does not contain any noise abatement language. ADOT has established noise impact thresholds for different types of land use affected by their transportation facilities. Like ADOT, MDCOT has established a noise guidance and policy document to address the impacts of traffic noise from their facilities for different types of land use.

Local ordinances primarily address noise generated by motor vehicles, animals, and radios and sound amplification devices. Maricopa County Noise Ordinance P-23 (adopted February 15, 2006) states that noise at and above certain levels is detrimental to the health and welfare of Maricopa County citizens. Furthermore, it is in the best interest of its citizens to control noise in a manner that promotes commerce; the use, value, and enjoyment of property; sleep and repose; and environmental quality. The ordinance declares that it is the policy of Maricopa County to prohibit excessive, unnecessary, disruptive, and annoying noise from all sources.

Motor vehicle requirements include the proper and continual use of mufflers; prohibitions against the use of horns, signals, or noise devices on motor vehicles for other than their intended purpose; and excessive engine revving (especially between the hours of 8:00 p.m. and 7:00 a.m.). The ordinance also regulates public disturbances from commercial interests, unless produced in the normal conduct of business within the normal and customary hours of operation and by individuals on public streets and in public places.

Ordinance P-23 exempts 18 source categories of noise, including noise originating from aircraft in flight and from airport activities directly related to flight operations. Noise from emergency vehicles, non-amplified, as well as customary noise from public and private nurseries, daycare facilities, schools, and colleges, is also exempt. Noise from mechanical devices associated with heating and cooling equipment, watercraft and train noise, as well as noise from power plant equipment (during normal hours of operation) and farm equipment noise, is exempt as well.

The City of Goodyear in Chapter 15, Section 4-4P of the City Municipal Code, Required Improvements—Subdivisions, Freeway Development Standards, directs all development located within 500 feet of the I-10 and SR 303L alignment ROWs to develop a sound attenuation plan that includes the following:

1. A noise analysis detailing projected freeway noise levels based on MAG projected levels 15 years from the date of the attenuation plan submittal;
2. Proposed mitigation measures necessary to reasonably predict exterior noise levels consistent with the ADOT residential impact threshold;
3. Certification by a qualified transportation noise analyst regarding the effectiveness of the noise mitigation measures;
4. Measures to reasonably predict that interior noise levels consistent with HUD standards for interior noise levels and adherence to building and material standards prescribed by the City for exterior walls, roof/ceiling assembly, windows, and doors.

The City Municipal Code also includes general nuisance standards similar to those of Maricopa County.

3.16.1.3 Thresholds of Significance

Land use compatibility thresholds of significance for roadway traffic noise can be established with either the equivalent L_{eq} noise metric used by FHWA, ADOT, and MCDOT or the 24-hour L_{dn} noise metric implemented by HUD. Local nuisance ordinances are often based on a 24-hour L_{dn} threshold. The L_{eq} equivalent noise level metric is well suited to activities with known (or anticipated) peak activity periods such as morning and evening rush hour traffic to and from the analysis area and the Phoenix metropolitan area. The relevant thresholds for each metric are presented in the sections below; however, the environmental consequences (see Chapter 4) for the proposed Sonoran Valley Parkway on the ambient noise environment will be examined with respect to the L_{eq} noise metric only.

HUD Standards

Noise has two different types of effects on people: the direct physical effects such as hearing loss, and the less direct effects of interference with activities such as sleep and conversation. The standards contained in the HUD noise regulation are based on levels that can cause interference effects, not on the levels that can cause hearing loss.

HUD noise guidelines are based on a series of surveys compiled in *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). Most of the surveys indicated that there were two breakpoints in reported interference and annoyance. Below 55 L_{dn}, there was very little interference (for example, speech intelligibility was greater than 99%) and very little resulting annoyance. Over 65 L_{dn}, interference and annoyance both increase rapidly.

The EPA set 55 L_{dn} as the basic goal. But other federal agencies, including HUD, in consideration of their own program requirements and goals as well as the difficulty of actually achieving a goal of 55 L_{dn}, have settled on 65 L_{dn} as the standard.

At 65 L_{dn}, activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be expected to be achieved. Following the federal lead, most local jurisdictions that have adopted noise standards have adopted 65 L_{dn} as the breakpoint for acceptability. Table 3-21 summarizes the HUD acceptability standards.

Table 3-21. Housing and Urban Development Site Acceptability Standards

	Day-Night Average Noise Level (dB)	Special Approvals and Requirements
Acceptable	Not exceeding 65 dB*	None
Normally unacceptable	Above 65 dB but not exceeding 75 dB	Special approvals,† environmental review,† attenuation‡
Unacceptable	Above 75 dB	Special approvals,‡ environmental review,‡ attenuation

* Acceptable threshold may be shifted to 70 dB in special circumstances, pursuant to 24 CFR 51.105(a).

† See 24 CFR 51.104(b) for requirements.

‡ 5 dB additional attenuation required for sites above 65 dB but not exceeding 70 dB; 10 dB additional attenuation required for sites above 70 dB but not exceeding 75 dB (24 CFR 51.104[a]).

Federal Highway Administration, Arizona and Maricopa County Departments of Transportation, and City Standards

The FHWA has issued regulations for noise evaluation in 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise. The main objectives of 23 CFR 772 are "to provide procedures for noise studies and noise abatement measures, to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23, United States Code." According to FHWA regulations, a traffic noise impact occurs when the predicted traffic noise level approaches or exceeds the Noise Abatement Criteria (NAC) for the specified land use. In addition, an impact occurs when the predicted traffic noise level substantially exceeds the existing noise level.

Noise level impact criteria may be based on a threshold, the change in noise level from the existing noise level, or both. Table 3-22 shows the FHWA-defined NAC for various land use categories. The NAC for Category B, which includes homes, churches, schools, and parks, is 67 dBA.

Table 3-22. Noise Abatement Criteria

Land Use Category	Noise Level L_{Aeq1h}* dBA	Description of Land Use
A	57 dBA (exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks, or open spaces that are recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 dBA (exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, playgrounds, active sports areas, and parks.
C	72 dBA (exterior)	Developed lands, properties, or activities not included in Categories A and B above.
D	–	Undeveloped lands.
E	52 dBA (interior)†	Residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: 23 CFR 772.

Note: Noise abatement criteria are from FHWA-defined land use categories and NAC (23 CFR 772).

* L_{Aeq1h} is the 1-hour equivalent sound level.

† The interior sound level (activity) applies to 1) indoor activities for those parcels where an exterior noise sensitive activity is identified, and 2) those situations in which the exterior activities will not be affected by the noise, but the interior activities will be affected.

Each state may define the levels at which the noise "approaches" the criteria and when it "substantially exceeds" the existing noise level. The ADOT (2005) Noise Abatement Policy (NAP) determines the noise level impact for Category B land uses when the noise level "approaches" within 3 dBA of the FHWA NAC, or 64 dBA, and considers mitigation for customer locations where the predicted highway traffic noise level is equal to or greater than 64 dBA. ADOT also considers mitigation if the noise level from the transportation improvement project is predicted to increase substantially. A substantial noise level increase is equal to or greater than 15 dBA.

According to MCDOT (2008a) Policy Document #T3103, *Noise Abatement*, noise abatement should be considered if noise levels reach 66 dBA or higher at noise-sensitive properties adjacent to their facilities. Additionally, mitigation measures will be considered for noise-sensitive properties if predicted traffic noise levels substantially exceed existing levels. "Substantially exceed" is defined as a 15 dBA increase between the existing noise levels and the future noise levels, just like in the ADOT definition.

The City's Zoning Ordinance, Article 9, Special District, Freeway Development Overlay District, applies the ADOT Category B land use impact threshold of 64 dBA as the appropriate exterior noise level for residential areas within the city limits and within 500 feet of I-10 and SR 303L. The standards contain similar language found in the ADOT (2005) NAP regarding noise analysis methodology, minimum noise reduction (5 dBA or more), and suggested maximum noise wall heights (20 feet above grade). The City standards for interior noise levels apply the HUD 45 dBA interior noise level threshold. These development standards will be referenced in the determination of environmental consequences for the action alternatives.

Other Standards

The FTA and FRA noise criteria are based on a comparison of the transit system noise with the outdoor ambient noise from other sources in the community. They incorporate both absolute criteria, which consider annoyance caused by the transit system alone, and relative criteria, which consider annoyance as a result of the change in noise environment caused by the transit system.

The FTA guidance manual *Transit Noise and Vibration Impact Assessment* establishes noise impact criteria on the basis of cumulative, A-weighted noise exposure, using either the L_{eq} or L_{dn} noise metric (FTA 1995). L_{dn} is applied to residences and other buildings where people normally sleep, and L_{eq} is applied to all other noise-sensitive land use categories.

Two levels of noise impact are included in the FTA criteria as follows:

- Severe. Severe noise impacts are considered "significant" as this term is used in NEPA and implementing regulations. Noise mitigation will normally be specified for severe impact areas unless there is no practical mitigation measure.
- Impact. In this range, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and numbers of noise-sensitive land uses affected, existing outdoor-to-indoor sound insulation, and the cost effectiveness of mitigating noise to more acceptable levels.

Transit improvements are not associated with the project; therefore, FTA and FRA regulations are not germane to the discussion of applicable noise standards. However, the Southern Pacific Railroad (SPRR) owns a rail line that runs south of and parallel to SR 238 , near the southern end of the project area. The rail line is located outside the limits of the action alternatives for the SVPP, as currently proposed. If the final design of the selected alternative alignment incorporates an at-grade crossing of the SPRR, these criteria would need to be considered in the location of the crossing and any potential mitigation measures.

3.16.2 Analysis Area

The analysis area (location of the three action alternatives and two sub-alternatives) is bounded on the northeast and east by the Sierra Estrella Mountains, Estrella Mountain Regional Park, and the Gila River Indian Community and on the west and southwest by the SDNM. Land ownership includes the BLM, ASLD, and private owners.

The analysis area for assessing noise impacts of a new Parkway alignment or modified existing alignment is defined by the location of Category B land uses and other noise-sensitive land uses (such as Category A) located within 300 to 500 feet of the proposed ROW for the project, especially in urban areas. For projects in rural areas, such uses located within 1,000 feet of the proposed ROW are an acceptable

approach to establish the affected environment and assess future environmental consequences. A 1,000-foot perimeter was placed around the 250-foot-wide ROW associated with Alternatives A, C, and H, and Sub-alternatives F and G. Figure 3-23 shows the perimeter around the ROW for each of the proposed action alternatives. Because of the sparse development in the analysis area, three Category B land uses are located within the 1,000-foot perimeter: two residences and one park (the eastern boundary of the SDNM). Therefore, the analysis area is more appropriately set at the perimeter of each 1-mile section crossed by each of the three action alternatives.

Category B land uses within the analysis area for noise include 44 detached single-family residences and/or mobile homes and one school. The housing icons (R1 to R5) in Figure 3-23 indicate the general location of the residences. R1 represents one residence located within Township 4 South, Range 1 East, Section 21 that lies within an undeveloped plat for Tangier Acres and approximately 0.5 mile north of SR 238. R2 represents one residence located in Township 3 South, Range 1 West, Section 21. R3 represents five residences located east of Bullard Avenue in Township 3 South, Range 1 West, Section 9. R4 represents 16 residences located east of 171st Avenue in Township 3 South, Range 2 West, Section 1. R5 represents five residences located east of Rainbow Valley Road in Township 2 South, Range 1 West, Section 35 and 16 residences located west of Rainbow Valley Road in Township 2 South, Range 12 West, Section 34.

The school is the Mobile Elementary School, located east of 99th Avenue along westbound SR 238 and within the analysis area. Two commercial uses (Category C) also exist within the analysis area. The Butterfield Station Landfill is located in Township 4 South, Range 1 East, Section 18, which is approximately 0.75 mile north of R1. Another commercial use is located in Township 3 South, Range 2 West, Section 10, approximately 1 mile west of Rainbow Valley Road. Portions of the SDNM located within the analysis area for air quality begin at the divergence of all three action alternatives in Township 4 South, Range 1 West, Section 13 and end at the convergence of all three action alternatives in Township 2 South, Range 2 West, Section 34.

3.16.3 Ambient Conditions

Short-term noise level measurements were completed on August 20, 2009, to describe the existing noise environment. Measurements were taken between approximately 8:30 a.m. and 10:00 a.m. at the south end of the analysis area, near SR 238, and between approximately 11:30 a.m. and 2:30 p.m. at the north end of the analysis area, near the intersection of Riggs and Rainbow Valley Roads, with additional measurements taken in the vicinity of the proposed action alternatives to the south and east.

The equipment used for the noise-level measurements is a Larson Davis Model 820 precision integrating sound-level meter (SLM). The SLM was calibrated in the field before use with a Larson Davis Model CAL-200 acoustical calibrator. The SLM complies with the American National Standards Institute S1.4-1971 for a Type 1 SLM. The methodology used for the sound-level measurement follows the procedures specified in Section 4 of FHWA-PD-96-046/DOT-VNTC-FHWA-96-5, *Measurement of Highway-Related Noise* (FHWA 1996).

The measurement locations shown in Figure 3-23 are numbered sequentially from southeast (the beginning of the analysis area) to northwest (the end of the analysis area), with the letter M for measurement as a prefix. Six total measurements were recorded at locations in the vicinity of four occupied houses, one demolished home site, and a school located within the bounds of the noise analysis. A summary of each short-term noise level measurement is presented in Table 3-23.

The temperature at the time of the morning noise level measurements was approximately 95°F to 100°F, with the relative humidity at 31% to 38% and calm wind conditions (0 to 2 mph average wind speed).

The temperature at the time of the midday noise-level measurements was approximately 104°F to 107°F, with the relative humidity at 23% to 34% and calm wind conditions (0 to 3 mph average wind speed).

Measured equivalent noise levels (L_{eq}) ranged from 61.6 to 68.5 dBA at M1, located in the vicinity of the Mobile Elementary School on the dirt shoulder approximately 20 feet north of the SR 238 westbound edge of the pavement. A train pass-by on the SPRR line, located approximately 175 feet south of SR 238, occurred during the end of the second measurement sample interval and the beginning of the third measurement sample interval. Maximum noise levels of 81.6 and 84.2 dBA, respectively, were recorded. The 61.6 dBA L_{eq} recorded during the first measurement sample is more typical of a rural noise environment, although noise levels likely increase during sustained peak traffic periods in this location.

Measured L_{eq} ranged from 42.0 to 49.1 dBA at M2, located near the undeveloped Tangier Acres subdivision plat, approximately 0.5 mile north of M1 and east of 99th Avenue. A truck pass-by on 99th Avenue occurred during the beginning of the first measurement sample interval, and a maximum noise level of 67.7 dBA was recorded. The 42.0 and 45.1 dBA L_{eq} recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment somewhat removed from any consistent traffic or other noise source. Currently, 99th Avenue is unpaved and does not carry significant vehicle traffic, as evidenced by the single vehicle pass-by that occurred during the entire 32-minute measurement period at this location.

Measured L_{eq} ranged from 39.7 to 48.8 dBA at M3, located near a detached single-family farm house that is approximately 3 miles south of Patterson Road and 0.5 mile east of Bullard Avenue. Wind gusts up to 9 mph occurred during the first measurement sample interval, and a maximum noise level of 65.7 dBA was recorded. The 43.1 and 39.7 dBA L_{eq} recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment completely removed from any consistent traffic or other noise source.

Measured L_{eq} ranged from 52.9 to 61.4 dBA at M4, located near a detached single-family house on Patterson Road that is 0.5 mile east of Bullard Avenue. The range in recorded noise levels is typical of a suburban to urban residential noise environment, although this location is completely removed from any consistent traffic or other noise source. Noise events that occurred during the measurement period explain the increase in equivalent (L_{eq}) noise levels over those expected for a remote location. Dogs at the residence were barking during the entire second measurement sample interval, and a maximum noise level of 70.2 dBA was recorded. Small-aircraft flyovers occurred during the first and third measurement sample intervals.

Measured L_{eq} ranged from 37.8 to 48.2 dBA at M5, located near a detached single-family house and two mobile homes east of 171st Avenue, 0.5 mile south of Hunt Highway and 1 mile east of Rainbow Valley Road. A small-aircraft flyover occurred during the beginning of the first measurement sample interval, and a maximum noise level of 66.5 dBA was recorded. The 41.7 and 37.8 dBA L_{eq} recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment somewhat removed from any consistent traffic or other noise source.

Measured L_{eq} ranged from 38.8 to 47.0 dBA at M6, located near the demolished remnants of a detached single-family house on the southwest corner of Rainbow Valley and Riggs Roads. A car engine was idling in the background during the entire first measurement sample interval and the beginning of the second measurement sample interval. A maximum noise level of 56.5 dBA was recorded. The 41.4 and 38.8 dBA L_{eq} recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment without any consistent traffic or other noise source.

Table 3-23. Summary of Noise Levels (in dBA) at Monitoring Sites within the Analysis Area

August 20, 2009						
Site ID*	**Sample**	**Begin Time**	**End Time**	**L_{eq}**	**L_{min}**	**L_{max}**
M1	1	8:28 a.m.	8:38 a.m.	61.6	37.1	78.2
	2	8:49 a.m.	8:59 a.m.	68.5	38.1	81.6†
	3	9:02 a.m.	9:12 a.m.	66.3	35.5	84.2†
M2	1	9:26 a.m.	9:36 a.m.	49.1	31.0	67.7‡
	2	9:37 a.m.	9:47 a.m.	42.0	27.9	55.4
	3	9:48 a.m.	9:58 a.m.	45.1	31.7	55.4
M3	1	1:09 p.m.	1:10 p.m.	48.8	30.4	65.7§
	2	1:20 p.m.	1:30 p.m.	43.1	23.4	58.3
	3	1:31 p.m.	1:41 p.m.	39.7	22.1	52.2
M4	1	1:52 p.m.	2:02 p.m.	53.2	42.6	61.8
	2	2:03 p.m.	2:13 p.m.	61.4	39.8	70.2¶
	3	2:14 p.m.	2:24 p.m.	52.9	39.5	62.5
M5	1	12:11 p.m.	12:21 p.m.	48.2	24.9	66.5**
	2	12:32 p.m.	12:42 p.m.	41.7	26.1	55.4
	3	12:43 p.m.	12:53 p.m.	37.8	24.8	51.0
M6	1	11:27 a.m.	11:37 a.m.	47.0	45.1	54.1††
	2	11:38 a.m.	11:48 a.m.	41.4	25.7	56.5††
	3	11:49 a.m.	11:59 a.m.	38.8	24.7	54.2

Notes: L_{eq} = equivalent continuous noise level (slow response setting).
L_{max} = maximum sound level (slow response setting).
L_{min} = minimum sound level (slow response setting).
* Site ID indicating noise measurement location is shown in Figure 3-23.
† SPRR train pass-by at 8:57 a.m.
‡ Truck pass-by at 9:28 a.m.
§ Winds reached a 9 mph maximum during measurement interval.
¶ Dogs barking during entire measurement interval.
** Small-aircraft flyover at 12:11 p.m.
†† Car idling in background.

3.17 HAZARDOUS MATERIALS AND PUBLIC SAFETY

SWCA completed a Phase I Environmental Site Assessment (Phase I ESA) for Alternative A of the SVPP in October 2007 and completed Phase I ESAs for Alternatives B and C of the SVPP in July 2009 (SWCA 2007, 2009c, 2009d). The purpose of the Phase I ESAs was to perform environmental due diligence to identify potential sources of contamination that could affect construction or operation of the proposed action alternatives. Per American Society for Testing and Materials (ASTM) Standard 1527.00, an additional Phase I ESA may be required upon the approval of the POD.

The Phase I ESAs followed the standards described in the ASTM 2005 Standard E 1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. Deletions or deviations from ASTM Standard E 1527-05 were documented in these reports. The objective of the Phase I ESAs was to assess the proposed action alternatives, to the extent practical, for the potential presence of recognized environmental conditions, defined in the ASTM standard as “the presence or

likely presence of hazardous materials or petroleum products under conditions that indicate an existing release, a past release, or material threat of a release of any hazardous substances or petroleum products into structures on the property, or into the ground, groundwater, or surface water of the property." The term is not intended to include de minimis conditions, which generally do not present risks of harm to public health or the environment and which generally would not be the subject of enforcement actions if brought to the attention of appropriate regulating agencies.

The Phase I ESAs did not include activities such as inspections or sampling for the presence of asbestos-containing materials, radon or other radioactive substances, vapor intrusion, lead-based paint, non-hazardous wastes and materials, mold, or biological and medical wastes. No soil, air, or water samples were collected for these Phase I ESAs.

To achieve the objective referenced above, SWCA completed the following tasks:

- reviewed intermittent topographic maps and/or aerial photographs dating from 1937 to 2009;
- surveyed relevant documents in order to assess the project's physiography, including a review of the local hydrogeology and geology of the surrounding area;
- reviewed available federal and state regulatory databases; and
- visually surveyed the area of the proposed action alternatives by walking on and driving around the analysis area, and visually surveyed the surrounding properties.

3.17.1 Applicable Laws, Regulations, and Policies

In 2005, the EPA issued its final rule defining the scope of "all appropriate inquiry" to be conducted prior to property acquisition in order to qualify for certain defenses under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (or "Superfund"). The EPA's rule increased the burdens on prospective purchasers of property to investigate past uses and possible releases of hazardous substances. The EPA allows for the requirements of the rule to be satisfied by compliance with ASTM Standard E 1527- 05. To this end, a Phase I ESA was conducted for each of the proposed action alternatives. The results of the Phase I ESA are discussed in Sections 3.17.2 to 3.17.4.

The Resource Conservation and Recovery Act, as amended by Federal Facility Compliance Act of 1992 (42 USC 6901–6992) (RCRA), authorizes the EPA to manage, by regulation, hazardous wastes on active disposal operations. It waives sovereign immunity for federal agencies with respect to all federal, state, and local solid and hazardous waste laws and regulations, and makes federal agencies subject to civil and administrative penalties for violations, and to cost assessments for the administration of the enforcement.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601–9673) (CERCLA), provides for liability, risk assessment, compensation, emergency response, and cleanup (including the cleanup of inactive sites) for hazardous substances. It requires federal agencies to report sites where hazardous wastes are or have been stored, treated, or disposed of and requires responsible parties, including federal agencies, to clean up releases of hazardous substances.

The Community Environmental Response Facilitations Act of 1992 (42 USC 9620[h]) is an amendment to CERCLA. The 1992 act expands on the risk assessment requirements for land transfers and disposal.

The Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 11001–11050) (EPCRA) requires the private sector to inventory chemicals and chemical products, to report those in excess of threshold planning quantities, to inventory emergency response equipment, to provide annual reports and

support to local and state emergency response organizations, and to maintain a liaison with the local and state emergency response organizations and the public.

The Pollution Prevention Act of 1990 (42 USC 13101–13109) requires and encourages prevention and reduction of waste streams and other pollution through minimization, process change, and recycling. It encourages and requires development of new technology and markets to meet the objectives.

Under ARS 49-99, 49-929, and 49-930, the State refers to the requirements to establish a hazardous waste program equivalent to and consistent with the federal hazardous waste program promulgated under RCRA Subtitle C. This subtitle establishes reporting requirements for the generation, storage, handling, transport, and disposal of hazardous waste. Certain waste materials generated at mining sites, however, are excluded from Subtitle C under the Bevill Amendment of 1980. Although the Bevill Amendment exempts much of the waste generated at mining facilities, hazardous waste generators activities that are "not unique" to the mining industry are subject to RCRA Subtitle C, such as hazardous waste generated from equipment servicing and repair and laboratory wastes that meet the criteria for hazardous waste under 40 CFR 262. On-site accumulation in excess of the requirements under 40 CFR 262.34 would require a storage permit. In some cases, on-site treatment or disposal would require a hazardous waste permit.

Table 3-24 presents permits or regulatory actions and the laws and statutes related to the production, transportation, storage, and disposal of toxic or hazardous materials in Arizona that may apply to the SVPP.

Table 3-24. Permits, Laws, and Regulatory Codes Related to Facilities that Produce, Transport, Store, or Dispose of Toxic or Hazardous Materials in Arizona

Permit or Regulatory Action	Regulation
Hazardous Waste Permit	• ARS 49-921 • AAC R18-8-260
EPA Identification Number	• ARS 49-922
Pollution Prevention Plan	• ARS 49-961 through 49-973
Hazardous Waste Management Facility—Annual Registration	• ARS 49-929 • ARS 49-930
Emergency and Community Right to Know	• 42 USC 11001 *et seq.* • 42 USC 11023 (EPCRA 313) • 40 CFR 372
Toxic Data Report	• ARS 49-963 • ARS 49-964 • ARS 49-971 • ARS 49-973
Solid Waste Annual Report	• ARS 49-860
Solid Waste Special Waste Facilities Plan Approval	• ARS 49-761 *et seq*. for Solid Waste • ARS 49-851 *et seq*. for Special Waste • ARS 49-857.01 • ARS 49-241 *et seq*. governs the Aquifer Protection Permit Program

3.17.2 Analysis Area

The hazardous materials and public safety analysis area for this project includes the alternative alignments' 250-foot ROW and the additional search distances specified in ASTM Standard E 1527-05 (ASTM 2005). These search distances have been determined by ASTM to be appropriate distances in which to search for potential sources of contamination that could affect the project area (Table 3-25).

Table 3-25. Hazardous Materials Analysis Areas

Environmental Record Source	Approximate Minimum Analysis Area (mile)
Federal NPL	1.0
Federal Delisted NPL	0.5
Federal CERCLIS	0.5
Federal CERCLIS NFRAP	0.5
Federal RCRA CORRACTS	1.0
Federal RCRA non-CORRACTS TSD	0.5
Federal RCRA Generators	250-foot ROW and adjacent properties
Federal IC/EC	250-foot ROW
Federal ERNS	250-foot ROW
State and Tribal Hazardous Waste Sites (NPL Equivalent)	1.0
State and Tribal Hazardous Waste Sites (CERCLIS Equivalent)	0.5
State and Tribal Landfill and/or Solid Waste Disposal Sites	0.5
State and Tribal LUST	0.5
State and Tribal Registered UST	250-foot ROW and adjacent properties
State and Tribal IC/EC	250-foot ROW
State and Tribal Voluntary Cleanup (VCP) Sites	0.5
State and Tribal Brownfield Sites	0.5

CERCLIS = Comprehensive Environmental Response, Compensation, and Liability Information System
CORRACTS = Corrective Action Sites
ERNS = Emergency Response Notification System
IC/EC = Institutional Controls / Engineering Controls
LUST = leaking underground storage tank
NFRAP = no further remedial action planned
NPL = National Priorities List
RCRA = Resource Conservation and Recovery Act
TSD = Treatment, Storage, and Disposal
UST = underground storage tank

3.17.3 Records Review

Environmental database reports generated by Environmental Data Resources, Inc. (EDR), were used to access environmental records for the project and the surrounding properties. The proximity of listed facilities was reviewed to determine the potential effect, if any, these facilities may have on the SVPP. The 69 databases searched by EDR include those specified by ASTM Standard E 1527-05, as well as several additional federal and state databases, and databases proprietary to EDR. EDR updates its records in accordance with ASTM Standard E 1527-05 guidelines. Additional listed facilities that EDR has not

identified may exist within a 1-mile radius. SWCA also accessed the ADEQ Interactive GIS eMaps website to search state environmental databases (ADEQ 2009c). Figure 3-24 shows the mapped locations of listed sites relative to the project area.

Mobile Elementary School was listed in the Leaking Underground Storage Tank (LUST) database. A leak was reported in late 1998, and the site was closed in June 2000, with soil levels meeting Tier 1 standards. This school is located at 42798 South 99th Avenue in Mobile, approximately 0.25 to 0.5 mile northeast and downgradient of the project.

Hamilton Homes Property was listed in the Underground Storage Tank (UST) and LUST databases. A leak was reported in January 1999, and the site was closed in January 2007, with soil levels meeting Tier 1 standards. The tanks were permanently removed in May 2006. This site is located on the southwest corner of Rainbow Valley and Riggs Roads, possibly adjacent to and upgradient of the project.

Two additional sites were revealed by the ADEQ online database search: Butterfield Station Landfill, and RM Cat Environmental Services Remediation Site. The Butterfield Station Landfill and Solid Waste Transfer Station is located downgradient of the project area, nearly adjacent to the east of the southern terminus of the proposed Sonoran Valley Parkway. This active landfill (AZ Solid Waste Facility No. 07032700.01, EPA ID No. AZD983481813) is operated by Waste Management, Inc., and handles wastes, including municipal solid waste, biosolids, construction and demolition debris, drums, industrial and special waste, and CERCLA (or “Superfund”) waste.

RM Cat Environmental Services Remediation Area is mapped in the immediate vicinity of or possibly on the project area. The remediation area may be located in an area that is common to all action alternatives; however, the exact location of the remediation area is unknown. RM Cat Environmental Services is now called Balfor Environmental, a company for which train derailments and spill cleanup represent a significant portion of business. This site is mapped in the vicinity of railroad tracks and may indicate a past spill of unknown type and size. Aerial photography does not indicate large, disturbed soil areas in the mapped area, and no large, disturbed soil areas were observed during SWCA’s site reconnaissance. The site was listed with a status of “not active” on October 31, 2006.

In addition to the sites and facilities listed in the EDR report, EDR provided a list of sites and facilities that could not be mapped because of incomplete address or location information; these are called orphan sites. These facilities are listed in one or more regulatory agency databases but do not have enough address information to be located by EDR. The EDR report identified 61 orphan sites. All 61 listings were deemed to be not relevant because of their status and/or location with respect to the project area.

3.17.4 Site Reconnaissance

Site reconnaissance for the Phase I ESA site investigations for Alternative A of the SVPP was completed on September 19, 2007, and for Alternatives B and C of the SVPP on May 27, 2009 (SWCA 2007, 2009c, 2009d). The project area was accessed from public thoroughfares and by walking through areas that were inaccessible to vehicles.

The project consists primarily of undeveloped desert land, but it also crosses maintained gravel roads and a natural gas pipeline and crosses under two power lines. The project area lies entirely within the Rainbow Valley sub-basin, a large, valley-wide creosote flat. There is also a small segment of the project area that crosses an agricultural field and irrigation canal. The field and canal both appear inactive. The project area contains other segments of minor development: in the north end, where the project corridor overlaps Rainbow Valley Road, there is a gravel/dirt roadway.

A recently constructed steel high-voltage electric transmission line crosses the project in Township 4 South, Range 1 East, Section 18. The area underneath and to the south of this line has been cleared of vegetation. A natural gas pipeline runs parallel to and south of the electric line and crosses through the project area in the same area as the power line. A maintenance road and a graded corridor of land separate the gas and electric lines.

No evidence of surface contamination from hazardous material spills or leaks, or petroleum-based liquids, was observed on the project. A small amount of debris was observed on the project that included de minimis debris items, such as windblown trash, aluminum cans, glass bottles, broken cinder blocks, scrap metal, and several tires.

Although several wells were listed in the ADWR well database as being near the project area, no wells were observed within the corridor during the site visit. No evidence of historical structures was observed on the project area.

The vicinity of the project area consists primarily of vacant, undeveloped desert land. Vegetation is sparse and typical of the region. Unimproved roads transect the vicinity in places, and the community of Mobile is located southeast of the project area.

3.17.5 Recognized Environmental Conditions

SWCA completed Phase I ESAs of the three action alternatives in conformance with the scope and limitations of ASTM Standard E 1527-05 and certain additional limitations. Based on the information obtained during the site reconnaissance, conducted on September 19, 2007, and on May 27, 2009, and the information obtained through the activities of this Phase I ESA, excluding the limitations, one recognized environmental condition was identified. Portions of the project have been used for farming in the past; therefore, pesticides may be present in the soil on the project area from the historical use of pesticides.

3.17.6 Public Safety

Following is a brief discussion of the various public health and safety issues for the analysis area. The health and safety concerns present within the analysis area are both natural and human-caused and may pose risks for individuals visiting or working within the area. Many of these topics, such as air quality, soils, recreation, and transportation, have been described more fully in the preceding sections.

3.17.7 Applicable Laws, Regulations, and Policies

The construction of the Parkway must be in conformance with OSHA regulations set forth in 29 CFR 1926. The Occupational Safety and Health Act of 1970 (PL 91-596) created OSHA. The act requires employers to do the following:

- maintain conditions or adopt practices reasonably necessary and appropriate to protect workers on the job;
- be familiar with and comply with standards applicable to their establishments; and
- ensure that employees have and use personal protective equipment when required for safety and health.

The Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 11001–11050) requires the private sector to inventory chemicals and chemical products, report those in excess of threshold

planning quantities, inventory emergency response equipment, provide annual reports and support to local and state emergency response organizations, and maintain a liaison with the local and state emergency response organizations and the public.

The Pollution Prevention Act of 1990 (42 USC 13101–13109) requires and encourages prevention and reduction of waste streams and other pollution through minimization, process change, and recycling. It encourages and requires development of new technology and markets to meet the objectives.

Floodplain Regulations for Maricopa County (FCDMC 2006) is the current guiding document for development within floodplains in Maricopa County.

3.17.8 Flood Control

As noted in Section 3.8, the action alternatives are in an area that receives shallow sheet flow and channelized flow during large storm events (V3 2007). The flood insurance rate maps (FIRMs) for Maricopa County indicate that portions of the project area are located in 100- and 500-year floodplains, as designated by FEMA. Development within FEMA floodplains is strictly regulated by both the City and Maricopa County (see Figure 3-12).

The City General Plan recommends mitigation measures for development within floodplains. These mitigation measures include buffer areas, filling/grading, and reinforced and/or elevated structure foundations. Available development options include dedicating potential flood areas as passive and/or active open space. If development and construction are chosen for the area, reducing flood impacts with flood abatement construction must be incorporated, even though these construction efforts can increase development costs (City 2003).

In Maricopa County, if a property is located within a FEMA floodplain, the property owner is required to have flood insurance. In addition, the property owner must apply for a floodplain use permit to make any changes to their property, including new development. FCDMC enforces floodplain regulations, which regulate the location and construction of buildings and other development within designated floodplains. FCDMC has delegated floodplain regulation and enforcement occurring within Goodyear city limits to the City. FCDMC is required to ensure that structures or improvements in the floodplain will not cause adverse impacts to properties upstream or downstream (FCDMC 2006).

3.17.9 Area Hazards

Area hazards are dominated by geological and transportation hazards, as well as potential hazards associated with undeveloped desert lands in the region (see Section 3.5 for geological hazards).

3.17.9.1 Transportation Hazards

Currently, residents in and around the community of Mobile and the City of Maricopa have only two viable options for commuting to and from the greater Phoenix area. They can either use a combination of SR 238, SR 347, and I-10, or a combination of MC 85 and I-10. Because these routes are not direct, they can cause significant delays to the response time of emergency vehicles in the area. The City considers the proposed Sonoran Valley Parkway essential to providing emergency access.

Some residents of Mobile, as well as others from outside the community, have been using the unpaved maintenance access road that parallels the EPNG pipeline to travel to and from Mobile and the greater Phoenix metropolitan area. The maintenance road runs northwest-southeast and generally parallels the

eastern boundary of the SDNM; public use of this road is not authorized by EPNG. There are four existing pipe natural gas pipelines buried directly beneath the maintenance road; in places they lie only inches beneath the surface of the road. This poses a safety threat to the vehicles driving over them.

There are also two other unpaved access roads that are within the analysis area—the Transwestern Pipeline access road and the El Paso Transmission Line access road. These are relatively new lines and access roads but also enable a degree of unauthorized access between Mobile and southern Goodyear. None of the action alternatives actually intersect these access roads; however, if one of the action alternatives is implemented, construction of the SVPP could alleviate some of the traffic concerns along these roads.

3.17.10 Recreation Safety

The analysis area consists of hundreds of acres of natural desert, areas that are typically exposed to OHV traffic. OHV use can pose potential safety concerns for those using the vehicles. OHV traffic can also contribute to potential air quality issues in the immediate area of use as a result of increased particulate matter, particularly PM_{10} and O_3. As was discussed in more detail in Section 3.2, PM_{10} and O_3 can be inhaled into the lungs and cause health problems, including asthma.

3.18 SOCIAL AND ECONOMIC CONDITIONS

The scope of the analysis for social and economic resources includes a discussion of current social and economic data relevant to the proposed project, including population, demographics, employment, income, and taxes in the analysis area. State, county, municipal, and census tract data are also included to provide a comparative discussion for the analysis area.

Information in this section was obtained from various sources, including the Census Bureau, State of Arizona, and Sonoran Institute Economic Profile System (EPS) database, which uses different sources of information, such as Bureau of Economic Analysis and Arizona state data.

3.18.1 Applicable Laws, Regulations, and Policies

The BLM (2005a) *Land Use Planning Handbook* (H-1601-1) specifies that the social and economic environment must be considered for all BLM land use planning decisions. Additionally, in accordance with this handbook, by statute, regulation, and EO, the BLM must use social science in the preparation of informed, sustainable land use planning decisions. Further, as noted in the BLM (2008b) NEPA Handbook (H-1790-1), socioeconomic issues typically occur within communities located outside BLM-managed lands. Nevertheless, the BLM must analyze the impacts of a given decision or project on the social and economic resources of a community or region.

Section 202(c)(2) of FLPMA requires BLM to integrate physical, biological, economic, and other sciences in developing land use plans (43 USC 1712[c][2]). FLPMA regulations 43 CFR 1610.4-3 and 4-6 also require BLM to analyze social, economic, and institutional information. Section 102(2)(A) of NEPA requires federal agencies to “insure the integrated use of the natural and social sciences… in planning and decision making” (42 USC 4332[2][A]). Federal agencies are also required to “identify and address…disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States” in accordance with EO 12898 on environmental justice.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed by President Clinton in 1994. The EO requires agencies to advance environmental justice by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means such groups should not bear a disproportionately high share of negative environmental consequences from federal programs, policies, decisions, or operations. Meaningful involvement means federal officials actively promote opportunities for public participation, and federal decisions can be materially affected by participating groups and individuals.

The Lower Sonoran RMP (BLM 2012a) provides information on and analyzes the social and economic conditions of the planning area where this project would be located. As discussed in the 2012 RMP, BLM management decisions have the potential to affect the social and economic conditions of communities and individuals.

The project would be located in Maricopa County and would border Pinal County. The goals, objectives, and policies set forth in the plans associated with these counties, along with plans for the city of Goodyear and the nearby city of Maricopa, are related to social and economic considerations.

3.18.2 Analysis Area

The analysis area for this project includes the communities of Goodyear and Maricopa, as well as Maricopa and Pinal Counties. Mobile, Arizona, is a very small community located near the south end of the analysis area. Mobile is not incorporated and is now within the annexed portion of the city of Goodyear (City 2007). Additionally, there are scarce data available for Mobile; as such, this community is not addressed individually in this analysis. It is also important to note that the city of Maricopa was not incorporated until 2003; thus, there are no data for this locality prior to 2003. This analysis focuses on the populations closest to the project area and includes a broad cross section of demographics in which the project is situated (Figure 3-25). The data presented for state and county demographics are used for comparison purposes.

The overall demographics, economy, and quality of life in the analysis area have changed dramatically as the state's population has seen explosive growth. In 1990, Arizona was the second fastest-growing state in the United States, as the population grew from roughly 750,000 people in 1950 to more than 3 million in 1990 (Berman 1998). This explosive growth has altered the local landscape in terms of land use patterns, housing, employment composition, and transportation patterns. The historic and unprecedented growth in Arizona's population and economy changed between 2007 and 2009 during the national recession and beyond. During this time, growth slowed considerably. Maricopa County covers more than 9,000 square miles in central Arizona. Of the county's land area, the majority is either privately or federally owned: 29% is under private ownership, 28% is owned by the BLM, and 11% is owned by the Forest Service (Arizona Department of Commerce [ADOC] 2010). Another 11% is controlled by the State (ADOC 2010). Alternatively, land ownership in Pinal County, which covers 5,374 square miles, is dominated by ASLD (35%), followed by private ownership (22%) and tribal land (23%). The Forest Service and BLM collectively own 14% (ADOC 2009a).

3.18.3 Population and Demographics

Arizona has experienced substantial population growth over the past 20 years, with a 70.4% increase in the resident population between 1990 and 2010 (Table 3-26). Although that growth slowed between 2000 and 2010, there was still a 21.8% increase in the state's population. Maricopa County's growth for the same periods was in line with the state's population growth: 76.8% between 1990 and 2010, and 22.1% between 2000 and 2010. Pinal County's population growth between 1990 and 2010 was more than double

that of the state and Maricopa County, at 183%. The city of Goodyear grew by 941.5%, from 6,258 people in 1990 to more than 65,000 in 2010 (Census Bureau 2010). Growth in the city of Maricopa since it became incorporated in 2003 has been explosive, increasing by more than 3,200% over a 10-year period, with further rapid growth expected over the next decade (see Table 3-26) (ADOC 2009a–c, 2010; Census Bureau 2010; City of Maricopa 2006).

Table 3-26. Population Trends for the Sonoran Valley Parkway Project Analysis Area, 1990–2020

Location	1990	2000	2010	2020*	% Change 1990–2010	% Change 2000–2010	% Change 2010–2020
Cities							
Goodyear	6,258	18,911	65,178	162,000	941.5	244.6	148.5
Maricopa	N/A	1,040	34,809	190,000	–	3,247.0	445.8
Counties							
Maricopa	2,122,101	3,072,149	3,751,410	4,506,900	76.8	22.1	20.1
Pinal	116,379	179,727	329,297	493,200	183.0	83.2	49.8
State							
Arizona	3,665,228	5,130,632	6,246,816	7,485,000	70.4	21.8	19.8

Sources: ADOC 2009b, 2009c; Census Bureau 2010; City of Maricopa 2006
* Forecasted Population Growth.

3.18.4 Economic Sectors and Employment

3.18.4.1 Economic Activity

Income

Per capita income is a measure of the average income that an individual receives in terms of his or her equal share of a locality's total income, that is, the monetary amount each resident would receive of the yearly income generated in the country if the annual city, county, or state income were divided evenly between each resident. Per capita income is usually reported in units of currency per year. Alternatively, median household income divides income distribution into two equal groups—half with income above the median, and half with income below the median. Median income is based on all households and families over 15 years old with an income; household income is often the combination of two income earners pooling the resources and should be distinguished from individual earnings (as in per capita income).

In 2010, per capita income in Maricopa County and the cities of Maricopa and Goodyear was in line with the state and nation (Table 3-27). Per capita income in Pinal County was 28% less than in Maricopa County. Median household income for Maricopa and Pinal Counties was in line with the state and national averages. Median household income in the cities of Goodyear and Maricopa was 50% and 30% higher than the state, respectively (see Table 3-27).

Table 3-27. Per Capita and Median Household Income by City and County, 2010

Location	Per Capita	Median Household
Cities		
Goodyear	$28,141	$76,221
Maricopa	$26,609	$65,790

Table 3-27. Per Capita and Median Household Income by City and County, 2010 (Continued)

Location	Per Capita	Median Household
Counties		
Maricopa	$27,816	$55,054
Pinal	$21,716	$51,310
State/Country		
Arizona	$25,680	$50,448
United States	$27,334	$51,914

Source: Census Bureau (2010).

Cost of Living

Although the city of Phoenix is not within the analysis area, the estimated cost of living in the city can be used as a proxy for the overall cost of living in Maricopa County, and to a lesser degree, Pinal County. In 2000, Phoenix was ranked as the fortieth most expensive metropolitan area in the United States; in 1990, Phoenix was ranked seventieth. In 1990, living costs were an estimated 2% above the national average, compared with those in 2000, estimated at 4.5% higher (Vest 2002).

An area's cost of living can be represented in the Cost of Living Index (COLI); a COLI is a theoretical pricing index that measures the relative cost of living over time and compares the difference in living costs between cities. The Bureau of Labor Statistics publishes the Consumer Expenditure Survey, which is used to evaluate the price data for categories such as housing, transportation, food, goods and services, and medical expenditures for cities and counties across each state. These expenditure categories are then weighted according to their overall importance in the average consumer's budget.

A Cost of Living Rate of 100 represents the state average. A number below 100 indicates that the city is less expensive than the state average, and anything above 100 indicates that it is more expensive than the state average. The 2010 COLI for Phoenix was 100.60; in 2000, it was 101.80 (Morrison Institute for Public Policy 2012).

Taxes and Revenues

In 2012, Arizona ranks twenty-seventh in the United States in the Business Tax Climate Index in the context of corporate taxes, individual income taxes, sales taxes, unemployment insurance taxes, and taxes on residential and commercial property (State Tax Climate Index 2012). In comparison, California ranks forty-eighth, Nevada third, and Colorado sixteenth. Arizona has a tax climate that neither encourages nor discourages new business expansion and start-ups. The state does have luxury, estate, personal, and corporate income taxes. Only those revenues that are clearly and concisely reported by the state or federal government (i.e., property taxes, sales tax, etc.) were considered for the analysis. Revenue information was gathered for the county level.

Property Tax

In general, revenue from primary property tax collections helps fund state and local government budgets in terms of local government operating budgets and school and fire districts. Counties can use their allocation of property taxes to fund Superior Court systems, Sheriff's departments, transportation projects, and emergency services.

In Arizona, the ratio of assessed valuation (percentage of market value) is 10% on residential properties and 25% on commercial properties (Arizona Tax Research Foundation 2009). By comparison, the ratio of assessed valuation on residential properties is 35% in Nevada and 100% in California. In FY 2012, the net property valuation for Maricopa County was $34.26 billion, and for Pinal County, it was $2.15 billion (Arizona Department of Revenue [ADOR] 2012). The State distributed $5.1 million to the City of Goodyear and $3.4 million to the City of Maricopa for the same period (ADOR 2012).

Housing Characteristics and Property Values

The Rainbow Valley area is a generally rural area with some low-density residential properties near the north end of the proposed Parkway and near the south end at SR 238 near Mobile. In 2011, there were an estimated 1.6 million housing units in Maricopa County, 13.4% of which were vacant. In Pinal County, 20.5% were vacant, out of 118,826 units (Census Bureau 2011). Vacancy in the cities of Goodyear and Maricopa were generally consistent with the counties (Table 3-28). Median home value was over $181,000 in the city of Goodyear and Maricopa County, $124,900 in the city of Maricopa, and $119,000 in Pinal County.

Both in Goodyear and Maricopa County, property values peaked in 2006 and have steadily, but not dramatically, decreased at approximately the same pace as neighboring cities and the county. The percentage of distressed properties and foreclosures or bank-owned properties as a result of the general negative shift in the housing market affecting the entire nation, continues to occur throughout the county and state. In 2009, 2.4% of bank-owned houses in Maricopa County were located in the Rainbow Valley area, by 2011, this figure dropped to 1.9% and home foreclosures in Goodyear are occurring half as fast as compared to Maricopa County (City 2012).

Initially, the Parkway concept originated to provide direct access from southern Goodyear to new proposed development within the annexed Sonoran Valley, however, with the economic downturn, plans for residential and commercial development were halted. This real estate trend occurred throughout metropolitan Phoenix and the nation during 2005 to 2009. Current trends within Goodyear indicate that the housing market is improving, though continuing to reflect a distressed realty market. Single-family housing building permits submitted to the City generally decreased from 2,758 at its peak in 2005, to 511 at its nadir in 2010, with a slight uptick in 2011 to 594.

Table 3-28. Housing Characteristics in the Analysis Area, 2010 and 2011

Location	Total Units*	Occupied (%)*	Median Value†
Cities			
Goodyear	21,077	18,217 (86.4)	$181,300
Maricopa	16,534	12,822 (77.5)	$124,900
Counties			
Maricopa	1,596,165	1,382,002 (86.6)	$181,600
Pinal	149,504	118,826 (79.5)	$119,400
State			
Arizona	2,776,037	2,326,468 (83.8)	$169,500

* Census Bureau (2010).
† Census Bureau ACS (2011).

Economics Related To Recreation

Common social trends in the western United States include rapidly growing urban populations, increased concern over loss of open space, increasingly transformed landscapes, continued and increasing loss of biodiversity, increased pressures for uses of all types (in particular, strong trends in recreational uses, such as hiking, biking, OHV and sport utility vehicle [SUV] use, camping, picnicking, etc.), increased pressures for preservation and conservation, and increased feelings of loss associated with public and private lands, including lost access to public lands and recreation.

Although economic conditions are changing in the communities within and surrounding the analysis area, public land resources continue to be perceived as linked to local economic well-being. The scenic resources, climate, and outdoor opportunities in the region attract retirees and those looking for second homes. Some residents in the surrounding communities perceive BLM lands as being critical to their economy by providing hunting, fishing, wildlife, and recreational trails and a direct link to the local tourism industry.

Recreation and tourism are important contributors to the economic stability of the local area; economic benefits are derived from direct spending on food, gas, lodging, etc., but also from sales tax generated from visitor spending. Local and sales tax revenue is extremely important in rural (or non-urban) areas. This is because tourism often forms a larger proportion of the economic activity in these areas and also because special excise taxes on tourists and visitors (i.e., from food, lodging, auto rentals, etc.) are more heavily paid by visitors, rather than residents (Dean Runyan 2006). OHV use and camping (both dispersed and developed), along with hunting and fishing, stimulate the economy through direct local expenditures on motorized vehicles, trailers, equipment and accessories, and insurance and maintenance costs (Arizona State Parks 2003). Local spending on food, gas, lodging, and souvenirs also indirectly benefits the region by supporting wages and income in the local economy, as well as contributing local and state tax dollar revenue.

Population growth in Arizona is partially attributed to the state's appeal as a year-round recreational destination that offers diverse opportunities for outdoor recreational activities including wildlife watching, birding, nature photography, hiking, biking, camping, off-highway vehicle use, equestrian activities, and hunting. In 2005, Maricopa County had nearly $11.2 billion in travel-generated earnings, while Pinal County had about $507.4 million, and the state total was over $18.3 billion (Arizona Office of Tourism 2012). Travel-generated tax revenue is the state's highest generator (retail comes in second) (Arizona Office of Tourism 2012).

AGFD has undertaken studies to quantify the economics of consumptive and nonconsumptive wildlife recreation (AGFD 2002; Southwick 2003). Table 3-29 below describes the annual consumptive (angling and hunting) expenditures in Maricopa and Pinal Counties. Table 3-30 describes the economics of consumptive and nonconsumptive wildlife recreation in Maricopa and Pinal Counties.

Table 3-29. Angler and Hunter Expenditures, Maricopa and Pinal Counties

Expenditures	Maricopa County	Pinal County
Trip Expenditures	$141,350,773	$11,361,494
Equipment Expenditures	$267,679,695	$8,499,312

Source: AGFD (2002).

Table 3-30. Economic Impacts from All Watchable Wildlife Recreation in 2001

Expenditures*	Maricopa County	Pinal County
Number of full- and part-time jobs	6,603	949
Retail sales	$368,334,416	$50,897,041
Salaries and wages	$192,817,949	$26,614,902
State sales and fuel tax revenues	$20,968,707	$2,911,907
State income tax revenues	$4,846,347	$665,331
Federal income tax revenues	$33,868,552	$4,638,383

Source: Southwick (2003).
* Expenditures include County residents, residents from other counties, and non-residents.

Trip expenditures include but are not limited to purchases such as food, lodging, gas, equipment rental, ammunition, and use/access fees. Equipment expenditures include but are not limited to fishing gear, camping equipment, clothing, guns and rifles, and vehicle purchases.

Economic impacts in the analysis area from all watchable wildlife recreation generated approximately $400 million in retail sales in 2001, supporting nearly 8,000 jobs. The total tax revenue from all watchable wildlife recreation of the analysis area was approximately $65 million in 2001.

As illustrated in Tables 3-29 and 3-30, the economic benefits of consumptive and nonconsumptive recreation in Maricopa and Pinal Counties is a multimillion-dollar economy that supports thousands of jobs. At a more local level, revenue generated directly from visitor spending is more difficult to quantify, however, several recreational destinations are located within or adjacent to the area of analysis (e.g., SDNM) and would draw a variety of recreationists to the area.

Specific information regarding economic generation in areas smaller than the county level does not exist for this area. In addition, revenue-generating recreational activities that have required fees do not occur within the analysis area.

Economics Related to Livestock Grazing

As stated in Section 3.12, Livestock Grazing, the proposed SVPP ROW, under all action alternatives and sub-alternatives, would intersect two existing allotments. The actual year-long use on these two allotments varies from year to year, based on resource and livestock market conditions.

Livestock grazing, grazing authorizations, and livestock uses are measured in animal unit months (AUMs). The federal grazing fee is computed by using a 1966 base value of $1.23 per AUM for livestock grazing on public lands in Western states. The figure is then adjusted each year according to three factors: current private grazing land lease rates, beef cattle prices, and the cost of livestock production. In effect, the fee rises, falls, or stays the same based on market conditions, with livestock operators paying more when conditions are better and less when conditions have declined.

The federal grazing fee, which applies to federal lands in 16 Western states on public lands managed by the BLM and the Forest Service, is adjusted annually and is calculated by using a formula originally set by Congress in the Public Rangelands Improvement Act of 1978. Under this formula, as modified and extended by a presidential Executive Order issued in 1986, the grazing fee cannot fall below $1.35 per AUM; also, any fee increase or decrease cannot exceed 25% of the previous year's level. An AUM is the amount of dry forage required to sustain one "animal unit" for one month. In Arizona, BLM grazing

allotments are classified as perennial, ephemeral, or perennial-ephemeral. The grazing fee for 2013 is $1.35 per AUM.

The Beloat allotment is, in part, located on 101,111 acres of BLM land and typically has approximately 280 cattle for grazing. The Conley allotment is, in part, located on 91,018 acres of BLM land. Current (2013) AUMs for the Beloat and Conley allotments are being evaluated by the BLM Lower Sonoran Field Office. The 2012 SDNM RMP has resulted in closures to grazing in certain areas of the allotments effective in fall 2014, and new AUMs would be established upon the closures.

3.18.4.2 Employment

In 2010, total employment in the two cities of Goodyear and Maricopa was 43,335; it was 1.86 million in the two-county (Maricopa and Pinal) analysis area (Table 3-31). The total employment in Maricopa and Pinal Counties represented 68% of total state employment. In both cities, counties, and the state, the "education, health, and social services" sector was the top industry for employment in 2010. This industry accounts for 19% of employment in both counties and 20% in the cities of Maricopa and Goodyear (EPS 2012).

Table 3-31. Employment by City and County, 2010

Industry	City		County		State
	Goodyear	Maricopa	Maricopa	Pinal	Arizona
Agriculture, forestry, fishing, hunting, mining	157	303	9,568	3,977	36,905
Construction	2,069	1,304	156,130	12,691	244,026
Manufacturing	1,386	2,127	144,797	11,789	211,782
Wholesale trade	886	541	52,150	3,450	73,841
Retail trade	2,799	2,017	209,943	15,287	334,791
Transportation	2,216	1,189	88,940	7,035	136,251
Information	376	581	36,058	2,200	52,675
Finance, insurance, real estate	2,514	1,599	172,412	8,361	225,051
Professional, scientific, management, administrative	2,622	1,449	213,073	9,648	306,180
Education, health, and social services	5,844	3,272	334,926	25,061	562,284
Arts, entertainment, recreation	2,060	1,303	166,658	10,029	282,794
Public administration	1,876	1,202	74,971	10,588	151,134
Other	1,105	548	81,199	5,461	129,761
Total	**25,910**	**17,435**	**1,740,825**	**125,577**	**2,747,475**

Source: EPS (2012).

3.18.4.3 Unemployment

In terms of the annual unemployment rate in 2010, unemployment was lowest in the city of Goodyear, at 7%, and highest in the city of Maricopa, at 13%. Unemployment rates in Maricopa and Pinal Counties (9.6% and 11.70%, respectively) were similar to the state and national unemployment rates (10.5% and 9.6%, respectively) (Arizona Office of Employment and Population Statistics 2012).

3.18.5 Environmental Justice

This section identifies and describes the potential for environmental justice (EJ) impacts as a result of the construction and operation of the proposed Parkway. Environmental justice is defined as the fair treatment and meaningful involvement of all people—regardless of race, ethnicity, or income level—in environmental decision-making. EJ programs promote the protection of human health and the environment, empowerment by means of public participation, and the dissemination of relevant information to inform and educate affected communities. Consideration of EJ issues is mandated by EO 12898, which was published on February 11, 1994. This EO requires that all federal agencies incorporate EJ into their mission by "identifying and addressing…disproportionately high and adverse human health of environmental effects of [their] programs, policies and activities on minority and low-income populations in the United States" (EPA 1994).

The EPA defines a community with potential EJ populations as one that has a greater percentage of minority or low-income populations than does an identified reference community. Minority populations are those populations having 1) 50% minority population in the affected area or 2) a significantly greater minority population than the reference area (EPA 1994). The EPA has not specified what percentage of the population can be characterized as "significant" in order to define EJ populations. Therefore, for the purposes of this analysis, a conservative approach is used to identify potential EJ populations; it is assumed that if the affected area minority and/or poverty status populations are considerably higher than those of the reference area, there is likely an EJ population of concern. Low-income populations were defined as those individuals who are considered living below poverty levels. The Census Bureau defines poverty-level thresholds for individuals and a family of four as income levels below $11,170 and $23,050, respectively (Census Bureau 2012).

The methodology for this analysis included assessing the presence and percentage of minority and low-income populations in the area of analysis and determining whether those communities would experience disproportionately high and adverse impacts as a result of the proposed project. The Census Bureau data for 2010 at the state, county, municipal, and census-tract level were used to determine the presence of minority and low-income populations. By establishing a reference population from definable communities and determining whether higher concentrations of environmental justice populations exist within the area of analysis, any disproportionately high or adverse impacts are identified, analyzed, and disclosed herein.

The reference population was determined to be Goodyear and Maricopa. Both cities are located within the area of analysis and are adjacent to the proposed SVPP alternatives. By comparison, the city of Maricopa had the highest minority population, with 26.7%, followed by Pinal County (26.3%), whereas the city of Goodyear (18.5%) and Maricopa County (19.5%) were similar to the state (21.8%) (Table 3-32). Relevant ethnicity data for the census tracts were used to determine whether populations residing in the affected area constitute a potential EJ population. This was done by comparing minority statistics for the census tracts with those reported for Goodyear and Maricopa. The most current data available at the census tract level were from 2010.

A potential EJ population was determined to exist in the census tracts if the minority population (i.e., a non-white population) is considerably more, or exceeds 50%, than the minority population in one of the reference communities (Maricopa or Goodyear). Table 3-32 summarizes these proportions for census tracts within the area of analysis.

Sixteen census tracts encompass the area of analysis and are located within a 14-mile radius of the project area. The potential EJ populations located closest to the proposed Parkway are located between approximately 2 and 14 miles of the project area.

Minority population data for the state of Arizona, Maricopa and Pinal Counties, and the cities of Goodyear and Maricopa were obtained from the Census Bureau; the latest available data are from the 2010 census. For this analysis, a population is classified as "minority" based on all races and ethnicities that are not "white." Results of census-tract population trends show four census tracts with a higher concentration of minority populations (e.g., Hispanic or Latino and American Indian) representing over 50% of the total census-tract population. These census tracts are 7233.06, 9410, 9411, and 9413 (see Table 3-32).

Table 3-32. Minority Population by Race and Ethnicity, 2010

Location	Total Population	White Alone	Hispanic Alone	Black or African American	American Indian	Asian	Native Hawaiian
Census Tracts							
Census Tract 7233.04	4,230	3,187	1,701	80	70	17	4
Census Tract 7233.06*	5,259	2,509	2,154	699	295	30	6
Census Tract 9410*	2,931	55	363	10	2,659	2	1
Census Tract 9411*	63	9	40	0	27	0	0
Census Tract 9413*	6,293	1,413	805	19	4,496	14	9
Census Tract 17.01	1,087	723	411	24	72	22	0
Census Tract 17.02	2,727	2,031	664	240	40	162	40
Census Tract 17.03	2,001	1,389	630	132	61	52	4
Census Tract 17.04	6,420	4,111	1,902	699	169	213	14
Census Tract 17.05	7,209	5,659	1,502	542	167	267	15
Census Tract 17.06	4,872	3,567	1,016	427	47	280	14
Census Tract 17.07	5,070	3,243	1,301	618	125	348	17
Census Tract 17.08	5,979	4,701	1,063	541	79	188	8
Census Tract 17.09	2,738	1,818	682	301	44	145	5
Census Tract 17.10	4,324	2,970	1,145	501	83	95	15
Census Tract 17.11	2,157	1,459	706	212	60	51	6
Cities							
Goodyear	57,896	47,185	16,602	2,838	502	1,444	47
Maricopa	34,809	25,509	8,591	2,175	492	1,318	142
Counties							
Maricopa	3,751,410	3,018,608	1,087,987	170,642	58,074	122,090	7,134
Pinal	329,297	242,656	95,091	13,363	16,539	5,025	1,274
State							
Arizona	6,246,816	4,883,606	1,814,674	228,860	253,612	162,134	11,053

Source: Census Bureau (2010).

* Gray highlight indicates the percentage of the population below the poverty level is higher than the reference populations

Low-income populations in an affected area are populations below the annual statistical poverty thresholds published by the Census Bureau's current population reports on income and poverty. Families and persons are classified by the Census Bureau as below poverty level if their total family income or unrelated individual income is less than the poverty threshold specified for the applicable

family size, age, and number of related children under 18 years of age. Poverty status is determined for all families (and, by implication, all family members). For persons not in families, poverty status is determined by their income in relation to the appropriate poverty threshold. Thus, two unrelated individuals living together may not have the same poverty status. According to the 2010 Census, 15.3% of individuals in Arizona live below the federal poverty level. The percentage of individuals living below the federal poverty level in Maricopa and Pinal Counties was 13.9% and 13.5%, respectively. The percentage of individuals living below the federal poverty level in the cities of Goodyear and Maricopa was 7.5% and 5.6%, respectively. Nationwide, 13.8% of individuals live below the federal poverty level. Within the selected census tracts that compose the area of analysis, four census tracts reported a percentage of the population below the poverty level higher than the reference populations. These census tracts are 7233.04, 9410, 9413, and 17.08 and are identified in Table 3-32 and Table 3-33 by gray highlights (Census Bureau 2010).

Table 3-33. Low-income Population by Area, 2010

Location	Population Below Poverty Level	Population Below Poverty Level (%)
Census Tracts		
Census Tract 7233.04	763	20.4
Census Tract 7233.06	0	0.0
Census Tract 9410	1,645	65.5
Census Tract 9411	0	0.0
Census Tract 9413	1,770	26.2
Census Tract 17.01	4	0.6
Census Tract 17.02	54	2.2
Census Tract 17.03	0	0.0
Census Tract 17.04	219	3.5
Census Tract 17.05	184	2.9
Census Tract 17.06	84	2.0
Census Tract 17.07	20	0.5
Census Tract 17.08	915	18.3
Census Tract 17.09	139	6.9
Census Tract 17.10	81	2.1
Census Tract 17.11	10	0.5
Cities		
Goodyear	4,614	7.0
Maricopa	2,086	4.7
Counties		
Maricopa	664,966	17.4
Pinal	61,458	17.1
State		
Arizona	1,203,501	19.0

3.18.6 Quality of Life

Increased regional growth over the past several decades has been a significant driving force in the current social and economic setting of the area. As previously noted, explosive population growth has "altered local land, housing, and labor markets; transportation patterns, accessibility to open space, riparian habitats; and other aspects of the human, built, and natural environments of central Arizona" (Gober 1998:30). Growth in the region has exerted some pressure on undeveloped federal lands as residential and commercial developments move closer to the fringe. The areas immediately north of the proposed Sonoran Valley Parkway (in the city of Goodyear) and at the south end the proposed Sonoran Valley Parkway (near Mobile) are largely undeveloped areas with potential for future residential growth as a result of the availability of some private lands.

Although current population and development in the immediate vicinity of the action alternatives is relatively sparse, Rainbow Valley and the SDNM do provide dispersed recreation opportunities such as hiking, hunting, sightseeing, rock collecting, and OHV use (BLM 1988). Rainbow Valley stretches between the cities of Goodyear and Maricopa and is a largely undeveloped area with a patchwork of agricultural fields and undisturbed desert. The SDNM, which is located southwest of all the action alternatives, has been noted for lands that exhibit a high degree of naturalness and for providing outstanding opportunities for visitors to experience solitude and primitive, unconfined recreation. Although the cities of Goodyear and Maricopa are not tourism or recreation destinations per se, they do provide access points to the SDNM and BLM lands in the region. The undeveloped nature of the project area amid rapid regional growth and its proximity to the SDNM define the quality of life and nature of the analysis area.

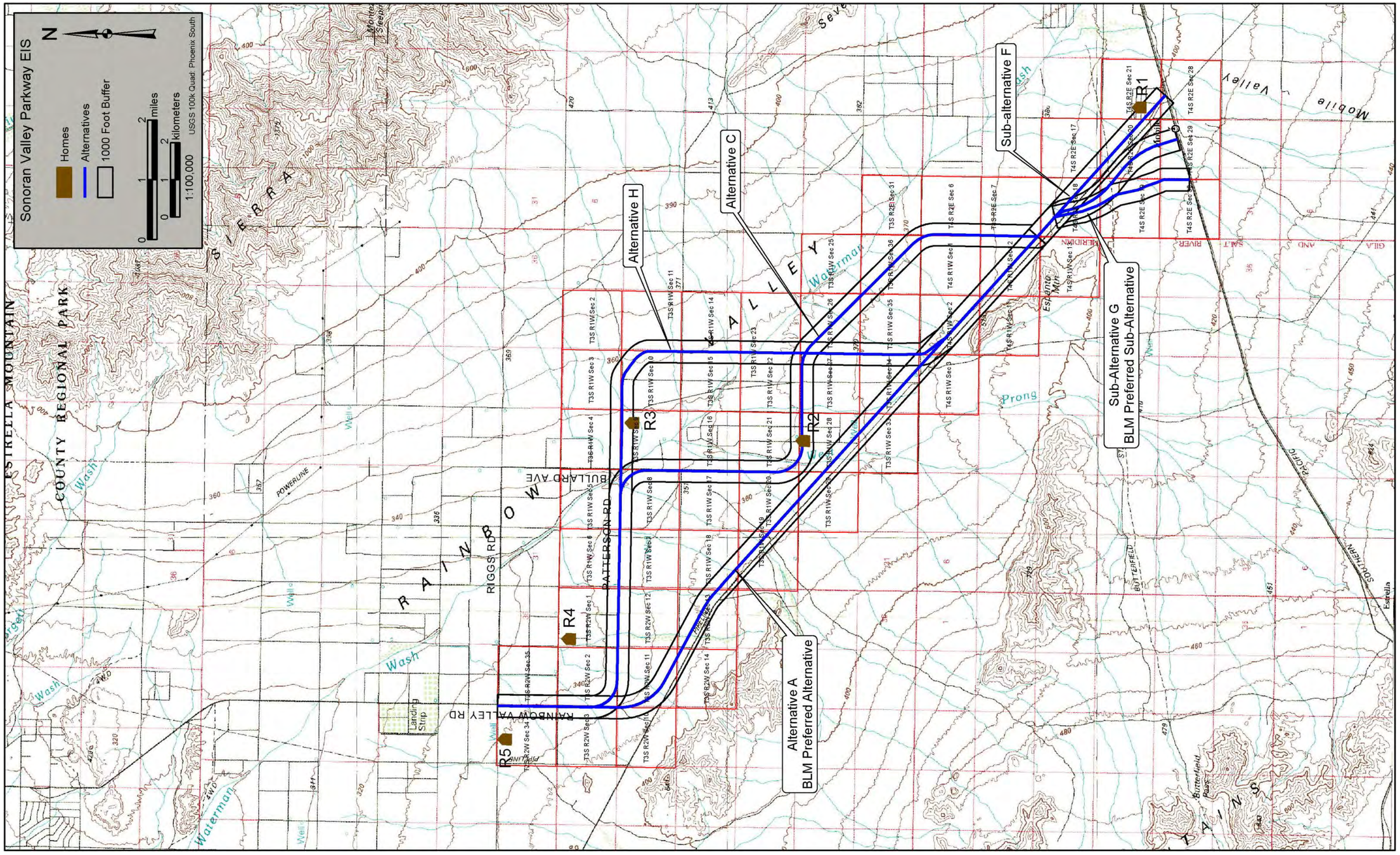

Figure 3-1. Air quality analysis area.

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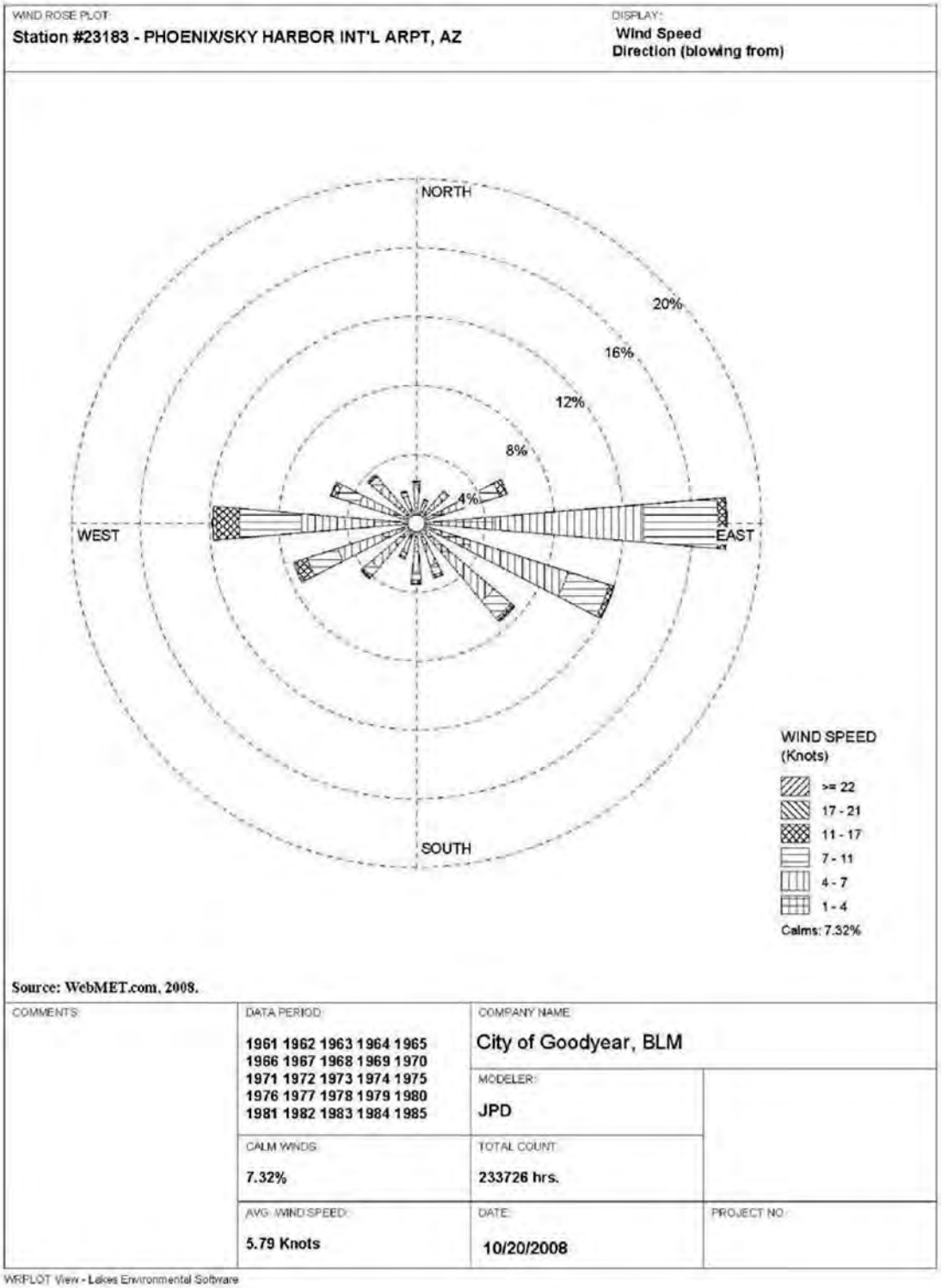

Figure 3-2. Phoenix Sky Harbor International Airport wind rose.

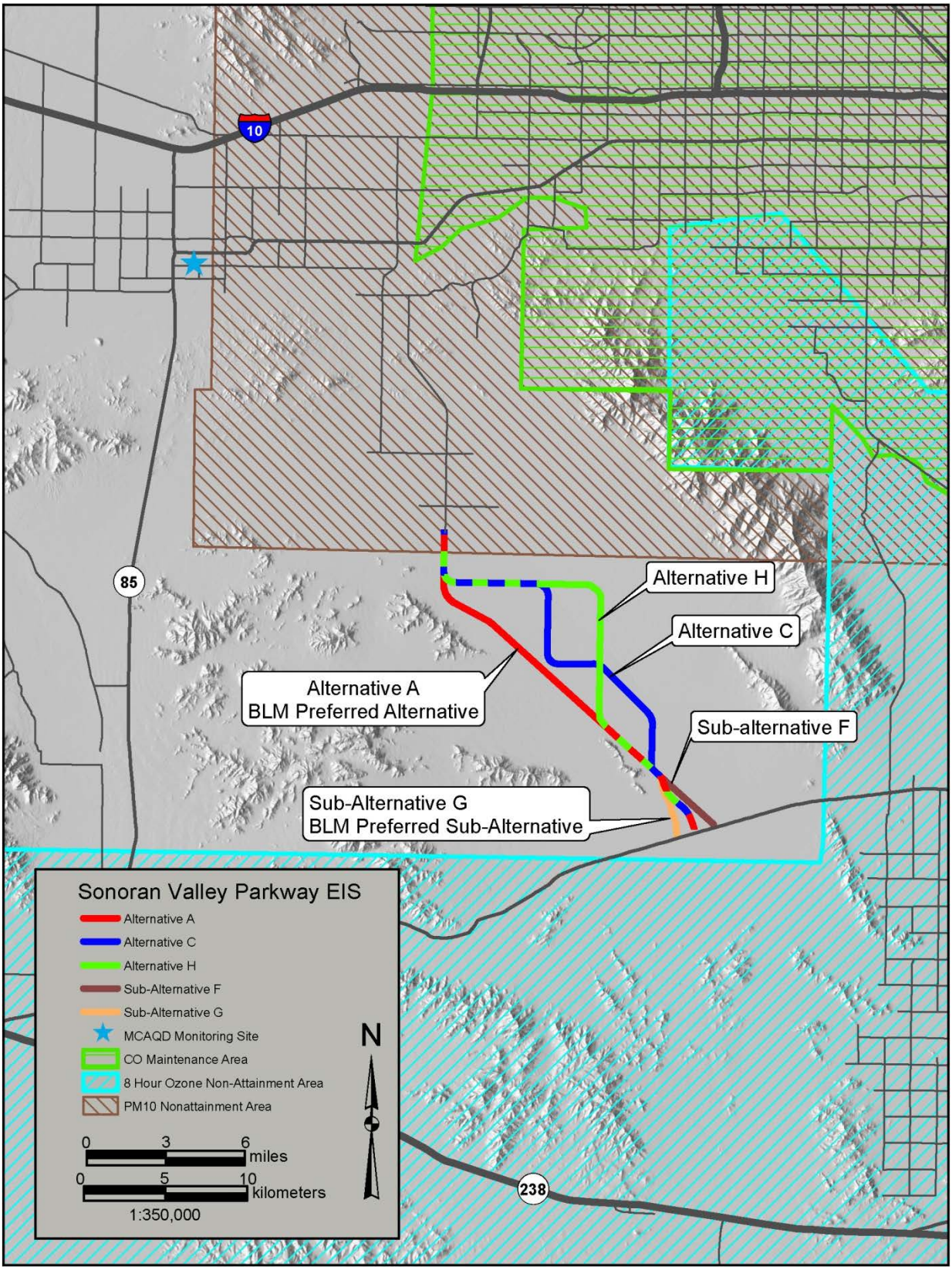

Figure 3-3. Phoenix metropolitan area NAAQS attainment, nonattainment, and maintenance areas.

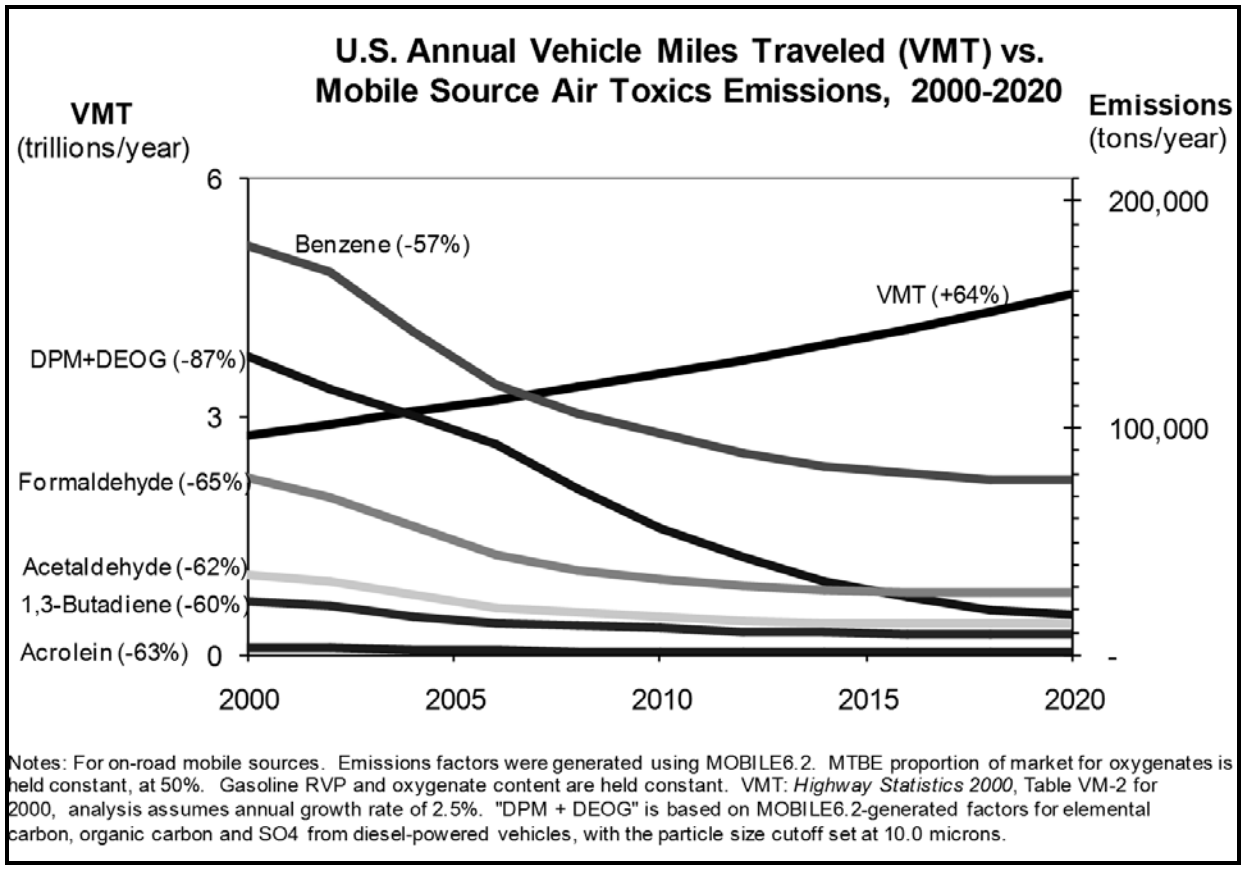

Figure 3-4. National VMT vs. MSAT emissions, 2000–2020.

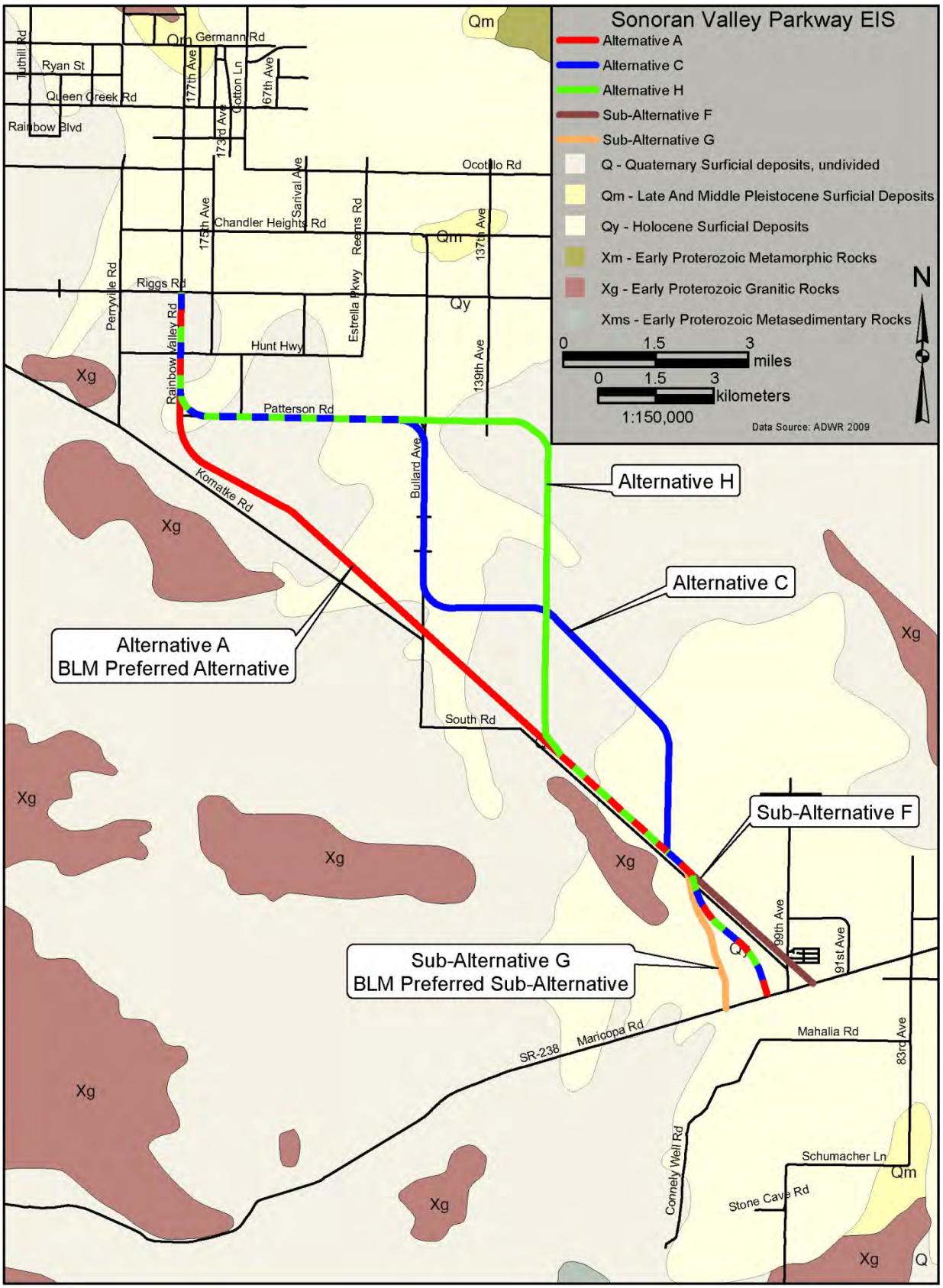

Figure 3-5. Geological units within the analysis area.

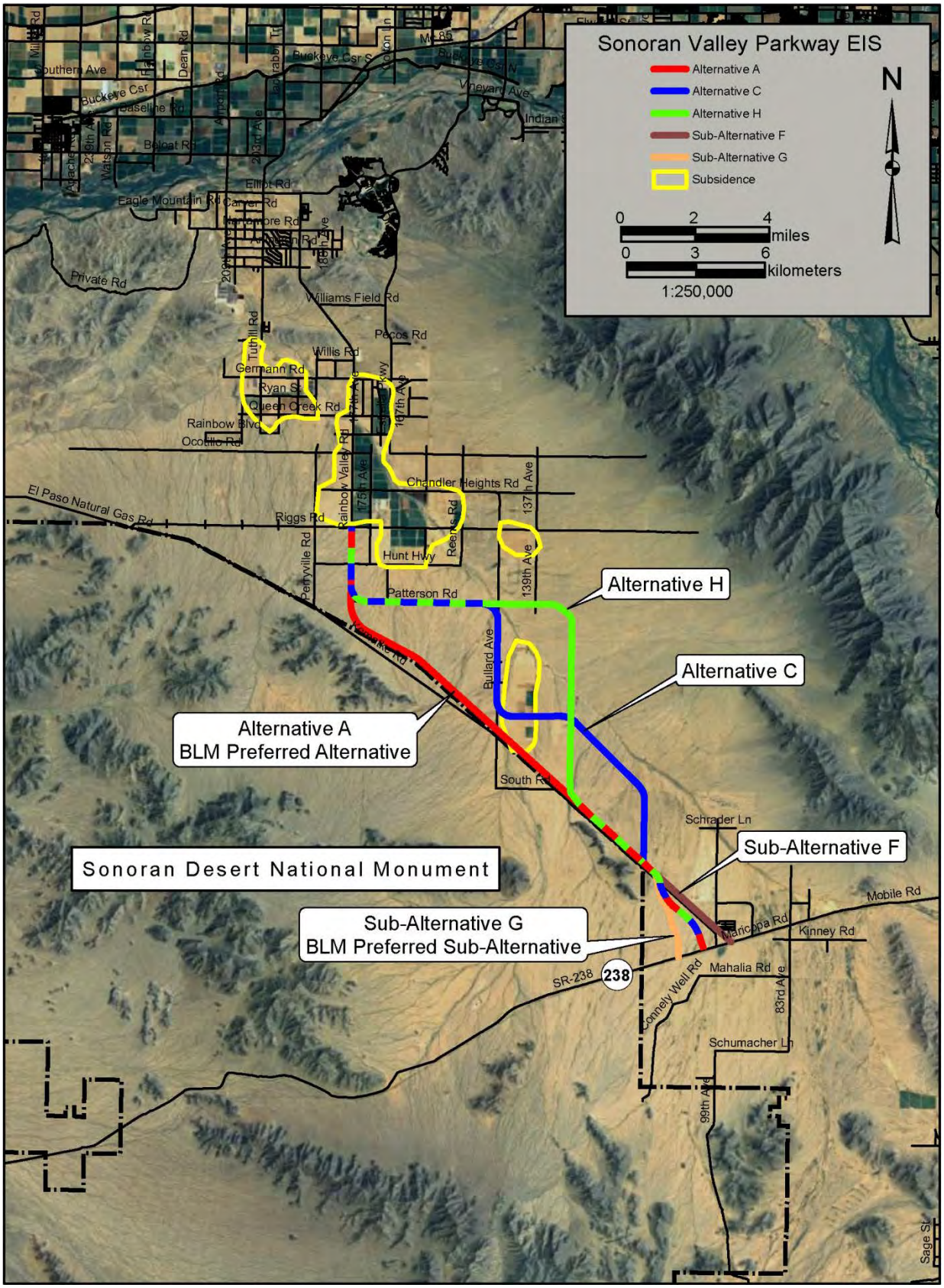

Figure 3-6. Land subsidence in the Rainbow Valley sub-basin.

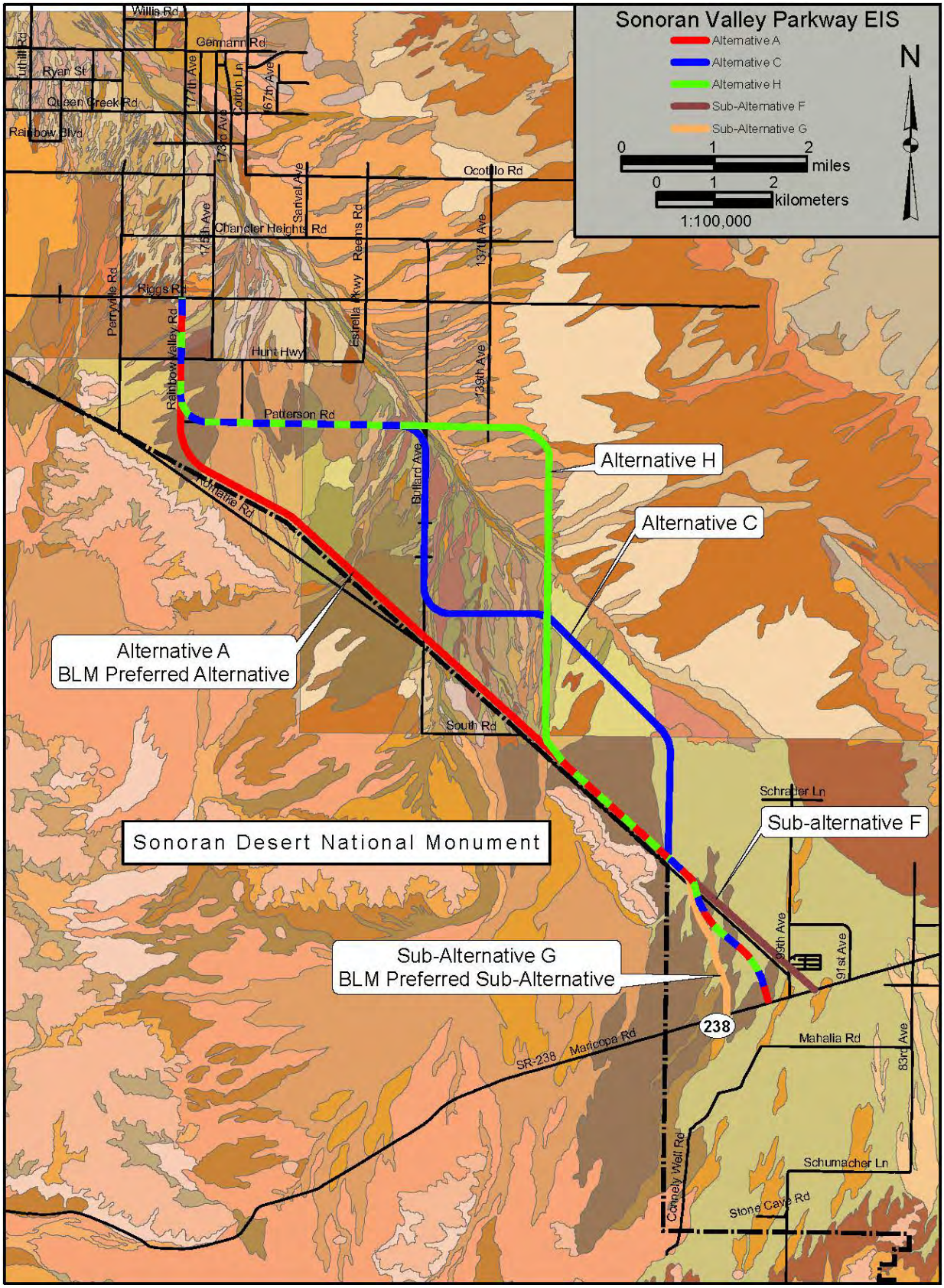

Figure 3-7. Soil associations in the SVPP analysis area.

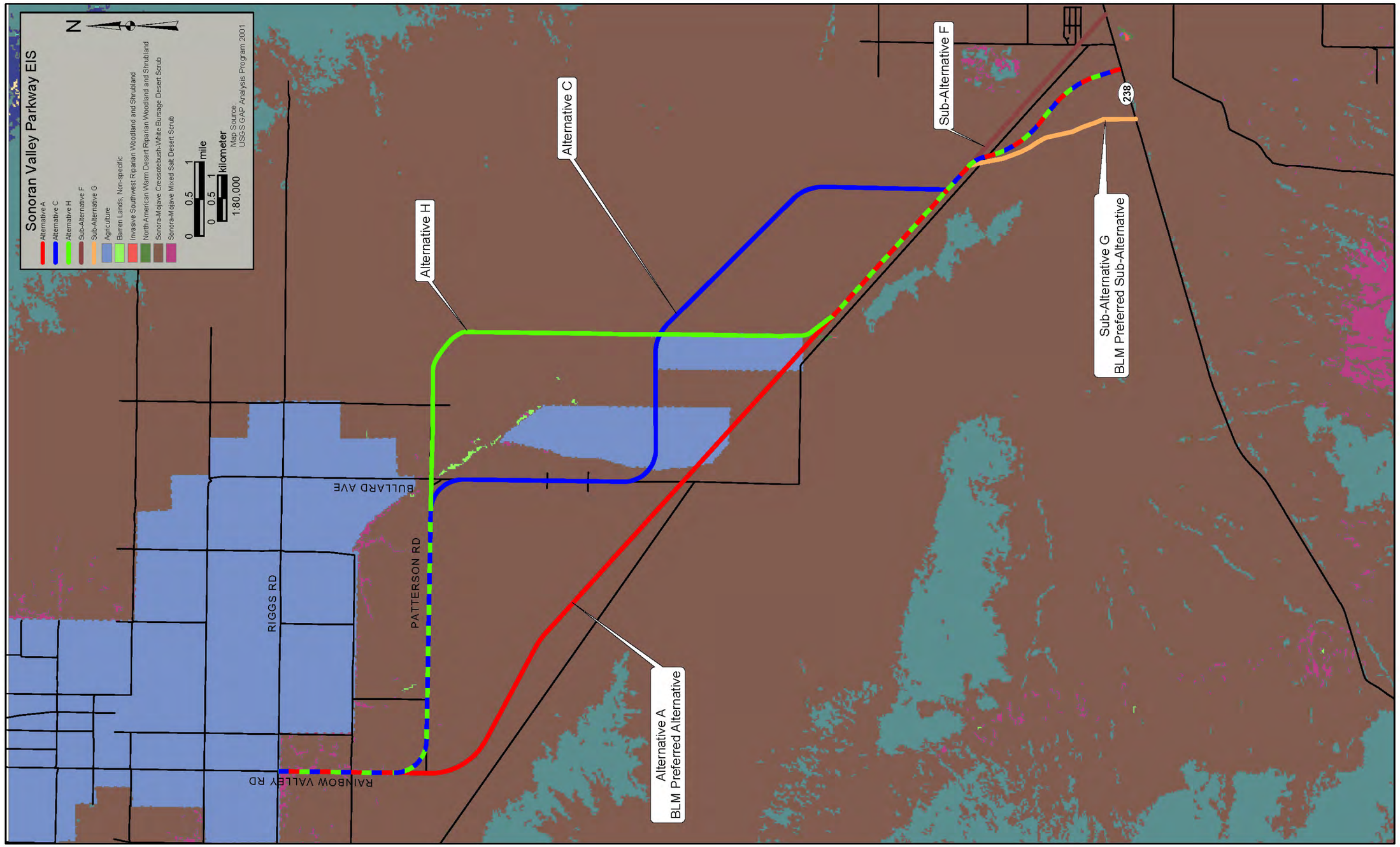

Figure 3-8. Vegetation communities within the analysis area.

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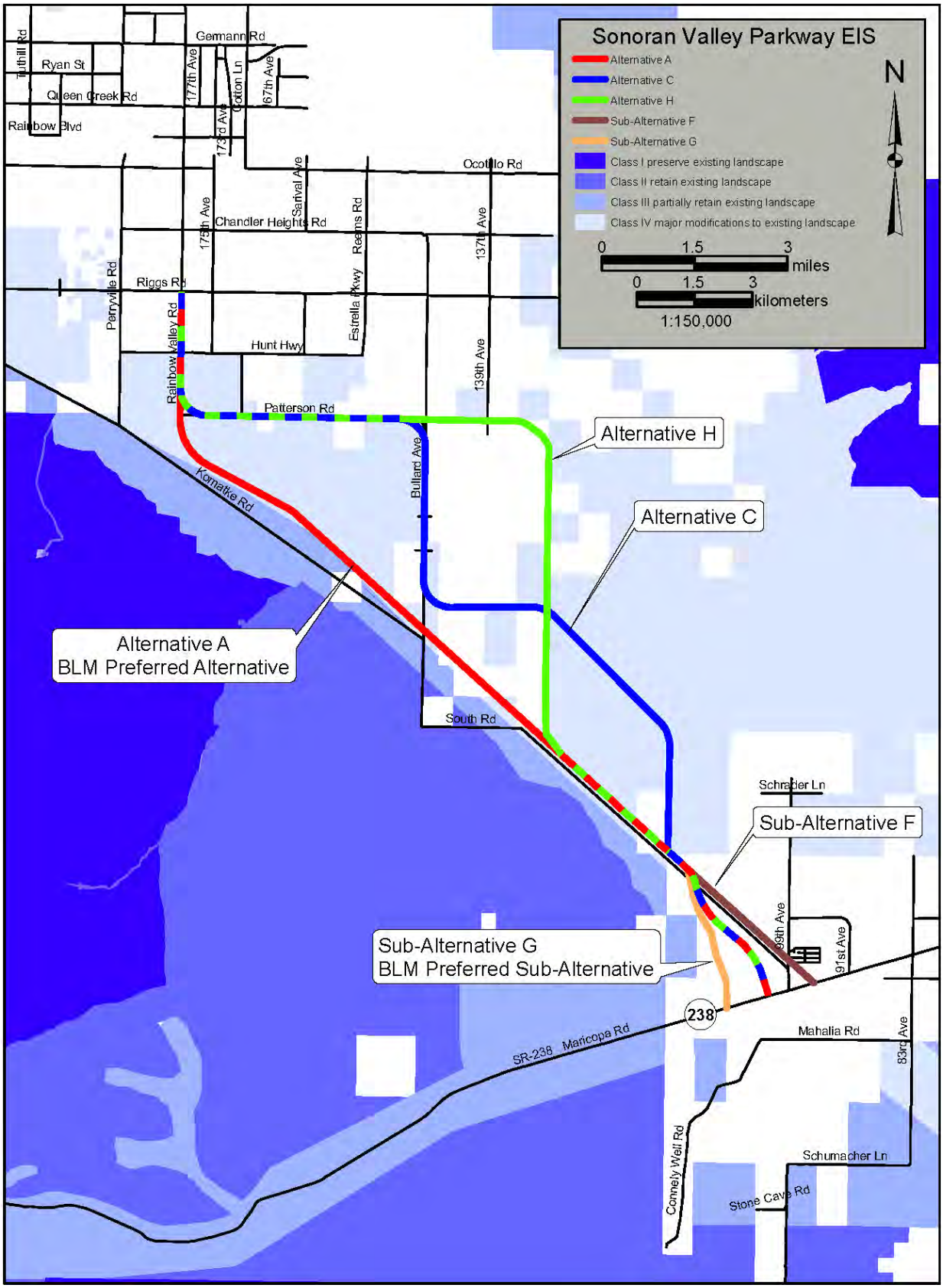

Figure 3-9. VRM management classes within the analysis area.

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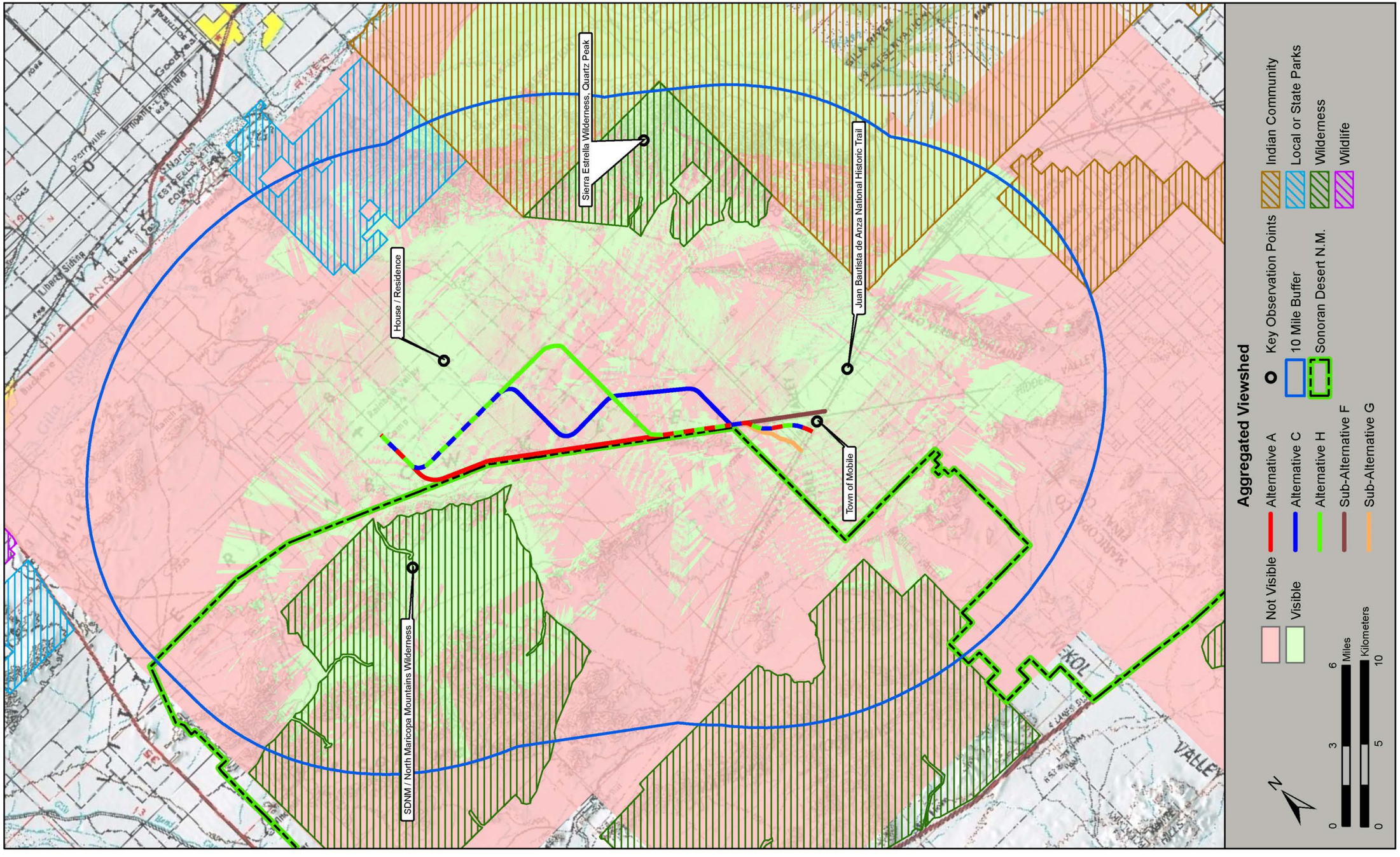

Figure 3-10. Aggregated viewshed.

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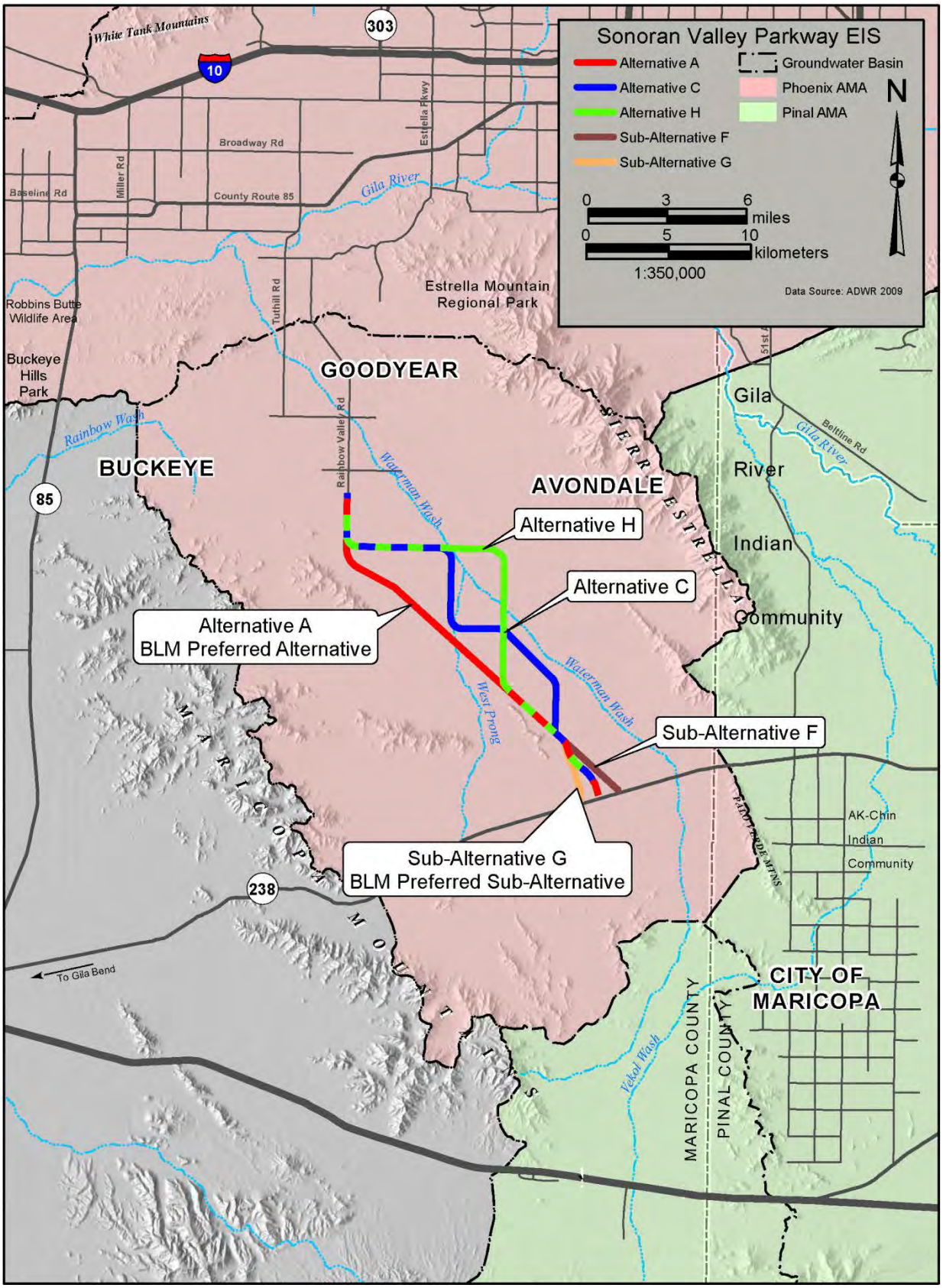

Figure 3-11. Location of the project area within area groundwater basins.

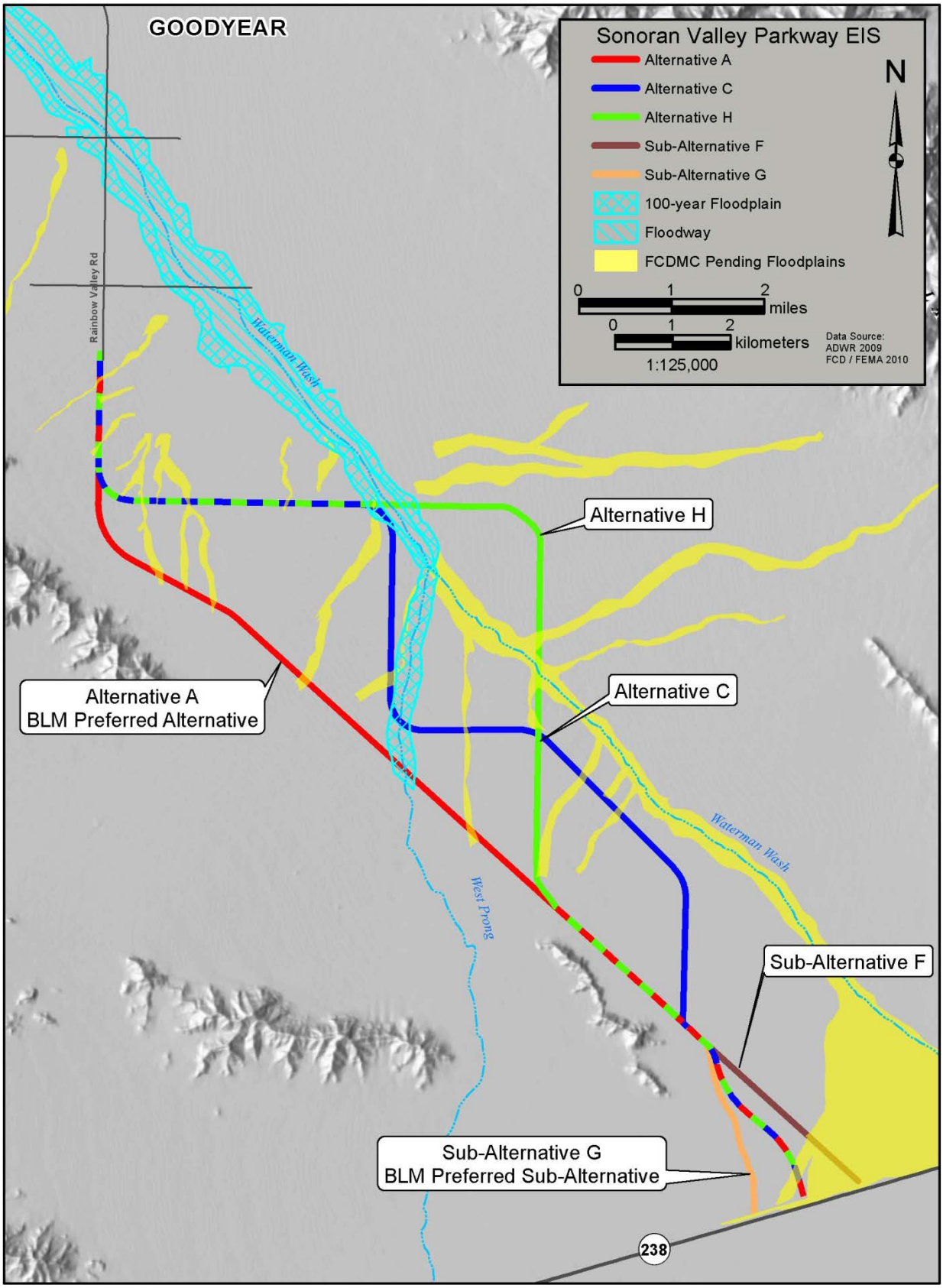

Figure 3-12. FEMA designated and pending floodplains in the analysis area.

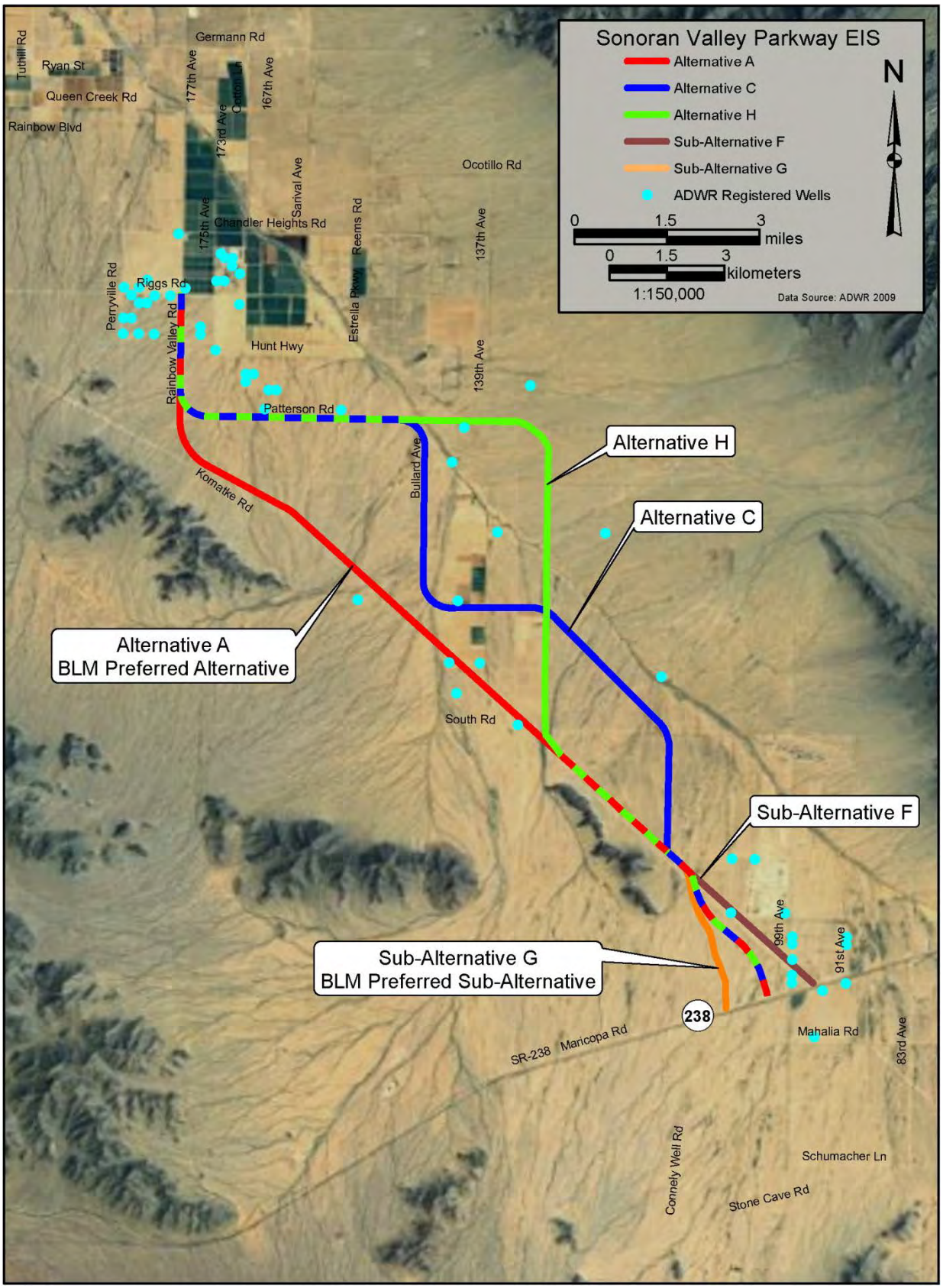

Figure 3-13. Location of ADWR registered wells within the analysis area.

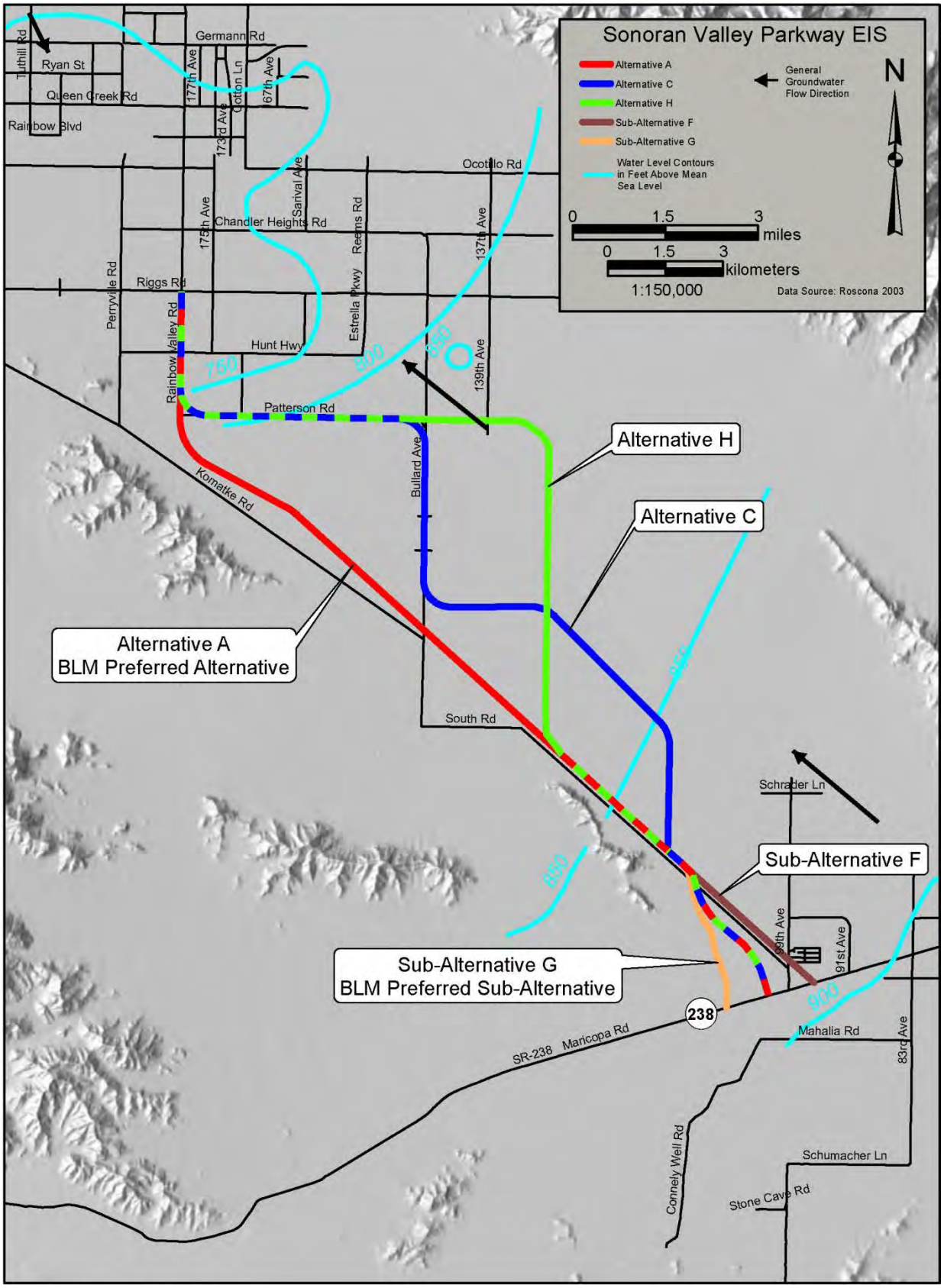

Figure 3-14. Flow of groundwater within the analysis area.

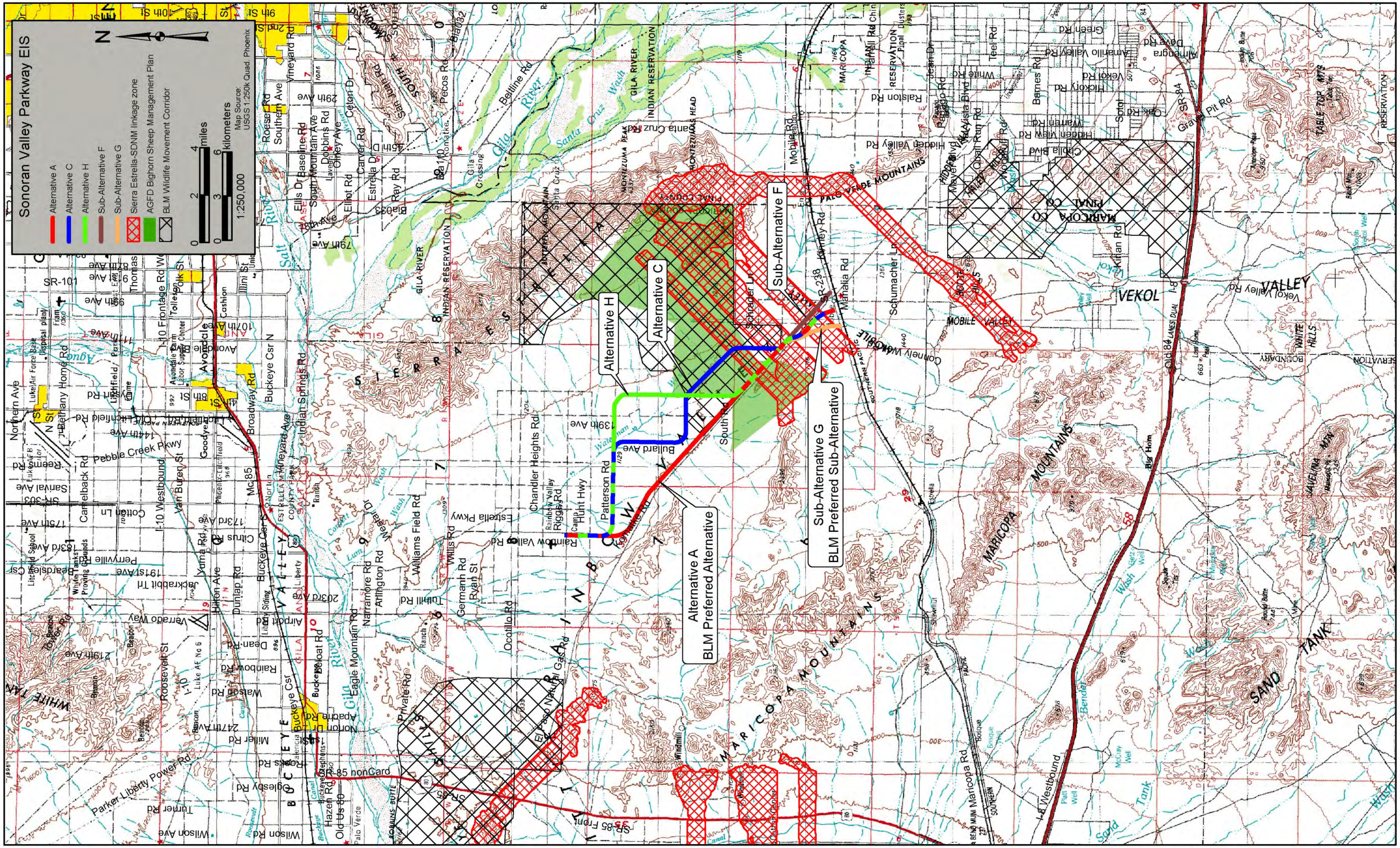

Figure 3-15. Location of wildlife linkages in and near the analysis area.

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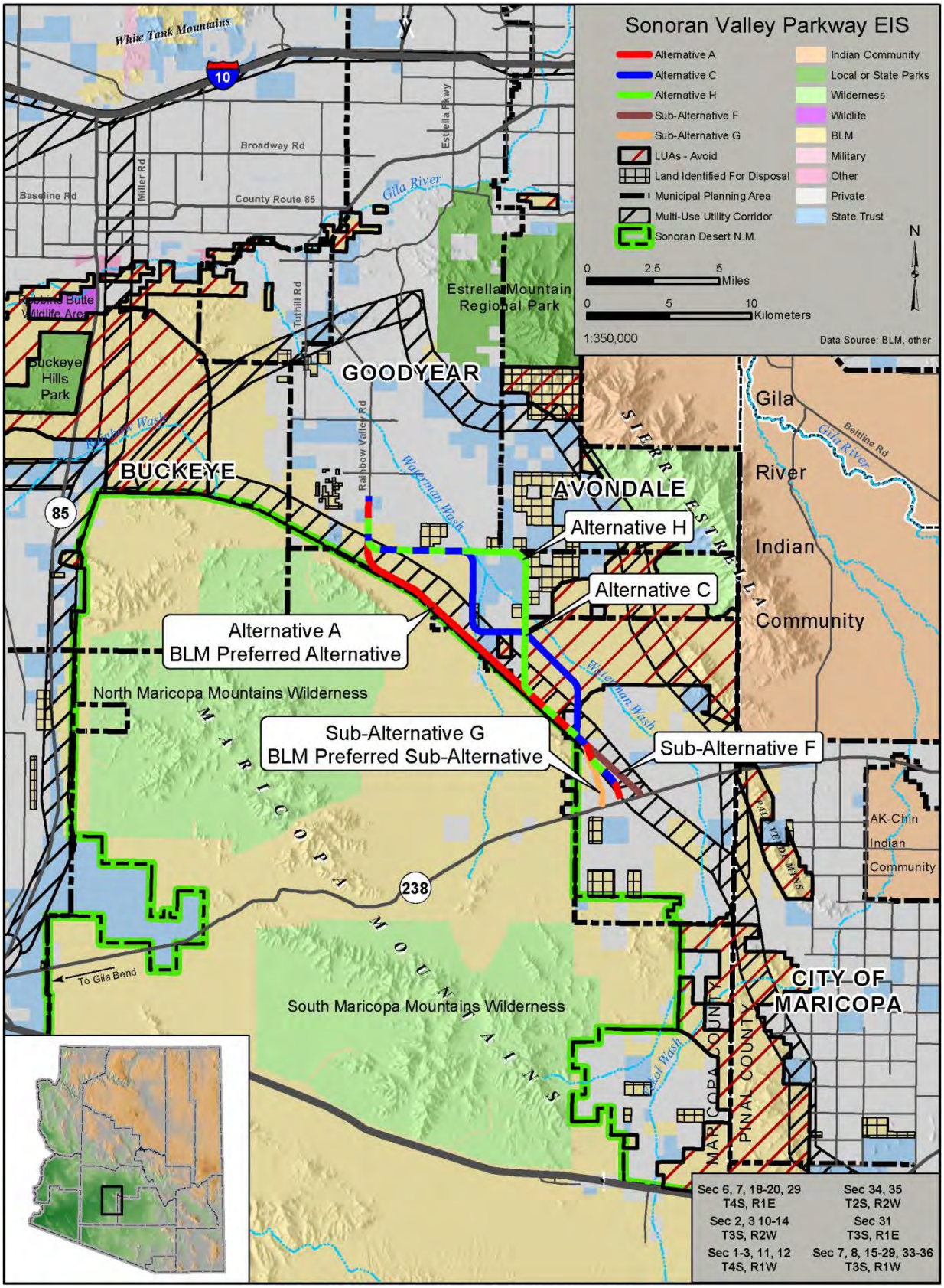

Figure 3-16. Lands and realty map.

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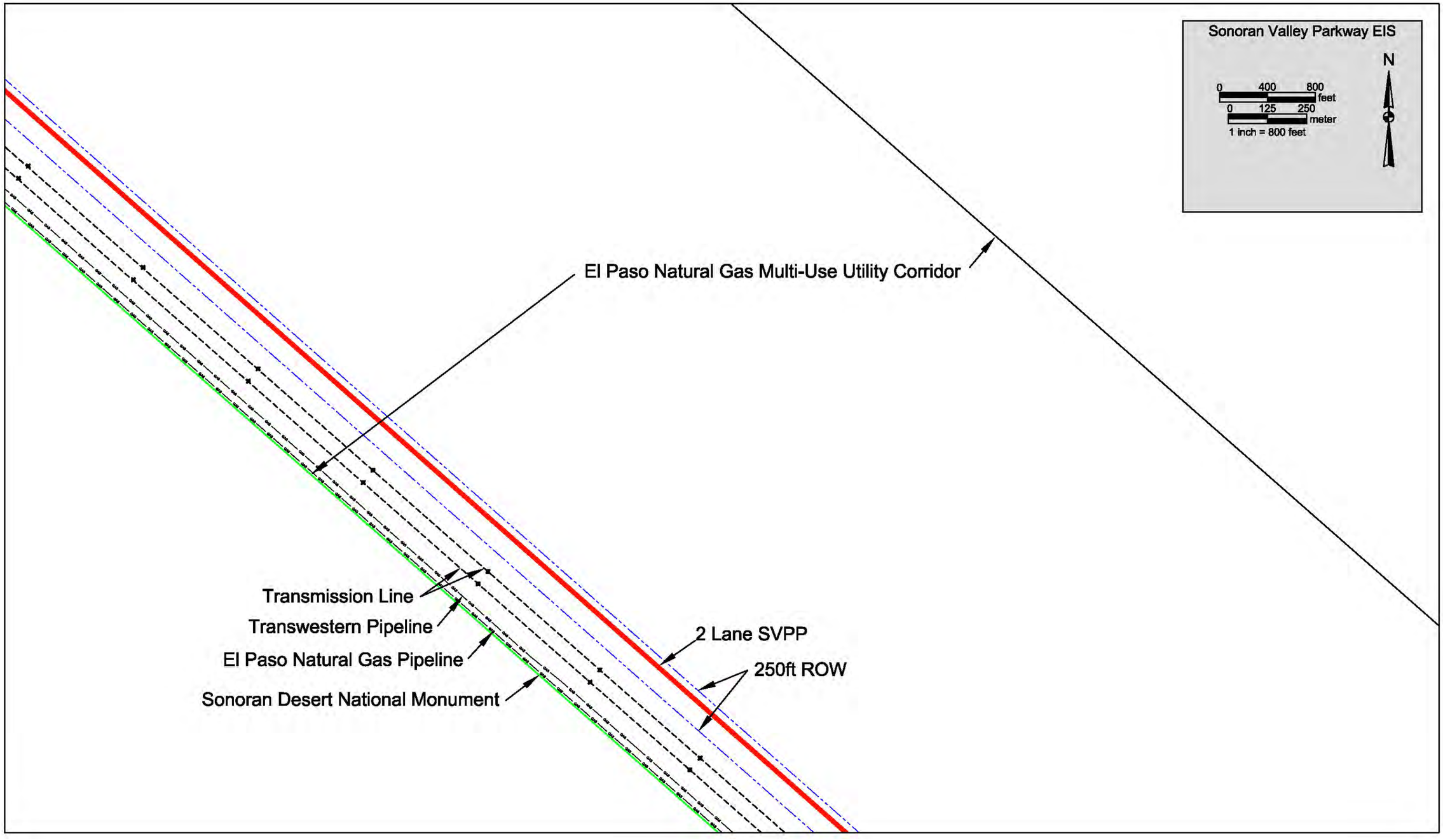

Figure 3-17. Proposed SVPP and existing facilities within the EPNG utility corridor.

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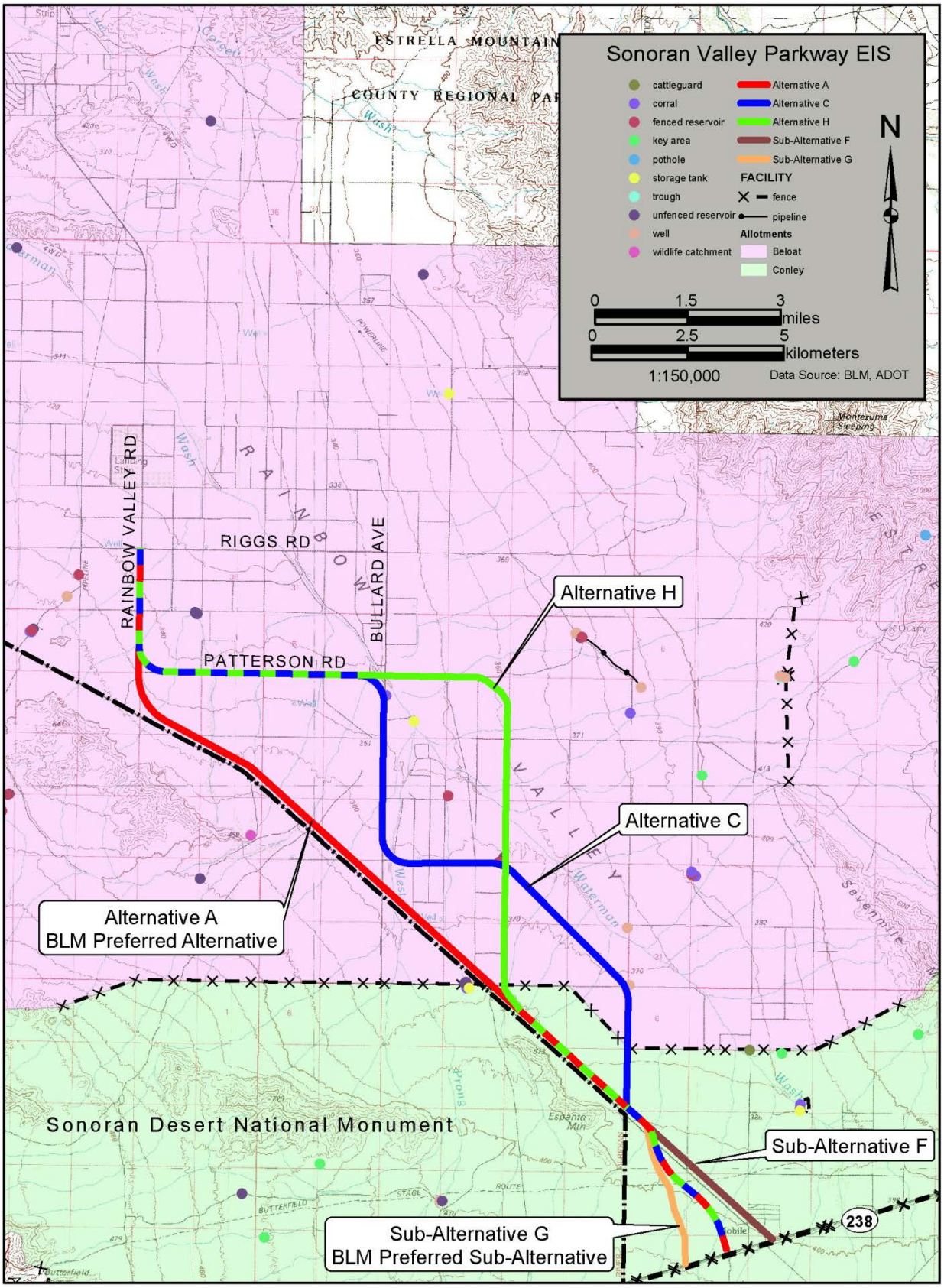

Figure 3-18. Beloat and Conley grazing allotments.

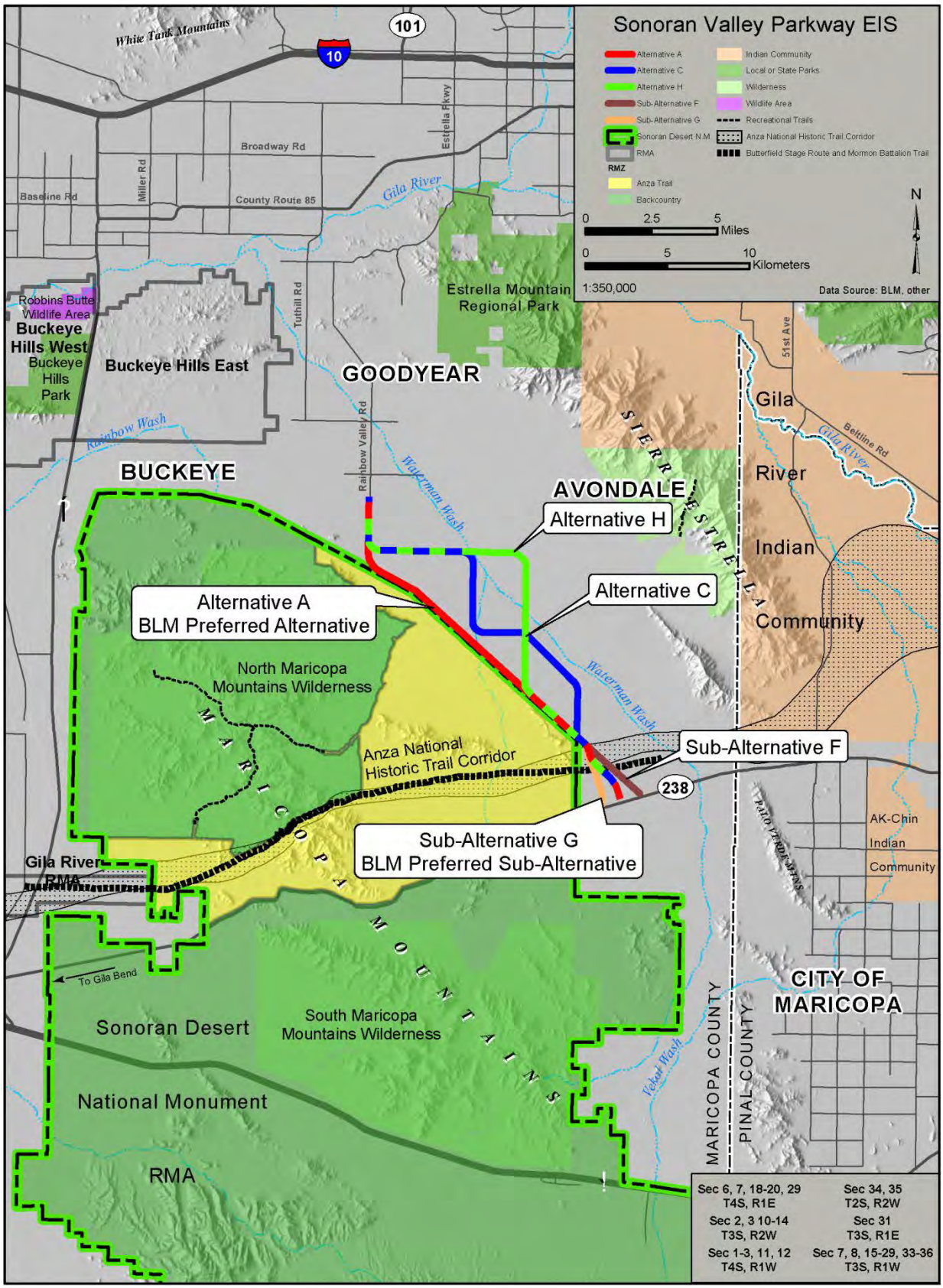

Figure 3-19. Area recreation opportunities.

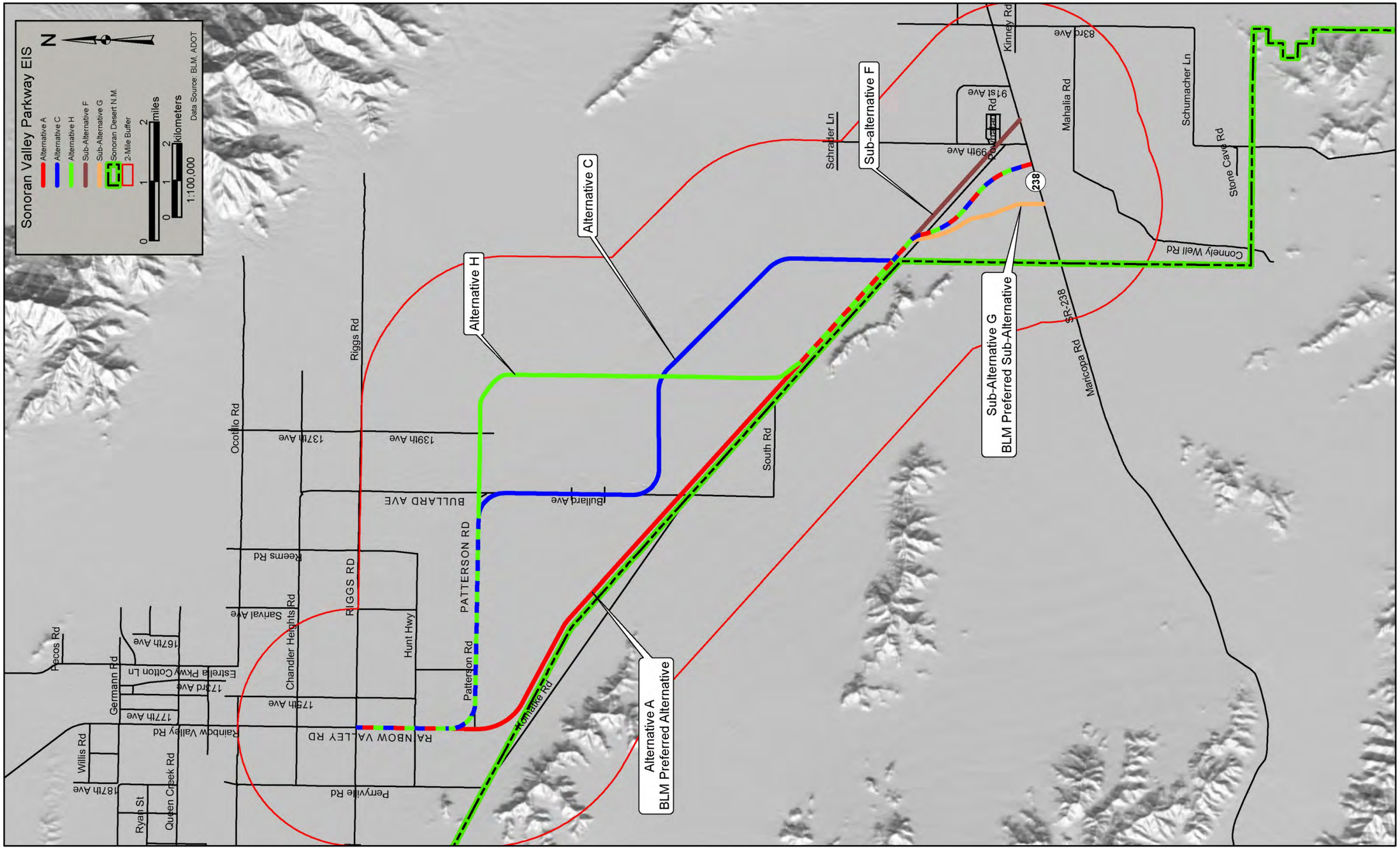

Figure 3-20. ADOT roads.

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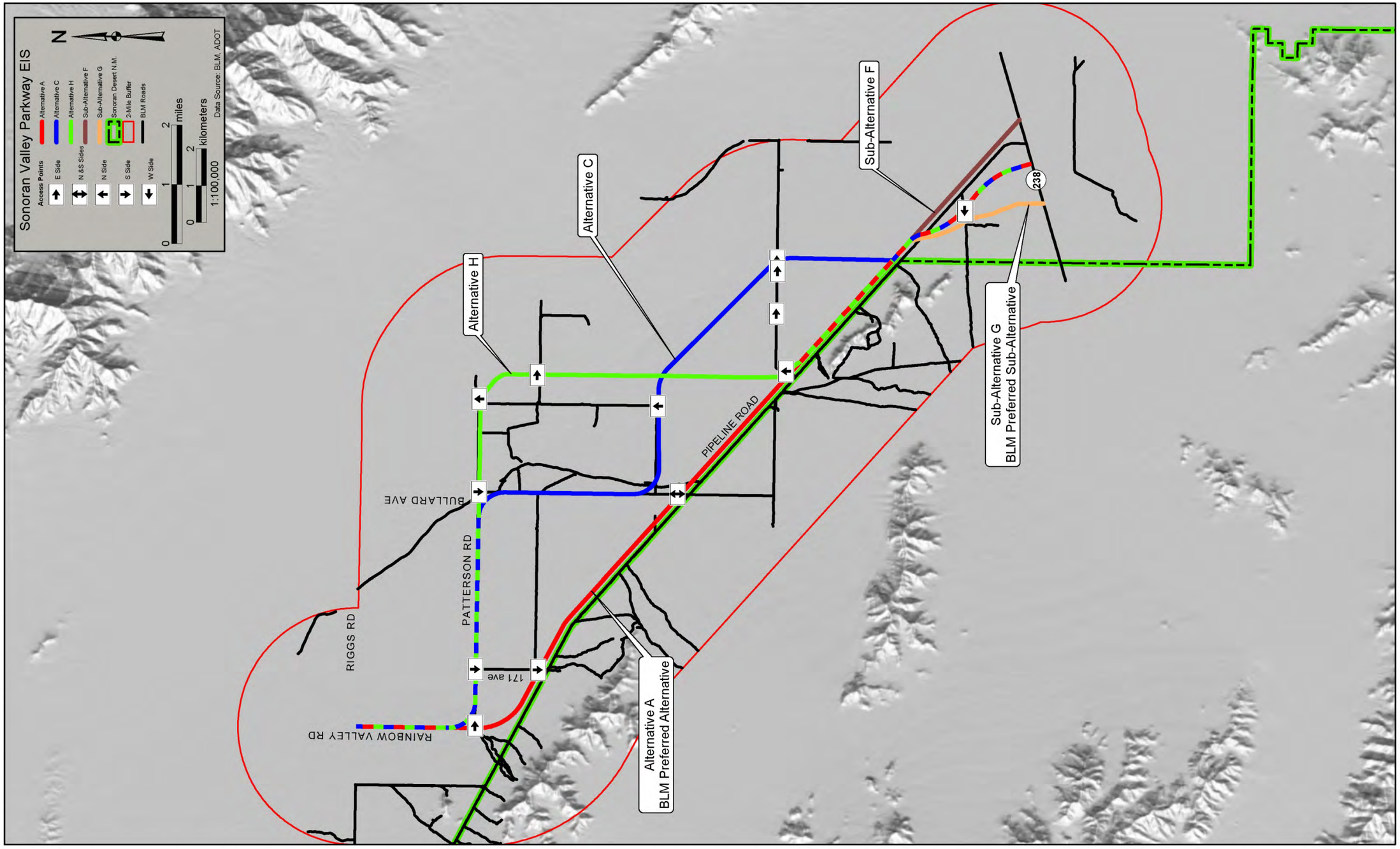

Figure 3-21. BLM roads.

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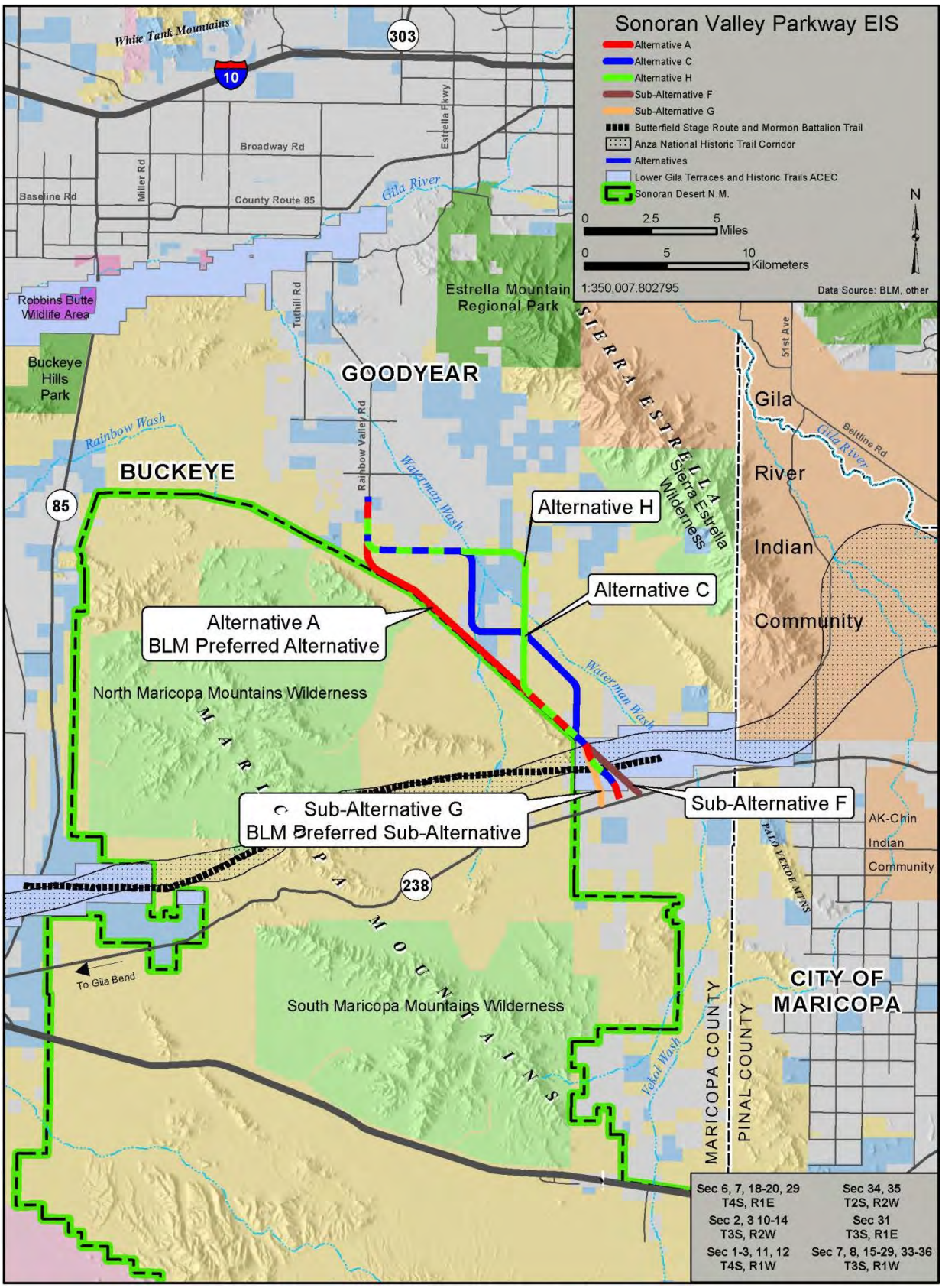

Figure 3-22. Special designations within the analysis area.

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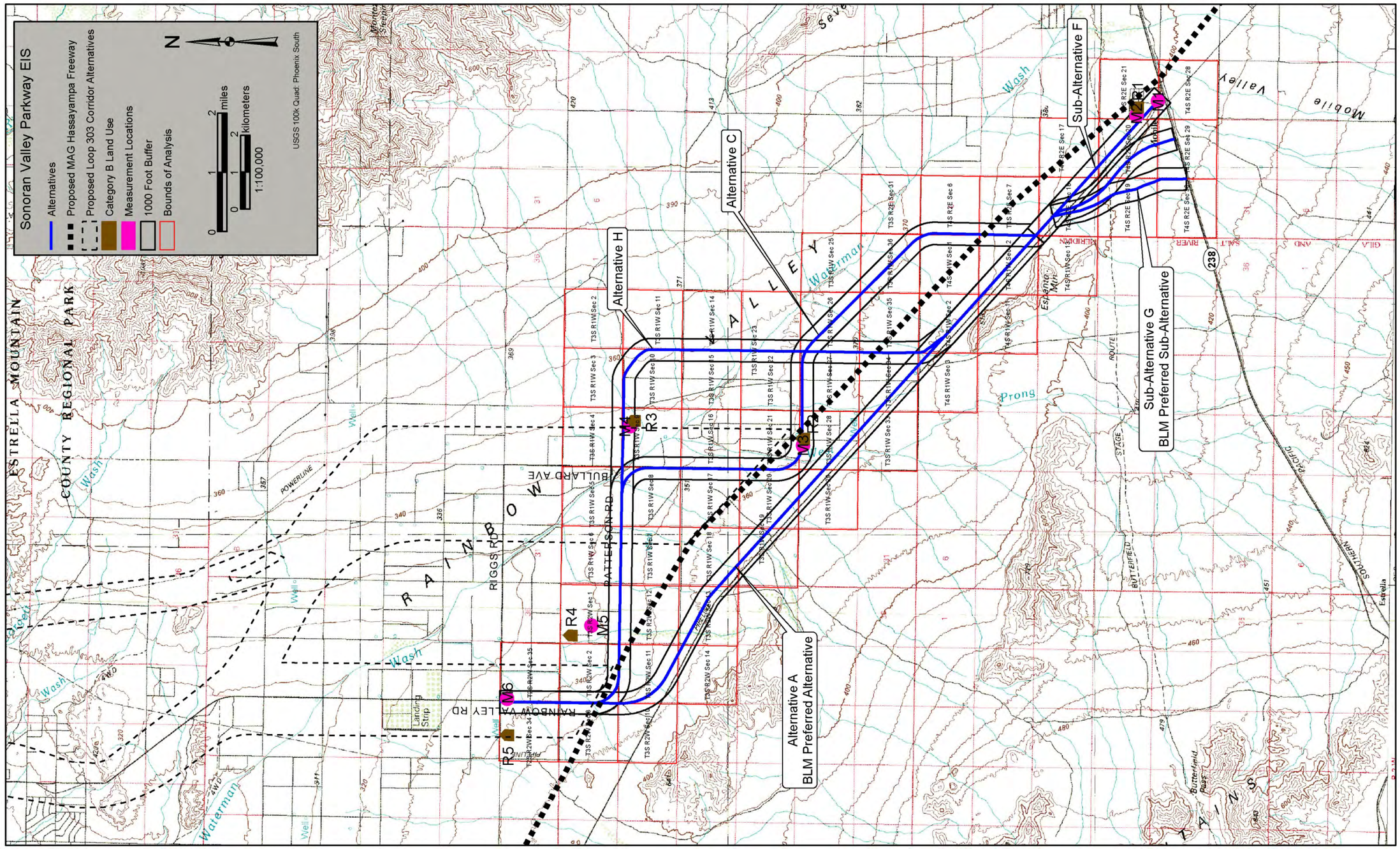

Figure 3-23. Bounds of noise analysis and measurement locations.

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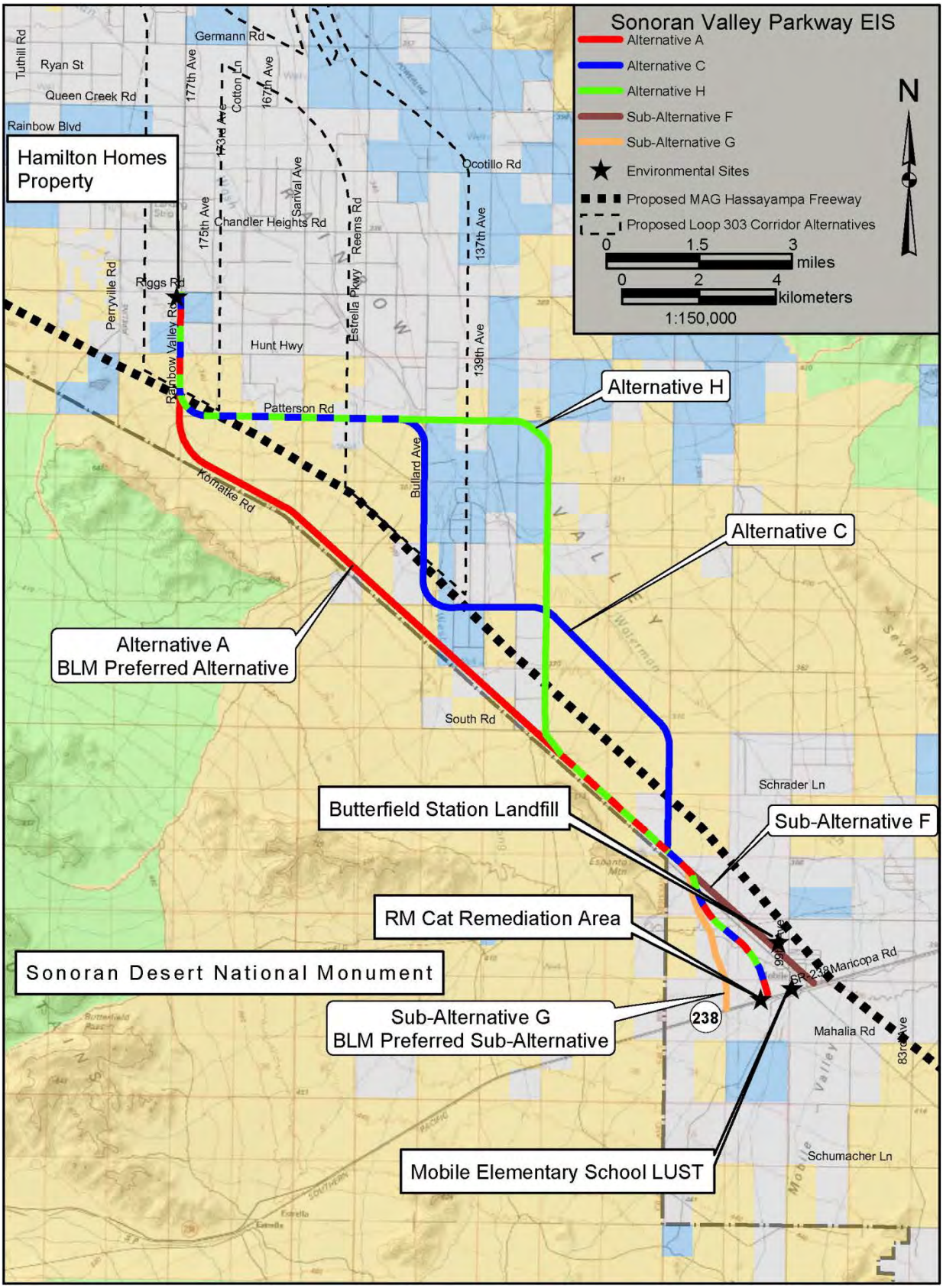

Figure 3-24. Listed environmental sites.

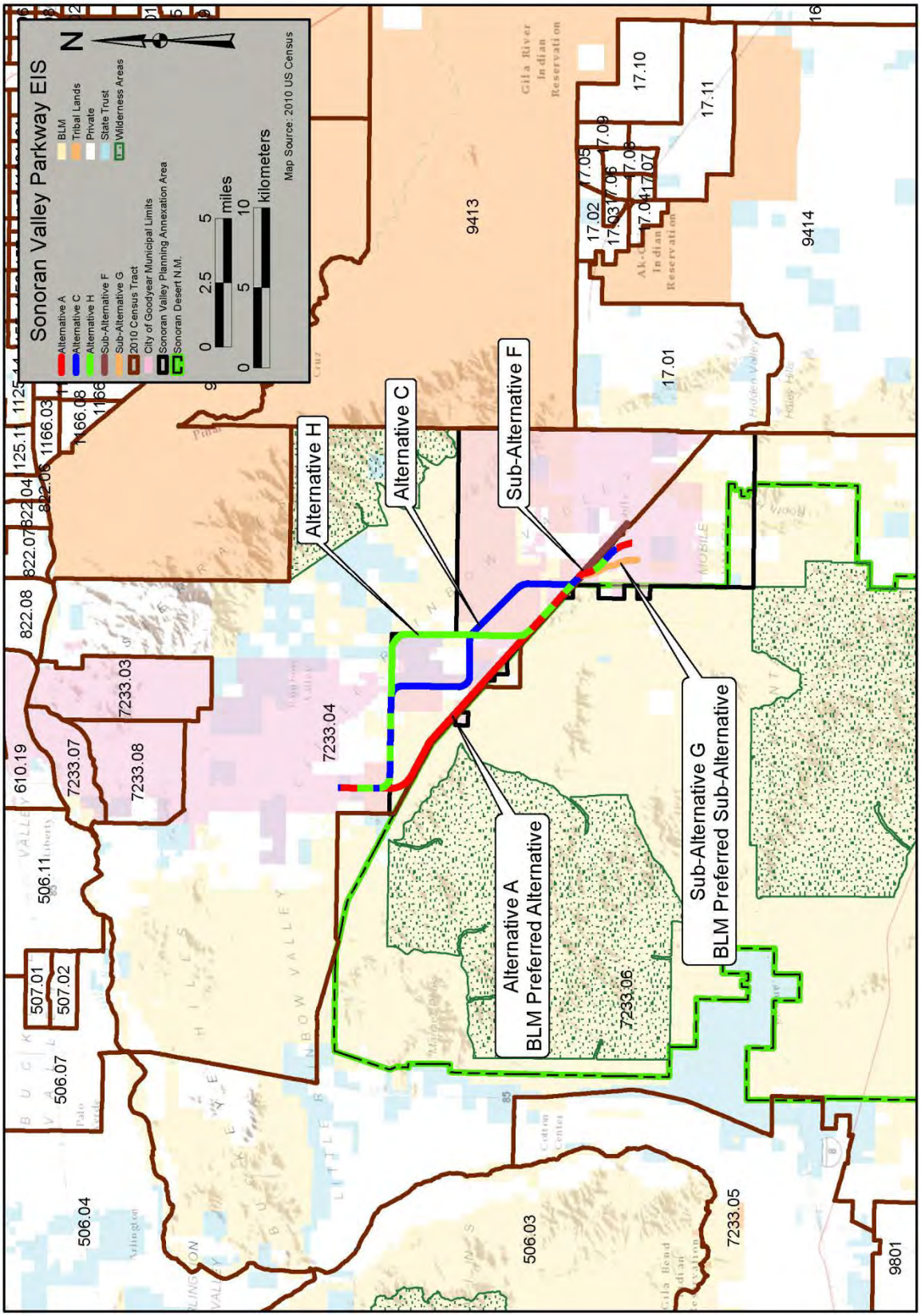

Figure 3-25. Social and economic conditions.

Chapter 4

ENVIRONMENTAL EFFECTS

4.1 INTRODUCTION

This chapter discusses the anticipated environmental consequences of each alternative considered in detail in Chapter 2. The four alternatives and two sub-alternatives addressed below are analyzed.

Under the **No Action Alternative**, the City's ROW application to develop the SVPP would not be approved. The SVPP would not be developed, and existing land uses in the project area would continue. The No Action Alternative forms the baseline against which the potential impacts of the Proposed Action and the other action alternatives are compared. Thus, it includes current actions and activities in the project area. No additional actions are assumed to occur in the absence of approval of any of the action alternatives.

Alternative A, the Proposed Action would stretch 15.7 miles from southern Goodyear to near Mobile, Arizona, generally bordering and running parallel to the SDNM until it connects with SR 238. This alternative would be located within an existing utility corridor (the EPNG utility corridor), identified in the *Lower Sonoran RMP* (BLM 2012).

Alternative C would be 18.1 miles in length, beginning at Riggs Road at the north end, turning a southerly direction for approximately 1.8 miles along Rainbow Valley Road. The proposed road would go directly east along Patterson Road for approximately 4 miles. The next section would proceed south along the Bullard Avenue alignment for approximately 3 miles, and finally head east and southeast for 5.4 miles.

Alternative H would be 18.3 miles in length, beginning at Riggs Road at the north end, then would travel south along Rainbow Valley Road for approximately 1.9 miles to Patterson Road. Alternative H would then turn east and follow Patterson Road for approximately 5.5 miles to the Dysart Avenue alignment (there currently is no Dysart Avenue roadway at this location), where the alignment would turn due south and then follow the SDNM boundary, terminating at SR 238.

Sub-alternative F is a sub-alternative that would only apply to the southern portions of the Parkway. Sub-alternative F is meant to provide an alternative for the southern portion of the proposed ROW that is common to Alternative A, C, and H. Sub-alternative F would be 2.8 miles in length and would begin approximately 3 miles north of SR 238 at the Komatke/Gas Pipeline Road and would follow the existing roadway south to SR 238. Sub-alternative F would be confined to the pre-existing Komatke/Gas Pipeline Road alignment. Sub-alternative F would be located just to the east of the existing pipeline, not on the pipeline itself. Sub-alternative F's total length is not included in Alternative A, C, or H; it is meant to provide an alternative for the southern terminus alignment only.

Sub-alternative G is a sub-alternative that would only apply to the southern portions of the Parkway. Sub-alternative G is meant to provide an alternative for the southern portion of the proposed ROW that is common to Alternative A, C, and H. Sub-alternative G would be 2.4 miles in length, and would begin approximately 3 miles north of SR 238 at the Komatke/Gas Pipeline Road. Sub-alternative G would leave the existing roadway and travel in a southwesterly direction across undeveloped BLM land in order to avoid a historical homestead site and to move the future SVPP interchange with SR 238 away from the Mobile area, farther to the west. Sub-alternative G would intersect with SR 238 approximately 1 mile west of the Proposed Action's terminus. Sub-alternative

G's total length is not included in Alternative A, C, or H; it is meant to provide an alternative for the southern terminus alignment only.

The analysis uses existing data, appropriate scientific methodologies, and professional judgment. The analysis takes into account the applicant-committed measures described in Chapter 2 (Section 2.5). Impacts from actions to be carried out under more than one alternative are discussed under the first applicable alternative. This discussion is then referenced under the other pertinent alternatives.

4.1.1 Types of Impacts to be Addressed

This chapter analyzes both beneficial and adverse impacts that would result from implementing any of the alternatives considered in this EIS. This chapter also includes definitions of impact thresholds for each resource, methods used to analyze impacts, and the analysis methods used for determining cumulative impacts. Table 4-1 provides standard definitions of degree and duration of impact that are broadly applicable to all resources; certain analyses in the sections that follow may further refine these definitions to be more specific to that particular resource.

Table 4-1. Standard Resources Impact Description

	Description Relative to Resource
Type	
Adverse	A change that moves the resource away from a desired condition or detracts from its appearance or condition.
Beneficial	A change that moves the resource toward a desired condition or improves its appearance or condition.
Context	
Site-specific	Impacts would occur in the footprint of the Parkway alignment.
Local	Impacts would occur in the Rainbow Valley.
Regional	Impacts would occur on lands administered by the BLM Lower Sonoran Field Office.
Magnitude	
No Impact	Would not produce measurable changes in baseline condition of the resources.
Negligible	Impacts would occur, but no measurable changes in baseline conditions would occur.
Minor	Impacts would occur, but resources would retain existing character and overall baseline conditions.
Moderate	Impacts would occur, but resources would partially retain existing character. Some baseline conditions would remain unchanged.
Major	Impacts would occur that would create a high degree of change within the existing resource character and overall condition of resources.
Duration	
Temporary	Up to 1 year
Short-term	1 to 4 years
Long-term	Greater than 4 years

For ease of reading, the impacts of the proposed SVPP on a specific resource under a particular alternative are generally characterized as no impact, minor, moderate, or major. This represents comparison to the status quo or baseline for that resource. However, in order to properly and meaningfully evaluate the impacts of each alternative, the impacts expected under that alternative should be measured against the impacts projected to occur under the No Action Alternative, which is the baseline for purposes of comparison of the alternatives to one another, as it represents the existing condition. That

is, the true impact of a particular action alternative is the difference between the impacts under Alternative A and that particular alternative. Whenever possible for a given resource, quantitative (i.e., numeric) values are assigned as a means of more objectively and accurately assessing the scope and intensity of potential impacts. For certain resources such as air, these values will be accepted regulatory standards such as NAAQS, or for resources such as water or soils, they may be standard units of measurement such as acres of land or acre-feet of water.

The following section defines and clarifies the concepts and terms used in this EIS when discussing the impacts assessment. The terms “impact” and “effect” are used synonymously.

Only those resources and resource uses that would potentially be impacted by any of the alternatives are brought forward for detailed analysis and discussed in Chapter 4. Impacts are defined as modifications to the existing environment brought about by implementing an alternative. Impacts can be beneficial or adverse in nature.

4.1.2 Direct and Indirect Impacts

Direct impacts are attributable to implementation of an alternative that affects a specific resource, and generally occur at the same time and place. Indirect impacts can result from one resource affecting another (e.g., soil erosion and sedimentation affecting water quality) or can occur later in time or removed in location, but can be reasonably expected to occur. Long-term impacts are those that would substantially remain for many years (more than 4 years) or for the life of the project. Short-term impacts result in changes to the environment that are stabilized or mitigated rapidly and without long-term effects (less than 4 years).

The analysis in this chapter provides a quantitative or qualitative comparison (dependant on available data and nature of the impact) between alternative impacts and establishes the severity of those impacts in the context of the existing environment. The discussion of each resource includes sections for specifically required disclosures under NEPA, including the disclosure of residual impacts, irreversible and irretrievable commitment of resources, and the impact of the project's short-term resource use on the long-term productivity of the project area. These required disclosures are explained in the sections below. All environmental consequences direct and indirect impact discussions are bounded by the analysis area, as defined per resource in Chapter 3, Affected Environment.

4.1.3 Cumulative Impacts

CEQ regulations for implementing NEPA define *cumulative impacts* as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions (RFA) regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

BLM’s NEPA Handbook states that the purpose of the cumulative effects analysis is to ensure the decision makers consider the full range of the consequences of the Proposed Action, alternatives to the Proposed Action, and No Action Alternative (BLM 2008a). Assessing the cumulative effects of the actions begins early in the NEPA process, during the identification of issues.

If the actions under each alternative have no direct or indirect effect on a resource then the cumulative impacts on that resource are not addressed. In any NEPA analysis, it is preferable to quantify the assessment of effects (changes) on each affected resource. This is true for direct, indirect, and cumulative

effects. Where possible, the analysis is quantified. Where quantification is not available, a meaningful and qualified judgment of cumulative effects is included to inform the public and the decision maker.

Cumulative impacts discussions are bounded both geographically and temporally. Analyzing cumulative effects differs from the traditional approach to direct and indirect impacts assessment because cumulative assessment requires expanded analysis to encompass additional effects to the natural, cultural, and human resources. As such, resources may have different cumulative impacts analysis area(s) since the conditions for assessing different resources may require larger or smaller analysis areas in order to capture the relevant concerns. All cumulative impact discussions may be bounded by a unique cumulative effects analysis area. Each resource analysis area for cumulative impacts are described below in the cumulative impacts section (Section 4.19, Cumulative Impacts).

Staff from the BLM interdisciplinary team (ID team) developed a list of the relevant cumulative actions that may have applicable effects to resource values and uses of the project area (see Appendix H, SVPP Cumulative Actions).

4.1.3.1 Residual Impacts

This section addresses impacts that cannot be avoided by the application of mitigation measures. The mitigation measures identified in Chapter 4 consist of potential mitigation (including measures outside the jurisdiction of the lead or cooperating agency) that could be implemented to address impacts that would result from the project's implementation. The residual impacts section therefore discloses the effectiveness of proposed mitigation measures for each resource, and helps the decision maker identify those mitigation measures to be included in the ROD.

4.1.3.2 Irretrievable and Irreversible Commitments of Resources

Irreversible and irretrievable commitments of resources (in other words, irreversible and irretrievable impacts) are disclosed in this chapter for each resource. Irreversible impacts are those impacts that would result in changes to the environment that cannot be reversed, reclaimed, or repaired. An example of an irreversible impact would be the removal of groundwater from a poorly recharged aquifer. Once groundwater reserves are removed, they cannot be replaced or reclaimed. Irretrievable impacts are those impacts that result in the temporary loss or degradation of the resource value until reclamation is successfully completed.

4.1.3.3 Relationship of Short-term Uses to Long-term Productivity

This section describes how the short-term project use would affect the long-term productivity of a given resource.

4.1.4 Regulation Requirements, Mitigation and Monitoring Measures

All Parkway operations would comply with pertinent state, federal, and local laws, ordinances, regulations, and standards. Because LORS are generally specific to a resource, they are presented in Chapter 3 (Affected Environment) of this EIS, which describes the current environment and its management. In addition, Section 1.7 (Relationship to Policies, Plans, and Programs) summarizes existing state, federal, and local requirements that would be required under any of the alternatives. Regulatory requirements, mitigation and monitoring measures, and applicant-committed environmental protection measures particular to each resource are also identified in specific resource sections.

4.1.5 General Analytical Assumptions, Guidelines, and Notes

The following are the general assumptions used for assessment under all alternatives. Assumptions associated with a given resource (e.g., wildlife habitat) are included within the impact analysis for that resource.

- For all action alternatives, direct and indirect impacts are analyzed under a scenario for each potential phase of the proposed SVPP: two lanes, four lanes, and six lanes, including construction and operation.
- Short-term impacts are those that would last fewer than 4 years (construction period).
- Long-term impacts are those that would last 4 years or more (operational, or post-construction period).
- Acreages were calculated using GIS technology; there may be slight variations in total acres between resources. These variations are negligible and do not affect analysis.
- All acreages and percentages presented in this chapter pertain to all lands in the project area (rather than only BLM lands), unless otherwise specified.

4.2 AIR RESOURCES

4.2.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to existing air quality resulting from the SVPP are analyzed within the bounds of each 1-mile section crossed by the action alternatives and the No Action Alternative as shown in Figure 3-1. This area of analysis has been selected to account for potential air quality impacts to existing areas of frequent and extended exterior use (receptors) in the project area. The environmental consequences analyzed consider the compatibility of the alternatives with both existing receptors and applicable planning documents governing the use of project lands as they relate to receptors. Cumulative impacts to receptors are analyzed within the boundaries of the SVPA, defined in the *Sonoran Valley Planning Area Proposed Major General Plan Amendment* (City 2007).

It is assumed that no uses other than transportation are planned in the project area. Impacts to receptors resulting from the No Action Alternative and from implementation of the SVPP (action alternatives) are discussed in terms of the potential to increase concentrations of NAAQS criteria pollutants CO, O_3, $PM_{10,}$ and $PM_{2.5}$ above current monitored levels at existing and planned locations. The potential of project alternatives to increase Mobile Source Air Toxics emissions is also discussed.

4.2.2 No Action

The No Action Alternative assumes that the SVPP would not be completed; however, other transportation improvements identified in the City General Plan Amendment (City 2007), including the widening of SR 238 and the expansion of the local roadway network, would occur. Dispersed outdoor recreation including the use of OHVs would continue.

As detailed in Section 3.11, land use types within the air quality analysis area include detached single-family residences and/or mobile homes, one school, and several undeveloped parcels. The approximate

distance of the No Action and action alternatives to the nearest land use by type is summarized in Table 4-2.

Table 4-2. Proximity of Air Quality Receptors to the No Action and SVPP Action Alternatives

Affected Land Use Type	Closest Receptor Location by Type and Potential Impacts									
	Alternative A (the BLM Preferred Alternative)		Alternative C		Alternative H		Sub-alternative F		Sub-alternative G (the BLM Preferred Sub-alternative)	
Residential	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**
Detached single-family homes and mobile homes	1	2,800 feet	16	At ROW	2	At ROW	1	At ROW	1	7,500 feet
Schools	1	2,400 feet	1	2,400 feet	1	2,400 feet	1	1,400 feet	1	6,000 feet
Outdoor Recreation (hunting, target shooting, back-country driving, mountain biking, natural and cultural resources study, and sightseeing)	Various	Locations throughout project area. Activities occurring within the SDNM bordered by 9.2-mile segment of SVPP.	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM

4.2.2.1 Carbon Monoxide and Ozone

Portions of the air quality analysis area lie within the Phoenix CO Maintenance Area and the Phoenix 8-Hour O_3 Non-Attainment Area as shown in Figure 3-3. The MCAQD does not currently operate any air quality monitoring stations in the project area. The closest MCAQD-operated station is located in Buckeye, near the intersection of SR 85 and Buckeye Road (Site #21525). The most recent ambient concentration monitoring data at this site indicate that the 1-hour and 8-hour NAAQS for CO and the 8-hour NAAQS for O_3 are attained (see Table 3-3). Due to the relatively long distance to the nearest receptor and the current attainment/maintenance status of the project area, localized concentrations of CO and O_3 would not increase under the No Action Alternative and attainment of the NAAQS for these two criteria pollutants would be achieved.

4.2.2.2 Particulates

Portions of the air quality analysis area lie within the Phoenix Non-Attainment Area for PM_{10} and $PM_{2.5}$ as shown in Figure 3-3. The methodology used to determine the potential of this project to cause a new violation or increase the frequency or severity of an existing PM_{10} violation per 40 CFR 93.101 involves 1) comparison of project elements to similar roadways and area characteristics where ambient particulate concentrations are known, and 2) reference to current studies of PM_{10} conformity. Primary sources of PM_{10} from roadway facilities include vehicle tailpipe emissions, brake wear, tire wear, re-entrained road dust, and construction. 40 CFR 93.123(c)(5) does not require the inclusion of temporary emissions from roadway construction in a PM_{10} “hot-spot" analysis. Similarly, secondary particles formed from

precursors to PM_{10} emissions are not included in the analysis due to their temporary nature. Therefore, this qualitative analysis of project alternatives focuses only on vehicular and roadway surface sources and uses current estimates and future projections of peak hour traffic volumes on project roadway segments as a proxy for PM_{10} emissions.

Table 4-3 shows the maximum traffic segments for the No Action and action alternatives and Table 4-4 shows the PM_{10} concentrations near different roadway types in urban and rural areas of Maricopa County including the Buckeye Site. This station is situated in a rural area adjacent to agricultural land. In 2008, four exceedances of the 24-hour PM_{10} were recorded. These exceedances have been noted as exceptional events, which in agricultural areas are typically caused by weather-related events such as wind-blown dust. The MCAQD also operates monitoring stations in more urbanized settings, such as the Durango Complex located at 27th Avenue and Durango Street, and the Central Phoenix site located at 19th Avenue and Roosevelt Street. In 2008, two exceedances of the 24-hour PM_{10} standard occurred at the 27th Avenue and Durango Street site as a result of exceptional events, while no exceedances were recorded for the Central Phoenix site located at 19th Avenue and Roosevelt Street.

Table 4-3. Maximum Traffic Segments and Vehicle Miles Traveled

Alternative	Number of Lanes	Average Daily Traffic*	Vehicle Miles Traveled	Percentage Trucks†	Level of Service
No Action	–	–	–	–	–
Alternative A (BLM Preferred Alternative)	2	24,000	377,280	5%	C
	4	48,000	754,560	5%	C
	6	72,000	1,131,840	5%	C
Alternative C	2	24,000	434,880	5%	C
	4	48,000	869,760	5%	C
	6	72,000	1,304,640	5%	C
Alternative H	2	24,000	438,720	5%	C
	4	48,000	877,440	5%	C
	6	72,000	1,316,160	5%	C

* Based on LOS C traffic volumes for two-lane Parkway at 55 mph (Highway Capacity Manual 2000); four- and six-lane Parkways are conservatively estimated by multiplying two-lane Parkway values by 2 and 3, respectively.

† Based on *Draft Air Quality Analysis for SR 303L, SR 801 to I-10* (ADOT 2008a).

For the purpose of determining potential PM_{10} impacts associated with this project, the Central Phoenix site was chosen based on its proximity to the I-10/SR 51/SR 202L traffic interchange (TI). This TI connects an interstate with two state routes in a multilevel directional ramp structure with at-grade and below-grade freeway mainline segments and has a configuration that includes design elements similar to the proposed project. The area surrounding the I-10/SR 51/SR 202L TI includes commercial, light industrial, and residential uses as well as municipal uses and office buildings not found in the project area. MAG traffic counts for 2007 indicate that the highest traffic volumes occur on the portion of the I-10 that forms the western leg of the TI. The approximate volume for this segment of the I-10 is 290,000 vehicles for the average weekday.

Table 4-4. PM_{10} Concentrations for Different Roadway Types in Urban and Rural Areas of Maricopa County, 2008

Location	PM_{10} Concentrations ($\mu g/m^3$)			Number of Exceedances	Nearest Roadway	Distance from Roadway	Average Daily Traffic	Percentage Trucks
	Maximum 24-hour	Second Maximum 24-hour	Annual Average					
Urban locations adjacent to freeways (less than or equal to 0.5 mile)								
Central Phoenix (19th and Roosevelt)	133*	116	35.3	0	I-10	0.25 mile	291,000	6 (7–8)†
Urban locations removed from freeways (greater than 0.5 mile)								
Durango Complex (27th Avenue and Durango Street)	247*	169	48.2	2	I-17	0.75 mile	119,000	6 (7–8)†
Rural locations								
Buckeye (MC 85 and SR 85)	223*	203*	43.2	4	N/A	N/A	N/A	N/A

Source: Arizona Department of Environmental Quality (2009a).
* Exceptional event that exceeds NAAQS.
† Percentages in parentheses reported in SR 801, SR 303L to SR 202L (ADOT 2008a).

By comparison, the No Action Alternative (based on the Traffic Analysis Report for the SVPA [City 2006]) represents 87% of the I-10 volumes (252,500 vehicles; 3,969,300 VMT). Therefore, it is not likely that any new violations of PM_{10} standards would occur due to the No Action Alternative. However, projected truck volumes, and potential diesel particulate emissions, under the No Action Alternative are similar to I-10 volumes.

There are no $PM_{2.5}$ monitors near the project area. ADEQ reported data for five monitors in Maricopa County for the 2008 calendar year. None of the five monitors reported any exceedances of either the annual or 24-hour standards of the $PM_{2.5}$ NAAQS (12 $\mu g/m^3$ and 35 $\mu g/m^3$, respectively) for 2008. The highest reported annual value was from the South Phoenix monitor with an annual $PM_{2.5}$ value of 10.93 $\mu g/m^3$. The highest reported 24-hour average value was from the West Phoenix (1) Monitor with a 24-hour maximum value of 29.1 $\mu g/m^3$.

4.2.2.3 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. MSATs are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA regulations for vehicle engines and fuels will cause overall MSAT emission to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOBILE6.2 model forecasts a combined reduction of 72% in the total annual emission rate for the priority MSATs from 1999 to 2050, while vehicle-miles of travel are projected to increase by 145%.

In February 2007, EPA issued the final rule to reduce hazardous air pollutants from mobile sources. The final standards will lower emissions of benzene and other air toxics in three ways: 1) by lowering the benzene content in gasoline, 2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures, and 3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

Under this rule, EPA has required that, since the beginning of 2011, refiners must meet an annual average gasoline benzene content standard of 0.62% by volume on all gasoline (the national benzene content of gasoline today is about 1.0% by volume).

In addition, EPA is adopting new standards to reduce non-methane hydrocarbon exhaust emissions from new gasoline-fueled passenger vehicles at colder temperature below 75°F. Non-methane hydrocarbons include many MSATs, such as benzene. Finally, the February 2007 rule establishes standards that will limit hydrocarbon emissions that evaporate or permeate through portable fuel containers such as gas cans.

EPA expects that the new fuel benzene standard and hydrocarbon standards for vehicles and gas cans will together reduce total emissions of MSATs by 330,000 tons in 2030, including 61,000 tons of benzene. As a result of this rule, new passenger vehicles will emit 45% less benzene, gas cans will emit 78% less benzene, and gasoline will have 38% less benzene overall. In addition, the hydrocarbon reductions from the vehicles and gas can standards will reduce VOC emissions (which are precursors to O_3 and can be precursors to $PM_{2.5}$) by over 1 million tons in 2030. The vehicle standards will reduce direct $PM_{2.5}$ emissions by 19,000 tons in 2030, and could also reduce secondary formation of $PM_{2.5}$. Once the regulation is fully implemented, EPA estimates that these PM reductions will prevent nearly 900 premature deaths annually.

Unavailable Information for Project-specific MSAT Impact Analysis

This Draft EIS presents a qualitative analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable the prediction of the project-specific health impacts of the emission changes associated with the alternatives in this Draft EIS. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information.

Information that is Unavailable or Incomplete

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

1. Dispersion: The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion modeling is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The National Cooperative Highway Research Program (NCHRP) is conducting testing of MSATs. The NCHRP's work will also focus on identifying appropriate methods of documenting and communicating MSAT impacts in the

NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

2. Exposure Levels and Health Effects: Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

As discussed above, technical shortcomings of dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (Claggett and Miller 2011).

For each alternative in this Draft EIS, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative.

4.2.3 Impacts Common to all Action Alternatives

The 250-foot ROW is the same for each alternative (Alternatives A, C, and H, and Sub-alternatives F and G) and Parkway (two-lane, four-lane, and six-lane) analyzed, and includes 25-foot-wide drainage easements on both sides. The Parkway design speed is 65 mph and the posted speed limit would be 55 mph for all analyzed proposed alternatives and Parkway designs.

4.2.3.1 Two-lane Parkway

A two-lane road is proposed with a total Parkway width of 44 feet, which includes a 28-foot-wide paved surface with 8-foot-wide graded shoulders. Based on the annual average daily traffic (ADT) for a two-lane Parkway at 55 mph, a maximum of 24,000 vehicles per day is expected for all action alternatives.

4.2.3.2 Four-lane Parkway

For the expansion of the two-lane Parkway into the four-lane Parkway, the Parkway would have a total Parkway width of 200 feet, including a 112-foot median separating two 28-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on the AADT for a four-lane Parkway at 55 mph, a maximum of 48,000 vehicles per day is expected for all action alternatives.

4.2.3.3 Six-lane Parkway

If the four-lane Parkway is later expanded into a six-lane Parkway, the total Parkway width would be 200 feet, which includes an 84-foot median separating two 42-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on the AADT for a six-lane Parkway at 55 mph, a maximum of 72,000 vehicles per day is expected for all action alternatives.

Transportation Conformity

To demonstrate conformity, the project alternatives considered must be consistent with state and local transportation plans and demonstrate that they would not adversely affect the attainment of the primary and secondary NAAQS for criteria pollutants. As shown in Table 4-5, the implementation of all alternatives and sub-alternatives (Alternatives A, C, and H, and Sub-alternatives F and G) meet the stated goals and objectives of the City General Plan Amendment (City 2007), the MAG Regional Transportation Plan (MAG 2003), and the State Implementation Plan via federal statute (40 CFR 51).

Table 4-5. Consistency of the Project with Local Transportation Plans

Plan	Goals/Objectives/Policy	Consistency Determination
Sonoran Valley Planning Area City of Goodyear General Plan Amendment	Recognizes the need to "provide southern vehicular access and mobility for the forecasts for growth in the West Valley, and the limited connectivity that currently exists in Western Maricopa County" (City 2007).	Consistent because the General Plan was amended to provide for Parkway, infrastructure, and services expansion in Rainbow Valley. Planned facility is an interim two-lane minor collector with future expansion to six-lane major arterial.
MAG Regional Transportation Plan	Goal # 2: Access and Mobility discusses the objective of providing safety, access, and maintaining a reliable and acceptable level of service (MAG 2007c).	Consistent because the project would bring the existing, unacceptable conditions into compliance with the MAG Plan.

Mobile Source Air Toxics

Because the estimated VMT between each of the alternatives varies by less than 15% (with the exception of the No Action Alternative, see Table 4-3), it is expected there would be no appreciable difference in overall MSAT emissions among the three action alternatives. Also, regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57% to 87% between 2000 and 2020. Local conditions may differ from these national projections in terms of the fleet mix and the turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Construction activity may generate a temporary increase in MSAT emissions. Project-level assessments that render a decision to pursue construction emission mitigation would benefit from a number of technologies and operational practices that should help lower short-term MSATs. In addition, the Safe,

Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) has emphasized a host of diesel retrofit technologies in the law's CMAQ provisions-technologies that are designed to lessen a number of MSATs (FHWA 2005).

Construction mitigation includes strategies that reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposure can have positive benefits when sites are near vulnerable populations. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-orientated mitigation. Also on the construction emissions front, technological adjustments to equipment, such as off-road dump trucks and bulldozers, could be appropriate strategies. These technological fixes could include particulate matter traps, oxidation catalysts, and other devices that provide an after-treatment of exhaust emissions. The use of clean fuels, such as ultra–low sulfur diesel, also can be a very cost-beneficial strategy.

The EPA has listed a number of approved diesel retrofit technologies; many of these can be deployed as emissions mitigation measures for equipment used in construction. This listing can be found at EPA (2012).

4.2.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Alternative A is 15.7 miles long. Based on the Parkway length and the AADT, the maximum estimated VMT for the two-, four-, and six-lane Parkway scenarios is 377,280, 754,560, and 1,131,840 VMT, respectively.

4.2.4.1 Carbon Monoxide and Ozone

The nearest receptor, which is located at the Mobile Elementary School, is 2,400 feet from the Alternative A alignment. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic; however, because of the relatively large distance to the nearest receptor and the current attainment/maintenance status of the project area, the NAAQS for this criteria pollutant would be attained. It is difficult to quantify project contributions to local O_3 levels; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.4.2 Particulates

Based on VMT, Alternative A represents an increase of less than 10% of the No Action Alternative potential PM_{10} and $PM_{2.5}$ emissions. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Alternative A alignment. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

The operation of Alternative A may result in indirect air quality impacts to existing and planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved Parkway network to existing and planned receptors in the project area, creating the potential for increases in local CO and PM_{10} concentrations.

4.2.5 Alternative C Direct and Indirect Impacts

Alternative C is 18.1 miles long. Based on the Parkway length and the AADT, the maximum estimated VMT for the two-, four-, and six-lane Parkway scenarios is 434,880, 869,760, and 1,304,640 VMT, respectively.

4.2.5.1 Carbon Monoxide and Ozone

The impacts to existing receptors under Alternative C would be similar to those described for Alternative A, except near a group of single-family homes located east of Bullard Avenue (see Figure 3-1). The ROW for Alternative C is within several feet of these receptors. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic, especially if there is a planned signalized intersection of the SVPP with Bullard Avenue where vehicles queues would be created. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.5.2 Particulates

Identical to Alternative A, the Alternative C alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Alternative C alignment. The impact for potentially sensitive receptors would be long-term but negligible.

The operation of Alternative C may result in indirect air quality impacts to existing and planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.6 Alternative H Direct and Indirect Impacts

Alternative H is 18.3 miles long. Based on the Parkway length and the AADT, the maximum estimated VMT for the two-, four-, and six-lane Parkway scenarios is 438,720, 877,440, and 1,316,160 VMT, respectively.

4.2.6.1 Carbon Monoxide and Ozone

The Mobile Elementary School is also the nearest receptor from Alternative H, at 2,400 feet from the proposed alignment. The impacts to existing receptors under Alternative H would be the same as described for Alternatives A and C, with the exception of avoiding most of the SDNM and with some residential development along the ROW to the east of South Bullard Avenue along the southern boundary of West Patterson Road. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.6.2 Particulates

Identical to Alternatives A and C, the Alternative H alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Alternative H alignment. The impact for potentially sensitive receptors would be long-term but negligible.

As with Alternatives A and C, the operation of Alternative H may result in indirect air quality impacts to planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F is a possible rerouting of the southern portion of the Parkway. This rerouting would not represent a substantial increase in the length of the Parkway, and therefore would not substantively increase the VMT or the emissions for the Parkway.

4.2.7.1 Carbon Monoxide and Ozone

The impacts to existing receptors under Sub-alternative F would be similar to those described for Alternatives A, C, and H, except near a group of single-family homes located northeast of the intersection of 98th Avenue and Powhatan Road (see Figure 3-1). The ROW for Sub-alternative F is within several feet of these receptors. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.7.2 Particulates

Identical to Alternatives A, C, and H, the Sub-alternative F alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Sub-alternative F alignment. The impact for potentially sensitive receptors would be long-term but negligible.

The operation of Sub-alternative F may result in indirect air quality impacts to existing and planned receptors if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Like Sub-alternative F, Sub-alternative G (the BLM Preferred Sub-alternative) is a possible rerouting of the southern portion of the Parkway. This rerouting would not represent a substantial increase in the

length of the Parkway, and therefore would not substantively increase the VMT or the emissions for the Parkway.

4.2.8.1 Carbon Monoxide and Ozone

The impacts to existing receptors under Sub-alternative G would be similar to those described for Alternative A, with the nearest receptor the Mobile Elementary School located at approximately 6,000 feet from the proposed alignment. Concentrations of CO would increase from existing ambient levels due to SVPP peak hour traffic. It is difficult to quantify project contributions to local O_3 concentrations; however, because it is a regional pollutant and dependent upon precursors such as NOx and VOCs, they would likely be minor. Therefore, the impact for potentially sensitive receptors would be long-term but negligible.

4.2.8.2 Particulates

Identical to Alternatives A, C, and H and Sub-alternative F, the Sub-alternative G alignment with maximum potential PM_{10} and $PM_{2.5}$ emissions would carry less than 10% of the vehicle traffic projected for the No Action Alternative. Therefore, it is not likely that any new violations of PM_{10} or $PM_{2.5}$ standards would occur in the vicinity of the proposed Sub-alternative G alignment. The impact for potentially sensitive receptors would be long-term but negligible.

The operation of Sub-alternative G may result in indirect air quality impacts to existing and planned receptors if the SVPP creates land use amendments brought on by development interest. Future development would increase the proximity of the improved roadway network to existing and planned receptors in the project area, creating the potential for increases in local PM_{10} concentrations.

4.2.9 Additional Mitigation Measures

Rules 310 and 310.01 of the MCAQR include work practice standards to ensure that emissions from fugitive dust sources, such as open areas, vacant lots, unpaved parking lots, and unpaved roadways, are minimized to the extent practicable. An earthmoving permit and a dust control plan are required for any operations that disturb a total surface area equal to or greater than 0.10 acre. No additional mitigation measures are suggested.

As the specific construction activity equipment roster is unknown at this time, emissions of criteria pollutants and MSATs cannot be quantified. As such, it is also unknown whether or not mitigation of construction emissions would need to be undertaken. The possible need for construction equipment mitigation measures would be evaluated when actual construction activities are known.

4.2.10 Residual Impacts

Because no additional mitigation measures are suggested, the residual impacts to air quality would be the same as discussed under all action alternatives.

4.2.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, certain parcels in the project area would be converted from their existing undeveloped condition to transportation uses. The current productivity of the area in terms of air quality is

one with minor contributions from intermittent mobile pollutant sources operating in the project area comprising residential and recreational vehicle use.

Although there would be a loss in the capability of the project area to provide air quality conditions relatively free of mobile pollutant sources, the new transportation network would provide paved roadways that will reduce particulate emissions and better dispersion of CO due to reduced travel times for the traveling public.

4.2.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of local ambient air quality if the SVPP were implemented, due to the presence of commuter and recreational traffic on a paved Parkway. There may be an irreversible commitment of local ambient air quality because the SVPP could enable residential development and expansion of the transportation system in the area.

4.3 CULTURAL AND HERITAGE RESOURCES

4.3.1 Analysis Area, Approach and Assumptions

The cultural resources analysis area for the SVPP consists of 1,746 acres of private, BLM, and ASLD lands, and includes the total construction and operational impact footprints of proposed Alternative A (the BLM Preferred Alternative), Alternative C, Alternative H, Sub-alternative F, and Sub-alternative G (the BLM Preferred Sub-alternative), as well as the Temporary Access Road. Three NRHP-eligible historic properties have been identified in the analysis area–the Lung Homestead, AZ T:15:94(ASM), and the Butterfield Overland Stage Route. In addition, the Juan Bautista de Anza National Historic Trail corridor crosses the analysis area.

Portions of Alternative H, Sub-alternative F, and Sub-alternative G have not been surveyed. For the purposes of the analysis it is assumed that no NRHP-eligible cultural resources are located in the unsurveyed areas; however, if Alternative H, Sub-alternative F, or Sub-alternative G is chosen for development, a Class III pedestrian survey will need to be conducted to confirm the lack of resources. Please note that any adverse effects to all NRHP-eligible cultural resources in the selected alternative will be mitigated, regardless of alternative.

The following analysis assumes that all ground-disturbing activities would be confined to the project footprint (250-foot-wide ROW) for each action alternative and that only the three historic properties (Lung Homestead, AZ T:15:94(ASM), and Butterfield Overland Stage Route) are eligible for the NRHP.

Given the non-renewable nature of heritage resources—particularly archaeological sites and architectural structures—removing or damaging any portion of them diminishes their cultural and scientific value permanently. For the purposes of this analysis, there is no difference between temporary disturbance (short-term impacts; i.e., construction) or permanent disturbance (long-term impacts; i.e., operational). All disturbances to archaeological sites are considered permanent. Disturbance of artifacts and features would affect a site's NRHP eligibility.

4.3.2 No Action

Under the No Action alternative, the ROW application for the SVPP under Alternative A, Alternative C, Alternative H, Sub-alternative F, or Sub-alternative G would not be approved. The SVPP would not be built and there would be no adverse direct or indirect effect to cultural resources.

If SVPP is not built, the public would continue to try to use the pipeline road as an access route into this area of Rainbow Valley and the SDNM. This would keep the level of visitation to sites in the vicinity much lower than highway access.

4.3.3 Impacts Common to all Action Alternatives

All action alternatives and all phases of Parkway construction would adversely directly and indirectly impact the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor. Direct impacts include disruption of the connectivity of each resource and the disturbance of the physical remains of the Butterfield Overland Stage Route; however, the amount of disturbance would vary by alternative. The SVPP would cross both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT, which would hamper access for hikers who are following either trail; however, both resources would maintain their overall character. Lack of public access to these historic trails would be a permanent, direct impact upon recreational use. Direct impacts to each trail would be adverse, site-specific, and long-term.

Indirect impacts include visual and auditory impacts to the setting of the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor. The Parkway would be seen and heard by visitors to either resource outside of the immediate footprint of the Parkway (see Section 3.7 Visual Resources and Section 3.16 Noise for further discussion).

4.3.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Under Alternative A, the BLM Preferred Alternative, up to 220.1 acres (permanent) and 39.4 acres (temporary) would be disturbed during the construction of the SVPP. Alternative A would directly and indirectly impact the three known historic properties (Lung Homestead, AZ T:15:94[ASM], and the Butterfield Overland Stage Route), as well as the Juan Bautista de Anza NHT corridor and Management Area.

Measures for mitigating the adverse effects to the Lung Homestead, AZ T:15:94(ASM), and the Butterfield Overland Stage Route may include such options as data recovery, artifact analysis, archival research, interpretative signage, Parkway crossovers, and vehicle parking for trail access; measures for the adverse effects to the Juan Bautista de Anza NHT corridor may include interpretative signage, Parkway crossovers, and vehicle parking for trail access

4.3.4.1 Two-lane Parkway

Under Alternative A, ground disturbance from the Phase One, two-lane Parkway would consist of 178.3 acres of permanent and 39.4 acres of temporary disturbance, for a total of 217.7 acres.

Less than 2 acres of the 73-acre Lung Homestead and less than 146 linear feet of the Butterfield Overland Stage Route would be directly impacted by ground disturbance. In addition, 12.4 acres of the Juan Bautista de Anza NHT corridor would also be directly impacted. As stated in Section 4.3.3, direct impacts

to the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor would be adverse, site specific, and long-term.

All three resources would be indirectly impacted by the two-lane Parkway. The Lung Homestead may see indirect impacts from increased visitation to the area.

The two-lane Parkway would have an indirect visual and auditory impact on the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area. The Parkway would be visible to visitors to either resource from the valley floor, impacting the trails' setting. Visitors would hear traffic on the Parkway, which would adversely impact their overall experience of the trails.

There would be no direct impact to AZ T:15:94(ASM); however, there may be indirect impacts from increased visitation by the public.

4.3.4.2 Four-lane Parkway

Under Alternative A, the ground disturbance from the Phase Two, four-lane Parkway would consist of 206.5 acres (167.1 permanent and 39.4 temporary).

Site AZ T:11:94(ASM) would be directly impacted by the four-lane Parkway; permanent disturbance of 0.09 acre, or 80% of the site, is expected.

For the Lung Homestead, 3.5 acres would be impacted by ground disturbance. Almost 300 feet (293.3) of the Butterfield Overland Stage Route would be impacted and approximately 25 acres of the Juan Bautista de Anza NHT corridor and Management Area would be impacted.

As with the two-lane Parkway, ground disturbance to all the resources is adverse, site-specific, and long-term. Because the four-line Parkway would disturb 80% of the site, the impact to AZ T:11:94(ASM) is major in magnitude. Impact magnitude to the Lung Homestead would be moderate; minor impacts to the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area are expected.

Indirect impacts to the resources will be similar to those described for the two-lane Parkway.

4.3.4.3 Six-lane Parkway

The total ground disturbance from the Phase Three, six-lane Parkway would consist of 259.5 acres (220.1 permanent and 39.4 temporary).

All of AZ T:11:94(ASM) (about 1.1 acres) would be permanently disturbed by the six-lane Parkway. Less than 4 acres would be permanently disturbed by the six-lane Parkway. A total of 330.4 linear feet of the Butterfield Overland Stage Route and 28.2 acres of the Juan Bautista de Anza NHT corridor and Management Area would be directly impacted. Impacts to all resources would be adverse, site-specific, and long-term and with similar magnitudes as for the four-lane Parkway.

Indirect impacts to the resources will be similar to those described for the two-lane Parkway.

4.3.5 Alternative C Direct and Indirect Impacts

Under Alternative C, up to 254.5 acres would be disturbed by the construction of the SVPP. There would be no impacts to AZ T:15:94(ASM). Direct and indirect impacts to the Lung Homestead, the Butterfield

Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A, because Alternative C shares the same corridor through those resources.

4.3.5.1 Two-lane Parkway

Under Alternative C, ground disturbance (permanent and temporary) from the Phase One, two-lane Parkway would total 141.9 acres. Direct and indirect impacts for the two-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.5.2 Four-lane Parkway

Under Alternative C, ground disturbance (permanent and temporary) from the Phase Two, four-lane Parkway would total 238.5 acres. Direct and indirect impacts for the four-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT and Management Area corridor would be the same as those described under Alternative A.

4.3.5.3 Six-lane Parkway

Under Alternative C, ground disturbance (permanent and temporary) from the Phase Three, six-lane Parkway would total 299.9 acres. Direct and indirect impacts for the six-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.6 Alternative H Direct and Indirect Impacts

Under Alternative H, ground disturbance (permanent and temporary) from the Phase Three, six-lane Parkway would total 437.2 acres. Direct and indirect impacts for the six-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A, because Alternative H shares the same corridor through those resources.

4.3.6.1 Two-lane Parkway

Under Alternative H, ground disturbance (permanent and temporary) from the Phase One, two-lane Parkway would total 143.2 acres. Direct and indirect impacts for the two-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.6.2 Four-lane Parkway

Under Alternative H, ground disturbance (permanent and temporary) from the Phase Two, four-lane Parkway would total 240.8 acres. Direct and indirect impacts for the four-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.6.3 Six-lane Parkway

Under Alternative H, ground disturbance (permanent and temporary) from the Phase Three, six-lane Parkway would total 437.2 acres. Direct and indirect impacts for the six-lane Parkway to the Lung Homestead, the Butterfield Overland Stage Route, and the Juan Bautista de Anza NHT corridor and Management Area would be the same as those described under Alternative A.

4.3.7 Sub-alternative F Direct and Indirect Impacts

Under Sub-alternative F, total ground disturbance would be 106.0 acres (96.8 acres permanent and 9.2 acres temporary). Sub-alternative F was designed to avoid impacts to the Lung Homestead and consists of a 2.8-mile diversion around the site; therefore, there are no impacts to the Lung Homestead. Sub-alternative F would also not impact AZ T:15:94(ASM); however, both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area would be impacted by Sub-alternative F.

4.3.7.1 Two-lane Parkway

The two-lane phase of Sub-alternative F would disturb a total of 26.2 acres (9.2 acres temporary and 17.0 acres permanent). The two-lane phase would disturb 151.8 feet of the Butterfield Overland Stage Route and 14.2 acres of the Juan Bautista de Anza NHT corridor and Management Area. Similar to Alternatives A, C, and H, direct impacts to these two resources would be adverse, site-specific, minor, and long-term, but to a slightly greater degree. Indirect impacts would also be similar to Alternatives A, C, and H.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.7.2 Four-lane Parkway

The four-lane phase of Sub-alternative F would disturb a total of 43.3 acres (9.2 acres temporary and 34.1 acres permanent). The four-lane phase would disturb 304.3 feet of the Butterfield Overland Stage Route and 28.6 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly greater degree.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.7.3 Six-lane Parkway

Under Sub-alternative F, the six-lane Parkway phase would disturb a total of 106 acres. The six-lane phase would disturb 342.4 feet of the Butterfield Overland Stage Route and 32.3 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly greater degree.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Under Sub-alternative G (the BLM Preferred Sub-alternative), up to 79.2 acres (72.0 acres permanent and 7.2 acres temporary) would be disturbed. Like Sub-alternative F, Sub-alternative G was designed to avoid

impacts to the Lung Homestead and consists of 2.4 miles diverting around the site; therefore, there are no impacts to the Lung Homestead. Like Sub-alternative F, Sub-alternative G would also not impact AZ T:15:94(ASM); however, both the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area would be impacted by Sub-alternative G.

4.3.8.1 Two-lane Parkway

The two-lane phase of Sub-alternative G would disturb a total of 19.9 acres (7.2 acres temporary and 12.7 acres permanent). The two-lane phase would disturb 124.8 feet of the Butterfield Overland Stage Route and 11.9 acres of the Juan Bautista de Anza NHT corridor and Management Area. Similar to Alternatives A, C, and H, direct impacts to these two resources would be adverse, site-specific, minor, and long-term but to a slightly lesser degree. Indirect impacts would also be similar to Alternatives A, C, and H.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.8.2 Four-lane Parkway

Under Sub-alternative G, the four-lane phase would disturb a total of 32.5 acres (7.2 acres temporary and 25.3 acres permanent). The four-lane phase would disturb 247 feet of the Butterfield Overland Stage Route and 24 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly lesser degree.

Like the two-lane Parkway phase, the Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.8.3 Six-lane Parkway

Under Sub-alternative G, the six-lane Parkway phase would disturb a total of 79.2 acres. The six-lane phase would disturb 278 feet of the Butterfield Overland Stage Route and 28 acres of the Juan Bautista de Anza NHT corridor and Management Area. Overall, impacts to these resources would be similar to Alternatives A, C, and H but to a slightly lesser degree.

The Lung Homestead and AZ T:11:94(ASM) would not be impacted.

4.3.9 Mitigation Measures

Mitigation measures should be outlined in a treatment plan and a Memorandum of Agreement would need to be prepared and agreed to by all interested parties.

Mitigation of adverse impacts to AZ T:15:94(ASM) and the Lung Homestead would consist of a data recovery program. The data recovery may include but is not limited to surface artifact analysis, excavations, oral history, and archival research. Data recovery may also apply to the Butterfield Overland Stage Route. Artifacts removed during data recovery would be stored at a designated facility such as the Arizona State Museum.

Mitigation of adverse impacts to the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT may include crossovers or other pedestrian crossings of the Parkway for hikers, parking areas along the Parkway to allow access to the trails, access trails from the parking areas, and informative signage about the history and importance of the trails. Additional mitigation measures, if appropriate, would be identified by the decision-maker in the ROD.

4.3.10 Residual Impacts

Residual impacts to cultural resources in the analysis area would consist of all visual and auditory indirect impacts; these impacts to the setting of the resources would remain once the Parkway is constructed.

4.3.11 Short-term Uses versus Long-term Productivity

Because all direct and indirect impacts to cultural resources are permanent, all direct and indirect impacts are considered long-term.

4.3.12 Irreversible and Irretrievable Commitment of Resources

All ground disturbances to cultural resources are irreversible commitments of resources, because it represents the removal of resources from the landscape. There would not be any irretrievable impacts on cultural resources as a result of the project.

4.4 PALEONTOLOGICAL RESOURCES

4.4.1 Analysis Area, Approach and Assumptions

The analysis area for paleontological resources consists of the ROW corridors for all alternatives and sub-alternatives. All ground-disturbing activities that could affect paleontological resources will be confined to the ROW. The analysis assumes that the BLM's PFYC system is the appropriate method for assessing the potential presence of fossils in the analysis area and that the entire analysis area has a PFYC classification of 2, or low potential for paleontological resources.

4.4.2 No Action

Under the No Action Alternative, the SVPP would not be constructed and current land uses would continue. Little to no impact is expected to paleontological resources under the No Action Alternative. Current land uses such as grazing and recreation are unlikely to disturb any fossils, as the area has a low potential for paleontological resources (PFYC 2).

4.4.3 Impacts Common to all Action Alternatives

As stated in Section 3.4, the entire analysis area has a PFYC rating of 2. This rating suggests that the geologic units present in the analysis area are unlikely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. A PFYC 2 does not require construction monitoring due to the low probability of encountering fossils. Because the low PFYC rating of the analysis area means that the presence of paleontological resources is unlikely, there would be no anticipated direct or indirect impacts to paleontological resources associated with construction of the SVPP under any alternative and regardless of the number of lanes constructed.

4.4.4 Potential Mitigation Measures

Construction workers responsible for ground-disturbing activities could be instructed to recognize paleontological resources and the protocol to enact upon discovery. Any discoveries would be treated in accordance with the Paleontological Resources Protection Act of 2009.

4.4.5 Residual Impacts

Residual impacts remaining after potential mitigation measures would be beneficial because the specialized training of construction workers would result in recognition and protection of fossils if they are discovered during ground-disturbing activities.

4.4.6 Short-term Uses versus Long-term Productivity

Because the geological formations present in the analysis area are unlikely to contain fossils, the SVPP would not result in any impacts to long-term productivity of paleontological resources.

4.4.7 Irreversible and Irretrievable Commitment of Resources

Because the analysis area is unlikely to contain paleontological resources, the SVPP will not result in any irreversible and irretrievable commitment of resources.

4.5 SOIL RESOURCES

4.5.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to topography, geology, and soils resulting from the SVPP are analyzed within the 250-foot-wide project ROW for soils and the Rainbow Valley for topography and geology. This area of analysis was selected to account for potential direct and indirect impacts to existing resources. Environmental consequences analyzed consider the compatibility of the alternatives with known characteristics of the resources. Impacts to soil resources under each alternative are discussed below, and cumulative impacts are analyzed in the Rainbow Valley area of analysis, discussed in Section 4.5.9.

It is assumed that there would be no other use of the project area, except for transportation. Other utilities (i.e., transmission lines, gas pipelines, future roadways) would be located within the EPNG multi-use utility corridor but outside the SVPP proposed ROW (see Figure 3-17). Impacts to topography, geology, and soils in the area of analysis from implementation of SVPP are discussed in terms of changes from the existing use.

4.5.2 No Action

Under the No Action alternative, the land on which the project is proposed would continue to be managed under the existing conditions. Current activities in the area, which primarily involve livestock grazing, agriculture, and dispersed recreational use, would not result in significant impacts to topography, geology,

and soils within the project area. The status of existing topographic, geologic, and soil resources described in Section 3.5 would remain unchanged. Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative.

Other actions in the surrounding area, such as SR 303L construction, Hassayampa Freeway construction, various pipelines, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa may result in their own direct and indirect impacts to local resources, but would not affect the topography, geology, or soils in the project area.

4.5.3 Impacts Common to all Action Alternatives

4.5.3.1 Topography

Direct or indirect impacts to the general topography of the project area, such as elevation and overall slope, would not occur under any variant of the project alternatives. The project area does not cross hills that would need to be cut or graded down, or valleys that would need to be filled. Microtopography would necessarily be altered within the project area, to build the road bed, provide fill for culvert and wildlife crossings, and maintain consistent grades. These changes are not considered major and would not have direct or indirect impacts to the larger vicinity of the project area. Numerous unnamed dry washes cross the project area, flowing northeast towards Waterman Wash, which flows into the Gila River at the north end of Rainbow Valley (approximately 10 miles north of the analysis area). Potential impacts to these washes are described below in Section 4.8.

4.5.3.2 Geology

Similarly, construction and operation of the project would not directly or indirectly affect local geology and geologic events under any variant of the project alternatives. The geologic setting of the project area is described in Section 3.5.4. No quaternary faults or folds are mapped in the vicinity of the project, and the project is mapped in an area of very low seismic hazard (USGS 2008; see Appendix E, Geologic Maps). The project will not contribute to increased seismic hazards in the project area. The project does not include groundwater withdrawal, and therefore the project would not contribute to accelerated land subsidence or the creation of fissures in the project area. Landslides are not expected to be a factor for this project because there are no steep slopes on or adjacent to the project. A seismic hazards map, a map of quaternary faults and folds, and an earthquake probability map are included in Appendix E, Geologic Maps.

Because impacts to topography and geology are not anticipated under any proposed variation of the SVPP, only impacts to soils will be discussed herein.

4.5.3.3 Soils

Under each alternative, short-term disturbance of at least 39 acres of soils would occur, resulting in a conversion from natural soils (as well as dirt roads and a small amount of farmland) to a construction right-of-way. Each alternative also includes a 1.4-acre temporary construction easement. Direct impacts would result from clearing of vegetation, grading, and compaction. Some of the soil is likely to contain native biological soil crusts. Indirect impacts to soils within the project area are not anticipated.

Much of the area disturbed during construction would be reclaimed, resulting in long-term impacts to the footprints of only paved roadway and graded shoulders. Long-term impacts to soils would include the

loss of soil productivity within these areas due to preclusion of access to the soil. The quantity of long-term impacts would vary by alternative and phase.

The corridors of all proposed alternatives run through similar soil types that are common to alluvial valleys. Any soil reclamation efforts on the project would be limited by the droughty climate and the poor tilth, potentially high salt content, and low organic matter content of local soils (NRCS 1974, 1977, 1997). The effects of these limitations on soil resources would include increased potential for erosion and a much longer time period for revegetation to occur. Properly implemented BMPs for soil stabilization, and a reclamation and revegetation plan, would serve to minimize these effects to the extent practicable for these poor soils.

Temporary impacts would occur to at least 39.4 acres of soil under any alternative. Permanent impacts would affect approximately 84 acres of soil for a two-lane Parkway, 167 acres for a four-lane Parkway, and 220 acres for a six-lane Parkway. The types of impacts are described above. The maximum amount of native soil that would be permanently disturbed within a maintained ROW is anticipated to be 553.9 acres.

4.5.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.5.4.1 Soils

Under Alternative A, the BLM Preferred Alternative, short-term disturbance would occur along a 15.7-mile corridor, and would total 39.4 acres. Short-term disturbance would result in a conversion from natural soils (as well as dirt roads and a small amount of farmland) to a graded and otherwise disturbed construction corridor. Direct impacts would result from clearing of vegetation, grading, and compaction. Indirect impacts to soils within the project area are not anticipated.

Much of the area disturbed during construction would be reclaimed, resulting in long-term impacts to a corridor between 44 and 116 feet wide (depending on the phase) comprising paved Parkway and graded median and shoulders within a 250-foot-wide ROW. Impacts would result from the clearing of vegetation, grading, compaction, and from construction of the Parkway. Long-term impacts to soils would include the loss of soil productivity within the transportation corridor due to preclusion of access to the soil. The short-term and permanent impacts to soils under Alternative A are described in Table 4-6 below.

Table 4-6. Short-term and Permanent Impacts to Soils under Alternative A, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	39.4	39.4	39.4
Permanent Impacts	83.6	167.1	220.1
Total Disturbed Area	123.0	206.5	259.5
Permanent ROW	474.8	474.8	474.8

4.5.5 Alternative C Direct and Indirect Impacts

Qualitatively, the short-term and permanent, direct and indirect impacts to soils under Alternative C would be substantially the same as described under Alternative A. However, at 18.1 miles in length, the

corridor of Alternative C is approximately 15% longer than that of Alternative A and the area of soil disturbed would be commensurately larger. The short-term and permanent impacts to soils under Alternative C are described in Table 4-7 below.

Table 4-7. Short-term and Permanent Impacts to Soils under Alternative C, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	45.4	45.4	45.4
Permanent Impacts	96.5	193.1	254.5
Total Disturbed Area	141.9	238.5	299.9
Permanent ROW	548.5	548.5	548.5

4.5.6 Alternative H Direct and Indirect Impacts

Qualitatively, the short-term and permanent, direct and indirect impacts to soils under Alternative H would be substantially the same as described under Alternative A. At 18.3 miles in length, the corridor of Alternative H is approximately the same length as that of Alternative C, but is 16% longer than that of Alternative A. The area of soil disturbed would be commensurately larger. The short-term and permanent impacts to soils under Alternative H are described in Table 4-8 below.

Table 4-8. Short-term and Permanent Impacts to Soils under Alternative H, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	45.7	45.7	45.7
Permanent Impacts	97.5	195.1	391.5
Total Disturbed Area	143.2	240.8	437.2
Permanent ROW	553.9	553.9	553.9

4.5.7 Sub-alternative F Direct and Indirect Impacts

Qualitatively, the short-term and permanent, direct and indirect impacts to natural soils under Sub-alternative F would be substantially the same as the segment it would replace. However, at 2.8 miles in length (versus 2.4 miles for the segment it would replace), the corridor of Sub-alternative F is approximately 16% longer and the area of soil disturbed thus commensurately larger. The impact would occur wholly on private lands. The short-term and permanent impacts to soils under Sub-alternative F are described in Table 4-9 below.

Table 4-9. Short-term and Permanent Impacts to Soils under Sub-alternative F, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	9.2	9.2	9.2
Permanent Impacts	17.0	34.1	96.8
Total Disturbed Area	26.2	43.3	106.0
Permanent ROW	96.8	96.8	96.8

4.5.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Qualitatively, Sub-alternative G's short-term and permanent, direct and indirect impacts to natural soils would be substantially the same as the segment it would replace. At 2.4 miles in length (versus 2.4 miles for the segment it would replace), the corridor of Sub-alternative G is approximately the same and the area of soil disturbed thus the same. The impact would occur wholly on private lands. The short-term and permanent impacts to soils under Sub-alternative G are described in Table 4-10 below.

Table 4-10. Short-term and Permanent Impacts to Soils under Sub-alternative G, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	7.2	7.2	7.2
Permanent Impacts	12.7	25.3	72.0
Total Disturbed Area	19.9	32.5	79.2
Permanent ROW	72.0	72.0	72.0

The preferred Alternative (Alternative A) and the preferred Sub-alternative (Sub-alternative G) would result in impacts as described in Table 4-11 below.

Table 4-11. Short-term and Permanent Impacts to Soils under Alternative A and Sub-alternative G, by Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Temporary Impacts	46.6	46.6	46.6
Permanent Impacts	96.3	192.4	292.1
Total Disturbed Area	142.9	239	338.7
Permanent ROW	546.8	546.8	546.8

4.5.9 Additional Mitigation Measures

No mitigation measures for topographic or geologic resources are needed under any of the action alternatives. Regarding soil, all soil reclamation efforts on the project would be limited by the droughty climate and the poor tilth, potentially high salt content, and low organic matter content of local soils (NRCS 1977). The effects of these limitations on soil resources would include increased potential for erosion and a much longer time period for revegetation to occur. Properly implemented BMPs for soil stabilization (described in a SWPPP), and a reclamation and revegetation plan, would serve to minimize these effects to the extent practicable for these poor soils.

A soil reclamation and revegetation plan and a SWPPP would be in place before construction begins, and would include soil conservation measures and measures to salvage topsoil and biological soil crusts for use in restoration activities. The basic principle of a SWPPP is that construction project operators must identify areas and activities that may contribute pollutants to stormwater and must implement BMPs to minimize those pollutants. The primary pollutant from construction sites is sediment discharges from increased erosion. Adequate and effective erosion and sediment control BMPs must be used to minimize sediment discharges. The SWPPP describes how the site will be managed and monitored, and describes

the BMPs that will be implemented to help ensure pollutants, including soil sediment, do not reach surface waters. BMPs may include stormwater controls, erosion and sediment controls, good housekeeping practices, stabilization practices, structural practices, non-stormwater discharge management, and other controls (e.g., off-site tracking of soils and dust management) (ADEQ 2008b).

A reclamation plan would typically include descriptions of the BMPs to be utilized for erosion control on or from the affected lands. It would also identify how topsoil and biological soil crusts would be salvaged, stored, and replaced in order to properly revegetate the area. It would identify soil types, the slopes of the reclaimed areas, and precipitation rates. Based on this information, the reclamation plan would identify the seed species, seeding rates, the time and method of planting the soil, and fertilizer and mulch requirements. The plan would also describe mitigating the loss of biological soil crusts and enhancing vegetation establishment by inoculating soils with native soil crusts during vegetation restoration. Lastly, the plan would outline weed and invasive species management, and the requirements for long-term monitoring of success.

No additional mitigation measures are suggested beyond a SWPPP, soil reclamation and revegetation plans, and those mitigation measures discussed in Chapter 2.

4.5.10 Residual Impacts

No residual impacts to topographic or geologic resources are anticipated under any of the action alternatives. Residual impacts to soils outside of the permanent Parkway and graded shoulders are not anticipated.

4.5.11 Short-term Uses versus Long-term Productivity

Under all alternatives, there would be no short-term or long-term impacts to productivity of topographic or geological resources, except that geological resources would be precluded from access in the 250-foot-wide ROW during construction and during operation.

Short-term productivity of soils would be affected in the 250-foot-wide construction ROW during construction, as the soils would be temporarily disturbed, graded, and compacted. However, a reclamation and revegetation plan would be implemented for areas outside of the operational ROW, resulting in long-term impacts to soil productivity to only the operational ROW, due to pavement and shoulders precluding access to soils for grazing, wildlife habitat, and agriculture.

4.5.12 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible and irretrievable commitment of topographic and geological resources under any of the action alternatives.

There would be irreversible commitments to soils, because these areas are not expected to ever be reclaimed and revegetated; thus long-term productivity of soils will be negatively impacted. Soil within the footprint of the paved Parkway and graded shoulders, the area previously described as permanent impacts, would be irreversibly committed following construction of the SVPP (Table 4-12).

Table 4-12. Irreversibly and Irretrievably Committed Soil Resources, by Alternative and Phase

	Two-lane Parkway (acres)	Four-lane Parkway (acres)	Six-lane Parkway (acres)
Alternative A	83.6	167.1	220.1
Alternative C	96.5	193.1	254.5
Alternative H	97.5	195.1	391.5
Sub-alternative F	17.0	34.1	96.8
Sub-alternative G	12.7	25.3	72.0

4.6 VEGETATION RESOURCES

4.6.1 Analysis Area, Approach and Assumptions

This section describes the impacts of the Proposed Action and alternatives, as described in Chapter 2, on vegetation communities, special-status plant species, including federally and State-protected species, and invasive and noxious weeds. Four federal regulations pertain to vegetation resources in and adjacent to the project area: 1) those plant species listed under the ESA by the USFWS; 2) those plant species listed as sensitive by the BLM under BLM Manual Section 6840; 3) EO 13112 of February 3, 1999–Invasive Species; and 4) the Plant Protection Act. In addition, there are two sets of Arizona State regulations pertinent to the plant species addressed in this section: 1) State of Arizona laws addressing the control and eradication of noxious weeds (AAC R3-4-244 and R3-4-245); and 2) Arizona Native Plant Law (AAC R3-3-1101 through R 3-3-1111; and ARS 3-901 through 3-916). These regulations are described in Sections 1.5 and 3.6.1.

The analysis area for assessing potential direct and indirect impacts to vegetation resources is defined as the actual footprint of the project area, i.e., portions of the 250-foot-wide ROW plus the perimeter areas where noxious and invasive species could establish and/or where water resources could be affected. Impact determinations were based on calculations of disturbance acreage to vegetation types, including Lower Colorado River Valley Sonoran Desertscrub and xeroriparian as associated with habitat for species or to the vegetation community. These calculations included a GIS exercise to calculate polygons of upland desert areas that equated to Lower Colorado River Valley Sonoran Desertscrub and a 5-foot buffer along washes minus the sandy wash bottom to equate to xeroriparian vegetation. Impact indicators were assigned based mainly on the assumption that vegetation removal would be considered a long-term impact since desert vegetation does not recover rapidly, and that the impact would be negligible or minor since Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation types are common throughout central Arizona. Alternative comparisons were based on the relative acreage of impacts to each vegetation resource. Cumulative impacts to vegetation resources were analyzed in the Rainbow Valley area of analysis, as discussed in Section 4.6.9. The assumptions utilized in the analysis of impacts to vegetation resources include 1) that the “Applicant-Committed Environmental Protection Measures” as described in Section 2.5 will be followed; 2) that the vegetation in the proposed disturbance area will be removed during the initial construction phases; 3) that the design, construction, and operation activities would adhere to the specifications as outlined in Chapter 2; 4) that noxious and invasive plant species could colonize the perimeter areas from existing seed banks or from the introduction of propagules into the area; 5) that surface water flow throughout the area will only be minimally affected (see Section 4.8 Water Resources); and 6) the area where xeroriparian vegetation is located is equal to the associated floodplain of ephemeral washes in the project area. Thus, the approach for the analysis of impacts to vegetation resources in this section encompasses all of these considerations.

4.6.2 No Action

Under the No Action alternative, the SVPP would not be developed and existing land uses in the project area would continue. Management of vegetation would continue at the discretion of BLM management under the Lower Sonoran RMP. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC 1781[b]) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP would continue. Current land uses in the area of analysis would continue under the No Action alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action alternative. As discussed in Section 3.11, current land uses in the area of analysis include dispersed outdoor recreation, agriculture, grazing, utilities, and transportation. Livestock grazing in the project area would continue in two allotments, which is already impacting vegetation resources. Vehicle use of the existing dirt roads in and near the project area and the associated impacts to individual plants from fugitive dust would continue to occur as a result of vehicle use. Limited recreational foot traffic would presumably also continue at low levels. No acres of vegetation communities would be disturbed beyond any currently existing surface-disturbing activities. There would be no impacts to special-status plant species beyond any impacts associated with the existing conditions identified in Chapter 3. There would be no impacts to noxious and invasive plant species beyond any impacts associated with the existing conditions identified in Chapter 3, and there would be no project perimeter and/or construction disturbances to increase the likelihood of invasion by noxious and invasive plant species.

4.6.3 Impacts Common to All Action Alternatives

The analysis of effects to vegetation resources is divided into three categories for further clarification: 1) vegetation community types, 2) special-status plant species, and 3) noxious and invasive species.

4.6.3.1 Two-lane Parkway

Vegetation Communities

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, negligible, long-term direct impact to vegetation communities due to temporary and permanent vegetation removal, including of Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation community types.

Special-Status Plant Species

The only special-status plants species with the potential to occur within the project area are those listed under the ANPL, including but not limited to species such as blue paloverde, barrel cactus, velvet mesquite, desert ironwood, and crucifixion thorn. The project area contains habitat and individuals of ANPL-protected plant species. Thus, the implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, negligible, long-term direct impact to ANPL-protected plant species due to temporary and permanent vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could result in site-specific, minor, long-term, direct and indirect impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment. This impact could modify the existing vegetation communities by altering the vegetative composition and also by the potential increased risk of wildfire due to non-native species accumulation of fuel load. Because the rate of seed production and seed dispersal (i.e., the likelihood of introduction) differs for each particular noxious and invasive species, it is difficult to define the exact area that would be affected; thus, this impact is quantified as the ROW perimeter.

4.6.3.2 Four-lane Parkway

Vegetation Communities

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, negligible, long-term direct impact to vegetation communities due to temporary and permanent vegetation removal, including of Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation community types.

Special-Status Plant Species

The only special-status plants species with the potential to occur within the project area are those listed under the ANPL, including but not limited to species such as blue paloverde, barrel cactus, velvet mesquite, desert ironwood, and crucifixion thorn; thus, the project area contains habitat and individuals of ANPL-protected plant species. Thus, the implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, negligible, long-term direct impact to ANPL-protected plant species due to temporary and permanent vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could result in a site-specific, minor, long-term, direct and indirect impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment. This impact could modify the existing vegetation communities by altering the vegetative composition and also by the potential increased risk of wildfire due to non-native species accumulation of fuel load. Because the rate of seed production and seed dispersal (i.e., the likelihood of introduction) differs for each particular noxious and invasive species, it is difficult to define the exact area that would be affected; thus, this impact is quantified as the ROW perimeter.

4.6.3.3 Six-lane Parkway

Vegetation Communities

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, negligible, long-term direct impact to vegetation communities due to temporary and permanent vegetation removal, including of Lower Colorado River Valley Sonoran Desertscrub and xeroriparian vegetation community types.

Special-Status Plant Species

The only special-status plants species with the potential to occur within the project area are those listed under the ANPL, including but not limited to species such as blue paloverde, barrel cactus, velvet mesquite, desert ironwood, and crucifixion thorn; thus, the project area contains habitat and individuals of ANPL-protected plant species. Thus, the implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, negligible, long-term direct impact to ANPL-protected plant species due to temporary and permanent vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could result in a site-specific, minor, long-term, direct and indirect impact to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment. This impact could modify the existing vegetation communities by altering the vegetative composition and also by the potential increased risk of wildfire due to non-native species accumulation of fuel load. Because the rate of seed production and seed dispersal (i.e., the likelihood of introduction) differs for each particular noxious and invasive species, it is difficult to define the exact area that would be affected; thus, this impact is quantified as the ROW perimeter.

4.6.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.6.4.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the Impacts Common to all Action Alternatives (Section 4.6.3 above); however, the impact would include 178.3 acres of vegetation removal, including 175.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.5 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 178.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 178.5-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.4.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 421.2 acres of vegetation removal, including 415.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 5.9 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 421.2 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 421.6-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.4.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 474.3 acres of vegetation removal, including 467.6 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.7 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 474.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of

Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 474.8-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action alternative, but the same for all other alternatives and phases.

4.6.5 Alternative C Direct and Indirect Impacts

4.6.5.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 205.4 acres of vegetation removal, including 2.4 acres of Lower Colorado River Valley Sonoran Desertscrub and 203.0 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 205.4 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 206.3-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action alternative, but the same for all other alternatives and phases.

4.6.5.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 485.1 acres of vegetation removal, including 479.5 acres of Lower Colorado River Valley Sonoran Desertscrub and 5.6 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in

Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 485.1 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 487.1-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.5.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 546.1 acres of vegetation removal, including 539.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.4 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 546.1 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 548.5-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.6 Alternative H Direct and Indirect Impacts

4.6.6.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 207.3 acres of

vegetation removal, including 205.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.3 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 207.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 208.3-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.6.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 488.3 acres of vegetation removal, including 481.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.3 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 488.3 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 491.9-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.6.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 550.0 acres of vegetation removal, including 541.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 8.1 acres of xeroriparian vegetation community types.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 550.0 acres of vegetation removal, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 553.9-acre ROW perimeter.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.7 Sub-alternative F Direct and Indirect Impacts

4.6.7.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 36.3 acres of vegetation removal, including 35.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.4 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of vegetation removal, including 211.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.9 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 241.7 acres of vegetation removal, including 238.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.8 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 243.6 acres of vegetation removal, including 240.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.7 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 36.3 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of vegetation removal if Alternative A is selected; a total impact of 241.7 acres of vegetation removal if Alternative C is selected; or a total impact of 443.6 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), however, the impact is quantified as the 36.4-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total quantified impact to the 214.9-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 242.6-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 244.7-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.7.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 85.6 acres of vegetation removal, including 84.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.9 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 506.8 acres of vegetation removal, including 500.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.8 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 570.7 acres of vegetation removal, including 564.2 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.5 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 574.0 acres of vegetation removal, including 565.7 acres of Lower Colorado River Valley Sonoran Desertscrub and 8.3 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), however, the impact would include 85.6 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F;

thus, the impacts would be combined for a total impact of 506.8 acres of vegetation removal if Alternative A is selected; a total impact of 570.7 acres of vegetation removal if Alternative C is selected; or a total impact of 574.0 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 85.9-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total quantified impact to the 507.5-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 573.0-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 577.8-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.7.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 96.4 acres of vegetation removal, including 95.4 acres of Lower Colorado River Valley Sonoran Desertscrub and 1.0 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of vegetation removal, including 563.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.7 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 642.6 acres of vegetation removal, including 635.1 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.4 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 646.4 acres of vegetation removal, including 637.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 9.1 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact would include 96.4 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of vegetation removal if Alternative A is selected; a total impact of 642.6 acres of vegetation removal if Alternative C is selected; or a total impact of 646.4 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 96.8-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total quantified impact to the 571.5-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 645.3-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 650.7-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.6.8.1 Two-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative G, the BLM Preferred Sub-alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 27.0 acres of vegetation removal, including 26.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.1 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of vegetation removal, including 202.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.6 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 232.4 acres of vegetation removal, including 229.9 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.5 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 234.3 acres of vegetation removal, including 232.0 acres of Lower Colorado River Valley Sonoran Desertscrub and 2.4 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 27.0 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of vegetation removal if Alternative A is selected; a total impact of 232.4 acres of vegetation removal if Alternative C is selected; or a total impact of 234.3 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 27.1-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total quantified impact to the 205.6-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 233.3-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 235.3-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.8.2 Four-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative G, the BLM Preferred Sub-alternative, as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 63.8 acres of vegetation removal, including 63.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.5 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of vegetation removal, including 478.6 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.3 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 548.9 acres of vegetation removal, including 478.6 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.3 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 552.1 acres of vegetation removal, including 544.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.8 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 63.8 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of vegetation removal if Alternative A is selected; a total impact of 548.9 acres of vegetation removal if Alternative C is selected; or a total impact of 552.1 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 64-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C,

or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total quantified impact to the 485.5-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 551.0-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 555.8-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.8.3 Six-lane Parkway

Vegetation Communities

The impacts to vegetation communities from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 71.8 acres of vegetation removal, including 71.3 acres of Lower Colorado River Valley Sonoran Desertscrub and 0.6 acre of xeroriparian vegetation community types. However, since this is a sub-alternative, Alternative A or C would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 546.1 acres of vegetation removal, including 538.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 7.2 acres of xeroriparian vegetation community types if Alternative A is selected; a total impact of 548.9 acres of vegetation removal, including 542.8 acres of Lower Colorado River Valley Sonoran Desertscrub and 6.1 acres of xeroriparian vegetation community types if Alternative C is selected; or a total impact of 621.8 acres of vegetation removal, including 613.2 acres of Lower Colorado River Valley Sonoran Desertscrub and 8.7 acres of xeroriparian vegetation community types if Alternative H is selected.

Special-Status Plant Species

The impacts to ANPL-protected plant species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives), but the impact would include 71.8 acres of vegetation removal, which could affect individuals and/or their habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 546.1 acres of vegetation removal if Alternative A is selected; a total impact of 618.0 acres of vegetation removal if Alternative C is selected; or a total impact of 621.8 acres of vegetation removal if Alternative H is selected, which could affect individuals and/or their habitat.

Noxious and Invasive Plant Species

The impacts to vegetation communities along the perimeter of the project area due to the increased chance of noxious and invasive plant species introduction and establishment from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in Section 4.6.3 (Impacts Common to all Action Alternatives); however, the impact is quantified as the 72.0-acre ROW perimeter. In addition, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total quantified impact to the 546.8-acre ROW perimeter if Alternative A is selected; a total quantified impact to the 620.5-acre ROW perimeter if Alternative C is selected; or a total quantified impact to the 625.9-acre ROW perimeter, if Alternative H is selected.

Direct and indirect impacts to vegetation resources under this alternative and phase would be greater than under the No Action Alternative, but the same for all other alternatives and phases.

4.6.9 Additional Mitigation Measures

Due to the comprehensiveness of the design and construction specifications as described in Chapter 2, only two additional mitigation measures are proposed for the SVPP to minimize impacts to vegetation resources.

- All earth-moving equipment, hauling equipment, and other machinery will be inspected and washed with compressed air to remove any attached seeds, roots and rhizomes, and soil or other debris prior to entering or leaving the construction site.
- Verify that any soils or other materials imported for fill or restoration activities are certified as free of noxious and invasive plant species.

4.6.10 Residual Impacts

No residual impacts to vegetation resources are anticipated because impacts from the long-term disturbance and removal of vegetation communities, as discussed in the previous sections, would remain and cannot be mitigated any further.

4.6.11 Short-term Uses versus Long-term Productivity

Since the paved road bed surface will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated, long-term productivity of vegetation resources will be negatively impacted. In addition, those areas that are reclaimed will have a lag in return to full productivity given that desert ecosystems can take up to 50 years to return to pre-disturbance conditions (Guo 2004; Kade and Warren 2002). Lastly, native plants that are salvaged and replanted often do not survive or go into “shock” and take many years to establish in the new area and return to full productivity and pre-disturbance conditions (Bainbridge 2007).

4.6.12 Irreversible and Irretrievable Commitment of Resources

Irreversible commitment of resources would be limited to the paved road bed surface, since it will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated. Implementation of any of the action alternatives would result in the irreversible and irretrievable loss of between 178.5 and 625.9 acres of vegetative habitat.

4.7 VISUAL RESOURCES

For visual resources, the BLM manages landscapes that require varying levels of protection and modification, giving consideration to the uses and values of other resources and the scenic quality of the landscape. This visual resource analysis identifies the potential project impacts to the physical environment through an evaluation of visual contrast and viewer sensitivity.

Impacts for visual resources are described in terms of negligible (no known impacts to resources); minor (direct effects are apparent and measurable but small and localized or contained within the footprint of the action); moderate (direct effects would be readily apparent and measurable over a larger area but still mainly within the footprint of the action); and major (direct effects would be highly noticeable and extend well beyond the footprint of the action).

4.7.1 Analysis Area, Approach and Assumptions

The analysis area for the visual resources analysis is a 10-mile buffer around all the project alternatives (project area). The project area refers to the actual physical boundaries of the proposed SVPP alignments.

The visual resource impacts analysis is an assessment of landscape changes that would result from the construction and operation of SVPP under the action alternatives. Because changes to the characteristic landscape in the analysis area would be the primary direct impact of SVPP on visual resources, the relative impacts of each alternative to the characteristic landscape were assessed by comparing visual contrasts that would result from changes to the form, line, texture, and color of the existing environment directly resulting from the construction and operation of the SVPP. The area of analysis for visual resources is the extent from where the project would be visible—i.e., the viewshed (which is located roughly within a 10-mile radius of the action alternatives and slightly further when viewed from higher elevations). The Rainbow Valley roughly represents the region in which existing visual resources, when assessed in combination with the project and other cumulative actions, would be impacted if the SVPP were implemented.

The analysis also consists of an assessment of visual contrast resulting from those same actions as seen from five critical viewpoints, or key observation points (KOPs). For the SVPP, viewpoints selected were critical views of typical landscapes that were selected to represent the views of disturbances of the SVPP and that would be encountered by the greatest number of people, for the greatest viewing duration. Because the SVPP is proposed, in part, on BLM-managed land, the analysis also consists of an assessment of whether the proposed changes to the landscape would meet the BLM's objectives for management of visual resources, as prescribed in the Lower Sonoran RMP (BLM 2012a). Table 4-13 shows the total VRM classification acreage of each action alternative as well as acreage for State Trust land and private land. All BLM lands crossed by the action alternatives are located on VRM Class IV landscape.

Table 4-13. Land Use and VRM Classifications by Action Alternative (acres)

Alternative	VRM Class I	VRM Class II	VRM Class III	VRM Class IV	State Trust Land	Private Land
Alternative A (BLM Preferred Alternative)	0	0	0	284.4	32.4	157.8
Alternative C	0	0	0	314.3	57.1	172.0
Alternative H	0	0	0	242.3	74.3	171.5
Sub-alternative F	0	0	0	0.0	0	94.7
Sub-alternative G (BLM Preferred Sub-alternative)	0	0	0	0.0	0	72

The SDNM (located approximately 800 feet west/south of the Preferred Alternative [Alternative A]) is classified as Class III, II, and I. Areas of the SDNM immediately adjacent to the Preferred Alternative proposed ROW are classified as Class III. Privately owned land and State Trust Land remains unclassified in terms of BLM VRM.

4.7.2 No Action

Implementation of the No Action Alternative would result in no construction and operation associated with the SVPP, and therefore would result in no physical changes to the existing landscape. No change to the views currently experienced at each of the viewpoints described below in Section 4.7.4.3, Key Observation Points, and shown on Figure 3-10 is expected related to this project under the No Action Alternative.

The current landscape in the Rainbow Valley is characterized by flat to low desert hills and plains with low vegetative diversity typical of creosote flats. Existing human modifications in the project area are limited to dirt surface tracks and roads, utility features (e.g., transmission lines and pipelines), cultivated agriculture fields, and two abandoned stock ponds. Under the No Action Alternative, the landscape would continue to be influenced by these factors, and would meet the BLM's objectives for management of VRM Class IV.

4.7.3 Impacts Common to all Action Alternatives

Adding a Parkway to the landscape in Rainbow Valley would result in an alteration of the existing landscape. In the short-term, construction of SVPP would cause dust to be emitted from earthmoving activities, construction vehicles and equipment, construction worker vehicles, materials delivery vehicles, and from areas within the construction zone that have been disturbed or where excavation material is stockpiled. Fugitive dust, if emitted in sufficient quantities, and if adverse weather conditions persist, could impact or degrade existing views in the short term. However, fugitive dust would not result in permanent changes to the existing landscape.

Regardless of the alternative implemented, the SVPP would be visible from selected KOPs in the Rainbow Valley (see Figure 3-10 for SVPP KOP locations). In addition, for any of the alternatives selected, contrasts to the existing views in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. The Parkway design would be the same for each action alternative (aside from the actual road alignment, location of wildlife crossings, and drainage crossings which are dependent upon geographic location of the Parkway). Signage, curb and gutter, slope and gradient would be the same for each alternative, and mitigation measures employed would also be the same (further described in Section 4.7.9, Additional Mitigation Measures). The surface of the SVPP would have an even, fine and smooth texture when viewed both near and from afar. The project's scale and purpose during operation would be the same for each alternative. Visual contrast ratings were completed for each of the five KOPs and are provided in Appendix I (SWCA 2009b).

4.7.3.1 SDNM/North Maricopa Mountains Wilderness: KOP 1

Under all action alternatives, the Parkway would be scarcely visible in the foreground/middle ground from this KOP. The view towards the project area from this KOP is a level view, and is approximately 5 miles west of the SVPP. BLM Road 8000C penetrates SDNM near the northern end of the project area, and topographic screening obscures SVPP from coming into full view at this KOP (Figure 4-1). Travelers on this road would likely have high expectations for scenic quality (natural or undeveloped landscapes). The introduction of the SVPP into the landscape would result in contrasts to line due to the sharp edges of the Parkway, and the interruption of the expansive, panoramic landscape which currently has no views of similar facilities. Additionally, the SVPP would result in a band of contrasting color changing the current earth tones of browns, tans, and greens, to colors associated with built Parkway such as black/gray asphalt. In general, contrast resulting from the texture change of the SVPP in the landscape would result in the evidence of a straight, linear paved feature. SVPP would present weak visible contrasts to the

Figure 4-1. View from KOP 1, facing east from within SDNM toward the proposed SVPP.

existing landscape when observed from this KOP because of topographic and vegetative obstruction combined with the low-lying linear nature of the Parkway itself. A weak visual impact would correspond with BLM VRM Class IV designation.

4.7.3.2 House/Residence: KOP 2

Under all action alternative alignments, the Parkway would be visible in the middle ground from this KOP. The view towards the project area from this KOP is a level view. The residents at this KOP would have level views of the SVPP because of the flat, open expanse of land in this area (Figure 4-2). Views from this KOP of the proposed Parkway would only reveal 4 miles of the entire stretch of Parkway, and the absence of an elevated view would partially to almost completely screen most of the alignment from residents at this KOP. Areas of the SVPP that may be slightly elevated (culverts and bridges) in addition to other human-made modifications (unrelated to the Parkway) would be slightly more visible than the at-grade Parkway itself from this KOP. The regular geometric form and line associated with roads would result in a weak contrast with the irregular and organic forms (as well as existing regular and synthetic conditions) of the existing landforms and vegetation. A weak visual impact would correspond with BLM VRM Class IV designation.

4.7.3.3 Sierra Estrella Wilderness–Quartz Peak: KOP 3

The Quartz Peak summit would be approximately 10 to 12 miles from the action alternative alignments and would have superior views of the SVPP in the background distance zone (Figure 4-3). The entire SVPP would be visible from this KOP. However, from this distance, the geometric patterns would mimic the existing modifications associated with agricultural fields and other existing non-paved roads. The construction footprint followed by paving of the SVPP creates the greatest contrast to the surrounding landscape and therefore would result in a weak visual impact based upon distance and degree of contrast. A weak visual impact would correspond with BLM VRM Class IV designation.

Figure 4-2. View from KOP 2, facing southwest toward the proposed SVPP.

Figure 4-3. View from KOP 3, facing west toward the SDNM and proposed SVPP.

4.7.3.4 Town of Mobile: KOP 4

The SVPP would be visible from a level viewing position in the foreground distance zone approximately 0.5 mile from the southern terminus of the SVPP (Figure 4-4). Viewers at this KOP would likely not have a high expectation for scenic quality since existing development exists at this KOP, as well as the landfill

Figure 4-4. View from KOP 4, facing north toward the proposed SVPP.

being within view of this KOP. The SVPP would present a minimal and weak degree of visual contrasts to the existing landscape when observed from KOP 4 apart from those discussed in Section 4.7.3, Impacts Common to All Action Alternatives. Visual impacts from KOP 4 in the community of Mobile would be weak which would correspond with BLM VRM Class IV designation.

4.7.3.5 Juan Bautista de Anza National Historic Trail: KOP 5

This KOP was designated due to the relatively high number of tourists that travel the route once used by Spanish explorer Juan Bautista de Anza—the Juan Bautista de Anza National Historic Trail that travels along this portion of SR 238. The SVPP would not be visible from a level viewing position in the foreground and middle ground distance zone from KOP 5, which is located approximately 4.5 miles from the southern terminus of the SVPP (Figure 4-5). The SVPP, located in the middle ground and background, would be nearly completely screened by topography, vegetation, and the landfill. Visual impacts from KOP 5 would be weak and would correspond with BLM VRM Class IV designation.

4.7.3.6 Two-lane Parkway

Changes to the landscape caused by the construction and operation of the two-lane Parkway would create visual contrasts to line, color, and texture in an area where no or limited similar development exists. The profile of the Parkway would create mostly horizontal/linear changes to the viewshed and the movement of vehicles during operation would be evident from foreground and middle ground distances, but would be difficult to discern from background distances (8 miles and beyond). Changes to the landscape for all action alternatives would be long-term, moderate (due to the addition of a human-made feature where there currently there is none), and largely local (limited to within a 10-mile radius, or viewshed).

Figure 4-5. View from KOP 5, facing north toward the proposed SVPP.

4.7.3.7 Four-lane Parkway

Changes to the landscape caused by the construction and operation of the four-lane Parkway would be similar to those created by the two-lane scenario except that the addition of four lanes would support additional vehicular traffic which could be seen from foreground and middle ground distances.

The profile of the Parkway would create mostly horizontal/linear changes to the viewshed and the four-lane scenario would include a 112-foot-wide median. The expanded area of visual contrast would be evident from middle ground and foreground distances but due to topography, vegetation, and other visual disturbances, long distance views (over 5 miles away) would be largely obstructed. Changes to the landscape for all action alternatives would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed).

4.7.3.8 Six-lane Parkway

Changes to the landscape caused by the construction and operation of the six-lane Parkway would be similar to those created by the four-lane scenario except that the addition of six lanes would support additional vehicular traffic which could be seen from foreground and middle ground distances.
The profile of the Parkway would create horizontal/linear changes to the viewshed and the six-lane scenario would include an 84-foot-wide median. The expanded area of visual contrast would be evident from middle ground and foreground distances but due to topography, vegetation, and other visual disturbances, long distance views (over 5 miles away) would be largely obstructed. Changes to the landscape for all action alternatives would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed).
Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-13.

4.7.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Alternative A, the BLM Preferred Alternative, follows the boundary of the SDNM along an unimproved EPNG pipeline road. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the SDNM to the west. Alternative A would be visible from all KOPs in the Rainbow Valley to varying degrees (see Figure 3-10 for SVPP KOP locations) and visual contrast to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Likewise, the level of change to the characteristic landscape would be in keeping with the established VRM Class IV objectives for the 284.6 acres of BLM land within the project area (see Table 4-12 and Figure 3-9 VRM Classes).

4.7.4.1 Visual Resource Management

VRM objectives for public lands on which Alternative A is located are Class IV (see Table 4-12). Under the BLM VRM program, the objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. These activities may dominate the view and may be the major focus of viewer attention (BLM 1986b). The level of change to the characteristic landscape that would result from implementation of Alternative A is consistent with the objectives of VRM Class IV.

4.7.4.2 Visual Conditions

Under Alterative A, the SVPP would be largely constructed within the existing EPNG multi-use utility corridor, adjacent to an unpaved pipeline access road, existing 500-kV transmission line, and Komatke Road.

The complexity of SVPP construction would be a simple line with a “sharp” edge, and evident line, color, and texture contrast, when viewed from the surrounding mountaintops, but would have irregular texture and lines when viewed from nearby. The construction ROW would be 250 feet wide. The color of the SVPP would be the same at all times of the day; however, depending upon the viewing angle and time of day, the SVPP’s dull hues of Parkway and asphalt features may shift to a lighter hue when increased light shines down at various angles. During construction, the hue would primarily be a light brown and tan, characteristic of road construction, surface-soil grading, and leveling of the project area. Construction of the SVPP would have a coarse and random distribution texture, depending on the pattern of construction activities. This would be similar for both near and distant visual conditions.

Alternative A, as opposed to the other action alternatives presented, represents the alignment with the fewest turns and curves. When observed from a higher elevation, Alternative A will create a continuous contrasting linear form dividing the Rainbow Valley from SDNM. However, the contrast of SVPP would be weak when compared to the bold and complex forms of mountainous and desert landscapes that surround the project area. Similarly, other existing roads near the project area, such as Riggs Road and SR 238, can be viewed in the same viewshed as the SVPP. Since construction requires greater ground disturbance and an increased footprint (wider ROW), impacts to visual resources would be greatest during construction.

Once construction is completed, vehicles traveling on the Parkway would create movement in the landscape. In addition, during operation of the SVPP, the browns and tans would be replaced by a darker, dull chroma characteristic of other roads in the region. The project will result in a “similar look” to other

paved, two-lane roads in the area, such as SR 238. The SVPP would be paved with asphalt over aggregate base, resulting in a dark-colored surface that would travel the Rainbow Valley from north to south for 15.7 miles, at a width of 44 feet.

The dominant features of Rainbow Valley discussed in Section 3.7 would not be replaced by the SVPP as the primary dominating feature. The existing roads are not paved and are therefore a less-dominating contrast to the existing conditions than the SVPP. However, the characteristics of the landscape would shift slightly due to the introduction of a paved Parkway into a generally vacant landscape. The shift would be within the management objectives outlined in the Lower Sonoran RMP (BLM 2012a). Under Alternative A, the level of change to the characteristic landscape would range from weak to strong, based on the visual resource contrast analysis, and would meet BLM VRM Class IV objectives.

4.7.4.3 Key Observation Points

The closest viewpoint, and the viewpoint with the most unobstructed views, is from the community of Mobile (KOP 4) which lies less than 0.3 mile from the southern terminus (approximate last 2 miles) of the proposed Alternative A. Views from this KOP afford foreground/middle ground and background views of approximately 10.5 miles of Parkway. Human-made development obstructs portions of direct views of the proposed alternative, however the landscape is largely flat, panoramic, and sparsely vegetated, which affords ideal long-distance viewing conditions. The KOP located within the SDNM (KOP 1) has the least potential for views of Alternative A because of topographic and vegetative obstruction. Additionally, views of the road are within the middle ground to background distance zones, most of the proposed alternative would be obstructed from views from this KOP. KOP 2 (residence), KOP 3 (Sierra Estrella Wilderness), and KOP 5 (Juan Bautista de Anza NHT) would afford similar viewing conditions of Alternative A, which would be from middle ground and background distances. KOP 3 would afford a superior view (from an elevated location) which results in a panoramic view of the landscape, and though Alternative A would be in the background distance zone, nearly the entire road corridor would be in view from this angle of observation.

4.7.4.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway would include the physical changes resulting from the addition of a 44-foot wide Parkway constructed in a 250-foot-wide ROW. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic. A digital model depicting the proposed Parkway was rendered to illustrate the transportation facility as raised approximately 15 feet from ground level to simulate maximum elevated conditions. Changes to the landscape for the two-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). Alternative A follows an existing unpaved roadway or “scar” in the landscape which largely minimizes surface disturbance as compared to the other action alternatives being considered. The proposed Parkway is not located on a steep, exposed slope, but rather is located along an existing disturbed corridor.

4.7.4.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical

parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the four-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). However, adding two additional through lanes to the ROW would result in a minor increase in visual impact. The phasing of construction of the four-lane Parkway scenario would be based on both traffic demand and available funding.

4.7.4.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. Because the six-lane Parkway accommodates more traffic than the two- or four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the six-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 284.4 acres. The addition of a six-lane Parkway, or build-out conditions, would increase the visual impact of the alternative within the landscape; however, at build-out the full vegetation plan and all mitigation measures would be realized and would reduce the visual size and contrast of the Parkway within the viewshed.

4.7.5 Alternative C Direct and Indirect Impacts

Alternative C follows a curvilinear route south on Rainbow Valley Road, east along Patterson Road and south to connect with the EPNG pipeline road. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape, which would be visible from spots within the Rainbow Valley. Figure 3-10 indicates Alternative C would be visible from selected KOPs in the Rainbow Valley. Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Likewise, the level of change to the characteristic landscape would be in keeping with the established VRM Class IV objectives for the 314.3 acres of BLM land within the project area (see Table 4-12 and Figure 3-9 VRM Classes).

4.7.5.1 Visual Resource Management

Implementation of construction and operation activities associated with Alternative C would be consistent with BLM VRM objectives for the project area. This alternative traverses VRM Class IV landscape on BLM land which allows for major modifications. Alternative C also traverses private and State lands, which do not have visual management prescriptions. As compared to Alternative A, Alternative C is located between 3 and 6 miles from the KOP 1 (SDNM) which is the most highly sensitive viewing area. Alternative C may have slightly less of an adverse impact to the viewshed because of its distance from visually valued landscapes. However, the addition of Alternative C to the existing landscape would have

long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed) impacts.

4.7.5.2 Visual Conditions

The visual conditions of the SVPP under Alternative C would be similar to Alternative A. However, the complexity of SVPP construction for Alternative C would differ from Alternative A in that the Parkway is less simple due to sharp curves and turns. When observed from higher elevations, Alternative C will create a continuous contrasting linear form dividing the Rainbow Valley from SDNM. Though Alternative C is linear, the addition of Alternative C's curves and turns adds complexity to the geometric form of the landscape. The curvilinear nature of Alternative C in the Parkway alignment is more abrupt and appears to be more discordant with the existing topography than Alternative A; therefore Alternative C would have a higher level of visual contrasts to the landscape than Alternative A.

4.7.5.3 Key Observation Points

When observed from KOP 3, Sierra Estrella Mountains, Alternative C's curves and turns would add complexity to the geometric form of the landscape. This would result in an increased contrast to the existing landscape greater than that of Alternative A. However, aside from the curvilinear nature of the corridor adding to additional contrast within the landscape, Alternative C would largely be viewed similarly to Alternative A at each of the KOPs.

4.7.5.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway for Alternative C would include the physical changes resulting from the addition of a 44-foot-wide Parkway constructed in a 250-foot-wide ROW. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic. The alignment of Alternative C follows a curvilinear pathway which would result in more evident views of the Parkway in the areas of the curves and turns. Changes to the landscape for the two-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed).

4.7.5.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. The alignment of Alternative C follows a curvilinear pathway which would result in more evident views of the Parkway in the areas of the curves and turns. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the four-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed).

4.7.5.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. The alignment of Alternative C follows a curvilinear pathway which would result in more evident views of the Parkway in the areas of the curves and turns. Because the six-lane Parkway accommodates more traffic than the two- and four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway. Changes to the landscape for the six-lane scenario would be long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed). Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 314.3 acres.

4.7.6 Alternative H Direct and Indirect Impacts

Alternative H is physically similar to Alternative C in that it follows a curvilinear route south on Rainbow Valley Road, east along Patterson Road and south on Bullard Avenue then diverges south and east through unimproved landscape to connect with the EPNG pipeline road to heads south through undeveloped land to its terminus at SR 238. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from spots within the Rainbow Valley. Figure 3-10 indicates Alternative H would be visible from selected KOPs in the Rainbow Valley. Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Likewise, the level of change to the characteristic landscape would be in keeping with the established VRM Class IV objectives for the 242.3 acres of BLM land within the project area (see Table 4-12 and Figure 3-9 VRM Classes).

4.7.6.1 Visual Resource Management

Implementation of construction and operation activities associated with Alternative H would be consistent with BLM VRM objectives for the project area. This alternative traverses VRM Class IV landscape on BLM land which allows for major modifications. Alternative H also traverses private and State lands, which do not have visual management prescriptions. As compared to Alternative A, Alternative H is located between 3 and 16 miles from KOP 1 within the SDNM. Therefore, Alternative H may have slightly less of an adverse impact to the viewshed due to its distance from visually valued landscapes. However, the addition of Alternative H to the existing landscape would have long-term, moderate (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed) impacts.

4.7.6.2 Visual Conditions

The visual conditions of the SVPP under Alternative H would be similar to Alternative C. However, the complexity of SVPP construction for Alternative H would differ from Alternative C in that the Parkway includes a series of sharp (90-degree) turns within a relatively short distance of one another. When observed from higher elevations, Alternative H would create a continuous contrasting linear form dividing the Rainbow Valley from SDNM. Though Alternative H is linear, the addition of Alternative H's

sharp curves and turns adds more complexity to the geometric form of the landscape than Alternative C. The curvilinear nature of Alternative H in the Parkway alignment is more abrupt and appears to be more discordant with the existing topography than Alternative C; therefore Alternative H would have a slightly higher level of visual contrast to the landscape than Alternative A or C. The addition of Alternative H to the existing landscape would have long-term, minor (due to the addition of a human-made feature where there currently is none), and largely local (limited to within a 10-mile radius, or viewshed) impacts.

4.7.6.3 Key Observation Points

The contrasts of Alternative H would be visible predominantly from KOP 2 (residence) and KOP 3 (Sierra Estrella Wilderness) and would be similar to those described under Alternative C. When observed from KOP 3, Alternative H's curves and turns would add complexity to the geometric form of the landscape. This would result in an increased contrast to the existing landscape greater than that of Alternative C.

4.7.6.4 Two-lane Parkway

Visual impacts from the two-lane Parkway scenario for Alternative H would be the same as for Alternative C.

4.7.6.5 Four-lane Parkway

Visual impacts from the four-lane Parkway scenario for Alternative H would be the same as for Alternative C.

4.7.6.6 Six-lane Parkway

Visual impacts from the six-lane Parkway scenario for Alternative H would be the same as for Alternative C. Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 242.3 acres.

4.7.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F, which traverses a total of 2.8 miles, begins at the EPNG pipeline road and follows a southeasterly route to connect with its terminus at SR 238. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the Rainbow Valley. Figure 3-10 indicates Sub-alternative F would be visible from three KOPs in the Rainbow Valley (i.e., the community of Mobile, Juan Bautista de Anza National Historic Trail, and Sierra Estrella's Quartz Peak). Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Sub-alternative F is located entirely outside of BLM lands.

4.7.7.1 Visual Resource Management

Sub-alternative F is located entirely on private lands, which do not have visual management prescriptions.

4.7.7.2 Visual Conditions

The visual conditions of the SVPP under Sub-alternative F is primarily along the EPNG pipeline road, an existing unpaved, bladed maintenance road that ends at SR 238 (with no formal intersection).

4.7.7.3 Key Observation Points

The contrasts of Sub-alternative F are most visible from the two southernmost KOPs (KOP 4—Mobile and KOP 5—Juan Bautista de Anza NHT). When observed from the southern end of the project area, the intersection with SR 238 would be evident.

4.7.7.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway would include the visual changes resulting from the addition of a 44-foot-wide Parkway 2.8 miles in length, constructed in a 250-foot-wide ROW on the existing EPNG pipeline road alignment. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic.

4.7.7.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the visual changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway.

4.7.7.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the visual changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. Because the six-lane Parkway accommodates more traffic than the two- and four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway. Variation of acres of disturbance for visual impacts would increase incrementally for each of the two-, four-, and six-lane scenarios, however the maximum acreage (or six-lane scenario) of visual impact for each action alternative is reported in Table 4-12 as 2 acres.

4.7.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Sub-alternative G, the BLM Preferred Sub-alternative, which traverses a total of 2.4 miles, begins at the EPNG pipeline road and follows a southeasterly route through vacant land to connect to the 107th Avenue

alignment and heads south with its terminus at SR 238. The addition of this alternative to the landscape in Rainbow Valley would result in an alteration of the existing landscape which would be visible from viewpoints within the Rainbow Valley. Figure 3-10 indicates the visibility of Sub-alternative G would be evident from three KOPs in the Rainbow Valley (i.e., the community of Mobile, Juan Bautista de Anza National Historic Trail, and Sierra Estrella's Quartz Peak). Visual contrasts to the existing view in Rainbow Valley of the surrounding landscape from the area residents, users of adjacent public land, and SR 238 would be created. Sub-alternative G is located entirely outside of BLM lands.

4.7.8.1 Visual Resource Management

Sub-alternative G is located entirely on private lands, which do not have visual management prescriptions.

4.7.8.2 Visual Conditions

The visual condition of SVPP for Sub-alternative G is primarily undeveloped, vacant desert scrub landscape that ends at SR 238 (with no formal intersection).

4.7.8.3 Key Observation Points

The visual contrasts of Sub-alternative G are most visible from the two southernmost KOPs. When observed from the southern end of the project area, the intersection with SR 238 would be evident.

4.7.8.4 Two-lane Parkway

Visual impacts associated with the construction and operation of the two-lane Parkway would include the physical changes resulting from the addition of a 44-foot-wide Parkway 2.4 miles in length, constructed in a 250-foot-wide ROW. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as typical parkway type and views would be of a paved linear transportation feature with bidirectional movement of vehicular traffic.

4.7.8.5 Four-lane Parkway

Visual impacts associated with the construction and operation of the four-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The four-lane scenario would have two lanes in each direction with graded shoulders and a 112-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical parkway type and views would be of a paved linear transportation feature with four lanes of bidirectional movement of vehicular traffic. Because the four-lane Parkway accommodates more traffic than the two-lane scenario, the additional traffic would create a more obvious pattern of motion along the Parkway.

4.7.8.6 Six-lane Parkway

Visual impacts associated with the construction and operation of the six-lane Parkway would include the physical changes resulting from the addition of a 200-foot-wide Parkway constructed in a 250-foot-wide ROW. The six-lane scenario would have three lanes in each direction with graded shoulders and an 84-foot-wide median separating each set of lanes. Final design of the Parkway is not complete at this time, therefore the visual impacts are based upon the assumption that the Parkway will be built as a typical six-lane parkway type and views would be of a paved linear transportation feature with six lanes of bidirectional movement of vehicular traffic. Because the six-lane Parkway accommodates more traffic

than the two- and four-lane scenarios, the additional traffic would create a more obvious pattern of motion along the Parkway.

4.7.9 Additional Mitigation Measures and Best Management Practices

BLM prescribes BMPs for linear and horizontal structures introduced into the landscape. The proposed Parkway would be designed in keeping with Arizona Parkway Design Standards and in addition, BLM BMPs for scenic quality would be integrated into the design and construction of the Parkway. Mitigation measures specific to the project and environment would also be employed to reduce visual disturbance.

Mitigation measures to reduce impacts on visual resources, where feasible, will include the use of tinted or painted concrete (used in culverts, bridge crossings, or sidewalks) muted in standard desert colors from the BLM Standard Color Chart, in hues of olive, tan, and browns, to blend with the surrounding environment, which would reduce the degree of contrast to the surrounding landscape.

Final design and landscaping has not been conducted at the time of this analysis, therefore it is assumed that a landscape plan, and design of other Parkway amenities (e.g., lights, pedestrian walks, curbing, etc.) will be part of the final engineering and design of this Parkway and would be in keeping with Arizona Standards for Parkway Design as published by Maricopa County and BLM BMPs. BLM would have the final decision on the tinting or use of painted colors that may be applied to culverts, bridge crossings, etc.

Ground disturbances outside the road bed, such as construction staging areas and shoulder work, would be top-soiled and revegetated with native vegetation.

Additional best management practices for visual design include:

- A reseeding plan that restores proper species composition, and native vegetation.
- Color treatment of signage along the Parkway to reduce and remove glare from standard stainless steel sign backing.
- Vertical concrete color treating of surfaces such as outside edges of concrete box culverts and wildlife crossings, wing walls stemming off of concrete culverts, and any other retaining walls and bridges.
- Design detail of the concrete box culverts and wildlife crossings should include wing walls that taper gradually with fill slope as the Parkway is elevated over the landscape.
- Guardrails, ROW fencing, and light poles should be CorTen self-weathering steel or should be treated with a weathering agent resulting in a similar visual effect to reduce the visual contrast of traditional galvanized metal guardrail.

In addition, ADOT has also published BMPs and native plan salvage and replanting guidance. According to ADOT BMPs, soil stabilization and vegetation control and management is encouraged on slopes and within the median, shoulder, and road ROW (ADOT 2008b). Construction of a Parkway includes the salvaging of native trees, shrubs, and cactus, and post-construction revegetation includes the application of grass seed and mulch through hydroseeding to prevent erosion. The native seed mixture is subject to the specific project and is typically included in the landscaping section of the construction plan. ADOT also requires conformance with Arizona Native Plant Laws, and the ADOT Native Plant Salvage and Replanting Evaluation guidance includes the replanting and resalvaging of plant material to restore wildlife habitat or connectivity between habitat areas crossing the Parkway. Revegetation techniques are also used to maintain and enhance the visual quality of the Parkway and ADOT guidance encourages

professional judgment to be used to achieve an appearance similar to the surrounding area while simultaneously using self-sustainable vegetation that can thrive with naturally occurring moisture (ADOT 2013).

4.7.10 Residual Impacts

The effectiveness of using standard desert colors for painted concrete would be limited by the distance of the KOP and the presence of other sources of contrast; therefore, impacts would generally be the same as the direct and indirect impacts described under each alternative. Regardless of the alternative selected, certain views during the construction period would be altered by the presence of construction vehicles, equipment personnel, and emerging new highway facilities. This impact is an unavoidable consequence of project construction.

4.7.11 Short-term Uses versus Long-term Productivity

Construction and operation of the SVPP would require short-term and long-term uses of land for transportation. Implementation of the SVPP under all action alternatives would create long-term and permanent disruptions of the characteristic landscape from soil and vegetation disturbances and would change the land use from a vacant setting to a transportation corridor.

4.7.12 Irreversible and Irretrievable Commitment of Resources

The visual contrasts that would result from construction and operation of the SVPP would involve an irreversible and irretrievable loss of a portion of the characteristic landscape in Rainbow Valley.

4.8 WATER RESOURCES

4.8.1 Analysis Area, Approach and Assumptions

In this section, direct and indirect impacts to water resources resulting from the SVPP consider both surface water and groundwater. The area of analysis for permanent, long-term impacts to surface water includes the Parkway footprint specific to each action alternative, the downstream portions of Waterman Wash and the West Prong, and 14 miles of the Gila River downstream of its confluence with Waterman Wash. Additional acres specific to each action alternative were considered for the area of analysis of temporary, short-term impacts during construction of SVPP. The area of analysis for both long- and short-term impacts to groundwater includes the West Salt River Valley and Rainbow Valley sub-basins, which are 1,330 square miles and 420 square miles, respectively. Environment consequences evaluated include the effect of the alternatives on existing water quantity and quality.

Surface water resources that would be impacted by this project include disturbance to surface water drainages or FEMA floodplains and changes to water quantity or quality. Because permanent disturbance to regional drainage patterns would be the primary impact of the SVPP to surface water resources, the number of wash crossings and acres of FEMA floodplains disturbed is used for evaluating the surface water conveyance; a GIS analytical tool with an overlay of each action alternative was used to aid in this analysis. Surface water quality is evaluated by the potential for change in water chemistry from erosion or release of pollutants. In regards to groundwater resources, although the water source that will be used to

meet the short-term water demands for construction of the SVPP is yet to be determined, it will likely be groundwater from the regional aquifer. Therefore, the total SVPP water demand relative to the regional aquifer is used to evaluate the potential for change in groundwater resources.

It is assumed that the SVPP will be designed to meet current Parkway design standards utilizing the June 2011 Rainbow Valley ADMP and that existing natural drainage patterns and surface water peak flows will be maintained with no on-site retention (V3 2007). With respect to groundwater, it is assumed that water demand for the SVPP will occur only during the construction phase and will be purchased from an existing source located in the local Rainbow Valley basin; no new water source will be developed. For the four-lane and six-lane features it is assumed that disturbance to the center median will be temporary, occurring only during construction.

4.8.2 No Action

Under the No Action Alternative there will be no development on BLM land, and water resources would continue to be managed under existing conditions. Existing land uses would continue and ephemeral washes within the Parkway footprint would not be impacted by new Parkway crossings. Local use of groundwater resources would continue at the existing demand level and no additional groundwater resources would be used for the construction of the SVPP.

4.8.3 Impacts Common to all Action Alternatives

The types of impacts to surface water resources would be the same for all action alternatives, however there would be a difference in the amount of impact relative to the total amount of disturbance to washes and FEMA floodplains per each action alternative.

4.8.3.1 Surface Water

There are no perennial surface water features in the project area, only ephemeral washes that flow in response to rainfall. Ephemeral washes in the project area include the West Prong, numerous tributaries to the West Prong, and Waterman Wash. Construction of each action alternative would result in direct impacts to the ephemeral washes at each location the SVPP crosses a wash. Permanent disturbance to floodplains and surface drainages at wash crossings will occur with the installation of engineered road crossing.

Per the site-specific drainage report (V3 2007), at existing conditions the peak flow in washes resulting from a 100-year, 24-hour storm event within the project area is estimated to range from 80 to 1,043 cubic feet per second. With respect to wash crossings, the applicant has committed to environmental protection measures that will maintain natural drainage patterns, and crossings have been designed to maintain the existing flow velocities. To accomplish this, the SVPP will incorporate three types of wash crossings: low-water crossings to maintain sheet flow conditions, and culvert crossings or arch-span structures to maintain channel flow conditions. Table 4-14 summarizes the wash crossings proposed for each action alternative.

Once wash crossings are installed, surface water velocity and sediment load are not expected to be significantly different from pre-construction conditions which will allow the form and function of the floodplain to stay mostly intact. As stated in Chapter 3, a complete jurisdictional delineation will need to be conducted prior to construction to support CWA Section 404 permitting, to minimize surface water impacts and to evaluate the extent to which washes within the project area exhibit characteristics the

USACE may consider indicators of potentially jurisdictional WUS, thus requiring a permit under Section 404 of the CWA.

Table 4-14. Proposed Wash Crossing Types for each Action Alternative

Impact Feature	Approximate Dimensions	Number Proposed for Alternative A (BLM Preferred Alternative)	Number Proposed for Alternative C	Number Proposed for Alternative H	Number Proposed for Sub-alternative F	Number Proposed for Sub-alternative G (BLM Preferred Sub-alternative)
Low-water crossing	200–1,600 linear feet	19	30	29	0	0
Culvert	2- to 6-foot openings	17	12	8	0	0
Arch span-type culvert (wildlife crossing)	Minimum of 12 feet high	3	2	3	0	0

4.8.3.2 Groundwater

For each action alternative, water will be required for the SVPP during the first 3 to 4 years of the project during the construction phase. Annual demands range from 3.0 to 3.5 acre-feet of water for the action alternatives and 0.06 acre-feet or less for each sub-alternative (see Table 3-13). The supply of water to meet the annual construction demands is yet to be determined but it will most likely be groundwater purchased from a local source.

While demands on groundwater in most of the west Salt River Valley has surpassed supply and has resulted in groundwater deficit, the Rainbow Valley basin has seen a decrease in demand and corresponding rise in aquifer water levels in recent years. Pumping of groundwater in the Rainbow Valley sub-basin, which began in the 1940s with development of agriculture in the area, has dropped from an annual high of 72,000 acre-feet in 1972 to less than 7,000 acre-feet per year in 2002 (Rascona 2003). Additionally, recharge to the groundwater aquifer occurs both naturally along mountain fronts and in ephemeral streambeds, and from incidental recharge of agricultural irrigation. Recharge in Rainbow Valley is unknown (ADWR 2010), but is estimated to be approximately 9,300 acre-feet per year (White 1963).

The water demand for the SVPP ranges from 3.0 to 3.5 acre-feet per year, which is 0.04% or less of the estimated recharge for the sub-basin. Because total water demands for SVPP are very minimal and because the Rainbow Valley sub-basin has recently experienced a decline in groundwater pumping and rise in water levels, impacts to groundwater quantity are considered negligible. Any impact to groundwater resources would most likely occur locally, only in the Rainbow Valley sub-basin, and have a minor, short-term impact.

With respect to groundwater quality, because BMPs will be in place to protect against potential spills during the construction phase, the potential for the SVPP to impact groundwater quality during construction would be temporary and is negligible. During operation, stormwater runoff from the SVPP will contain petroleum products from vehicles and asphalt. But because there are no retention basins planned that would collect and hold stormwater runoff long enough to allow for percolation into the aquifer, and because the depth to groundwater in the vicinity is well over 250 feet below ground surface, the potential for the SVPP to impact groundwater quality is long-term but negligible.

4.8.3.3 Two-lane Parkway

Impacts to surface water and groundwater resources common to all action alternatives for the first phase of construction of the two-lane SVPP are as described above.

4.8.3.4 Four-lane Parkway

Surface Water

When the second phase of construction (four lanes) of the SVPP occurs, it is assumed that the same number of wash crossings will need to be constructed. Therefore, the same types of impacts to surface water resources will occur, but with increased amount of disturbance to washes and floodplains varying by each action alternative. Impacts to surface water quality would be the same for the second phase of the SVPP as described above.

Groundwater

It is assumed that the same amount of groundwater would need to be used for dust control as would be used for construction of the two-lane Parkway, therefore doubling the total amount of groundwater that would be withdrawn from the local aquifer (6 to 7 acre-feet) varying by each action alternative, or 0.4 to 0.5 acre-feet for the sub-alternatives. But because the rate of groundwater withdrawal for the second phase of the SVPP would remain very minimal relative to the estimated annual recharge to the aquifer, impacts to groundwater quantity would be minor, and because the withdrawal would occur only during construction, these impacts would be short-term. Impacts to groundwater quality would be the same as described above.

4.8.3.5 Six-lane Parkway

When the third phase of construction (six lanes) of the SVPPP occurs, it is assumed that the same number of wash crossings would need to be constructed and the same amount of groundwater would need to be used for dust control as required for the two- and four-lane phases.

Surface Water

The same types of impacts to surface water resources would occur, but with an increase in the amount of disturbance to washes and floodplains varying by each action alternative. Impacts to surface water quality would be the same as described above.

Groundwater

The rate of groundwater withdrawal for construction of the third phase of the SVPP would remain the same as with the other two phases, but the total amount of groundwater that would be withdrawn from the local aquifer for all three phases would be 9.0 to 10.5 acre-feet, varying by each action alternative, or 0.5 to 0.7 acre-feet for the sub-alternatives. This total amount remains very minimal relative to the estimated annual recharge to the aquifer and impacts to groundwater quantity would be minor and short-term. Impacts to groundwater quality for this phase of the SVPP would be the same as previously described.

4.8.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.8.4.1 Surface Water

Construction of Alternative A, the BLM Preferred Alternative, would result in direct impacts to the ephemeral washes at each location where the SVPP crosses a wash. Permanent disturbance to floodplains and surface drainages at wash crossings would occur with the installation of engineered road crossing. Table 4-15 summarizes the number of wash crossings and impacts to surface water resources for Alternative A.

Table 4-15. Alternative A Two-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
39	0.9	17.8	7.3

A total of 39 wash crossings would be constructed for Alternative A, resulting in a total of 0.9 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional. This constitutes 0.2% of the total project area and less than 0.0003% of the total Waterman Wash watershed. All impacts to jurisdictional washes will be subject to CWA permit general conditions, as well as any special conditions developed by the USACE. Impacts must also meet state and federal water quality standards, which are administered by ADEQ. Additionally, a site-specific SWPPP will identify temporary BMPs to control erosion and sedimentation from the project area that will be put in place prior to the start of construction activities and will remain until final stabilization has occurred. Permanent erosion control features such as concrete aprons or rip-rap will be installed at all wash crossings. Although Alternative A represents the straightest alignment, from a surface water drainage pattern perspective, the perpendicular crossings (as opposed to paralleling) of washes under Alternative A would have a moderate impact to surface water. The application of drainage modeling, mitigation measures, and design features would minimize this impact.

There are 25 acres of floodplains that would be temporarily and/or permanently impacted under Alternative A as a result of the installation of culverts and low-water crossings. Because these crossings would be engineered to preserve the washes' natural drainage patterns, permanent disturbance to floodplains as a result of the installation will have a negligible impact on the floodplain form. Because these crossings would be engineered to maintain the existing flow capacity of the washes, no changes to floodplain function due to project construction are expected to occur. Maintaining channel flow and floodplain form and function are important. The biochemical function of ephemeral channels and floodplains includes the cycling and transport of sediment, nutrients, and organic matter, all of which influence water quality and sediment deposition (Levick et al. 2008). Further, the physical, biological, and chemical integrity of floodplains is dependent on the connectivity of channels to floodplains during periodic flooding that provides opportunity for critical exchange of energy and nutrients between the channel and the floodplain (Nadeau and Rains 2007).

Mitigation measures for the SVPP include channel flows that will be maintained, floodplain function that will not be disrupted, temporary erosion control that will be in place during the construction phase of the project, and permanent erosion control measures incorporated into the project design. With these mitigation measures and a total project footprint of less than 0.2% of the total Waterman Wash watershed, impacts to surface water quality from Alternative A is long-term but minor.

With respect to nearby impaired waters, 12 miles north of the project area Waterman Wash drains 422 square miles of watershed into the Gila River. Beginning at its confluence with Waterman Wash, a 14-mile reach of the Gila River is designated as impaired for pesticides. Because the project will not involve the application of pesticides, impacts from the project in the Waterman Wash watershed are not expected to result in any further contributions of pesticide to the Gila River.

4.8.4.2 Groundwater

Impacts to groundwater resources for Alternative A would be the same as described for all action alternatives.

4.8.4.3 Two-lane Parkway

Impacts to surface water and groundwater resources from the first phase of construction of the two-lane for Alternative A are as described above.

4.8.4.4 Four-lane Parkway

Surface Water

When the second phase of Alternative A (four lanes) is constructed the same types of impacts to surface water resources would occur, but with increased amount of disturbance to washes and floodplains, as summarized in Table 4-16. Table 4-16 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Alternative A would be the same as described above for the first phase.

Table 4-16. Alternative A Four-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
39	2.2	17.8	10.5

For the second phase of Alternative A, a total of 2.2 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.5% of the total project area and less than 0.0008% of the total Waterman Wash watershed.

There are 28.3 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Alternative A as a result of the installation of culverts and low-water crossings. These crossings will be engineered to preserve the washes' natural drainage patterns, and permanent disturbance to floodplains as a result of the installation will only slightly alter the floodplain form. With these mitigation measures in place, impacts to surface water quality from the second phase of Alternative A are considered negligible.

Groundwater

Impacts to groundwater resources for the Alternative A four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.4.5 Six-lane Parkway

Surface Water

When the third phase of Alternative A (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-17. Table 4-17 includes the impacts of Phase One, Two, and Three.

Table 4-17. Alternative A Six-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
39	2.5	17.8	11.9

For the third phase of Alternative A, a total of 2.5 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.5% of the total project area and less than 0.0009% of the total Waterman Wash watershed.

There are 29.7 acres of floodplains that would be temporarily and/or permanently impacted under the third phase of Alternative A as a result of the installation of culverts and low-water crossings. With proposed mitigation measures in place, impacts to surface water quality from the third phase of Alternative A are considered negligible.

Groundwater

Impacts to groundwater resources for the Alternative A six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.5 Alternative C Direct and Indirect Impacts

4.8.5.1 Surface Water

The type and magnitude of direct impacts to surface water for Alternative C are the same as for Alternative A with slight differences in total impacts (Table 4-18) and as described below. Alternative C will require construction of the most wash crossings, with a total of 44 resulting in direct impacts of 1.2 acres of washes and 40.3 acres of impact to floodplains.

Table 4-18. Alternative C Two-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
44	1.2	30.5	9.8

Unlike Alternative A, Alternative C would include six curves. Alternative C does not include fewer perpendicular wash crossings than Alternative A (in fact there are five additional crossings), but Alternative C would cross many of the washes in a parallel layout, which decreases impacts to surface water since the wash crossing may not require extensive excavation within the wash. From a surface water drainage pattern perspective, these curves avoid some perpendicular wash crossings and would

therefore have commensurately less impact to surface water than Alternative A. The application of drainage modeling during engineering and design, mitigation measures, and design features would minimize this impact.

Groundwater

Impacts to groundwater resources for Alternative C would be the same as described for all action alternatives.

4.8.5.2 Two-lane Parkway

Impacts to surface water and groundwater resources from the first phase of construction of the two-lane for Alternative C are described above.

4.8.5.3 Four-lane Parkway

Surface Water

When the second phase of Alternative C (four lanes) is constructed, the same types of impacts to surface water resources will occur as in the first phase, but with increased amount of disturbance to washes and floodplains (Table 4-19). Table 4-18 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Alternative C would be the same as described above for the first phase.

Table 4-19. Alternative C Four-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
44	2.9	30.5	14.0

For the second phase of Alternative C, a total of 2.9 acres of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.5% of the total project area and less than 0.001% of the total Waterman Wash watershed. There are 44.5 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Alternative C.

Groundwater

Impacts to groundwater resources for the Alternative C four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.5.4 Six-lane Parkway

Surface Water

When the third phase of Alternative C (six lanes) is constructed the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-20. Table 4-20 includes the impacts of Phase One, Two, and Three.

Table 4-20. Alternative C Six-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
44	3.3	30.5	13.7

For the third phase of Alternative C, a total of 3.3 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.6% of the total project area and less than 0.001% of the total Waterman Wash watershed.

There are 44.2 acres of floodplains that would be temporarily and/or permanently impacted under the third phase of Alternative C.

Groundwater

Impacts to groundwater resources for the Alternative C six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.6 Alternative H Direct and Indirect Impacts

Surface Water

The type and magnitude of direct impacts to surface water for Alternative H are the same as for Alternative A, with slight differences in total impacts (Table 4-21) and as described below. Alternative H would require 40 wash crossings, resulting in direct impacts of 1.1 acres of washes and 45.9 acres of impact to floodplains.

Table 4-21. Alternative H Two-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
40	1.1	34.5	11.4

Unlike Alternative A, Alternative H would include three curves. Alternative H does not include fewer perpendicular wash crossings than Alternative A (in fact there is one additional crossing), but Alternative H would cross many of the washes in a parallel layout, which decreases impacts to surface water since the wash crossing may not require extensive excavation within the wash. From a surface water drainage pattern perspective, these curves avoid some perpendicular wash crossings and would therefore have commensurately less impact to surface water than Alternative A. The application of drainage modeling during engineering and design, mitigation measures, and design features would minimize this impact.

Groundwater

Impacts to groundwater resources for Alternative H would be the same as described for all action alternatives.

4.8.6.1 Two-lane Parkway

Impacts to surface water and groundwater resources from the first phase of construction of the two-lane for Alternative H are described above.

4.8.6.2 Four-lane Parkway

Surface Water

When the second phase of Alternative H (four lanes) is constructed, the same types of impacts to surface water resources would occur as in the first phase, but with increased amount of disturbance to washes and floodplains as summarized in Table 4-22. Table 4-22 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Alternative H would be the same as for the first phase.

Table 4-22. Alternative H Four-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
40	3.8	34.5	15.6

For the second phase of Alternative H, a total of 3.8 acres of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.7% of the total project area and less than 0.001% of the total Waterman Wash watershed. There are 50.1 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Alternative H.

Groundwater

Impacts to groundwater resources for the Alternative H four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.6.3 Six-lane Parkway

Surface Water

When the third phase of Alternative H (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-23. Table 4-23 includes the impacts of Phase One, Two, and Three.

Table 4-23. Alternative H Six-lane: Surface Water Impacts

No. of Wash Crossings	Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
40	4.2	34.5	15.5

For the third phase of Alternative H, a total of 4.2 acres of temporary and/or permanent impact to washes would occur that could possibly be jurisdictional. This constitutes 0.8% of the total project area and less than 0.002% of the total Waterman Wash watershed.

There are 50.0 acres of floodplains that will be temporarily and/or permanently impacted under the third phase of Alternative H.

Groundwater

Impacts to groundwater resources for the Alternative H six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.7 Sub-alternative F Direct and Indirect Impacts

4.8.7.1 Two-lane Parkway

Surface Water

The type and magnitude of direct impacts to surface water for Sub-alternative F are the same as for Alternative A with differences in total impacts (Table 4-24). Sub-alternative F will directly impact 0.1 acre of washes and 20.1 acres of floodplains.

Table 4-24. Sub-alternative F Two-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.1	15.1	5.0

Groundwater

Impacts to groundwater resources for Sub-alternative F would be the same as described for all action alternatives.

4.8.7.2 Four-lane Parkway

Surface Water

When the second phase of Sub-alternative F (four lanes) is constructed, the same types of impacts to surface water resources would occur as in the first-phase, but with increased amount of disturbance to washes and floodplains as summarized in Table 4-25. Table 4-25 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Sub-alternative F would be the same as for the first phase.

Table 4-25. Sub-alternative F Four-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.3	15.1	6.8

A total of 0.3 acre of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.3% of the total project area and less than 0.0001% of the total Waterman Wash watershed. There are 21.9 acres of floodplains that would be temporarily and/or permanently impacted under the second phase of Sub-alternative F.

Groundwater

Impacts to groundwater resources for the Sub-alternative F four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.7.3 Six-lane Parkway

Surface Water

When the third phase of Sub-alternative F (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains as summarized in Table 4-26. Table 4-26 includes the impacts of Phase One, Two, and Three.

Table 4-26. Sub-alternative F Six-Lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.8	15.1	7.3

A total of 0.8 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional would occur. This constitutes 0.8% of the total project area and less than 0.0003% of the total Waterman Wash watershed. There are 22.4 acres of floodplains that would be temporarily and/or permanently impacted under the third phase of Sub-alternative F.

Groundwater

Impacts to groundwater resources for the Sub-alternative F six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.8.8.1 Two-lane Parkway

Surface Water

The type and magnitude of direct impacts to surface water for Sub-alternative G, the BLM Preferred Sub-alternative, are the same as for Alternative A with differences in total impacts (Table 4-27). Sub-alternative G will directly impact 0.04 acre of washes with no impact to floodplains.

Table 4-27. Sub-alternative G Two-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.04	0	0

Groundwater

Impacts to groundwater resources for Sub-alternative G would be the same as described for all action alternatives.

4.8.8.2 Four-lane Parkway

Surface Water

When the second phase of Sub-alternative G (four lanes) is constructed, the same types of impacts to surface water resources would occur as in the first-phase, but with increased amount of disturbance to washes and floodplains as summarized in Table 4-28. Table 4-28 includes the impacts of Phase One and Phase Two. Impacts to surface water quality during the second phase of Sub-alternative G would be the same as for the first phase.

Table 4-28. Sub-alternative G Four-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.2	0	0

A total of 0.2 acre of temporary and/or permanent impact to washes that could be jurisdictional would occur, which constitutes 0.3% of the total project area and less than 0.0001% of the total Waterman Wash watershed. There are no impacts to floodplains under the second phase of Sub-alternative G.

Groundwater

Impacts to groundwater resources for the Sub-alternative G four-lane Parkway would be the same as described for all action alternatives four-lane Parkway.

4.8.8.3 Six-lane Parkway

Surface Water

When the third phase of Sub-alternative G (six lanes) is constructed, the same types of impacts to surface water resources would occur, with increased amount of disturbance to washes and floodplains (Table 4-29). Table 4-29 includes the impacts of Phase One, Two, and Three.

Table 4-29. Sub-alternative G Six-lane: Surface Water Impacts

Jurisdictional Wash Area (acres)	FEMA Floodplains Temporary Impacts (designated and/or pending, in acres)	FEMA Floodplains Permanent Impacts (designated and/or pending, in acres)
0.2	0	0

A total of 0.2 acre of temporary and/or permanent impact to washes that could possibly be jurisdictional would occur. This constitutes 0.3% of the total project area and less than 0.0001% of the total Waterman Wash watershed. There are no impacts to floodplains under the third phase of Sub-alternative G. Table 4-30 below provides a summary of surface water impacts for all action alternatives and sub-alternatives.

Table 4-30. Summary of Action Alternatives and Sub-alternatives: Surface Water Impacts

Action Alternative or Sub-alternative	No. of Wash Crossings, Entire ROW	Wash Area, Two-lane Four-lane Six-lane Total (acres)	FEMA Floodplains Temporary Impacts, Entire ROW (designated and/ or pending, in acres)	FEMA Floodplains Permanent Impacts, Two-lane Four-lane Six-lane Total (designated and/ or pending, in acres)
Alternative A	39	0.9 1.3 0.3 **2.5**	17.8	7.3 3.2 1.4 **11.9**
Alternative C	44	1.2 1.7 0.4 **3.3**	30.5	9.8 4.2 0.0 **14.0**
Alternative H	40	1.1 2.7 0.4 **4.2**	34.5	11.4 4.2 0.0 **15.5**
Sub-alternative F	0	0.1 0.2 0.5 **0.8**	15.1	5.0 1.8 0.5 **7.3**
Sub-alternative G	0	0.04 0.16 0.00 **0.20**	0	0 0 0 **0**

Groundwater

Impacts to groundwater resources for the Sub-alternative G six-lane Parkway would be the same as described for all action alternatives six-lane Parkway.

4.8.9 Additional Mitigation Measures

No additional mitigation measures for water resources are proposed.

4.8.10 Residual Impacts

There are no additional mitigation measures; therefore the residual impacts to water resources are the same as discussed above.

4.8.11 Short-term Uses versus Long-term Productivity

The long-term use of the project area for the SVPP will have no impact on the long-term productivity of surface water resources. As described above, the surface water control structures would be designed to maintain the natural drainage pattern and flow velocities of the project area, and BMPs will allow the water quality to be maintained. In regards to groundwater, the SVPP does not involve development of groundwater resources and use of groundwater is very minimal. The short-term use of a small amount of groundwater during the construction phase of the SVPP will not have an impact on the long-term productivity of groundwater resources.

4.8.12 Irreversible and Irretrievable Commitment of Resources

The footprint of the SVPP will physically impact washes and floodplains with the installation of permanent culverts, paved low-water crossings, and paved ROW within floodplains. However this will have minimal effect on surface quantity and quality because the project will be designed to maintain natural drainage patterns, maintain existing flows, and preserve the form and function of the floodplain. Because existing flows and floodplain form will be maintained, there will be no irreversible or irretrievable commitment of surface water flow. The surface water quality would be irreversibly changed since the proposed SVPP would introduce an impermeable surface, increasing the time water can naturally filter into the ground and surface flow velocity.

With respect to groundwater resources, the short-term impact of the use of groundwater during the construction phase of the project will be an irretrievable commitment of resources for the 3 to 4 years it is impacted. The commitment of groundwater resources is not irreversible though. Natural recharge will still occur in washes and along mountain fronts and any groundwater consumed by the SVPP during the construction phase will be recovered by recharge to the aquifer.

4.9 WILDLAND FIRE MANAGEMENT

4.9.1 Analysis Area, Approach and Assumptions

The analysis area for describing impacts to wildland fire management is the proposed 250-foot-wide ROW, Parkway alignments under the jurisdiction of the BLM's wildland fire management plans, and activities and lands immediately adjacent to the proposed ROW. This section analyzes the potential impacts that the Proposed Action and alternatives would have on fuel loads, the risk of fire ignition, the risk of a wildland fire spreading to adjacent lands, and BLM wildland fire management responsibilities. No assumptions are necessary to analyze the potential impacts that the Proposed Action and alternatives would have on the BLM's wildland fire management responsibilities.

4.9.2 No Action

Under the No Action alternative, the BLM's wildland fire management responsibilities would be the same for the analysis area as currently identified in the Lower Sonoran RMP. No change would occur to the existing vegetation, therefore, the existing fuel loads, risk of ignition, and risk of wildland fire spreading to adjacent lands would remain the same.

4.9.3 Impacts Common to all Action Alternatives

The Proposed Action, action alternatives and sub-alternatives would have the same impact to the BLM's wildland fire management responsibilities because: 1) the same vegetation clearing, Parkway construction, landscaping activities, and eventual traffic would occur under all action alternative alignments, and 2) each action alternative's alignment is located in or adjacent to BLM lands with the same fire characteristics and wildland fire classifications. These are:

1) vegetation type as related to fire ecology
2) fire and fuel management Allocation 2 area

3) Wildland Urban Interface (WUI) areas in the northern and southern termini
4) Fire Regime V and Condition Class 1 area

4.9.3.1 Fuel Load

All action alternatives would clear the existing vegetation prior to construction within the ROW of the alignment. As described in Chapter 3, vegetation throughout the analysis area is sparse and dominated by creosote flats with intermittent xeroriparian vegetation along ephemeral drainages. These vegetation types are not conducive to wildland fires that may cause irreparable harm to the environment as indicative of their designation as an Allocation 2 management area and Fire Regime V and Condition Class 1 area. The removal of this vegetation during clearing activities would lower the fuel load further within the ROW of the alternative alignments; however, the removal of trees and shrubs (fuel load) would likely increase the amount of herbaceous (grasses and forbs) fuel loads. The potential for an increase in herbaceous fuel load directly adjacent to the proposed Parkway would be further increased due to water infiltration and ponding next to the impenetrable (i.e., pavement or asphalt) surfaces. Therefore, there would be a direct impact to the fuel loads within the analysis area by the vegetation clearing. The impact would be temporary during the construction of the Parkway before landscaping activities return the vegetation levels in the non-Parkway areas of the ROW to near-existing conditions. An increase in the number of lanes (from two to four or six) would decrease the amount of land within the ROW that would be available to landscape and subsequently revegetate.

4.9.3.2 Ignition Risk

Fire ignition risk from the heavy equipment used to clear the vegetation and construct the Parkway would be negligible due to the use of spark arrestors on heavy equipment. Traffic of all types would occur on the Parkway once it is constructed and would also constitute a low risk of ignition. An increase in traffic would lead to an increase of human presence within the analysis area; however, only vehicle travel would be permitted within the ROW. As discussed above in Section 4.9.3.1, there would be an anticipated increase in the continuity of herbaceous fuel loads. When combined with the anticipated increase in human presence, the existing ignition risk would increase.

4.9.3.3 Wildland Fire Risk

There would be a low risk of fires emanating from the construction site and constructed Parkway and spreading to adjacent lands. However, since the amount of herbaceous fuels and human presence are likely to increase, the risk of wildland fire also increases. Landscaping would return the non-Parkway areas within the ROW to vegetation levels consistent with the low fire risk vegetation in the surrounding natural lands. A risk associated with active wildland fires would be the smoke created from burning fuel, which grows commensurately thicker according to the severity of the wildfire. Active wildland fires along Parkways are therefore more likely to increase the risk to firefighters and other emergency personnel since thick smoke may impede Parkway travel and increase response times. The Parkway would increase access and decrease response times to fires, should they occur. This would represent a beneficial impact and decrease the risks of wildland fires starting along the Parkway alignment and spreading to adjacent Public lands.

4.9.3.4 BLM Wildland Fire Management Responsibilities

The Proposed Action and action alternatives would not impact the BLM's current fuel and fire management Allocation 2 area classification for the lands within and immediately adjacent to the ROW. The primary objective for fuels and fire management would be to actively suppress fires as quickly as

possible. Once constructed, the Parkway would enable faster response times to fires, should they occur. A fire management plan would be included in the Plan of Development (POD). Therefore, the Parkway would have a beneficial impact on the BLM's current management objective of quickly suppressing fires within the analysis area.

Because the majority of the Parkway would go through undeveloped natural land, the proposed alternatives would not constitute an addition to the WUI. The existing WUIs at the termini of the proposed alternative alignments would remain the same.

The Fire Regime V and Condition Class 1 classifications would also remain because the ROW and adjacent lands would not depart from their historical fire regime and historical range.

4.9.4 Additional Mitigation Measures

Due to the comprehensiveness of the design and construction specifications as described in Chapter 2, two additional mitigation measures are proposed for the SVPP to minimize wildland fire risks associated with invasive plant species:

- All earth-moving equipment, hauling equipment, and other machinery will be inspected and washed with compressed air to remove any attached seeds, roots and rhizomes, and soil or other debris prior to entering or leaving the construction site.
- Verify that any soils or other materials imported for fill or restoration activities are certified as free of noxious and invasive plant species.

4.9.5 Residual Impacts

Because no additional mitigation measures are suggested, residual impacts to wildland fire management would be the same as discussed under all action alternatives.

4.9.6 Short-term Uses versus Long-term Productivity

Over the long term, fire suppression activities would benefit from the increased access to the analysis area under the Proposed Action, action alternatives, and sub-alternatives.

4.9.7 Irreversible and Irretrievable Commitment of Resources

Implementation of any of the alternatives, including the No Action, would likely result in an irreversible commitment of resources regarding wildland fire management due to the likelihood of the introduction of invasive, non-native plants. Many invasive, non-native plants are fire-tolerant (unlike many native plants) and would rapidly recover and spread following a wildland fire faster than native species. Loss of native vegetation species due to potential invasive, non-native plants species proliferating and out-competing native species following a wildland fire would be an irreversible commitment of resources.

4.10 WILDLIFE

4.10.1 Analysis Area, Approach and Assumptions

This section describes the impacts of the Proposed Action and alternatives, as described in Chapter 2, on wildlife resources within the project area, including endangered, threatened, special-status, and other sensitive terrestrial species. Five federal regulations pertain to wildlife resources in and adjacent to the project area: 1) those wildlife species listed by the USFWS under the ESA; 2) those wildlife species listed as Sensitive by the BLM under BLM Manual Section 6840; 3) those migratory bird species protected under the MBTA; 4) BCC species listed by the USFWS; and 5) the BGEPA, which gives protection to bald and golden eagles. In addition, there are two sets of Arizona State regulations pertinent to the wildlife species addressed in this section: 1) Species of Greatest Conservation Need as listed by the AGFD; and 2) game species as managed by the AGFD and BLM.

When considering the potential effects and impacts of this proposed project, an analysis area must be defined that accounts for all direct and indirect effects and impacts. For the impact analysis for wildlife resources, the analysis area is defined widely: it includes the actual footprint of the project area, i.e., the 250-foot-wide ROW, plus a regional area to account for movement of individual animals. This regional area includes the Rainbow Valley with the following boundaries: the Sierra Estrella Mountains to the north and northeast, the Buckeye Hills to the north and west-northwest, the Maricopa Mountains to the south and southwest, and SR 238 to the south. This 78,249-acre analysis area was defined in this manner because of the topography and movement patterns of the animals on a regional scale and includes approximately 70,355 acres of LCRV desertscrub, 7,022 acres of Arizona Upland desertscrub, and 872 acres of xeroriparian vegetation. In addition, the analysis area contains 560 acres of BLM-designated Category I Sonoran desert tortoise habitat, 14,833 acres of BLM-designated Category II Sonoran desert tortoise habitat, and 40,497 acres of wildlife movement corridors, including two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan. The project area is located within a low-lying valley, which is surrounded by several mountain ranges and includes fragmented habitat patches due to urban/suburban/agricultural development and transportation networks in the area. Animals from these mountain areas are known to move through the valley periodically when relocating to other mountain ranges in the region; thus, potential effects and impacts to the movement patterns of these animals must be considered when defining this action area. SR 238 was selected as the southern boundary because of the existing roadway and adjacent railroad, which currently act as a barrier limiting wildlife movement. As a result of defining this analysis area for this wildlife resource impacts analysis, all effects and impacts as presented will include not only the project area but also the regional area in order to evaluate the connectivity of movement patterns for wildlife species in the region, e.g., potential fragmentation of habitat, and any potential movement disruptions that may occur as a result of this project, as well as potential mortality. In addition, the cumulative impacts to wildlife resources were analyzed in the Rainbow Valley area of analysis, as discussed in Section 4.10.9.

The assumptions utilized in the analysis of impacts to wildlife resources include:

- the “Applicant Committed Environmental Protection Measures” as described in Section 2.5 will be followed;
- the design, construction, and operation activities would adhere to the specifications as outlined in Chapter 2;
- the presence of wildlife species is closely tied to the presence and quality of a vegetation community or resource;

- vegetation communities provide breeding, foraging, cover, and movement habitat for wildlife species, thus are synonymous with wildlife habitat, and therefore can be used to quantify loss or degradation of wildlife habitat;
- surface water flow throughout the area will only be minimally affected (see Section 4.8, Water Resources);
- the area where xeroriparian vegetation is located is equal to the associated floodplain of ephemeral washes in the project area;
- for amphibian species, the analysis determined that habitat removal and dispersal impacts were the only potential effects to consider. Furthermore, amphibian habitat was equated with the xeroriparian habitat associated with the two large washes in the project area, i.e., Waterman Wash and West Prong, where amphibian species would be most likely to occur;
- for bat species, the analysis determined that removal of foraging habitat would be the only potential effect to consider. Furthermore, bat foraging habitat was equated with both LCRV and xeroriparian vegetation types where this species could forage;
- for bird species, the analysis determined that removal of nesting habitat would be the only potential effect to consider, since the MBTA only protects birds, nests, and eggs (i.e., nesting habitat only, and not other habitat such as foraging habitat). An exception is for the golden eagle, where foraging habitat removal would be the only potential effect to consider, since suitable nesting habitat is not present within the project or analysis area and the BGEPA protects all aspects of eagle habitat. Furthermore, nesting habitat for most bird species was equated with xeroriparian habitat associated with Waterman Wash and West Prong, i.e., large washes with dense xeroriparian vegetation, since this is where suitable bird nesting habitat is most likely to occur. Exceptions are for 1) Costa's hummingbird, LeConte's thrasher, white-winged dove, and mourning dove nesting habitat, which includes both LCRV and xeroriparian vegetation; 2) western burrowing owl nesting habitat, which includes only LCRV vegetation; and 3) Bell's vireo nesting habitat, which includes xeroriparian vegetation associated with all washes, i.e., not just large washes;
- for reptile species, the analysis determined that habitat removal and dispersal impacts were the only potential effects to consider. Furthermore, both LCRV and xeroriparian habitat were equated with habitat for these species;
- for large mammal species, the analysis determined that dispersal and movement impacts were the only potential effects to consider; except for the javelina where impacts to all habitat types (i.e., dispersal, foraging, shelter, and breeding) were considered; and
- for effects to BLM-designated Sonoran desert tortoise Category I habitat, impacts are considered major, since BLM planning for this habitat category specifies there should be no net loss.

In addition, impact determinations were based on calculations of disturbance acreage to vegetation types, including LCRV Sonoran Desertscrub and xeroriparian as associated with habitat types for species, i.e., general habitat, nesting habitat, and dispersal/movement habitat. Impact indicators were assigned based mainly on the assumption that vegetation removal is equal to habitat removal and that impact would be considered a long-term impact since desert vegetation does not recover rapidly. Alternative comparisons were based on the relative acreage of impacts to each vegetation resource as compared to what exists within the analysis area. Cumulative impacts to wildlife were analyzed in the Rainbow Valley area of analysis, as discussed in Section 4.5.9. Thus, the approach for the analysis of impacts to wildlife in this section encompasses all of these considerations.

4.10.2 No Action

Under the No Action alternative, the SVPP would not be developed and existing land uses in the project area would continue. Management of wildlife resources would continue at the discretion of BLM management under the *Lower Sonoran Resource Management Plan* (2012a). BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC 1781[b]) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP would continue. Current land uses in the area of analysis would continue under the No Action alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative. As discussed in Section 3.11, current land uses in the area of analysis include dispersed outdoor recreation, agriculture, grazing, utilities, and transportation. Livestock grazing in the project area would continue in two allotments, and is already impacting wildlife resources through resource competition and habitat modification (e.g., fencing and water developments). Vehicle use of the existing dirt roads in and near the project area and the associated impacts to wildlife resources from habitat fragmentation, disruption and displacement from noise, and wildlife mortality would continue to occur as a result of vehicle use. Limited recreational foot traffic would presumably also continue at low levels. No acres of wildlife resource habitat would be disturbed beyond any currently existing surface-disturbing activities. There would be no impacts to wildlife species beyond any impacts associated with the existing conditions identified in Chapter 3.

4.10.3 Impacts Common to all Action Alternatives

The analysis of effects to wildlife resources is divided into three categories for further clarification: 1) general wildlife, 2) special-status wildlife species, and 3) wildlife connectivity/wildlife movement corridors.

4.10.3.1 Two-lane Parkway

General Wildlife

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could affect general wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, numerous general wildlife species (reptiles, amphibians, birds, and mammals) are known to occupy the project area and region. The ROW contains habitat for general wildlife, including LCRV desertscrub and xeroriparian vegetation. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss of habitat, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, minor, long-term, direct impact to general wildlife species habitat. In addition, noise and mortality impacts would result in a local, moderate, long-term, direct impact to general wildlife species due to traffic along the Parkway.

Special-Status Wildlife Species

Of the 15 species listed under the ESA by the USFWS in Maricopa County, two candidate species—the desert tortoise, Sonoran population, and the Tucson shovel-nosed snake—have the potential to occur in the project area of all alternatives. The BLM Lower Sonoran Field Office identifies 67 priority wildlife species that have the potential to occur within the Field Office region. This includes species listed as BLM Sensitive, SGCN, BCC, Game Species, and also species protected under the MBTA, BGEPA, and Arizona Native Plant Law. Twenty-six of the 67 priority species listed for the Lower Sonoran Field Office by the BLM have the potential to occur or are known to occur within the project area, and consist of reptiles, amphibians, birds, and mammals, including bats. Refer to Chapter 3 and the tables in Appendix G, Species Tables, for a complete list of these 26 species and details regarding their habitat.

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could affect special-status wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, habitat (including breeding, foraging, cover, and/or movement habitat) for 26 special-status wildlife species exists in the project area and region. The ROW contains habitat for special-status wildlife, including LCRV desertscrub vegetation, xeroriparian vegetation, and BLM-designated Category I Sonoran desert tortoise habitat. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, the implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, minor, long-term, direct impact to special-status wildlife species habitat; whereas the impact to BLM-designated Category I Sonoran desert tortoise habitat would result in a site-specific, major, and long-term impact. In addition, noise and mortality impacts would result in a regional, moderate, long-term, direct and indirect impact to special-status wildlife species.

Wildlife Connectivity/Wildlife Movement Corridors

Habitat fragmentation is one of the most serious threats to biodiversity worldwide (Saunders et al. 1991; Wilcox and Murphy 1985), and one of the principal factors contributing to habitat fragmentation has been road construction (Meffe and Carroll 1997). Wide-ranging species such as large carnivores and migratory big-game species are particularly vulnerable to extinction in fragmented habitats because of large home ranges, low densities, slow population growth rates, and long-range dispersal patterns (Crooks 2000, 2002; Noss et al. 1996; Woodroffe and Ginsberg 1998). The creation of new roads and road modifications, such as increased numbers of traffic lanes, repaving of lanes, and construction of non-permeable wildlife fencing, may have short- and long-term impacts to connectivity between the habitat patches that the roads bisect. Not only do these roadways separate previously connected areas of habitat, they also create a barrier effect for organisms attempting to move between patches (Yanes et al. 1995). In addition, increasing highway mortality also plays a role in eliminating more individuals from a population (Harris and Gallagher 1989). There has been an increasing amount of research devoted to the role played by roads in impacting both rare and common wildlife species that have the potential to occur within the analysis area, including mountain lions (Beier 1996; Clevenger and Waltho 2005; Dickson and Beier 2002), bighorn sheep (Bristow and Crabb 2008; Cunningham and DeVos 1992; McKinney and Smith 2007; Singer et al. 2001), deer (see review in Huijser et al. 2007), snakes (Rosen and Lowe 1994; Rudolph et al. 1998), and desert tortoises (Boarman and Sazaki 1996, 2006).

The implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway could affect the movement of wildlife species within the Rainbow Valley analysis area through noise disturbance, permanent and temporary displacement, habitat fragmentation, and individual

mortality. As described in Chapter 3, two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan—are present within the project area. These linkage zones are located within the southern portions of the alternatives and have been shown to be the preferable areas for wildlife species to use when moving from one mountain range to another. Thus, implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a site-specific, minor, long-term, direct impact to wildlife movement corridors. In addition, implementation of any of the alternatives during Phase One construction and operation of a two-lane Parkway would result in a regional, moderate, long-term, direct impact to wildlife species along the entire length of the Parkway through decreased connectivity, habitat fragmentation, and individual mortality.

4.10.3.2 Four-lane Parkway

General Wildlife

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could affect general wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality.
As described in Chapter 3, numerous general wildlife species (reptiles, amphibians, birds, and mammals) are known to occupy the project area and region. The ROW contains habitat for general wildlife, including LCRV desertscrub vegetation and xeroriparian vegetation. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss of habitat, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, minor, long-term, direct impact to general wildlife species habitat. In addition, noise and mortality impacts would result in a local, moderate, long-term, direct impact to general wildlife species.

Special-Status Wildlife Species

Of the 15 species listed under the ESA by the USFWS in Maricopa County, two candidate species—the desert tortoise, Sonoran population, and the Tucson shovel-nosed snake—have the potential to occur in the project area. The BLM Lower Sonoran Field Office identifies 67 priority wildlife species that have the potential to occur within the Field Office region. This includes species listed as BLM Sensitive, SGCN, BCC, Game Species, and also species protected under the MBTA, BGEPA and Arizona Native Plant Law. Twenty-six of the 67 priority species listed for the Lower Sonoran Field Office by the BLM have the potential to occur or are known to occur within the project area, and consist of reptiles, amphibians, birds, and mammals, including bats. Refer to Chapter 3 for a complete list of these 26 species and details regarding their habitat.

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could affect special-status wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality.
As described in Chapter 3, habitat (including breeding, foraging, cover, and/or movement habitat) for 26 special-status wildlife species exists in the project area and region. The ROW contains habitat for special-status wildlife, including LCRV desertscrub vegetation, xeroriparian vegetation, and BLM-designated Category I Sonoran desert tortoise habitat. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would

increase the risk of displacement and mortality. Thus, the implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, minor, long-term, direct impact to special-status wildlife species habitat; whereas the impact to BLM-designated Category I Sonoran desert tortoise habitat would result in a site-specific, major, and long-term impact. In addition, noise and mortality impacts would result in a regional, moderate, long-term, direct and indirect impact to special-status wildlife species.

Wildlife Connectivity/Wildlife Movement Corridors

The implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway could affect the movement of wildlife species within the Rainbow Valley analysis area through noise disturbance, permanent and temporary displacement, habitat fragmentation, and individual mortality. As described in Chapter 3, two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan—are present within the project area. These linkage zones are located within the southern portions of the alternatives and have been shown to be the preferable areas for wildlife species to use when moving from one mountain range to another. Thus, implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a site-specific, minor, long-term, direct impact to wildlife movement corridors. In addition, implementation of any of the alternatives during Phase Two construction and operation of a four-lane Parkway would result in a regional, moderate, long-term, direct impact to wildlife species along the entire length of the Parkway through decreased connectivity, habitat fragmentation, and individual mortality.

4.10.3.3 Six-lane Parkway

General Wildlife

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could affect general wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, numerous general wildlife species (reptiles, amphibians, birds, and mammals) are known to occupy the project area and region. The ROW contains habitat for general wildlife, including LCRV desertscrub vegetation and xeroriparian vegetation. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss of habitat, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, minor, long-term, direct impact to general wildlife species habitat. In addition, noise and mortality impacts would result in a local, moderate, long-term, direct impact to general wildlife species.

Special-Status Wildlife Species

Of the 15 species listed under the ESA by the USFWS in Maricopa County, two candidate species—the desert tortoise, Sonoran population, and the Tucson shovel-nosed snake—have the potential to occur in the project area. The BLM Lower Sonoran Field Office identifies 67 priority wildlife species that have the potential to occur within the Field Office region. This includes species listed as BLM Sensitive, SGCN, BCC, Game Species, and also species protected under the MBTA, BGEPA and Arizona Native Plant Law. Twenty-six of the 67 priority species listed for the Lower Sonoran Field Office by the BLM have the potential to occur or are known to occur within the project area, and consist of reptiles, amphibians,

birds, and mammals, including bats. Refer to Chapter 3 for a complete list of these 26 species and details regarding their habitat.

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could affect special-status wildlife species through noise disturbance, permanent and temporary displacement, habitat degradation, habitat loss, habitat fragmentation, and individual mortality. As described in Chapter 3, habitat (including breeding, foraging, cover, and/or movement habitat) for 26 special-status wildlife species exists in the project area and region. The ROW contains habitat for special-status wildlife, including LCRV desertscrub vegetation, xeroriparian vegetation, and BLM-designated Category I Sonoran desert tortoise habitat. As described in Chapter 2, portions of the ROW would be entirely disturbed from construction and result in a loss, whereas other areas would be disturbed but then reclaimed. In addition, noise from construction and travel on the Parkway once constructed would increase the risk of displacement and mortality. Thus, the implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, minor, long-term, direct impact to special-status wildlife species habitat; whereas the impact to BLM-designated Category I Sonoran desert tortoise habitat would result in a site-specific, major, and long-term impact. In addition, noise and mortality impacts would result in a regional, moderate, long-term, direct and indirect impact to special-status wildlife species.

Wildlife Connectivity/Wildlife Movement Corridors

The implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway could affect the movement of wildlife species within the Rainbow Valley analysis area through noise disturbance, permanent and temporary displacement, habitat fragmentation, and individual mortality. As described in Chapter 3, two designated wildlife movement corridors—the Sierra Estrella–SDNM linkage as designated in the Arizona Wildlife Linkages Assessment (2006) and a BLM-designated wildlife corridor adopted from the AGFD Bighorn Sheep Management Plan—are present within the project area. These linkage zones are located within the southern portions of the alternatives and have been shown to be the preferable areas for wildlife species to use when moving from one mountain range to another. Thus, implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a site-specific, minor, long-term, direct impact to wildlife movement corridors. In addition, implementation of any of the alternatives during Phase Three construction and operation of a six-lane Parkway would result in a regional, moderate, long-term, direct impact to wildlife species along the entire length of the Parkway through decreased connectivity, habitat fragmentation, and individual mortality.

4.10.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.10.4.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative A, the BLM Preferred Alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the “Impacts Common to all Action Alternatives” section; however, the impact would include approximately 178.3 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 178.5 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 178.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 2.5 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 31.1 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 115.9 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 15.7-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases, except for all Phase Three (six-lane Parkway) alternatives.

4.10.4.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 421.6 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife species habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 421.1 acres of habitat for special-status wildlife out of the 78,249 acres total of habitat for special-status wildlife within the analysis area, including approximately 415.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 5.9 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 73.3 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately

273.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 15.7-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.4.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 474.2 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 474.2 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 467.6 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 6.7 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 82.5 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative A as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 308.1 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 15.7-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (i.e., six-lane Parkway) alternatives.

4.10.5 Alternative C Direct and Indirect Impacts

4.10.5.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately

205.4 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 205.4 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 203.0 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 2.4 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 9.8 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 142.0 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.1-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.5.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 485.1 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 485.1 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 479.5 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 5.6 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 23.0 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 335.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.1-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.5.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 546.1 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 546.1 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 539.7 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 6.4 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 25.9 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative C as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 377.9 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.1-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (i.e., six-lane Parkway) alternatives.

4.10.6 Alternative H Direct and Indirect Impacts

4.10.6.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 207.3 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 207.3 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 205.0 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 2.3 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 30.9 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 123.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.3-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.6.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 488.3 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 488.3 acres

of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 481.0 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 7.3 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 72.8 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 305.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.3-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.6.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 550.0 acres of general wildlife species habitat out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include 550.0 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 541.9 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 8.1 acres of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 82.0 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Alternative H as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section; however, the impact would include approximately 343.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 18.3-mile Parkway.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (i.e., six-lane Parkway) alternatives.

4.10.7 Sub-alternative F Direct and Indirect Impacts

4.10.7.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 36.3 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of general wildlife species habitat if Alternative A is selected; a total impact of 241.7 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 243.6 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 36.3 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 35.9 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 0.4 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 4.1 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 214.6 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 35.2 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 241.7 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 13.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 243.6 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 35.0 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 20.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.8-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 136.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 12.1-mile Parkway if Alternative A is selected; a total impact of 162.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts

to species along the entire 16.8-mile Parkway if Alternative C is selected; or a total impact of 144.4 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.9-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.7.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 85.6 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 506.8 acres of general wildlife species habitat if Alternative A is selected; a total impact of 570.7 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 574.0 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 85.6 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 84.7 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 0.9 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 9.6 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 506.8 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 570.7 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 32.6 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 574.0 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.4 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 49.0 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area

and impacts to species along the entire 2.8-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 322.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 12.1-mile Parkway if Alternative A is selected; a total impact of 384.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.8-mile Parkway if Alternative C is selected; or a total impact of 354.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.9-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.7.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 96.4 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of general wildlife species habitat if Alternative A is selected; a total impact of 642.6 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 646.4 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 96.4 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 95.4 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area, approximately 1.0 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area, and approximately 10.8 acres of BLM-designated Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 570.7 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 93.3 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 642.6 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 36.7 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 646.4 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 92.8 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative F as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 55.2 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.8-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative F; thus, the impacts would be combined for a total impact of 363.3 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 12.1-mile Parkway if Alternative A is selected; a total impact of 433.1 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.8-mile Parkway if Alternative C is selected; or a total impact of 398.8 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.9-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (six-lane Parkway) alternatives.

4.10.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.10.8.1 Two-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative G, the BLM Preferred Sub-alternative, as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 27.0 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of general wildlife species habitat if Alternative A is selected; a total impact of 232.4 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 234.3 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 27.0 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 26.9 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area and approximately 0.1 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area (there is no BLM-designated Category I Sonoran desert tortoise habitat in this sub-alternative). However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 205.4 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 31.1 acres of Category I Sonoran desert

tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 232.4 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 9.8 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 234.3 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 30.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase One construction and operation of a two-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 17.8 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.4-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 133.7 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 11.7-mile Parkway if Alternative A is selected; a total impact of 159.8 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.4-mile Parkway if Alternative C is selected; or a total impact of 141.5 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.5-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.8.2 Four-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 63.8 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of general wildlife species habitat if Alternative A is selected; a total impact of 548.9 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 552.1 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 63.8 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 63.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area and approximately 0.5 acre of xeroriparian vegetation out of

the 872 acres total of xeroriparian vegetation within the analysis area (there is no BLM-designated Category I Sonoran desert tortoise habitat in this sub-alternative). However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 484.9 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 73.3 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 548.9 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 23.0 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 552.1 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 72.8 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Two construction and operation of a four-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 42.0 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.4-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 315.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 11.7-mile Parkway if Alternative A is selected; a total impact of 377.6 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.4-mile Parkway if Alternative C is selected; or a total impact of 347.5 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.5-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative, but essentially the same for all other alternatives and phases except for all Phase Three (six-lane Parkway) alternatives.

4.10.8.3 Six-lane Parkway

General Wildlife

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include approximately 71.8 acres of general wildlife species habitat. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 546.1 acres of general wildlife species habitat if Alternative A is selected; a total impact of 618.0 acres of general wildlife species habitat if Alternative C is selected; or a total impact of 621.8 acres of general wildlife species habitat if Alternative H is selected out of the 78,249 acres total of general wildlife habitat within the analysis area.

Special-Status Wildlife Species

The impacts to special-status wildlife species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 71.8 acres of habitat for special-status wildlife out of the 78,249 acres of habitat for special-status wildlife within the analysis area, including approximately 71.3 acres of LCRV vegetation out of the 70,355 acres total of LCRV vegetation within the analysis area and approximately 0.6 acre of xeroriparian vegetation out of the 872 acres total of xeroriparian vegetation within the analysis area (there is no BLM-designated Category I Sonoran desert tortoise habitat in this sub-alternative). However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 546.1 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.5 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative A is selected; a total impact of 618.0 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 25.9 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative C is selected; or a total impact of 621.8 acres of special-status habitat out of the 78,249 acres of habitat for special-status wildlife within the analysis area and 82.0 acres of Category I Sonoran desert tortoise habitat out of the 560 acres total of Category I Sonoran desert tortoise habitat within the analysis area if Alternative H is selected.

Wildlife Connectivity/Wildlife Movement Corridors

The impacts to general wildlife species from the implementation of Sub-alternative G as proposed during Phase Three construction and operation of a six-lane Parkway would be the same as described in the "Impacts Common to all Action Alternatives" section, but the impact would include 47.3 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 2.4-mile Parkway. However, since this is a sub-alternative, Alternative A, C, or H would also be selected in combination with Sub-alternative G; thus, the impacts would be combined for a total impact of 355.4 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 11.7-mile Parkway if Alternative A is selected; a total impact of 425.2 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 16.4-mile Parkway if Alternative C is selected; or a total impact of 390.9 acres of wildlife movement corridors out of the 14,833 acres total of wildlife movement corridors within the analysis area and impacts to species along the entire 10.5-mile Parkway if Alternative H is selected.

Direct and indirect impacts to wildlife resources under this alternative and phase would be greater than under the No Action Alternative and all Phase One and Two alternatives, but overall essentially the same as all other Phase Three (six-lane Parkway) alternatives.

Table 4-31 below provides a summary of the potential impacts to wildlife habitat. Table 4-32 shows the impacts to wildlife habitat when combining the potential scenarios of an action alternative and sub-alternative combination.

Table 4-31. Summary of Impacts to Wildlife Habitat

	Total Acreage within Analysis Area	Alternative A: Two Lanes Four Lanes Six Lanes (acres)	Alternative C: Two Lanes Four Lanes Six Lanes (acres)	Alternative H: Two Lanes Four Lanes Six Lanes (acres)	Sub-alternative F: Two Lanes Four Lanes Six Lanes (acres)	Sub-alternative G: Two Lanes Four Lanes Six Lanes (acres)
Total Miles (Alternative A, C and H share common length at the north and south ends)	–	15.7	18.1	18.3	2.8	2.4
General Wildlife Habitat	78,249	178.3 421.1 474.2	205.4 485.1 546.1	207.3 488.3 550.0	36.3 85.6 96.8	27.0 63.8 71.8
Special-Status Species Habitat	78,249	178.3 421.1 474.2	205.4 485.1 546.1	207.3 488.3 550.0	36.3 85.6 96.8	27.0 63.8 71.8
LCRV Vegetation	70,355	178.3 415.3 467.6	203.0 479.5 539.7	205.0 481.0 541.9	35.9 84.7 95.4	26.9 63.3 71.3
Xeroriparian Vegetation	872	2.5 5.9 6.7	2.4 5.6 6.4	2.3 7.3 8.1	0.4 0.9 1.0	0.1 0.5 0.6
Category I Sonoran Desert Tortoise Habitat	560	31.1 73.3 82.5	9.8 23.0 25.9	30.9 72.8 82.0	4.1 9.6 10.8	0 0 0
Wildlife Connectivity/ Corridors	40,487	115.9 273.6 308.1	142.0 335.6 377.9	123.7 305.6 343.6	20.7 49.0 55.2	17.8 42.0 47.3

Table 4-32. Summary of Wildlife Impacts

	Two Lanes			Four Lanes			Six Lanes		
	Alternative A + F; Alternative A + G	**Alternative C + F; Alternative C + G**	**Alternative H + F; Alternative H + G**	**Alternative A + F; Alternative A + G**	**Alternative C + F; Alternative C + G**	**Alternative H + F; Alternative H + G**	**Alternative A + F; Alternative A + G**	**Alternative C + F; Alternative C + G**	**Alternative H + F; Alternative H + G**
Total Miles	16.1; 15.7	18.7; 18.1	18.5; 18.3	16.1; 15.7	18.7; 18.1	18.5; 18.3	16.1; 15.7	18.7; 18.1	18.5; 18.3
General Wildlife Habitat (acres)	214.6; 205.4	241.7; 232.4	243.6; 234.3	506.8; 484.9	570.7; 548.9	574.0; 552.1	570.7; 546.1	642.6; 618.0	646.4; 621.8
Special-Status Species Habitat (acres)	214.6; 202.8	241.7; 232.4	243.6; 234.3	506.8; 484.9	570.7; 548.9	574.0; 552.1	570.7; 546.1	642.6; 618.0	646.4; 621.8
LCRV Vegetation (acres)	211.7; 202.8	238.9; 229.9	240.9; 232.0	500.0; 478.6	564.2; 542.8	565.7; 544.3	563.0; 538.8	635.1; 611.0	637.3; 613.2
Xeroriparian Vegetation (acres)	2.9; 2.6	2.8; 2.5	2.7; 2.4	6.8; 6.3	6.5; 6.1	8.3; 7.8	7.7; 7.2	7.4; 7.0	9.1; 8.7
Category I Sonoran Desert Tortoise Habitat (acres)	35.2; 31.1	13.9; 9.8	35.0; 30.9	82.9; 73.3	32.6; 23.0	82.4; 72.8	93.3; 82.5	36.7; 25.9	92.8; 82.0
Wildlife Connectivity/ Corridors (acres)	136.6; 133.7	162.7; 159.8	144.4; 141.5	322.6; 315.6	384.6; 377.6	354.6; 347.5	363.3; 355.4	433.1; 425.2	398.8; 390.9

4.10.9 Additional Mitigation Measures

Although the design and construction specifications as described in Chapter 2 will help to reduce the impacts to wildlife resources, several additional mitigation measures are proposed for the SVPP to minimize impacts to wildlife resources.

- Pre-construction surveys of the ROW should be conducted by a qualified biologist. These surveys should focus on burrowing species, such as the Sonoran desert tortoise and the western burrowing owl, but additional species such as Tucson shovel-nosed snake, raptor nests, and other species identified with the potential to occur in the area would also need to be included. From the results of these pre-construction surveys, the BLM may require that a biological construction monitor also be present during the initial clearing phases to help protect wildlife from harm and/or that relocation plans be developed for any species requiring relocation from the project area.
- During design, consultation with AGFD in coordination with BLM, on wildlife mitigation designs and siting during the development of the final engineering plans and construction phases should be conducted.
- Due to the presence of designated Category I Sonoran desert tortoise habitat, a Sonoran Desert Tortoise Mitigation Plan should be developed for this project in conjunction with the BLM. This plan should follow the *Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat* (Arizona Interagency Desert Tortoise Team 2008).
- During construction, vehicle speeds within the ROW and access roads will not exceed 25 miles per hour in order to protect wildlife during construction.
- All construction personnel shall attend a wildlife awareness training conducted by a qualified biologist prior to commencement of construction activities in order to educate the construction crew of potential wildlife and how to protect the species from harm.
- To the extent practicable, design and construction should try to minimize the construction staging areas and associated impacts within the designated wildlife linkage areas. In addition, minimizing removal of vegetation during construction at washes crossings within the designated wildlife linkage areas and restoration post construction to restore cover on approaches to wildlife crossing structures should be considered to increase the overall success of wildlife using the crossing structures.
- The *Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects* (AGFD 2007b) should be followed if any tortoises are encountered during construction. Handling of tortoises will be conducted by qualified personnel to remove tortoise from harm's way.
- All ephemeral washes present within the BLM-designated Category I Sonoran desert tortoise habitat should be constructed with culverts suitable for tortoises to move under the Parkway and to help reduce potential mortality.
- During design, the Rainbow Valley ADMP (RVADMP) drainage plan and crossing structure recommendations for designated Sonora Wash Corridors within the project area should be consulted and implemented to the extent practicable.
- Due to the presence of designated Category I Sonoran desert tortoise habitat and per BLM Instructional Memorandum No. AZ-2009-010, compensation for the loss of this protected habitat must follow the 5:1 compensation ration specified in the November 1991 Compensation for the Desert Tortoise document (BLM 1991). Once an alternative is selected, then the BLM will calculate this compensatory mitigation.

- Due to the presence of designated Category I Sonoran desert tortoise habitat and two designated wildlife linkages, the selected alternative should be redesigned to include additional culvert crossings for wildlife in these areas, i.e., additional crossings will be needed outside of drainage areas to accommodate safe passage of wildlife through the area.
- Fences installed along the perimeter of the ROW should be constructed with the BLM standard mule deer wire configuration, i.e., four strands with smooth wire on the bottom.
- Signage should be placed along the Parkway, especially in the southern portions where designated wildlife linkages are present, to warn motorists to drive carefully and watch for wildlife. This may help reduce wildlife mortality. The exact locations and wording should be developed in accordance with the BLM.
- In conjunction with the BLM, a Post-Construction Wildlife Crossing Monitoring Plan should be prepared and implemented, particularly within designated wildlife corridors. The goal would be to gather data, such as road kill occurrences in terms of numbers and locations, culvert use by wildlife to assess whether the opening ratio is sufficient for wildlife, wildlife-friendly fence structure and layout effectiveness, monitoring cameras, and sign placement effectiveness. These data would then be used to assess if any additional modifications are necessary in order to reduce wildlife mortality along the Parkway and provide safer routes for wildlife across the Parkway.

4.10.10 Residual Impacts

Residual impacts would include the long-term removal of habitat for general wildlife and special-status wildlife species within the project area. These species that currently inhabit the project area would be permanently displaced into the adjacent areas. Additionally, the noise and mortality impacts would remain a possibility even with the implementation of the mitigation measures; however, these impacts should be reduced through implementation of mitigation measures. Lastly, the mitigation measures will help to provide safe passage for wildlife species across the road, but road-related barrier effects may still occur and result in reduced gene flow between some wildlife populations.

4.10.11 Short-term Uses versus Long-term Productivity

Since the paved road bed surface will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated, long-term productivity of this general wildlife and special-status wildlife species habitat will be negatively impacted. In addition, those areas that are reclaimed will have a lag in return to full productivity given that desert ecosystems can take up to 50 years to return to pre-disturbance conditions (Guo 2004; Kade and Warren 2002). Thus, the SVPP would reduce the amount of habitat available for these wildlife species and also displace wildlife individuals from habitat that has been removed or degraded. In addition, the road barrier effect to wildlife connectivity areas would affect wildlife movement patterns and potentially reduce population gene flow.

4.10.12 Irreversible and Irretrievable Commitment of Resources

Irreversible commitment of resources would include the paved road bed surface, since it will remain for an indeterminate amount of time in the future and these areas are not expected to ever be reclaimed and revegetated. Implementation of any of the action alternatives would result in 1) the irreversible and irretrievable loss of between 72.0 and 391.5 acres of general wildlife and special-status wildlife species habitat, 2) the irreversible and irretrievable loss of up to 82.5 acres of BLM-designated Category I

Sonoran desert tortoise habitat, and 3) irreversible impacts consisting of wildlife displacement, wildlife disruption, and potential mortality of wildlife utilizing the area for dispersal and movement within the region, including the designated wildlife corridors.

4.11 LANDS AND REALTY

4.11.1 Analysis Area, Approach and Assumptions

The area of analysis for analyzing direct and indirect impacts to land use resulting from the SVPP is defined as the 250-foot-wide construction ROW for all alternatives and sub-alternatives. This area of analysis was selected to account for potential direct and indirect impacts to existing land uses. Environmental consequences analyzed consider the compatibility of the alternatives with both existing and planned future land uses as well as applicable planning documents governing the use of project lands. Cumulative impacts to land use are analyzed in the Rainbow Valley area of analysis, discussed in Section 4.11.9.

It is assumed that there would be no other use of the project area except for transportation. Impacts to land uses in the area of analysis from implementation of the SVPP are discussed in terms of changes to the existing use.

4.11.2 No Action

Under the No Action Alternative, the BLM land on which the project is proposed would continue to be managed under the existing conditions. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC Section 1781(b)) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP (BLM 2012a) would continue. Current land uses in the area of analysis would continue under the No Action Alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is undeveloped land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative. As discussed in Section 3.11, current land uses in the area of analysis include dispersed outdoor recreation, agriculture, grazing, utilities, and transportation.

4.11.3 Impacts Common to all Action Alternatives

4.11.3.1 Two-, Four-, and Six-lane Parkway

Land Ownership

The implementation of any action alternative would alter only the private land ownership of the project area discussed in Section 3.11.3, Land Ownership. Approximately 80% of the project area would continue to be owned by BLM and ASLD, but the City of Goodyear would be granted a transportation-use ROW.

The private lands (approximately 20% of the project area) would be acquired by the City of Goodyear under the 1987 Uniform Relocation Assistance and Real Property Acquisitions Act. The landowners would be compensated at market value for the land that would be acquired for the ROW, as discussed in Chapter 2. All of the private land is either undeveloped desert or agricultural land. Much of the existing

agricultural and cultivated land has not been in production for many years. Some cultivation still exists. No buildings or structures would be required to be removed.

Land Use Planning

As described in Chapter 1, the area of analysis is located within federal, state, and local planning areas. Table 4-33 outlines the plans that are applicable within the area of analysis, their goals and objectives, and consistency with those plans if any of the action alternatives is implemented.

Table 4-33. Consistency of the Project Alternatives with Local Plans

Plan	Goals/Objectives/Policy	Consistency Determination
BLM Lower Sonoran Approved Resource Management Plan (RMP) Record of Decision (2012)	Recognizes "ROWs under FLPMA are authorized for highways or systems that are in the public interest" (BLM 2012a) Major linear LUAs include "primary paved roads"*	Consistent because the RMP provides opportunities for multiple land uses in the project area, including transportation ROWs.
City of Goodyear General Plan (2003) and Amendment (2007)	Recognizes the need to "provide southern vehicular access and mobility for the forecasts for growth in the West Valley, and the limited connectivity that currently exists in Western Maricopa County" (City 2007).	Consistent because the General Plan was amended to provide for Parkway, infrastructure, and services expansion in Rainbow Valley.
Maricopa County Comprehensive Plan	Developed goal of "promoting efficient land development that is well integrated with the transportation system" (Maricopa County 2002).	Consistent because the annexation of Rainbow Valley is currently not well-integrated with the transportation system; the SVPP would integrate the area into the existing transportation system.
MAG Regional Transportation Plan	Goal # 2: Access and Mobility discusses the objective of providing safety, access, and maintaining a reliable and acceptable level of service (MAG 2007c).	Consistent because the SVPP would bring the existing, unacceptable conditions into compliance with the MAG Plan.

* As defined by the Planning and Conducting Route Inventories Technical Reference Guide 9113-1 [2006].

The consistency of the project alternatives with applicable federal and local plans would be the same for all action alternatives.

A 2-year notification letter explaining the potential ramifications of the proposed SVPP to existing grazing allottees would be mailed under any alternative. Notification would be required per existing BLM grazing regulations.

Current Land Uses

The primary land use change associated with the construction of all action alternatives is the development of currently natural or undeveloped land for a two-, four-, and six-lane Parkway in the project area.

If the SVPP is authorized, the project would have to conform to the terms and conditions of previously issued ROWs in the project area. Therefore, there would be no impacts to utility corridors and other existing ROWs (see Tables 3-15 and 3-16). Existing, authorized adjacent or intersecting linear land use facilities (transmission and utility corridors) would not be impacted if any action alternative were implemented.

Other authorized land uses, such as outdoor recreation, and grazing may experience minor displacement since these activities are dispersed and not concentrated within certain areas. Table 4-34 summarizes the impacts to land uses for the project action alternatives and sub-alternatives. The No Action Alternative is analyzed in Section 4.11.2, above.

Potential effects on land use are generally associated with project construction rather than operation because once the ROW grant has been made by BLM and construction begins, no further changes to land use patterns in the project footprint are expected. Existing land uses surrounding the project area would not be precluded during the construction period. Access to all existing land uses would be maintained.

Land Tenure

Lands identified for disposal in the analysis area are typically isolated and fragmented from larger tracks of BLM-managed lands. Disposal actions usually take place in response to a request from the public, or from an application that could result in a title transfer wherein the lands leave the public domain (BLM 2012a).

The individual acreages of lands identified by the Lower Sonoran RMP as suitable for disposal that may be impacted by each action alternative are discussed below.

4.11.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.11.4.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be similar to those described under Impacts Common to all Action Alternatives except the following.

Under Alternative A, approximately 285 acres of BLM-owned land, 32 acres of ASLD land, and 158 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Alternative A, two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

All BLM lands used for the SVPP under Alternative A would be constructed within the existing EPNG multi-use utility corridor (BLM 2012a).

Under Alternative A, current and future land authorization uses described in Table 3-15 and Table 3-16 would not be precluded and replaced if Alternative A were implemented.

Table 4-34. Impacts to Land Uses from the SVPP

Affected Land Use	Impact				
	Alternative A (BLM Preferred Alternative)	**Alternative C**	**Alternative H**	**Sub-alternative F**	**Sub-alternative G (BLM Preferred Sub-alternative)**
Utility corridors (electrical transmission, oil/gas pipeline)	No anticipated impacts	No anticipated impacts	No anticipated impacts	No anticipated impacts	No anticipated impacts
Outdoor recreation (hunting, target shooting, backcountry driving, mountain biking, natural and cultural resources study, and sightseeing)	Loss of approximately 475 acres due to ROW occupation	Loss of approximately 549 acres due to ROW occupation	Loss of approximately 554 acres due to ROW occupation	Loss of approximately 97 acres due to ROW occupation	Loss of approximately 72 acres due to ROW occupation
Grazing	Loss of approximately 20 and 33 acres available for forage in the Beloat and Conley allotments, respectively, due to Parkway occupation and loss of plant productivity	Loss of approximately 48 and 13 acres available for forage in the Beloat and Conley allotments, respectively, due to Parkway occupation and loss of plant productivity	Loss of approximately 43 and 20 acres available for forage in the Beloat and Conley allotments, respectively, due to Parkway occupation and loss of plant productivity	Loss of approximately 11 acres available for forage in the Conley allotment due to Parkway occupation and loss of plant productivity	Loss of approximately 8 acres available for forage in the Conley allotment due to Parkway occupation and loss of plant productivity
Mineral entry	No impact	No impact	No impact	No impact	No impact
Residential	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development	May indirectly increase development potential of Rainbow Valley through infrastructure improvements that would enable further development
Commercial and Industrial	No impact	No impact	No impact	No impact	No impact
Airport/public/quasi-public	No impact	No impact	No impact	No impact	No impact

The Alternative A alignment would be cleared and graded when road construction begins, resulting in a land conversion from dirt road and undeveloped land to a transportation corridor. A temporary construction road would be constructed adjacent to the two-lane Parkway. Construction would preclude grazing and recreational land uses because there would be no safe access or use of the project area for these activities for the life of the project. However, the abundance of dirt roads available for recreational use and land available for grazing in the Rainbow Valley region would provide similar experiences; therefore the impact to grazing and recreational land use is minimized. Construction of the Alternative A two-lane Parkway would result in the conversion of approximately 84 acres of undeveloped land to transportation use. Construction of Alternative A would not reduce the opportunities for access to SDNM due to the current closure of all BLM routes accessible from the project area that lead into the eastern regions of SDNM.

Existing land uses surrounding Alternative A would not be directly impacted following project completion. The conversion of approximately 84 acres from undeveloped land to a Parkway would constitute a small change when compared to the expansive amount of open space and federally managed land in the surrounding region. Access to the existing land uses would be maintained during project operation.

Approximately 36.1 acres of the Alternative A two-lane Parkway would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative A that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that “All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives.”

The operation of Alternative A may have indirect impacts to current land uses if the Parkway creates land use amendments brought on by development interest.

Land Tenure

Under the Alternative A two-lane Parkway, there would be no BLM-managed lands identified as suitable for disposal within the 250-foot-wide ROW.

4.11.4.1 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative A two-lane Parkway.

Land Use Planning

The Alternative A, four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative A four-lane Parkway would result in the additional conversion of approximately 167 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 19.3 acres of the Alternative A four-lane Parkway would occur within the Lower Gila Terraces and Historic Trails ACEC. The Lower Sonoran RMP specifies that “All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives.”

Land Tenure

Under the Alternative A four-lane Parkway, there would be no BLM-managed lands identified as suitable for disposal within the 250-foot-wide ROW.

4.11.4.2 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative A two-lane Parkway.

Land Use Planning

The Alternative A, six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative A six-lane Parkway would result in the additional conversion of approximately 220 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 19.5 acres of the Alternative A six-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative A six-lane Parkway, there would be no BLM-managed lands identified as suitable for disposal within the 250-foot-wide ROW.

4.11.5 Alternative C Direct and Indirect Impacts

Alternative C's direct and indirect impacts to land use would be the same as described under Alternative A, in addition to the following impacts.

4.11.5.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Alternative C, approximately 319 acres of BLM-owned land, 57 acres of ASLD land, and 172 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Alternative C, two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

The Alternative C alignment would occupy the least amount of the existing EPNG multi-use utility corridor of all the action alternatives. As such, Alternative C would require the greatest amount of vegetation clearing and grading, since the alignment covers predominantly undeveloped land.

Construction and operation of the Alternative C two-lane Parkway would result in the conversion of 171 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 59 acres of the Alternative C two-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative C that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative C two-lane Parkway, 9.9 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.5.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative C two-lane Parkway.

Land Use Planning

The Alternative C, four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative C four-lane Parkway would result in the additional conversion of 171.1 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 33 acres of the Alternative C four-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative C four-lane Parkway, 8.5 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.5.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative C two-lane Parkway.

Land Use Planning

The Alternative C six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative C six-lane Parkway would result in the additional conversion of 131.6 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 33 acres of the Alternative C six-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative C that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative C six-lane Parkway, approximately 6.4 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.6 Alternative H Direct and Indirect Impacts

4.11.6.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Alternative H, 308.1 acres of BLM-owned land, 74.3 acres of ASLD land, and 171.5 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Alternative H two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative H two-lane Parkway would result in the conversion of 241.4 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 39 acres of the Alternative H two-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative H that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative H two-lane Parkway, 11.6 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.6.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative H two-lane Parkway.

Land Use Planning

The Alternative H four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative H four-lane Parkway would result in the additional conversion of 132.9 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 26 acres of the Alternative H four-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative H that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative H four-lane Parkway, 8.9 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.6.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Alternative H two-lane Parkway.

Land Use Planning

The Alternative H six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Alternative H six-lane Parkway would result in the additional conversion of 132.9 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Approximately 23 acres of the Alternative H six-lane alignment would occur within the Lower Gila Terraces and Historic Trails ACEC; however, all areas of Alternative H that occur within the ACEC would be located on private land. The Lower Sonoran RMP specifies that "All LUAs…would be avoided, mitigated, and otherwise managed to be consistent with management objectives."

Land Tenure

Under the Alternative H six-lane Parkway, approximately 7 acres of BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.7 Sub-alternative F Direct and Indirect Impacts

4.11.7.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Sub-alternative F, 2 acres of BLM-owned land and 95 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Sub-alternative F two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives. Sub-alternative F would occur within the Lower Gila Terraces and Historic Trails ACEC wholly on private lands.

Current Land Uses

Construction and operation of the Sub-alternative F two-lane Parkway would result in the conversion of approximately 42.6 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative F two-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.7.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative F two-lane Parkway.

Land Use Planning

The Sub-alternative F four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative F four-lane Parkway would result in the additional conversion of 23.2 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative F four-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.7.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative F two-lane Parkway.

Land Use Planning

The Sub-alternative F six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative F six-lane Parkway would result in the additional conversion of 23.22 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative F six-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.11.8.1 Two-lane Parkway

Land Ownership

Impacts to land ownership would be the similar as described under Impacts Common to all Action Alternatives except the following.

Under Sub-alternative G, approximately 72 acres of private land would be used for the two-lane SVPP.

Land Use Planning

The Sub-alternative G two-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives. Sub-alternative G would occur within the Lower Gila Terraces and Historic Trails ACEC wholly on private lands.

Current Land Uses

Construction and operation of the Sub-alternative G two-lane Parkway would result in the conversion of 31.7 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative G two-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.8.2 Four-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative G two-lane Parkway.

Land Use Planning

The Sub-alternative G four-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative G four-lane Parkway would result in the additional conversion of 17.3 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative G four-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.8.3 Six-lane Parkway

Land Ownership

Impacts to land ownership would be the same as described under the Sub-alternative G two-lane Parkway.

Land Use Planning

The Sub-alternative G six-lane Parkway would be consistent with local land use planning, as described above under Impacts Common to all Action Alternatives.

Current Land Uses

Construction and operation of the Sub-alternative G six-lane Parkway would result in the additional conversion of 17.3 acres of undeveloped land to transportation use. No existing or future LUAs would be impacted.

Land Tenure

Under the Sub-alternative G six-lane Parkway, no BLM-managed lands identified as suitable for disposal would be included within the 250-foot-wide ROW.

4.11.9 Additional Mitigation Measures

No additional mitigation measures are suggested.

4.11.10 Residual Impacts

Because no additional mitigation measures are suggested, residual impacts to land use would be the same as discussed under all action alternatives.

4.11.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, the project area lands would be converted from their existing respective land uses (i.e., grazing, agriculture, dispersed recreation) to a transportation-based land use. The current productivity of the project area (i.e., within the 250-foot-wide ROW) for grazing, agriculture, and dispersed recreation would be unavailable for as long as the Parkway exists. Although there would be a loss in the capability of the project area to provide for (produce) grazing, agriculture, recreation, and utilities, the new transportation land use would provide safe transportation for residents, emergency services, and infrastructure maintenance.

4.11.12 Irreversible and Irretrievable Commitment of Resources

There would be an irreversible and irretrievable loss of approximately 220 to 392 acres of grazing, agricultural, and recreational land uses if the SVPP were implemented, due to the presence of a paved Parkway.

4.12 LIVESTOCK GRAZING

4.12.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to grazing management resulting from the SVPP are analyzed within the 250-foot-wide project ROW, as well as areas of allotments that would be separated by the SVPP. This area of analysis was selected to account for potential direct and indirect impacts to existing grazing management. Environmental consequences analyzed consider the compatibility of the alternatives with both existing grazing management and applicable planning documents governing the livestock grazing use of project lands. Cumulative impacts to grazing management are analyzed in the Beloat and Conley grazing allotments, discussed in Section 4.12.9. Impacts to grazing management will be determined by changes to the acres of forage available for livestock grazing and changes to livestock movement and/or access to the allotments, brought on by the implementation of the Proposed Action and/or the alternatives and sub-alternatives.

It is assumed that there would be no other use of the project area except for transportation. Impacts to grazing management in the area of analysis from the implementation of the SVPP are discussed in terms of changes to the existing use. BLM and ADOT road inventories were used to identify potential road crossings that would require cattle guards should the Proposed Action or other action alternatives be selected. Some existing roadways may not be identified in these inventories, such as illegal or user-created roads.

4.12.2 No Action

Under the No Action Alternative, the BLM land on which the project is proposed would continue to be managed under the existing conditions. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC 1781(b)) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP (BLM 2012a) would continue. Current grazing management in the area of analysis would continue under the No Action Alternative; there would be no loss of grazing access to or acres of forage available for grazing on either of the allotments and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is vacant land. Land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative. As discussed in Section 3.12, authorized grazing would continue on the Beloat and Conley grazing allotments in the project area.

4.12.3 Impacts Common to all Action Alternatives

The Proposed Action and action alternatives would effectively bisect the Beloat grazing allotment from the northwest to the southeast. Cattle would not be able to cross east to west or west to east as they currently are able to do. Cattle would not be able to freely cross the Parkway to the north because of Article 7-4 of the city code of the City of Goodyear, which prohibits animals roaming at large north of Patterson Avenue. Although the overall reduction of acres of grazing land is relatively small compared to the overall grazing allotment size, grazing productivity would decrease due to the inability of cattle to reach facilities such as reservoirs, stock tanks, corrals, and troughs on the opposite side of the Parkway. Because the Proposed Action and action alternative alignments are different, the number of facilities that would be located on either the east or west side of the Parkway would vary for each alternative, as described below. Livestock movement would also be restricted on the Conley alignment, albeit to a lesser extent since cattle currently do not travel north-south across SR 238.

The introduction of traffic associated with the construction and operation of the SVPP would increase the risk of injury or death to individual cattle through vehicle strikes, if cattle are grazing in the area. Fencing and cattle guards applied during construction and operation of the SVPP would help minimize hazards to cattle grazing near these portions of the allotments.

Because the 250-foot-wide project ROW would be the same for the two-, four-, or six-lane Parkway, the acreage of grazing allotments impacted by implementing the SVPP would be the same as described under the direct and indirect impacts of each alternative and sub-alternative. The proposed alignments of the action alternatives and sub-alternatives are not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. Though existing fencing alignments are not anticipated to change, the addition of the ROW fencing will effectuate new fencing alignments on both sides of the ROW. The number of access roads and fence lines crossed by the alternative Parkway alignments would be the same as described under the direct and indirect impacts for each alternative and sub-alternative as well.

4.12.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.12.4.1 Grazing allotments

Under Alternative A, the BLM Preferred Alternative, site preparation would include the clearing of some natural vegetation from the project area. Because some vegetation would be removed and the area would be fenced, livestock would no longer be able to graze from vegetation communities associated with the SVPP project area. The total operational footprint of Alternative A would be 53.2 acres removed from livestock grazing as a result of fencing and grading the area. Specifically, 33.2 acres (0.002% of the total allotment acreage of 174,080 acres) of the Beloat allotment would be removed from livestock grazing use for the life of the SVPP. Twenty acres of the Conley allotment (0.002% of the total allotment acreage of 116,234 acres) would also be removed from livestock grazing use for the life of the SVPP. Implementation of Alternative A would slightly reduce the amount of acres of forage available for livestock grazing.

4.12.4.2 Livestock Movement

The proposed alignment of the SVPP under Alternative A is not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. The proposed alignment under Alternative A would cross 11 access roads identified in the BLM road inventory and seven roads identified in the ADOT road inventory; these roads are typically two-track access roads to a cattle tank or a pipeline. Where the SVPP is proposed to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access.

As illustrated on Figure 3-17, three existing unfenced reservoirs, four fenced reservoirs, one well, and one corral would be located on the west side of the Parkway. Three existing unfenced reservoirs, three fenced reservoirs, six wells, one storage tank, and four corrals would be located on the east side of the Parkway.

4.12.5 Alternative C Direct and Indirect Impacts

Direct and indirect impacts to livestock grazing under Alternative C would be largely the same as under Alternative A, except as described below.

4.12.5.1 Grazing Allotments

The operational footprint of Alternative C would be 61.4 acres, which is 8.2 acres more than Alternative A. Alternative C would reduce acres available for grazing by 48.1 acres (0.002%) and 13.3 acres (0.001%) in the Beloat allotment and Conley allotment, respectively.

Unmitigated, BLM lands available for grazing included in the Conley allotment west of the Alternative C alignment would be lost (approximately 712 acres) since the Alternative C alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 1% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.

4.12.5.2 Livestock Movement

The proposed alignment under Alternative C would cross 29 roads identified in the BLM road inventory and nine roads identified in the ADOT road inventory. Where the SVPP is proposed to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access. As stated above, unmitigated, BLM lands available for grazing included in the Conley allotment west of the Alternative C alignment would be lost (approximately 712 acres) since the Alternative C alignment would sever the ability for livestock to move in and out of the existing pasture at this location. The loss of livestock movement ability would be a long-term, adverse impact.

As illustrated on Figure 3-17, three existing unfenced reservoirs, four fenced reservoirs, one well, and one corral would be located on the west side of the Parkway. Three existing unfenced reservoirs, three fenced reservoirs, six wells, one storage tank, and four corrals would be located on the east side of the Parkway.

4.12.6 Alternative H Direct and Indirect Impacts

Direct and indirect impacts to livestock grazing under Alternative H would be largely the same as under Alternative A, except as described below.

4.12.6.1 Grazing Allotments

The operational footprint of Alternative H would be 62.1 acres, which is 8.9 acres more than Alternative A. Alternative H would reduce acres available for grazing by of 42.5 acres (0.002%) and 19.6 acres (0.001%) in the Beloat allotment and Conley allotment, respectively.

4.12.6.2 Livestock Movement

The proposed alignment under Alternative H would cross 21 roads identified in the BLM road inventory and 10 roads identified in the ADOT road inventory. Where the SVPP is proposed to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access.

As illustrated on Figure 3-17, four unfenced reservoirs, five fenced reservoirs, one well, one storage tank, and two corrals would be located on the west side of the Parkway. One unfenced reservoir, two fenced reservoirs, six wells, and three corrals would be located on the east side of the Parkway.

4.12.7 Sub-alternative F Direct and Indirect Impacts

4.12.7.1 Grazing Allotments

The operational footprint of Sub-alternative F would be 10.8 acres wholly in the Conley allotment. This represents a reduction 0.001% of grazing land in the Conley allotment. Unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative F alignment would be lost (approximately 320 acres) since the Sub-alternative F alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 0.5% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.

4.12.7.2 Livestock Movement

The proposed alignment of the SVPP under Sub-alternative F is not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. The proposed alignment under Sub-alternative F would cross one road identified in the BLM road inventory and four roads identified in the ADOT road inventory. Where the SVPP proposes to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access. As stated above, unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative F alignment would be lost (approximately 320 acres) since the Sub-alternative F alignment would prevent livestock from moving in and out of the existing pasture at this location. The loss of livestock movement ability would be a long-term, adverse impact.

4.12.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.12.8.1 Grazing Allotments

The operational footprint of Sub-alternative G would be 8.5 acres. This represents a reduction of 8.1 acres (0.001%) in the Conley allotment. Unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative G alignment would be lost (approximately 320 acres) since the Sub-alternative G alignment would sever the existing pasture at this location. Since there are no existing livestock waters in this area, the pasture could not be used for forage. This represents less than 0.5% of the total BLM lands within the Conley allotment (91,018 acres). The loss of forage would be a long-term, adverse impact.

4.12.8.2 Livestock Movement

The proposed alignment of the SVPP under Sub-alternative G is not expected to affect current fencing alignments within either of the grazing allotments; however, if the Parkway alignment goes through a fence, BLM and the City will work with the grazing allottee to determine methods to minimize impacts to the allotment. The proposed alignment under Sub-alternative G would cross three roads identified in the BLM road inventory and three roads identified in the ADOT road inventory. Where the SVPP proposes to cross these access roads, a cattle guard or gate must be installed, depending on the amount of traffic for each access, in order to keep cattle off the road while allowing grazing permittee and public user access. As stated above, unmitigated, BLM lands available for grazing included in the Conley allotment west of the Sub-alternative G alignment would be lost (approximately 320 acres) since the Sub-alternative G alignment would prevent livestock from moving in and out of the existing pasture at this location. The loss of livestock movement ability would be a long-term, adverse impact.

4.12.9 Additional Mitigation Measures

The following additional mitigation measures are suggested under all action alternatives and sub-alternatives:

- The entire ROW will be fenced with standard ROW barbed-wire fencing (as approved by BLM).

- The City of Goodyear shall reimburse the grazing permittee for the forage lost over a 50-year period, at the going rate per AUM. The amount of reimbursement depends upon the alternative selected.
- Cattle guards would be installed at the following locations/intersections for the Beloat allotment:
    - Rainbow Valley Road and Germann Road on the east side
    - Rainbow Valley Road and Queen Creek Road on both sides
    - Rainbow Valley Road and Ocotillo Road on both sides
    - Rainbow Valley Road and Riggs Road on both sides

The following additional mitigation measures are suggested if Alternative A, the BLM Preferred Alternative, is implemented:

- Any wildlife crossing intended for large mammals would be compatible for livestock.
- Gates would be installed at the following locations/intersections for the Beloat allotment:
    - Alternative A alignment and Patterson Road
    - Alternative A alignment and Bullard Avenue
    - Between the Patterson Road and Bullard Avenue gates on the east side
    - Near the intersection of the Alternative A alignment and the southern allotment boundary fence

The following additional mitigation measures are suggested if Alternative C is implemented:

- Any wildlife crossing intended for large mammals would be compatible for livestock.
- Relocate or compensate the Beloat allottee for shipping pens, Ranch Headquarters, corrals, well, dirt tanks, and pasture fence that would be lost.
- Provide livestock water at South Well on both sides of alignment for the Beloat allotment.
- Provide livestock water at Yonker Tank on both sides of alignment for the Beloat allotment.
- Gates would be installed at the following locations/intersections for the Beloat allotment:
    - Alternative C alignment and Patterson Road
    - Alternative C alignment at Yonker tank
    - Alternative C north and south of South Well

4.12.10 Residual Impacts

Residual impacts would include the permanent loss of access to forage within the proposed ROW and a change in cattle foraging habits where pasture boundaries and pathways to water sources are reconfigured (because water is a limiting factor on cattle movement). In addition, cattle foraging habits may be permanently altered by reconfigured pasture boundaries. This is because the grazing process is influenced by livestock's diet selection and the animals' physiological needs such as water or thermal regulation (e.g., shade) (Heitschmidt and Stuth 1991). The localized impact of grazing on vegetation and soils (i.e., livestock foraging) tends to dissipate with distance from points of concentration such as water

(Washington-Allen et al. 2004). Livestock would likely forage outward from reconfigured pasture boundaries, which would change the pattern of previous foraging and pathways to water sources.

Fencing of the proposed ROW would reduce the likelihood of impacts to cattle from vehicle strikes. Under all action alternatives and sub-alternatives, even with application of mitigation measures proposed in Section 3.12.9, the existing Beloat and Conley allotments would be reduced in size to accommodate the proposed SVPP.

4.12.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, construction and operation of the SVPP would affect the long-term vegetation productivity of the project area via vegetation removal. The land with the 250-foot-wide ROW, as well as any isolated portions of the allotment that the alternative may create, would be unavailable for grazing for as long as the Parkway exists. Although there would be a loss in the capability of the project area to provide for (produce) grazing, the new transportation land use would provide safe transportation for residents, emergency services, and infrastructure maintenance.

4.12.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of grazing land uses if the SVPP were implemented, due to the presence of a paved Parkway.

There be irreversible commitments to grazing management resources, because these areas are not expected to ever be reclaimed and revegetated; thus long-term productivity of grazing management will be negatively impacted. Implementation of any of the action alternatives would result in the irreversible and irretrievable loss of between 72 and 391.5 acres of allotments available for livestock grazing, and irreversible impacts consisting of livestock displacement and livestock disruption. Due to the direct, indirect, and cumulative impacts associated with the SVPP and the reasonably foreseeable actions associated with community development in the Goodyear, Mobile, and Maricopa areas, this project may cause an irreversible commitment of grazing resources through an irretrievable loss of land and available forage for livestock grazing.

4.13 RECREATION MANAGEMENT

4.13.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to recreation resulting from the SVPP are analyzed within the Rainbow Valley, including within the 250-foot-wide ROW. This area of analysis was selected to account for potential direct and indirect impacts to existing recreational conditions occurring within the 250-foot-wide ROW. Environmental effects analyzed consider the compatibility of the alternatives with existing recreation activities and settings governing the various types of recreational use of project lands. Impacts to recreation will be determined by potential changes to the type of recreational activities, the settings needed to support those activities, and desired recreational experience, brought on by the implementation of any of the project alternatives.

Cumulative impacts to recreation are analyzed in the Rainbow Valley area of analysis, discussed in Section 4.19.12.

The analysis area is any topographic point located in the adjacent recreation areas described in Section 3.13, Recreation Management. To assess changes to recreation opportunities resulting from the implementation of the SVPP, this analysis also utilizes information from the Visual Resources and Noise sections.

It is assumed for this analysis that the greater the degree of contrast, the more visible the SVPP will be on the landscape, and the greater the impact to the recreational activities, settings, and experiences. See Section 4.7 (Visual Resources) for more detailed information on visual resources analysis methodologies and results.

It is assumed that there would be no other use of the project area except for transportation. Impacts to recreation in the project area from implementation of the SVPP are discussed in terms of potential losses to the recreation experiences, settings, and opportunities that currently exist within the 250-foot-wide ROW.

4.13.2 No Action

Under the No Action Alternative, the BLM land on which the project is proposed would continue to be managed under the existing conditions. BLM's framework for a program of multiple use and sustained yield would continue within the project area. The maintenance of environmental quality of public lands (43 USC Section 1781(b)) in conformance with applicable statutes, regulations, and the Lower Sonoran RMP (BLM 2012a) would continue. Current recreational use and opportunities in the area of analysis described in Section 3.13 would continue under the No Action Alternative, and the project area would be available to other uses that are consistent with the Lower Sonoran RMP.

Much of the project area is undeveloped land. Land in the immediate vicinity of the project area would remain primarily open desert under the No Action Alternative. As discussed in Section 3.13, current recreational uses in the area of analysis include OHV driving, hunting, hiking, wildlife viewing, horseback riding, target shooting, camping, mountain biking, geocaching, picnicking, night-sky viewing, scenic driving, and photography.

4.13.3 Impacts Common to all Action Alternatives

4.13.3.1 Two-, Four-, and Six-lane Parkway

For some recreationists, the presence of and noise from construction equipment and its associated activities would detract from the recreation opportunity, experience, and setting. For others, the presence of equipment and construction activities would not detract from the recreation opportunity, experience and setting because it may attract interest.

All action alternatives would result in a direct loss of recreational settings and opportunities in the project area such as hunting, target shooting, OHV driving, and camping. These activities would be replaced by the single use of a transportation corridor (Parkway). Recreational use of the land in the project area during the lifespan of the SVPP ROW grant would be precluded.

In the areas designated for construction staging, safety zones would be established by fencing. These zones would preclude the area for hiking or other dispersed recreational activities currently occurring along the alignment.

Opportunities for dispersed recreation in the adjacent areas would be interrupted during construction of the SVPP due to changes in patterns of access caused by construction traffic. Increases in vehicular traffic on the roads and along utility corridors would deter or delay some recreationists from the area due to safety concerns, noise, and traffic congestion.

Noise from construction and operation of the SVPP is not likely to directly affect the visitor's experience in surrounding recreational areas, including the North Maricopa Mountains Wilderness and the Sierra Estrella Wilderness, SDNM, Buckeye Hills Regional Park, and Estrella Mountain Regional Park. The loudness and character of this noise, the times of day or night at which it is produced, and the proximity of the SVPP to noise-sensitive locations would diminish the natural quiet needed to support the recreational experience for a typical visitor seeking solitude. However, as visitors venture deeper into adjacent recreation areas and further from the project area, this noise intrusion would lessen and eventually cease. The effect on individual visitors would vary, depending on their desired recreation activity and experience and tolerance to the intrusion (refer to Section 4.16, Noise).

Although the operation and presence of a new Parkway in a previously inaccessible-to-passenger-vehicles area may attract some recreational users (sightseeing, wildlife viewing, and driving for pleasure), those seeking the common features for dispersed recreation opportunities would see change to the existing landscape resulting from the SVPP as a substantial modification. Public land would be available in the immediate vicinity for activities such as picnicking, OHV driving, wildlife viewing, interpretive use, vehicle camping, and other dispersed recreation activities; therefore these activities could continue in the analysis area and would offset the direct loss of land available for dispersed recreation. Indirect adverse impacts would occur to users in adjacent areas (e.g., SDNM) who seek opportunities for solitude or seek the limited light pollution required for recreation experiences such as night-sky viewing (BLM 2012b).

4.13.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.13.4.1 Two-lane Parkway

The removal of vegetation and construction of the SVPP in the project area would have an indirect impact on adjacent recreational users in the analysis area (e.g., users in SDNM) by altering the quality of the recreational setting on 474.8 acres. No impacts would occur to the recreation setting or opportunities in the lands managed by Maricopa County Parks and Recreation Department.

Under the Alternative A two-lane Parkway, approximately 84 acres would be lost to accommodate the operation and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation in the analysis area (public lands not designated as RMAs) by 0.36%, a negligible reduction.

4.13.4.2 Four-lane Parkway

Under the Alternative A four-lane Parkway, an additional approximately 167 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.03%, a negligible reduction.

4.13.4.3 Six-lane Parkway

Under the Alternative A six-lane Parkway, an additional approximately 220 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of

lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.5 Alternative C Direct and Indirect Impacts

4.13.5.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Alternative C two-lane Parkway, approximately 97 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.04%, a negligible reduction.

4.13.5.2 Four-lane Parkway

Under the Alternative C four-lane Parkway, approximately 193 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.03%, a negligible reduction.

4.13.5.3 Six-lane Parkway

Under the Alternative C six-lane Parkway, approximately 255 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.6 Alternative H Direct and Indirect Impacts

4.13.6.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Alternative H two-lane Parkway, approximately 98 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.04%, a negligible reduction.

4.13.6.2 Four-lane Parkway

Under the Alternative H four-lane Parkway, approximately 195 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.6.3 Six-lane Parkway

Under the Alternative H six-lane Parkway, approximately 391 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by 0.02%, a negligible reduction.

4.13.7 Sub-alternative F Direct and Indirect Impacts

4.13.7.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Sub-alternative F two-lane Parkway, approximately 17 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.7.2 Four-lane Parkway

Under the Sub-alternative F four-lane Parkway, approximately 34 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.7.3 Six-lane Parkway

Under the Sub-alternative F six-lane Parkway, approximately 97 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.13.8.1 Two-lane Parkway

Impacts to recreation experience, settings, and opportunities from the construction and operation of the SVPP would be the same as described for Alternative A except as described below.

Under the Sub-alternative G two-lane Parkway, approximately 13 acres of BLM land would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.8.2 Four-lane Parkway

Under the Sub-alternative G four-lane Parkway, approximately 25 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.8.3 Six-lane Parkway

Under the Sub-alternative G six-lane Parkway, approximately 72 acres would be lost to accommodate the construction, operation, and maintenance of the SVPP. This would reduce the size of lands available for dispersed recreation (public lands not designated as RMAs) by less than 0.01%, a negligible reduction.

4.13.9 Additional Mitigation Measures

When the initial two-lane highway is complete, the City would install permanent fencing and crossings, in accordance with BLM stipulations, as stated in Chapter 2. Mitigation measures discussed in Section 4.16 Noise, would also mitigate impacts to the recreation setting. Similarly, mitigation discussed in Section 4.2, Air Resources would mitigate impacts to the recreation setting.

The following mitigation measure would be implemented to reduce impacts to recreation during construction of the SVPP:

- Traffic control measures would be implemented on existing access roads adjacent to the project area during construction to direct traffic and ensure safe and continual access to the adjacent public lands.

4.13.10 Residual Impacts

Utilization of traffic control measures in areas where construction of the SVPP is adjacent to existing roads would reduce the risk of vehicle accidents and congestion and ensure continued access to recreation settings and opportunities on adjacent public and private lands during construction of the SVPP. Maintenance of access would ensure continued availability of public lands for recreation uses. Existing access to the public lands would continue.

There would be no further mitigation measures for recreation. Therefore, the remaining impacts would be the same as discussed under the alternatives.

4.13.11 Short-term Uses versus Long-term Productivity

Construction and operation of the SVPP would result in use of land for transportation rather than BLM's multi-use mandate, including recreation. Implementation of the project would eliminate recreational access and activities in the project area in three primary ways: elimination of access to dispersed recreation on between 84 to 98 acres during construction of the two-lane Parkway, elimination of access to dispersed recreation on between 167 to 195 acres during construction of the four-lane Parkway, and elimination of access to dispersed recreation on between 220 to 392 acres during construction of the six-lane Parkway. The elimination of access to dispersed recreation would result in long-term changes to dispersed recreation including hunting, target shooting, and motorized vehicle use patterns. Implementation of the SVPP would limit these types of desired recreational experiences at the project area.

4.13.12 Irreversible and Irretrievable Commitment of Resources

There would be irretrievable commitment of recreation resources because construction and operation of the SVPP would alter the scenery to a more developed setting, as viewed from within the adjacent recreation areas. This alteration would not be irreversible since the developed setting could someday be reclaimed to the current condition, though unlikely. There are no immediate plans with regards to the life of the SVPP and any subsequent reclamation plans, since the ROW permit would be permanent. Reclamation plans, if any, would be specified by the BLM in the terms of the ROW permit. If the SVPP were reclaimed, it could take many years before the SVPP footprint is no longer visible. This would be an

irretrievable change to the recreation setting and could result in the displacement of recreation users or alteration of their experiences and/or activities.

4.14 TRAVEL MANAGEMENT

4.14.1 Analysis Area, Approach and Assumptions

The area of analysis for travel management is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing travel management, when assessed in combination with the project and other cumulative actions, would be impacted if the SVPP were implemented. In this analysis, Rainbow Valley is defined as the Waterman Wash and Rainbow Wash watersheds, bounded generally by the Buckeye Hills and Gila River to the north, the Sierra Estrella Mountains to the east, and the Maricopa Mountains to the south and west. The analysis does not include an analysis of projected level of service and traffic volumes for the proposed SVPP. LOS and traffic volume of the current pipeline road is unavailable.

4.14.2 No Action

Under the No Action Alternative, the SVPP would not be developed, and the existing transportation and traffic patterns and infrastructure in and around the project area would remain unchanged. Generally, the project area and ROW are relatively inaccessible. Commuters to and from the greater Phoenix area are limited in viable options such as SR 238 to SR 347 (Maricopa Road) to I-10; or SR 85 to I-10. Recent population growth has resulted in increased traffic volumes that have significantly reduced the level of service on these existing roadways.

4.14.3 Impacts Common to all Action Alternatives

4.14.3.1 Two-lane Parkway

The addition of two lanes would provide access to/from southern Goodyear to Mobile and the Sonoran Valley. A new road would result in reduced traffic volumes on SR 238, SR 347 to I-10, and SR 85 to I-10. Change in level of service on these roads is not quantified in this analysis. However, the two-lane Parkway capacity would accommodate approximately 24,000 vehicles per day. In addition, construction of the two-lane Parkway is, in part, intended to relieve future increases in traffic volume due to residential and commercial development within the Sonoran Valley area and region.

Where the two-lane Parkway intersects existing BLM roads, existing legal public access would be retained. A gate or cattle guard would be installed at each BLM road intersection, washes that are identified as BLM roads notwithstanding.

4.14.3.2 Four-lane Parkway

The addition of four lanes would provide additional access to/from southern Goodyear to Mobile and the Sonoran Valley. Four lanes would result in additional reduction in traffic volumes on SR 238, SR 347 to I-10, and SR 85 to I-10. Change in level of service on these roads is not quantified in this analysis. However, operation of the four-lane Parkway would generally relieve future increases in traffic volume on the Sonoran Valley Parkway due to residential and commercial development within the Sonoran

Valley area and region. The four-lane Parkway capacity would accommodate approximately 48,000 vehicles per day.

Where the four-lane Parkway intersects existing BLM roads, existing legal public access would be retained. A gate or cattle guard would be installed at each BLM road intersection, washes that are identified as BLM roads notwithstanding.

4.14.3.3 Six-lane Parkway

The addition of six lanes represents build-out conditions of the Parkway and would provide additional vehicular access to/from southern Goodyear to Mobile and the Sonoran Valley. Six lanes would result in additional reduction in traffic volumes on SR 238, SR 347 to I-10, and SR 85 to I-10. Change in level of service on these roads is not quantified in this analysis. However, operation of the six-lane Parkway would generally relieve future increases in traffic volume on the Sonoran Valley Parkway due to residential and commercial development within the Sonoran Valley area and region. The six-lane Parkway capacity would accommodate approximately 72,000 vehicles per day.

Where the six-lane Parkway intersects existing BLM roads, existing legal public access would be retained. A gate or cattle guard would be installed at each BLM road intersection, washes that are identified as BLM roads notwithstanding.

4.14.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.4.1 State Highways

Alternative A would connect with SR 238 just west of 99th Avenue near the Mobile Elementary School (see Figure 3-24). During construction, traffic volume would increase along SR 238. At the peak of construction, construction-related vehicles would be commuting to and from the project area on a daily basis, and additional construction trucks per day would be making trips to and from the site. Once in operation, the proposed Parkway under Alternative A may continue to impact traffic volume on SR 238 as it is expected to increase from existing conditions as a result of greater access to the highway from the proposed Parkway (City 2006). However, traffic using SR 238 to make a connection to southern Goodyear or Mobile would likely be reduced, because the Parkway would now provide an alternative road, and a more direct route.

4.14.4.2 Maricopa County Roads

As previously stated in Section 3.14, the project area is located amongst a crudely developed network of existing county roads. Alternative A does not intersect most of these roads, with the exception of Riggs and Rainbow Valley Roads. Approximately 2.5 miles of Maricopa County roads would be upgraded for use for Alternative A as it would start at Riggs Road and head south along Rainbow Valley Road. Under this alternative, parts of Rainbow Valley Road also would be upgraded for use in the Parkway. During construction, access would be maintained for the public, however there may be temporary delays caused by construction-related traffic. Once the proposed Parkway is in operation under Alternative A, the use of

these roads would provide beneficial long-term impacts to motorists and residents in the area as access to and from Rainbow Valley would be greatly improved during operation.

4.14.4.3 BLM Roads

Under Alternative A, approximately 9 miles of the proposed Parkway would be located on BLM-administered lands (comprising 284 acres within the 250-foot-wide ROW and 1.4 acres in a temporary construction easement). During operation, the use of these roads for the proposed Parkway under Alternative A would provide beneficial long-term impacts to motorists and residents, as access to and from the area would be greatly improved during operation. Apart from short-term construction delays, the unpaved BLM roads would experience very little impact from the construction and operation of Alternative A.

The Alternative A alignment would provide mechanisms for BLM to control illegal OHV driving into the SDNM from the SVPP, primarily through the construction and maintenance of ROW fencing. Final design of the proposed Parkway would include design features for ROW fencing, curbing, and/or other vehicle barriers.

4.14.4.4 Utility Company Roads

As previously stated in Section 3.11, there is currently no direct, paved road link between the vicinity of Mobile and central Goodyear. As a result, some residents of Mobile, as well as others from outside of the community, have been using the unpaved EPNG pipeline maintenance road and Transwestern Pipeline and El Paso Transmission access roads to travel to and from Mobile as well as the greater Phoenix metropolitan area. Though this road is not currently gated or restrictive of public access, use of this road for the general public is discouraged for safety reasons. During construction, it is likely that motorists would continue to use the utility company roads while the proposed Parkway is constructed. Construction-related traffic is unlikely to affect these roads. Because Alternative A would parallel the EPNG pipeline maintenance road for approximately 10.4 miles, during operation, motorists would be less likely to continue using the unpaved utility road. This would serve to alleviate any safety concerns and significantly reduce continuing degradation of the EPNG pipeline maintenance road.

4.14.4.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Alternative A.

4.14.4.6 Highways and Road Usage

Alternative A totals 15.7 miles, starting at Riggs Road at the north end, running south for approximately 2.5 miles along Rainbow Valley Road, then heading southeast roughly paralleling the EPNG pipeline maintenance road for 10.4 miles. The proposed Parkway under Alternative A would also allow for a direct paved road link between the vicinity of Mobile and central Goodyear, which would likely increase use of SR 238 and other adjacent roads that provide connection to/from the proposed Parkway. The ease of access to view the open desert and SDNM from the Parkway could increase the likelihood of driving for pleasure and/or casual exploration.

4.14.4.7 Traffic Volume

During construction, traffic volume within the project area, including SR 238, would increase slightly as a result of construction-related traffic. During operation, under Alternative A, traffic volume along SR 238,

as a result of the proposed Parkway, would continue to increase from those commuting to and from the greater Phoenix area (City 2006). Exact calculations of traffic volume changes are not available at this time. However, it is assumed that construction of the Parkway would provide increased access where it does not exist at the present; thus, increased traffic volumes would be assumed for adjacent connections to the Parkway as traffic use would be both local (accessing the Sonoran Valley) and regional (making a connection to other roadways).

4.14.4.8 Access

Access to the proposed Parkway from the north would be from Riggs Road to Rainbow Valley Road. From the south, access routes to the Parkway would be through SR 283. As previously mentioned, this would eliminate access to part of an authorized county route, Rainbow Valley Road, within the project's footprint. However, although there is minimal use of county roads under Alternative A, construction of the proposed Parkway would not greatly affect access to dispersed recreation in the area on BLM-administered lands as access would be maintained at all times. There may be construction-related traffic delays, particularly on sparsely used BLM roads that provide legal access to the SDNM, however these delays would be short-term.

During operations, improved access would serve as a beneficial long-term impact for residents of Goodyear, Mobile, and Maricopa. Such improved access would provide faster response times for emergency, police, and fire vehicles to access the area. As previously mentioned, existing legal public access would be retained.

4.14.4.9 Two-lane Parkway

The two-lane Parkway scenario for Alternative A would span 15.7 miles and provide a Parkway connection from southern Goodyear to Mobile. Construction would require a temporary easement of 1.4 acres as well as temporary disturbance of 39.4 acres as the two-lane Parkway is built. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth.

4.14.4.10 Four-lane Parkway

The four-lane Parkway scenario for Alternative A would span the same length as the two-lane Parkway scenario and would provide the same accessibility. Construction staging would require the same amount of temporary, short-term disturbance but staging and construction would occur in a different area within the ROW. Long-term impacts of the four-lane Parkway would be similar to the two-lane Parkway, however the four-lane Parkway would provide additional capacity and would accommodate added vehicular traffic.

4.14.4.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative A would span the same length as the two-lane and four-lane Parkway scenarios and would provide the same accessibility. Construction staging would require the same amount of temporary, short-term disturbance but staging and construction would occur in a different area within the ROW. Long-term impacts of the six-lane Parkway would be similar to the two-lane and four-lane Parkway scenarios; however the six-lane Parkway would provide additional capacity and would accommodate added vehicular traffic.

4.14.5 Alternative C Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.5.1 State Highways

Under Alternative C, impacts to SR 238 would be the same as Alternative A.

4.14.5.2 Maricopa County Roads

Alternative C would have the greatest impact on county roads as approximately 8.8 miles of county roads would be converted to Parkway under this alternative, including parts of Rainbow Valley and Patterson Roads, and Bullard Avenue. Construction of Alternative C may have adverse short-term impacts on residents living along Patterson Road due to construction-related traffic delays. However, access to these roads would be maintained at all times. During operation, the use of county roads would provide long-term benefits to residents as emergency response vehicles and utility-related traffic would have better access to this area.

4.14.5.3 BLM Roads

Under Alternative C, a total of 18.1 miles of the proposed Parkway would be located on BLM-administered lands (comprising 548.5 acres within the 250-foot-wide ROW, with 319.4 acres being BLM-administered, and 1.4 acres in a temporary construction easement). This would amount to an increase of 34.8 acres on BLM lands from Alternative A. In addition, temporary impacts from construction of the proposed Parkway would be 45.4 acres (6 acres more than Alternative A). Impacts to unpaved BLM roads would be the same as described under Alternative A.

4.14.5.4 Utility Company Roads

Alternative C follows a different alignment that does not parallel the existing unpaved EPNG pipeline maintenance road (as opposed to Alternative A). Alternative C would not follow existing utility company roads.

4.14.5.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Alternative C.

4.14.5.6 Highways and Road Usage

Alternative C measures 18.1 miles, starting at Riggs Road at the north end, running south for approximately 1.8 miles along Rainbow Valley Road, heading directly east along Patterson Road for approximately 4 miles, then south along the Bullard Avenue alignment for roughly 3 miles, and finally heading east and southeast for 5.4 miles. Under Alternative C, impacts on highway and road usage from construction and operation would be similar to Alternative A; however, portions of Alternative C run parallel to existing roads (i.e., Bullard Avenue, Rainbow Valley Road, Patterson Road), and therefore these roadway segments would be replaced by the proposed Parkway but traffic would be uninterrupted during construction to the extent possible.

4.14.5.7 Traffic Volume

Under Alternative C, impacts on traffic volume from construction and operation may include some effect to existing traffic on portions of Bullard Avenue, Rainbow Valley Road, and Patterson Road. However, low volumes of traffic currently exist on these roads and impacts from construction and operation of the proposed Parkway would likely be negligible. It is relevant to note that Alternative C is longer and more curvilinear than Alternative A, resulting in reduced travel times and a reduced posted speed limit (particularly at sharp turns) as compared to Alternative A.

4.14.5.8 Access

Under Alternative C, impacts to access from construction and operation would be the same as Alternative A, except as described below.

There may be construction-related traffic delays, particularly on sparsely used BLM roads that provide legal access to the Sierra Estrella Wilderness, however the impact would be short-term. Operational traffic of the SVPP is not anticipated to result in traffic delays to access BLM lands. Refer to Section 4.19, Cumulative Impacts for further analysis on future access.

4.14.5.9 Two-lane Parkway

The two-lane Parkway scenario for Alternative C would span 18.1 miles and provide a Parkway connection from southern Goodyear to Mobile via portions of existing roads to the east and south. Construction would require a temporary easement of 1.4 acres as well as temporary disturbance of 39.4 acres as the two-lane Parkway is built. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable Parkways and is slated for population growth. Alternative C follows a curvilinear Parkway alignment that traverses existing road corridors, rural developed private land, and vacant State land from its terminus at Riggs Road to the north and its final connection at SR 238 to the south.

4.14.5.10 Four-lane Parkway

The four-lane Parkway scenario for Alternative C would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.5.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative C would be the same as the two- and four-lane scenarios, except would allow for added traffic capacity.

4.14.6 Alternative H Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.6.1 State Highways

Under Alternative H, impacts to SR 238 would be the same as Alternatives A and C.

4.14.6.2 Maricopa County Roads

Under the Alternative H scenario, approximately 5.5 miles of county roads would be impacted (Patterson Road). Construction of Alternative H may have adverse short-term impacts on residents living along Patterson Road due to construction-related traffic delays. However, access to these roads would be maintained at all times. During operation, the use of county roads would provide long-term benefits to residents as emergency response vehicles and utility-related traffic would have better access to this area.

4.14.6.3 BLM Roads

Under Alternative H, a total of 18.3 miles of the proposed Parkway is proposed (comprising 553.9 acres within the 250-foot-wide ROW, with 308.1 acres being BLM-administered, and 1.4 acres in a temporary construction easement). This would amount to an increase of disturbance on 79 acres as compared to Alternative A. Alternative H would have an increase of 41.9 acres of disturbance on State lands and an increase of 13.7 acres of disturbance on private lands. In addition, temporary impacts from construction of the proposed Parkway would be 45.7 acres (6.3 acres more than Alternative A). Impacts to unpaved BLM roads would be the same as described under Alternative A.

4.14.6.4 Utility Company Roads

Alternative H follows a different alignment that does not parallel the existing unpaved EPNG pipeline maintenance road. Alternative H would not follow existing utility company roads.

4.14.6.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Alternative H.

4.14.6.6 Highways and Road Usage

Alternative H measures 18.3 miles, starting at Riggs Road at the north end, running south for approximately 1.8 miles along Rainbow Valley Road, heading directly east along Patterson Road for approximately 6 miles, then running south along unimproved land for roughly 5 miles, finally heading east and southeast for about 5.5 miles. Under Alternative H, impacts on highway and road usage from construction and operation would be similar to Alternative C, however Alternative H crosses more unimproved landscape.

4.14.6.7 Traffic Volume

Under Alternative H, impacts on traffic volume from construction and operation would be very limited, as only approximately 6 miles of an existing paved roadway is paralleled. Alternative H is the longest alternative and, similar to Alternative C, is curvilinear, causing reduced travel times and a reduced posted speed limit (particularly at sharp turns).

4.14.6.8 Access

Under Alternative H, impacts to access from construction and operation would be the same as under Alternative C.

4.14.6.9 Two-lane Parkway

The two-lane Parkway scenario for Alternative H would span 18.3 miles and provide a Parkway connection from southern Goodyear to Mobile via portions of existing roads to the east and south. Construction would require a temporary easement of 1.4 acres as well as temporary disturbance of 45.7 acres as the two-lane Parkway is built. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth. Alternative H follows a curvilinear Parkway alignment that traverses existing road corridors, rural developed private land, and vacant State land from its terminus at Riggs Road to the north and its final connection at SR 238 to the south.

4.14.6.10 Four-lane Parkway

The four-lane Parkway scenario for Alternative H would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.6.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative H would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.7 Sub-alternative F Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.7.1 State Highways

Under Sub-alternative F, impacts to SR 238 would be the same as Alternative A.

4.14.7.2 Maricopa County Roads

Sub-alternative F is located entirely on vacant private land and follows the existing EPNG pipeline road to its southern terminus at SR 238. Sub-alternative F is approximately 2.8 miles long. Construction of Sub-alternative F will likely result in few construction- or operation-related impacts because the alignment is located within an existing, unpaved access road ROW.

4.14.7.3 BLM Roads

Sub-alternative F, totaling 2.8 miles of the proposed Parkway, does not include BLM land or BLM roads within the 250-foot-wide ROW.

4.14.7.4 Utility Company Roads

Sub-alternative F follows the existing unpaved EPNG pipeline maintenance road at its northernmost point to its terminus at SR 238.

4.14.7.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Sub-alternative F.

4.14.7.6 Highways and Road Usage

Sub-alternative F measures 2.8 miles, starting at the EPNG pipeline road at its north end, and then running south along this alignment to make its final connection with SR 238. Under Sub-alternative F, impacts on highway and road usage from construction and operation would be negligible as no other existing roads or corridors are crossed.

4.14.7.7 Traffic Volume

Under Sub-alternative F, impacts on traffic volume from construction and operation would be negligible aside from potential temporary impacts during construction of a traffic interchange or intersection with SR 238.

4.14.7.8 Access

Under Sub-alternative F, impacts to access from construction and operation would be improved, since currently limited access exists in this area.

4.14.7.9 Two-lane Parkway

The two-lane Parkway scenario for Sub-alternative F would span just over 3 miles and provide a Parkway connection from the alternatives (listed above) to an endpoint at SR 238. Construction would require no temporary easements and would result in about 9.2 acres of temporary construction impacts. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth. Sub-alternative F follows a slightly curving alignment that traverses mainly unimproved landscape and a portion of an existing road corridor to its final connection at SR 238 to the south.

4.14.7.10 Four-lane Parkway

The four-lane Parkway scenario for Sub-alternative F would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.7.11 Six-lane Parkway

The six-lane Parkway scenario for Sub-alternative F would be the same as the two- and four-lane scenarios, except would allow for added traffic capacity.

4.14.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

The following is a discussion of potential impacts on existing transportation systems within an immediate vicinity (2 miles or less) of the proposed Parkway. The systems described include state highways, county roads, BLM roads, utility company roads, access roads, and other private roads in the SVPP study area.

4.14.8.1 State Highways

Under Sub-alternative G, impacts to SR 238 would be the same as Sub-alternative F.

4.14.8.2 Maricopa County Roads

Sub-alternative G is located predominantly on vacant private land and follows about 0.5 mile of the existing 107th Avenue alignment to its southern terminus at SR 238. Sub-alternative G is approximately 2.4 miles long and does not cross BLM land. Construction of Sub-alternative G would likely result in few construction- or operation-related impacts as the alignment is located mostly on vacant lands. During operation, the use of 107th Avenue would be maintained.

4.14.8.3 BLM Roads

Sub-alternative G, totaling 2.4 miles of the proposed Parkway, would comprise 72 acres of private land within the 250-foot-wide ROW. One unpaved BLM road, the Butterfield Overland Stage Route would be intersected by Sub-alternative G. Existing legal public access would be retained.

4.14.8.4 Utility Company Roads

Sub-alternative G connects with the existing unpaved EPNG pipeline maintenance road at its northern terminus. Other than this intersection, Sub-alternative G would not follow existing utility company roads.

4.14.8.5 Other Private Roads

No known private roads intersect any of the project alternatives; therefore, there would be no impact on private roads under Sub-alternative G.

4.14.8.6 Highways and Road Usage

Sub-alternative G measures 2.4 miles, starting at the EPNG pipeline road on the north end, running south for approximately 2 miles through vacant private land, and heading south to the 107th Avenue alignment to make its final connection with SR 238. Under Sub-alternative G, impacts on highway and road usage from construction and operation would be minimal as only a short distance (0.5 mile) of the existing 107th Avenue is paralleled and no other existing roads or corridors are crossed.

4.14.8.7 Traffic Volume

Under Sub-alternative G, impacts on traffic volume from construction and operation would be negligible aside from potential temporary impacts during construction of a traffic interchange or intersection with SR 238.

4.14.8.8 Access

Under Sub-alternative G, impacts to access from construction and operation would be improved since currently no access exists in this area.

4.14.8.9 Two-lane Parkway

The two-lane Parkway scenario for Sub-alternative G would span about 2.4 miles and provide a Parkway connection from the alternatives (listed above) to an endpoint at SR 238. Construction would require no temporary easements and would result in about 7.2 acres of temporary construction impacts. Long-term impacts of a two-lane Parkway in terms of travel management would be the addition of access in an area that currently has no viable roadways and is slated for population growth. Sub-alternative G follows a slightly curving alignment that traverses unimproved landscape to its final connection at SR 238 to the south.

4.14.8.10 Four-lane Parkway

The four-lane Parkway scenario for Sub-alternative G would be the same as the two-lane scenario, except would allow for added traffic capacity.

4.14.8.11 Six-lane Parkway

The six-lane Parkway scenario for Alternative G would be the same as the two- and four-lane scenarios, except would allow for added traffic capacity.

4.14.9 Additional Mitigation Measures

No additional mitigation measures are recommended.

4.14.10 Residual Impacts

Because no additional mitigation measures are recommended the residual impacts to travel management would be the same as discussed under all action alternatives.

4.14.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, travel management would be expanded from existing routes. The current transportation routes within the area do not present enough viable options for commuters to and from the Phoenix metropolitan area. Given existing levels of traffic congestion and use of unauthorized utility roads for commuting, new transportation uses would provide better means of transportation for residents, emergency services, and infrastructure maintenance. In addition, the Sonoran Valley Parkway has been identified in regional and local transportation plans as an important element of the transportation network and would provide both regional and local transportation connections.

4.14.12 Irreversible and Irretrievable Commitment of Resources

If the SVPP were implemented, there would be no irreversible and irretrievable commitment of resources of travel management resources, because existing access is currently open to the public. However, construction and operation of the Parkway, for any of the alternatives, would require the use of appropriate traffic crossings for pedestrians, bicyclists, and motorized vehicles. Therefore, in cases where the proposed Parkway would cross currently undeveloped lands, crossing of these lands would be restricted or require proper adherence to proper traffic and pedestrian safety standards.

4.15 SPECIAL DESIGNATIONS

4.15.1 Analysis Area, Approach and Assumptions

This section outlines the impacts to special designation areas from the implementation of any of the project alternatives. As discussed in Section 3.15, special designation areas considered in this analysis include: 1) the North and South Maricopa Mountains Wilderness areas, 2) Sierra Estrella Wilderness, 3) the SDNM, and 4) the Juan Bautista de Anza National Historic Trail. The wilderness areas are managed to maintain or enhance the natural character and vegetation communities, to provide opportunities for primitive recreation and solitude, and to provide habitat for a diversity of fauna (BLM 1995). SDNM is managed to protect biological, archaeological, and historical resources (Presidential Proclamation 7397). The impacts to the historic trail are discussed in Section 4.3, Cultural and Heritage Resources.

These special designations discussed in Chapter 3 lie outside of the immediate project area footprint (the historic trail notwithstanding); however, they would be subject to indirect and cumulative impacts from changes to the existing viewshed, increases in noise, changes in access, and impacts to wildlife from activities associated with construction and operation of the SVPP. Impacts from noise are evaluated in terms of whether they would increase the ambient noise environment, and thus impact a visitor's recreation experience. Impacts to special designation's recreation characteristics are evaluated in terms of whether there would be a change in opportunities for solitude and primitive recreation, a change in the ability of the visitor to access the SDNM or wilderness areas, a change to the current vegetation communities, and changes to the natural or undeveloped character of the landscape. To assess these changes, this analysis utilizes information from the noise, wildlife, and visual sections of this chapter. As described in Chapter 3, the analysis area for special designations is not a defined polygon but rather any topographic point within the wilderness areas or SDNM where sights or sounds from the SVPP may be experienced by a visitor.

Cumulative impacts to special designation areas are analyzed in the Rainbow Valley analysis area, discussed in Section 4.19.14. It is assumed that there would be no other use of the SVPP, except for transportation.

4.15.2 No Action

Under the No Action Alternative, the SVPP would not be developed and the existing conditions of the special designation areas would continue. The landscape and existing roads and trails surrounding the analysis area would not be altered, and no changes to the viewshed or soundscape would occur. There would be no new barriers to wildlife movement or planned increases in vehicle traffic. Unsafe travel conditions along pipeline roads would continue to deteriorate and safety hazards would be increased. Management and current conditions of the special designations would remain unchanged.

Under the No Action Alternative, the past, present, and reasonably foreseeable future land uses would have the same cumulative effect on special designation values as described under the action alternatives, except that the SVPP would not be constructed. Continuation of existing uses would not result in any major changes to special designation area values.

4.15.3 Impacts Common to all Action Alternatives

4.15.3.1 Two-lane Parkway

Sonoran Desert National Monument

Conversion of the existing landscape from a natural setting to a high-contrast transportation corridor would have long-term adverse impacts to recreation opportunities and users of the adjacent areas of the SDNM. The impact would be limited to the areas of SDNM immediately adjacent to the alternative alignment, where the sights and sounds of the alternative alignment would change the existing viewshed and affect the solitude of SDNM (further discussed in Section 4.7, Visual Resources and Section 4.13, Recreation Management).

The color contrast the alternative alignments would impose upon the landscape during construction, operation, and maintenance would be highly noticeable throughout the day and the same throughout the year. Depending upon the engineering designs, the lights required for the SVPP at night would be noticeable; however, as stated in Chapter 2, all surface lighting would be designed to be in keeping with the Maricopa County Dark Sky Ordinance as stated in Section 1112 of the Maricopa County Zoning Ordinance (Maricopa County 2012) and Article 10 of the City of Goodyear's Zoning Ordinance (City 1999). Though these ordinances do not eliminate impacts to night skies, the ordinances would minimize the impacts and contrasts the alternative alignments would impose upon the landscape at night. This would have an adverse impact on the recreation setting and experience of SDNM immediately adjacent to the alternative alignments and from mountain peaks with expansive vistas, because all action alternatives would alter the view of Rainbow Valley from a mostly natural, rural setting to a more developed rural setting.

Under all action alternatives, including Alternative A, there would be an increase of traffic in the local area during the construction and operation of the SVPP. Traffic would come primarily from Rainbow Valley Road and SR 238. This increase in traffic would cause both short-term and long-term adverse impacts to SDNM wildlife because of vehicle strikes and barriers to movement. Traffic would increase the risk of wildlife mortality and would contribute to the fragmentation of wildlife populations. There would also be adverse impacts to the recreational setting and experience due to the increase in traffic.

Designated Wilderness Areas

The North and South Maricopa Mountain Wilderness would experience the same impacts as described above for SDNM, under all action alternatives, since the wilderness areas would experience the same indirect impacts to the viewsheds and recreational settings and desired experiences that would indirectly impact SDNM.

Because the Sierra Estrella Wilderness is 10 miles to the east of the proposed SVPP, this distance would reduce the effects of the view, and it is expected that the proposed Parkway would not stand out from the existing development in the area. Topography would also mitigate or eliminate (block) these effects in portions of the adjacent and nearby wilderness areas. The construction and operation of the SVPP under all action alternatives would create noise. The increase in construction-related noise would be noticeable from the northern and easternmost reaches of the North Maricopa Wilderness; however, the sound would quickly fade as visitors venture further into the wilderness.

Lower Gila Terraces and Historic Trails ACEC

Under all action alternatives and sub-alternatives, the proposed SVPP 250-foot ROW would intersect the Lower Gila Terraces and Historic Trails ACEC between approximately 2.0 and 2.8 miles (approximately 61–82 acres). The areas of the ACEC where the proposed SVPP 250-foot ROW would intersect currently include existing dirt roads, transmission lines and gas pipelines. All action alternatives and sub-alternatives would occur within the ACEC wholly on private lands. Private and non-federal lands within ACECs are not subject to the prescribed management of the ACEC (BLM 2012a).

The overall values for which the 82,500-acre ACEC was designated (cultural, archaeological, and Historic Trails) would not be lost if the SVPP were implemented; however, the conversion of the ACEC from the existing uses (including but not limited to dispersed recreation and livestock grazing) to a Parkway would adversely impact these values for between approximately 61 and 82 acres of the ACEC, which is less than approximately 0.1% of the entire ACEC.

The 2012 Lower Sonoran RMP (BLM 2012a) specifies in AC-1.1.13 that “Motorized vehicle routes that conflict with the values in the Importance and Relevance descriptions will be closed, limited, or mitigated. New route construction will not be allowed except as needed for resource protection, public safety, emergency, or other administrative uses, as determined by the authorized officer.” As specified in Section 4.3, Cultural and Heritage Resources, the alternative and/or sub-alternative that is chosen by the BLM decision maker will be mitigated (either by data collection or to-be-determined design features) to reduce the impacts to the ACEC.

4.15.3.2 Four-lane Parkway

Sonoran Desert National Monument

Further conversion to the landscape from the construction the proposed four-lane Parkway would have long-term adverse impacts to recreation opportunities and users of the adjacent areas of the SDNM. The impact would present the same amount of contrast as the two-lane Parkway since the four-lane would effectively mirror the two-lane construction, except on the opposite side of the ROW. The effects of this expansion would be the same as described under the two-lane Parkway.

Designated Wilderness Areas

The effects of the four-lane Parkway expansion to designated wilderness areas would be the same as described under the two-lane Parkway.

Lower Gila Terraces and Historic Trails ACEC

The effects of the four-lane Parkway expansion to the Lower Gila Terraces and Historic Trails ACEC would be the same as described under the two-lane Parkway.

4.15.3.3 Six-lane Parkway

Sonoran Desert National Monument

Further conversion to the landscape from the construction of the proposed six-lane Parkway would have long-term adverse impacts to recreation opportunities and users of the adjacent areas of the SDNM. The impact would not present the amount of contrast as the two-lane Parkway, since the six-lane would include Parkway expansion and not new Parkway construction. The effects of this expansion would be the same as described under the two-lane Parkway.

Designated Wilderness Areas

The effects of the six-lane Parkway expansion to designated wilderness areas would be the same as described under the two-lane Parkway.

Lower Gila Terraces and Historic Trails ACEC

The effects of the six-lane Parkway expansion to the Lower Gila Terraces and Historic Trails ACEC would be the same as described under the two-lane Parkway.

4.15.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

4.15.4.1 Two-lane Parkway

Sonoran Desert National Monument

Under Alternative A, approximately 84 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. The SVPP would introduce a 15.7-mile-long transportation corridor to the landscape in Rainbow Valley. Alternative A would occur approximately 800 feet to the east of the SDNM boundary, within the existing EPNG multi-use utility corridor. There would be no change to the landscapes or settings within SDNM; however, the presence (views) of the SVPP would degrade the primitive experience and solitude that visitors seek when visiting the nearby SDNM. These views would be most apparent from locations close to SVPP and from mountain peaks with expansive vistas. According to the Section 4.7 Visual Resources, the project footprint would be visible from certain portions of SDNM (see Figure 3-10). There are no access points, trailheads, or designated sites within SDNM that would be directly impacted as a result of Alternative A.

The entire view from areas of SDNM immediately adjacent to Alternative A and from mountain peaks with expansive vistas already includes views of residential areas, industrial sites, and utility corridors. The removal of vegetation and the conversion of the Alternative A alignment from a mostly natural setting to a Parkway would have long-term adverse impacts to the wildlife of SDNM because it would reduce the amount of forage and habitat that would be accessible for species that travel from SDNM to adjacent land areas (see Section 4.10, Wildlife). There would be no impacts to the habitat or forage within the SDNM.

The construction and operation of the SVPP would create noise in site-specific locations. The increase in construction-related noise would be noticeable from the northern and easternmost reaches of the SDNM. However, the sound would quickly fade as visitors venture further west into the SDNM. This would cause adverse impacts to the recreational setting and experience for visitors seeking solitude and primitive recreation opportunities. Construction of the SVPP under Alternative A would cause short-term and long-term impacts to wildlife moving between SDNM and the adjacent areas because the Parkway would create a barrier to wildlife movement. There would be no impacts to wildlife movements within SDNM.

Operation of Alternative A would impact 83.6 acres of BLM land adjacent to SDNM to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative A would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative A, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.4.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative A, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative A, 206.5 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative A would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative A, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.4.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative A, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative A, 514.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative A would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative A, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.5 Alternative C Direct and Indirect Impacts

4.15.5.1 Two-lane Parkway

Alternative C's direct and indirect impacts to special designations would be similar to those described under Alternative A, except that under Alternative C, 141.9 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. Impacts under Alternative C would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse

impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Alternative A.

4.15.5.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative C, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative C, 238.5 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative C would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative C, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.5.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative C, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative C, 593.9 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative C would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative C, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.6 Alternative H Direct and Indirect Impacts

4.15.6.1 Two-lane Parkway

Sonoran Desert National Monument

Alternative H's direct and indirect impacts to special designations would be similar as described under Alternative A, except that under Alternative H, 143.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of SVPP. Impacts under Alternative H would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse

impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Alternative A.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative H would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative H, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.6.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative H, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative H, 240.8 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative H would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative H, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.6.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Alternative H, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Alternative H, 437.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Alternative H would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Alternative H, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.7 Sub-alternative F Direct and Indirect Impacts

4.15.7.1 Two-lane Parkway

Sonoran Desert National Monument

Sub-alternative F's direct and indirect impacts to special designations would be similar to those described under Alternative A, except that under Sub-alternative F, 26.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. Impacts under Sub-alternative F would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Section 4.15.3.1, Impacts Common to all Action Alternatives.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative F would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative F, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.7.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative F, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative F, 43.3 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative F would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative F, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.7.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative F, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative F, 43.3 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative F would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative F, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

4.15.8.1 Two-lane Parkway

Sonoran Desert National Monument

Sub-alternative G's direct and indirect impacts to special designations would be similar to those described under Alternative A, except that under Sub-alternative G, 19.9 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP. Impacts under Sub-alternative G would be the same as under Alternative A because the SVPP would convert open desert to a paved Parkway. The project footprint would still be visible from the special designation areas, and increases in vehicle presence and easier access to the lands adjacent to special designations would still occur. This would have adverse impacts to the scenic quality of the landscape, recreation opportunities, and to wildlife, as discussed under Section 4.15.3.1, Impacts Common to all Action Alternatives.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative G would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative G, two-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.8.2 Four-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative G, four-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative G, 32.5 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative G would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative G, four-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.8.3 Six-lane Parkway

Sonoran Desert National Monument

Impacts to SDNM under Sub-alternative G, six-lane Parkway would be the same as described in Section 4.15.3.1 except that under Sub-alternative G, 79.2 acres of BLM land adjacent to SDNM would be graded to accommodate the construction of the SVPP.

Designated Wilderness Areas

Impacts to designated wilderness areas under Sub-alternative G would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

Lower Gila Terraces and Historic Trails ACEC

Impacts to the Lower Gila Terraces and Historic Trails ACEC under Sub-alternative G, six-lane Parkway would be same as described in Section 4.15.3.1, Impacts Common to all Action Alternatives.

4.15.9 Additional Mitigation Measures

To meet the objective of protecting the biological resources in the SDNM, additional mitigation measures could be implemented to protect wildlife from vehicle strikes and from loss of habitat connectivity. These measures are discussed in Section 4.10, Wildlife. Additional measures to mitigate visual and noise impacts are described in those respective sections (see Sections 4.7 and 4.16).

4.15.10 Residual Impacts

Residual impacts to special designations refer to any adverse impacts that remain after mitigation measures have been applied.

Residual impacts to the wildlife within special designations would include the long-term removal of breeding, foraging, and cover habitat in all areas occupied by the SVPP.

Regardless of the alternative selected, certain views during the construction period would be altered by the presence of construction vehicles, equipment personnel, and emerging new highway facilities. This impact (as well as construction noise) is expected to be considered adverse by some viewers and is an unavoidable consequence of project construction.

Please see Section 4.10 for a discussion of residual impacts to wildlife. Visual and noise residual impacts are discussed in Sections 4.7 and 4.16, respectively.

4.15.11 Short-term Uses versus Long-term Productivity

Implementation of the SVPP would create short-term and long-term changes to the scenic quality of the landscape and would create barriers to wildlife movement and loss of habitat. These impacts would have

an indirect impact on the human uses in special designation areas because the sight, presence, and use of the new Parkway would impact the recreational setting and experience, both beneficially and adversely. The beneficial indirect impacts would include easier access to the special designations located within the relatively remote Rainbow Valley. The adverse indirect impacts would include development of open desert and potential conflicts to primitive and semi-primitive recreational settings.

4.15.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of grazing, agricultural, and recreational land uses if SVPP were implemented due to the presence of a paved Parkway. In addition, the SVPP would have an irretrievable adverse impact on wildlife and the recreation setting and experience (e.g., solitude, quiet, unobstructed views) in the adjacent special designation areas.

4.16 NOISE

4.16.1 Analysis Area, Approach and Assumptions

Direct and indirect impacts to existing noise levels resulting from the SVPP are analyzed along the 250-foot-wide project ROW. This area of analysis was selected to account for potential direct and indirect impacts to FHWA-defined Category B land uses, which include homes, churches, schools, and parks, in the project area. The environmental consequences analyzed consider the compatibility of the alternatives with both existing Category B land uses and applicable planning documents governing the use of project lands as they relate to these uses. Cumulative impacts to Category B land uses are analyzed in the Sonoran Valley Planning Area, defined in the City General Plan Amendment (City 2007).

It is assumed that no uses other than transportation are planned in the project area. Impacts to Category B land uses within the bounds of the analysis from implementation of the SVPP are discussed in terms of the potential to increase the peak hour equivalent traffic noise levels above the noise level criteria of 64 dBA as defined in the Zoning Ordinance, Article 9 Special Districts (City 2006). Article 9 Special Districts are defined as “areas that, due to the unique nature of the area (including but not limited to areas adjacent to freeways, city centers, or rural residential areas), surrounding land uses and/or physical improvements or natural features, require special regulations and approval process above and beyond the regulations and approval process of the underlying zoning districts” (City 2006).

4.16.2 No Action

The No Action Alternative assumes that none of the transportation improvements identified in the Goodyear Major Plan Amendment, including the widening of SR 238 and the expansion of the local roadway network, would occur and the existing segmented network of unpaved roadways would remain and the rural character of the project area would be preserved. Dispersed outdoor recreation including the use of OHVs would remain unchanged.

Existing noise levels would not be affected, because local traffic would continue to use the unpaved roadway network and there would be no construction of the SVPP.

4.16.3 Impacts Common to all Action Alternatives

The 250-foot-wide ROW is the same for each alternative (Alternatives, A, C, and H, and Sub-alternatives F and G) and Parkway (two-lane, four-lane, and six-lane) analyzed and includes a 25-foot-wide drainage easements on both sides. The Parkway design speed is 65 mph and the posted speed limit would be 55 mph for all analyzed proposed alternatives and Parkway designs.

The noise level impact determination used in this analysis is based on the ADOT Noise Abatement Policy (NAP), dated July 13, 2011 (and subsequent updates). The ADOT NAP complies with the FHWA Noise Abatement Criteria (NAC). The FHWA NAC specifies hourly noise level (L_{eq1h}) impact thresholds for different categories of land uses and activities. The L_{eq1h} impact threshold for Category B land use, which includes residences, churches, schools, and parks, is 67 dBA. The ADOT NAP determines the noise level impact for Category B land uses when the noise level approaches within 3 dBA of the FHWA NAC impacted hourly noise level, or 64 dBA. ADOT also considers mitigation if the noise level from the transportation improvement project is predicted to increase substantially. A substantial noise level increase is equal to or greater than 15 dBA.

The FHWA Category B land uses located within the noise analysis area include 44 detached single-family residences and/or mobile homes and one school (Mobile Elementary), which is located at the northeast corner of SR 238 and 99th Avenue. An undeveloped plat for Tangier Acres is located approximately 0.5 mile north of the school.

The planned posted speed for the SVPP is 55 mph. Traffic noise is most dominant during peak traffic hour or LOS C number of vehicles traveling at the posted speed. Based on the planned posted speed limit of 55 mph, the peak traffic hour traffic volume would be 1,400 vehicles per lane, based on the upper limit for low-volume multilane highway from the Highway Capacity Manual 2000 (Transportation Research Board 2000).

Medium and heavy trucks are assumed to operate on the Parkway. Medium trucks are categorized as vehicles having two axles and six wheels designed for the transportation of cargo. The gross weight of a medium truck is greater than 10,000 pounds but less than 26,400 pounds, and heavy trucks are categorized as vehicles having three or more axles and designed for the transportation of cargo, with gross weight greater than 26,400 pounds, as defined in the FHWA TNM Technical Manual (FHWA 1998). For the noise assessment, it is estimated that 3% of the vehicles are medium trucks and 2% of the vehicles are heavy trucks.

Noise levels from vehicle traffic for each of the designed SVPP alternatives were estimated using the Washington State Department of Transportation (WSDOT) typical noise levels for traffic volumes at a given speed (WSDOT 2011:Table 7-3). The Parkway design speed of 65 mph was used to estimate the sound level in dBA at 50 feet from the Parkway from the WSDOT traffic volume tabulated values. For this assessment, soft site reduction of 4.5 dB per doubling of distance was used.

4.16.3.1 Two-lane Parkway

A two-lane road is proposed with a total Parkway width of 44 feet, which includes a 28-foot-wide paved surface with 8-foot-wide graded shoulders. Based on a peak traffic hour volume of approximately 2,800 vehicles, traffic noise levels at approximately 50 feet from the Parkway are estimated at 77.4 dBA. A distance of approximately 389 feet from the Parkway is necessary to attenuate traffic noise levels to below 64 dBA.

4.16.3.2 Four-lane Parkway

For the expansion of the two-lane Parkway into the four-lane Parkway, the Parkway would have a total Parkway width of 200 feet, including a 112-foot-wide median separating two 28-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on a peak traffic hour volume of approximately 5,600 vehicles, traffic noise levels at approximately 50 feet from the Parkway are estimated at 80.4 dBA. A distance of approximately 618 feet from the Parkway is necessary to attenuate traffic noise levels to below 64 dBA.

4.16.3.3 Six-lane Parkway

If the four-lane Parkway is later expanded into a six-lane Parkway, the total Parkway width would be 200 feet, which includes an 84-foot-wide median separating two 42-foot-wide paved surfaces with 8-foot-wide graded shoulders. Based on a peak traffic hour volume of approximately 8,400 vehicles, traffic noise levels at approximately 50 feet from the Parkway are estimated at 82.2 dBA. A distance of approximately 809 feet from the Parkway is necessary to attenuate traffic noise levels to below 64 dBA.

Since noise levels would be the primary direct impact of the SVPP, the relative impacts of each of the alternatives (A, C, and H) and sub-alternatives (F and G) were analyzed by comparing the closest receptors and type. Table 4-35 presents the potential impacts by receptor for each alternative and sub-alternative.

Table 4-35. Impacts to FHWA-defined Category B Land Uses from the SVPP Alternatives

Affected Land Use Type	Closest Receptor Location by Type and Potential Impacts									
	Alternative A (BLM Preferred Alternative)		Alternative C		Alternative H		Sub-alternative F		Sub-alternative G (BLM Preferred Sub-alternative)	
Residential	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**	**No.**	**Location**
Detached single-family homes and mobile homes	1	2,800 feet	16	At ROW	2	At ROW	1	At ROW	1	7,500 feet
Schools	1	2,400 feet	1	2,400 feet	1	2,400 feet	1	1,400 feet	1	6,000 feet
Outdoor Recreation (hunting, target shooting, backcountry driving, mountain biking, natural and cultural resources study, and sightseeing)	Various	Locations throughout project area. Activities occurring within the SDNM bordered by a 9.2-mile segment of SVPP.	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM	Various	Locations throughout project area including SDNM
Impact Summary	Existing noise levels between 40 and 62 dBA. Future peak hour noise level increase above existing < 15 dBA. Future peak hour noise levels below 64 dBA.									

4.16.4 Alternative A, BLM Preferred Alternative, Direct and Indirect Impacts

The closest residential unit to Alternative A is approximately 2,800 feet, and the closest school is approximately 2,400 feet. Based on these assumptions, the noise levels at 2,400 and 2,800 feet are anticipated to be less than 64 dBA for all Parkway designs (two-, four-, and six-lane). Due to the distance of potentially sensitive receptors from the Parkway, it is anticipated that the increase in noise levels from existing noise levels is less than 15 dBA. The impact on noise levels for potentially sensitive receptors would therefore be long-term but negligible.

The operation of Alternative A may result in indirect impacts to Category B land uses if the Parkway creates land use amendments brought on by development interest. Future development would increase the proximity of Category B land uses to the improved Parkway network in the project area.

4.16.5 Alternative C Direct and Indirect Impacts

The impacts to existing Category B land uses under Alternative C would be the same as described for Alternative A for all Parkway designs (two-, four-, and six-lane) except for a residential unit that would be approximately at the ROW. The noise level is anticipated to exceed 64 dBA with a greater than 15 dBA noise level increase from existing noise levels for this residential unit. The implementation of Alternative C would therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW.

As with Alternative A, the future development from the operation of Alternative C would increase the proximity of receptors to the improved roadway network in the project area, resulting in indirect impacts to planned Category B land uses.

4.16.6 Alternative H Direct and Indirect Impacts

The impacts to existing Category B land uses under Alternative H would be the same as described for Alternatives A and C for all Parkway designs (two-, four-, and six-lane) except for residences located approximately at the ROW. The noise level is anticipated to exceed 64 dBA with a greater than 15 dBA noise level increase from existing levels for these residential units. The implementation of Alternative H would therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW.

Alternative H’s indirect impacts from future land uses would be the same as described for Alternatives A and C.

4.16.7 Sub-alternative F Direct and Indirect Impacts

The closest residential unit to Sub-alternative F is located approximately at the ROW. Therefore, under all Parkway designs (two-, four-, and six-lane), the noise level is anticipated to exceed 64 dBA with a greater than 15 dBA noise level increase from background for this residential unit. Sub-alternative F would also move the Parkway to a distance of approximately 1,400 feet from the school. However, the noise level from the Parkway at this distance is still anticipated to be less than 64 dBA for the school, with a less than 15 dBA noise level increase from existing levels. The implementation of Sub-alternative F would

therefore result in long-term, adverse impact to noise levels for potentially sensitive receptors located along the ROW, and long-term, negligible impact to noise levels for potentially sensitive receptors not located along the ROW.

Sub-alternative F's indirect impacts from future land uses would be the same as described for Alternatives A, C, and H.

4.16.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

The closest residential unit to Sub-alternative G, the BLM Preferred Sub-alternative, is approximately 7,500 feet, and the closest school is approximately 6,000 feet. Based on these assumptions, the noise levels at these distances are anticipated to be less than 64 dBA for all Parkway designs (two-, four-, and six-lane). Due to the distance of potentially sensitive receptors from the Parkway, it is anticipated that the increase in noise levels from existing noise levels would be less than 15 dBA. The impact on noise levels for potentially sensitive receptors would therefore be long-term but negligible.

Sub-alternative G's indirect impacts from future land uses would be the same as described for Alternatives A, C, and H and Sub-alternative F.

4.16.9 Additional Mitigation Measures

The Zoning Ordinance, Article 9 Special Districts (City 2006) contains language found in the ADOT NAP regarding noise minimum noise reduction (5 dBA or more) and suggested maximum noise wall heights (20 feet abovegrade). Due to the uncertainties of future community development timing, noise wall requirements are unknown at this time. The City standards for interior noise levels apply the HUD 45 dBA interior noise level threshold. No additional mitigation measures are suggested.

4.16.10 Residual Impacts

Because no additional mitigation measures are suggested, the residual impacts to noise receptors would be the same as discussed under all action alternatives.

4.16.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, the project area would be converted from existing land uses to transportation. The current productivity of the area in terms of noise is one with minor contributions from intermittent local residential and recreational vehicle use in the project area.

Although there would be a loss in the capability of the project area to maintain relatively low noise level conditions with few traffic noise sources, the new transportation network would provide increased mobility to the traveling public and future area residents.

4.16.12 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable loss of relatively low noise levels if the SVPP were implemented, because of the presence of commuter and recreational traffic on a paved Parkway. There may be an irreversible

loss of relatively low noise level conditions because the Parkway could enable residential development and expansion of the transportation system in the area.

4.17 HAZARDOUS MATERIALS AND PUBLIC SAFETY

4.17.1 Analysis Area, Approach and Assumptions

The area of analysis for hazardous materials and solid waste includes the 250-foot-wide project ROW for each alternative alignment (the area where these materials would be generated and used), and the additional search distances specified in ASTM Standard E 1527-05 (ASTM 2005). The ASTM determines these search distances to be appropriate distances in which to search for potential sources of contamination which could affect the project area (Table 4-36).

Table 4-36. Hazardous Materials Analysis Areas

Environmental Record Source	Approximate Minimum Analysis Area (mile)
Federal NPL	1.0
Federal Delisted NPL	0.5
Federal CERCLIS	0.5
Federal CERCLIS NFRAP	0.5
Federal RCRA CORRACTS	1.0
Federal RCRA non-CORRACTS TSD	0.5
Federal RCRA Generators	250-foot-wide ROW and adjacent properties
Federal IC/EC	250-foot-wide ROW
Federal ERNS	250-foot-wide ROW
State and Tribal Hazardous Waste Sites (NPL Equivalent)	1.0
State and Tribal Hazardous Waste Sites (CERCLIS Equivalent)	0.5
State and Tribal Landfill and/or Solid Waste Disposal Sites	0.5
State and Tribal LUST	0.5
State and Tribal Registered UST	250-foot-wide ROW and adjacent properties
State and Tribal IC/EC	250-foot-wide ROW
State and Tribal Voluntary Cleanup (VCP) Sites	0.5
State and Tribal Brownfield Sites	0.5

CERCLIS = Comprehensive Environmental Response, Compensation, and Liability Information System
CORRACTS = Corrective Action Sites
ERNS = Emergency Response Notification System
IC/EC = Institutional Controls / Engineering Controls
LUST = leaking underground storage tank
NFRAP = no further remedial action planned
NPL = National Priorities List
RCRA = Resource Conservation and Recovery Act
TSD = Treatment, Storage, and Disposal
UST = underground storage tank

Proposed transportation routes to disposal sites were not included in the area of analysis because the most likely disposal site is the Butterfield Station Landfill, operated by Waste Management, Inc., which is located nearly adjacent to the east of the southern terminus of the project area. Environmental consequences analyzed consider the compatibility of the alternatives with currently existing hazardous

materials, as well as additional hazardous materials and solid waste that may be generated under each alternative. Cumulative impacts are analyzed and discussed in Section 4.17.9.

Because the primary impact from the use of hazardous materials and the generation of solid waste would be from potential leaks and spills and potential contamination of surrounding soils, surface waters, and groundwater, these materials are discussed in terms of 1) the types of materials that would occur on-site for construction and operation of the project, 2) their relative risk, and 3) how these materials and wastes would be managed for the project to prevent these impacts. Certain chemicals and materials that would be used during the construction and operation of the project are characterized as hazardous materials. Improperly handled chemicals and other hazardous materials have the potential to cause health issues in humans. Project construction and operation activities would generate certain hazardous and nonhazardous solid waste streams. Hazardous materials, wastes, and regulated, nonhazardous solid wastes are governed by the laws, regulations, and policies discussed in Section 3.17.1.

This analysis assumes a variety of safety-related plans and programs would be developed and implemented to ensure safe handling, storage, and use of hazardous materials. A spill prevention plan (SPP, sometimes referred to as a Spill Prevention Control and Countermeasure [SPCC] or spill control plan [SCP]) would be developed and implemented prior to construction of the project, and a stormwater pollution prevention plan (SWPPP) would address such aspects as proper storage and spill containment for hazardous materials, fuels, and lubricants used during construction.

The basic principle of a SWPPP is that construction project operators must identify areas and activities that may contribute pollutants to stormwater and must implement BMPs to minimize those pollutants. The primary pollutant from construction sites is sediment discharges from increased erosion. Adequate and effective erosion and sediment control BMPs must be used to minimize sediment discharges. Other potential pollutants from construction sites include fuels, lubricating oils, construction materials, fertilizers, and pesticides. Construction sites can also generate other pollutants associated with on-site wastes, such as sanitary wastes or concrete truck washout. Managing these properly is critical to ensure pollutants do not reach surface waters through stormwater runoff (ADEQ 2008b).

Therefore the operator is required to develop and implement a SWPPP. The SWPPP characterizes the construction activity, identifies potential sources of pollutants, describes how the site will be managed and monitored, and describes the BMPs that will be implemented to help ensure pollutants do not reach surface waters. BMPs may include stormwater controls, erosion and sediment controls, good housekeeping practices, stabilization practices, structural practices, non-stormwater discharge management, and other controls (e.g., off-site tracking of soils and dust management) (ADEQ 2008b).

An SPP is an important tool in preventing spills. An SPP specifies materials handling procedures and storage requirements, and identifies spill cleanup procedures for areas and processes in which spills may potentially occur. The plan standardizes process operating procedures and employee training in an effort to minimize accidental pollutant releases that could contaminate stormwater runoff. Maintaining a well-designed engineering procedure for preventing spill events is the overall goal of the plan. The plan also provides effective countermeasures to prevent significant migration of contaminants and prevent impacts to environmental resources (EPA 1999).

Personnel would be supplied with appropriate personal protective equipment (PPE) and would be properly trained in the use of PPE, the handling, use, and clean-up of hazardous materials potentially associated with construction or operation of the project, as well as procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate clean-up materials would be stored in construction areas.

A number of BMPs are recommended to prevent hazardous materials from coming in contact with the environment. BMPs would be detailed in the SWPPP and SPP. These plans would detail BMPs such as retaining sediments on the construction site by soil erosion and sediment control practices and proper refueling and maintenance procedures for equipment. Implementation of these plans, as well as compliance with federal, state, and local regulations, would provide sufficient mitigation to ensure that there would be no direct or indirect impacts from the use of hazardous materials or the generation of solid waste during construction activities.

It is assumed that there would be no other use of the project area, except for transportation. Impacts from hazardous materials in the area of analysis from implementation of the SVPP are discussed in terms of changes from the existing use.

4.17.2 No Action

Under the No Action Alternative, the land on which the project is proposed would continue to be managed under the existing conditions. Current activities in the area, such as livestock grazing, agriculture, and dispersed recreational use, would not result in the generation, use, or disposal of major quantities of hazardous materials and hazardous and solid waste within the project area. This includes the Butterfield Station Landfill (AZ Solid Waste Facility No: 07032700.01, EPA ID No. AZD983481813), which only accepts non-hazardous waste (SWCA 2009c, 2009d). The status of existing facilities described in Section 3.17.2 would remain unchanged. Much of the project area is vacant land, and land in the immediate vicinity of the project area and alternatives would remain primarily open desert under the No Action Alternative.

Other actions in the surrounding area, such as SR 303L construction, Hassayampa Freeway construction, various pipelines, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa would likely occur with or without the Proposed Action. These potential projects and developments would result in additional use of hazardous materials and increased quantities of generated solid waste during their construction phases, additional transportation of hazardous materials through the area of analysis during their use, and additional generation of solid waste after the communities are developed.

4.17.3 Impacts Common to all Action Alternatives

The implementation of any of the alternatives would result in the use of hazardous materials and creation of solid waste during construction. Potential hazardous materials associated with construction activity could include solvents, metals, petroleum products (oils, fuels, asphalt degreaser, lubricants, etc.), plated products, hazardous substances, paint, treated-wood products, and other products typically associated with Parkway construction sites. Hazardous materials may also include herbicides and other construction chemicals such as concrete products, sealants, and wash water associated with these products. Solid wastes may include paper, wood, metal, cured concrete, and general trash. Direct and indirect impacts during operation of the SVPP would be no more than from other roadways in use today.

Construction grading and utility installation activities may impact the Hamilton Homes Property at the southwest corner of Rainbow Valley and Riggs Roads, where a leaking underground storage tank was reported in 1999. The leaking tank was permanently removed in May 2006, and the site was closed in January 2007 with soil levels meeting risk-based corrective action Tier 1 standards. The precise location of the former LUST is unknown and may be within or outside of the 250-foot-wide project ROW (SWCA 2009c, 2009d). If the project footprint is found to overlap with the former LUST site, additional

mitigation measures may include soil sampling and proper removal and disposal of any remaining contaminated soils.

Construction grading and utility installation activities may impact the RM Cat Environmental Services Remediation Area cleanup site, which is mapped in the general vicinity of the project area at the southern terminus of the corridor at Maricopa Road (SR 238). However, the exact location of the remediation area is unknown and is likely to be along the railroad tracks south of Maricopa Road (SR 238) because RM Cat Environmental Services (now called Balfor Environmental) specializes in train derailments and spill cleanup. The cleanup site was listed with a status of "not active" on October 31, 2006 (SWCA 2009c, 2009d). If the project footprint is found to overlap with the remediation area, additional mitigation measures may include soil sampling and proper removal and disposal of any remaining contaminated soils. Note that this cleanup site is only common to the major alternatives; Sub-alternatives F and G are not in the vicinity of this site.

The mitigation measures described above in Section 4.17.1 are implemented to prevent spills and leaks of hazardous materials, and to provide for adequate containment and cleanup if they do occur. With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, and implementation of the SWPPP and SPP, construction and operation of any of the alternatives would not result in direct or indirect impacts from hazardous materials or solid waste to surrounding soils, surface water, or groundwater.

Although the specific equipment and construction methods for the SVPP have not been determined, it is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of a wider Parkway. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway.

4.17.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

The mitigation measures described above in Section 4.17.1 are implemented to prevent spills and leaks of hazardous materials, and to provide for adequate containment and cleanup if they do occur. With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, implementation of the SWPPP and SPP, and potentially the additional mitigation described in Section 4.17.3 for the Hamilton Homes and RM Cat Remediation sites, the construction and operation of Alternative A would not result in direct or indirect impacts from hazardous materials to surrounding soils, surface water, or groundwater.

It is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of a wider Parkway. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway. However, for the reasons stated in the previous paragraph, direct or indirect impacts from hazardous materials within the project area are not anticipated for any of the phases under this Alternative.

4.17.5 Alternative C Direct and Indirect Impacts

Alternative C's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except as described below.

Because Alternative C is approximately 15% longer than Alternative A, construction activities would likely consume a comparably higher amount of hazardous materials and would generate a comparably higher amount of solid waste. The quantity of hazardous materials on the project area at a given time would likely be the same as for Alternative A, but would remain on-site for a longer period of time because construction would likely take longer.

Similarly, it is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of wider Parkways. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway. However, as previously stated, direct or indirect impacts from hazardous materials within the project area are not anticipated for any of the phases under this alternative.

4.17.6 Alternative H Direct and Indirect Impacts

Alternative H's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as those described under Alternative A, except as described below.

Because Alternative H is approximately 16% longer than Alternative A, construction activities would likely consume a comparably higher amount of hazardous materials and would generate a comparably higher amount of solid waste. The quantity of hazardous materials on the project area at a given time would likely be the same as for Alternative A, but would remain on-site for a longer period of time because construction would likely take longer.

Similarly, it is likely that more hazardous materials would be used and stored, and used and stored for longer periods of time, during construction of a wider Parkway. Thus it follows that construction of a four-lane Parkway would likely use and store more hazardous materials, for a longer period of time, than a two-lane Parkway, and the same applies for a six-lane Parkway over a four-lane Parkway. However, as previously stated, direct or indirect impacts from hazardous materials within the project area are not anticipated for any of the phases under this alternative.

4.17.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as those described under Alternative A, except as described below.

While this Sub-alternative avoids the RM Cat Remediation site, and is the shortest and most direct route, it passes directly through the Butterfield Station Landfill, an active municipal solid waste landfill (AZ Solid Waste Facility No. 07032700.01, EPA ID No. AZD983481813) operated by Waste Management, Inc. Beyond the obvious logistical concerns of relocating over 5 acres of existing landfill contents to construct a Parkway, major and costly additional mitigation measures would be required, such as extensively sampling the waste for contaminants, proper removal and disposal of the waste elsewhere, and re-engineering of existing landfill liner systems and leachate and methane collection systems. Direct impacts would include exposing potentially hazardous waste materials to the environment, and exposing personnel to the potentially hazardous waste materials. Existing landfill liners in the area would be removed, and could compromise adjacent liner material in the process. Landfills generally have setback requirements from public Parkways, and special variances from various state and federal agencies may be needed. Indirect impacts at the landfill could also include temporary disruption of existing leachate and methane collection systems, which could put the environment and personnel at risk. The environmental

implications and necessary mitigation measures for cutting through the landfill are far more than can be adequately described in this document.

The above concerns apply to all phases of Sub-alternative F.

4.17.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Sub-alternative G's direct and indirect impacts from the use of hazardous materials and the generation of solid waste would be the same as described under Alternative A, except that this Sub-alternative avoids both the RM Cat Remediation site and the Butterfield Station Landfill. This applies to all phases of Sub-alternative G.

4.17.9 Additional Mitigation Measures

No additional mitigation measures are suggested beyond those already described in Chapters 2 and 3, unless the project footprint is found to overlap with the Hamilton Homes LUST site or the RM Cat Remediation site, in which case additional mitigation measures may include soil sampling and proper removal and disposal of potentially contaminated soils. If Sub-alternative F is proposed, major additional mitigation measures would be required. Proper sampling and handling of potentially contaminated soils would ensure that there would be no direct or indirect impacts from hazardous materials in the remediation area.

4.17.10 Residual Impacts

No residual impacts are anticipated from the use of hazardous materials or creation of solid waste under any of the action alternatives or sub-alternatives.

4.17.11 Short-term Uses versus Long-term Productivity

The mitigation measures described above are implemented to prevent spills and leaks of hazardous materials, and provide for adequate containment and cleanup if they do occur. With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, implementation of the SWPPP and SPP, and potentially the additional mitigation described in Section 4.17.3 for the Hamilton Homes and RM Cat Remediation sites, the construction and operation of the SVPP would not result in a change of productivity of the project area due to impacts from hazardous materials to surrounding soils, surface water, or groundwater.

4.17.12 Irreversible and Irretrievable Commitment of Resources

With adherence to LORS and the applicant-committed environmental protection measures described in Chapter 2, implementation of the SWPPP and SPP, and potentially the additional mitigation described in Section 4.17.3 for the Hamilton Homes and RM Cat Remediation sites, there would be no irreversible commitment of resources caused by the use of hazardous materials and the generation of solid waste under any of the action alternatives. The mitigation measures previously described are implemented to

prevent spills and leaks of hazardous materials, and provide for adequate containment and cleanup if they do occur.

4.18 SOCIAL AND ECONOMIC CONDITIONS

4.18.1 Analysis Area, Approach and Assumptions

Social and economic conditions include analyses of population and demographics, economic sectors and employment, environmental justice, and quality of life for the proposed project. The study area for the socioeconomic analysis consists of the communities of Goodyear and Maricopa, as well as Maricopa and Pinal Counties. This analysis focuses on the populations closest to the project area and includes a broad cross section of demographics in which the project is situated. The data presented for state-, county-, and Census Tract-level demographics are used for comparison purposes. The impacts analysis for socioeconomics evaluates the social and economic effects, both positive and negative, of the construction and operation of the SVPP.

Short-term impacts are considered to be 1.5 to 4 years (generally, the construction phase). Long-term impacts are considered to be greater than 4 years for the life of the project (post-construction use of the Parkway).

The social and economic impacts are quantified where possible. However, where quantification of impacts is not possible, the analysis includes a qualitative discussion of possible effects. Current AUMs for the Beloat and Conley allotments are being assessed and are not known at this time. The analysis includes separate but integrated approaches to addressing social, economic, fiscal, and environmental justice impacts of the SVPP.

4.18.2 No Action

Under the No Action Alternative, the SVPP would not be built, and impacts to social and economic conditions would remain similar to current conditions. However, no access would be available to the annexed areas south of Goodyear and connecting to Mobile, and people would continue to use the EPNG pipeline maintenance road which presents certain safety risks to public traffic. Under the No Action Alternative, the primary purpose of the project would not be met and no direct access to/from the city of Goodyear to the SVPA would exist to facilitate traffic movement and meet existing and future transportation demand for a transportation connection within this area. Additionally, emergency services would not have a route that would allow timely response to residents of the SVPA. Currently residents, municipal services, and commuters only have two viable options for traveling to and from the municipal boundaries of Goodyear south to Mobile and beyond: 1) an easterly route that uses SR 238 east to SR 347 (Maricopa Road), SR 347 north to 51st Avenue, 51st Avenue to I-10, and I-10 west to Goodyear—a total distance of over 55.5 miles; or 2) a westerly route that uses SR 238 west to SR 85, SR 85 to I-10, and I-10 east to Goodyear—a total distance of about 68 miles.

Recent population growth has created increasing traffic volumes on area roadways that have markedly reduced the operating conditions on these roadways. Some members of the public, including residents of Mobile, as well as others from outside the community, have been using the unpaved EPNG pipeline maintenance road to travel to and from Mobile and the core areas of the city of Goodyear. Such use poses a safety risk and is not recommended by the BLM because EPNG's authorization to use the ROW does not include public travel safety concerns around buried pipelines. The maintenance road runs northwest-southeast and generally parallels the eastern boundary of the SDNM. Four existing natural gas pipelines

(three EPNG gas lines and one Transwestern gas line) are buried directly beneath the maintenance road, and in some places they lie only a few inches beneath the surface and pose a safety threat to the vehicles driving over them. Unauthorized vehicles using the maintenance road also exacerbate erosion problems. Under the No Action Alternative, continued and additional public use of the EPNG pipeline maintenance road would persist, causing further safety risks.

From a regional perspective, the Sonoran Valley Parkway was conceptualized to provide an important connection within the regional transportation framework established by the MAG in the Regional Transportation Plan (2010) and the Hidden Valley Transportation Framework Study (2009). Under the No Action Alternative this important link in the regional transportation network would not be realized.

Under the No Action Alternative, both short-term and long-term negative, moderate to major impacts would occur both locally and regionally, as travelers and residents within the SVPA would not have a viable roadway connection from southern Goodyear to Mobile, SR 238, and beyond. These travelers may continue to use the EPNG pipeline road which is unsafe for large volumes of traffic. In the long term, as population growth continues, use of the EPNG pipeline road may become increasingly unsafe, because the purpose of the road is for maintenance access and it is not built to accommodate large volumes of vehicular traffic.

4.18.3 Impacts Common to all Action Alternatives

The introduction of a Parkway in the Rainbow Valley area would provide a transportation corridor where currently none legally exists. The impacts common to all action alternatives from the socioeconomic and environmental justice conditions perspective would include the potential for spurred residential and commercial growth as an indirect effect of the introduction of a Parkway; increased transportation and access to enhance public health and safety and emergency services; the increase of noise generated by the Parkway; the potential for reduction in wildlife and wildlife habitats; and the potential for reduction in recreationist and viewer experience in this rural, semiprimitive desert landscape. Impacts to socioeconomic and environmental justice are largely the same for each of the alternatives.

Long-term impacts to social and economic conditions from the introduction of the Parkway would be largely local and beneficial, that is, a new transportation corridor would benefit the current residents within the Rainbow Valley area as well as residents of Goodyear, Mobile, Maricopa, and beyond, by providing a safer alternative than the EPNG pipeline road, and improved transportation connections. Economic impacts would not be directly affected by the introduction of a road. Environmental justice populations would also benefit from the proposed Parkway, since it could provide increased access to public transit options for citizens who do not own a vehicle.

4.18.3.1 Population and Demographics

Under all action alternatives, project construction would occur on a phased schedule over the course of several years for each phase (the exact construction schedule has yet to be determined; each phase would add two additional through-lanes). The staffing for project construction would be expected to draw from the existing construction workforce in the region, including metropolitan Phoenix. According to Arizona Industry Employment projections for 2011 through 2013, construction-related jobs are expected to grow by over 13,000 and construction represents one of the major sectors for projected employment gains, particularly in the sub-sectors of heavy and civil engineering construction (EPS 2012). Because of the availability of construction workers within the metropolitan Phoenix area, construction workers would commute to the SVPP from their local residences rather than relocate. Therefore, there would be no anticipated increase in population or change in demographics in the short-term due to construction.

Studies have shown that one important effect of building a Parkway is the increase in commercial or residential development as the Parkway allows accessibility, reduction in travel time and cost, better access to public schools, and transport of goods and services, resulting in a benefit for both social and economic conditions. During operation of the Parkway, increased access to the SVPA and Mobile areas is expected to spur on commercial and residential growth (ADOT 2001). In addition, and indirectly related to the construction of the Parkway, population growth projections indicate considerable increases in population within Rainbow Valley (MAG 2009). According to the City of Goodyear, the SVPA is estimated to have over 202,000 residents and nearly 60,000 jobs at build-out conditions (City 2007). Therefore, should the exponential increase in population and development in the long term occur, the impacts of the SVPP within the local and regional context would be beneficial to the population. Generally, the SVPP would also provide a benefit to the community, since it would provide a safe alternative for transportation access where one does not currently exist.

4.18.3.2 Economic Sectors and Employment

Economic Activity

Impacts to economic factors which include income, cost of living, and taxes and revenues are discussed below.

Income

The proposed project would provide income to construction workers, therefore impacts to income will be beneficial and short-term. The timeframe for construction of the proposed Parkway is currently unknown and will be dependent upon future transportation funding availability.

Though direct and indirect economic impacts to income are largely unquantifiable, from a qualitative perspective, the operation of a new Parkway where one did not exist previously, will provide access to new areas for residential and commercial development, thus providing more potential opportunities for income generation.

Cost of Living

Given the relatively small number of construction workers needed to build this 15.7-mile-long Parkway, cost of living is not expected to be affected.

Cost of living may be indirectly impacted by the addition of the proposed Parkway, as studies indicate that proximity to a Parkway reduces travel time and cost of travel, by decreasing the vehicular distances being traveled. In addition, access to a Parkway also allows for the capability of affordable housing to be purchased. Changes to the cost of living index due to the construction and operation of the Parkway is unquantifiable at this time.

Taxes and Revenues

Property Tax

Because the construction workers are anticipated to commute rather than relocate to the project area, the proposed project is not expected to have any effect on property tax. However, real property taxes are calculated by Maricopa County based on the assessed value (not current market value) of a property and multiplied by the tax rate set in August of each year. Therefore, should the assessed value of real property in the Rainbow Valley area increase due to additional development or other factors, property tax may, correspondingly, increase providing a long-term benefit.

Sales, Use, and Lodging Taxes

Construction workers are anticipated to commute rather than relocate to the project area, therefore the construction of the Parkway is not expected to have any effect on lodging taxes within the region. However, construction workers are likely to purchase more goods and services locally as a result of being employed, which could slightly increase sales and use tax revenue generated in the study area and region. In the long-term, increased access to the Rainbow Valley area may promote additional visitors and travelers to the area, thus increasing sales and lodging tax revenue.

Housing and Property Values

Housing and property values in the Goodyear area have been highly affected by the economic downturn similar to the general negative shift in the housing market affecting the entire nation. Initially, the Parkway concept originated based on proposed residential development within Rainbow Valley, as currently no transportation access exists. Despite the withdrawal of large planned residential developers in the area, the need for a transportation facility still exists and would provide access to existing and future residences which would likely result in an increase in land value, property values, and building permits for new construction.

Property values generally reflect two components of value: the land itself; and the improvements on the land. Studies have shown that high-capacity Parkways often have a negative impact on property values at a localized level; however in general, land values increase with the overall improvement of a community, which would include the addition of transportation improvements. Additionally, little information exists on the effect of Parkways on property values, as Parkways are typically more conducive to urban development that supports a multitude of activities and the overall desirability of a location (ADOT 2001). A quantitative assessment of changes to housing and property values as a result of the Parkway was not conducted for this analysis.

In general, the housing stock in the Rainbow Valley area is low-density residential, with the largest concentration located near Mobile and SR 238 (at the southern terminus of the proposed Parkway). Though current trends in the housing market indicate that conditions are improving, the likelihood of large-scale developments being funded and constructed in Rainbow Valley is unconfirmed at this time. Though property values and plans for new development within the city of Goodyear have been highly affected by the economic downturn, the housing market is beginning to improve as indicated by the decrease in foreclosures and the slight increase in applications for building permits. Additional improvement to the housing market in general is expected, and the addition of a Parkway for access to Rainbow Valley will likely improve the appeal of this area for prospective investors and residents, thus providing a long-term benefit for housing and property values.

Economics Related to Recreation

Revenue generated from recreational activities composes a large proportion of state and regional economics (Dean Runyan 2006). As stated in Section 4.13 Recreation Management, all action alternatives would result in a direct loss of recreational settings and opportunities within the transportation ROW. However, recreational activities would still be accessible for the surrounding landscape and the introduction of a Parkway may promote additional recreational opportunities to the area due to improved access.

Each dollar spent by an angler or hunter increases another person’s income, enabling that person (or business) to spend more, which in turn increases income for someone else. The process continues to circulate throughout the economy until it is dissipated through ‘leakages’ in the form of savings or payments for goods and services from outside the local economy. In the end, the cumulative changes in

spending, incomes, and employment are a multiple of the initial retail sales spending (AGFD 2002). Changes to recreation-driven economic revenue would not occur as a result of the construction and operation of the Parkway, as no fee-generating activities (e.g., hunting, enthusiast events, etc.) occur in the Rainbow Valley area. Impacts resulting from the proposed Parkway would be considered the loss of opportunity to recreate in the immediate ROW, which is monetarily unquantifiable. However, increased access to an area for the purposes of recreation could generate recreation-related revenue, though the exact extent of recreation-generated revenue is unknown.

Increased growth in Arizona exerts environmental pressures on surrounding areas as development moves closer to BLM lands. As growth continues and development increases, the demand for access to and use of open space and recreational areas will also increase.

Economics Related to Livestock Grazing

Revenue generated from livestock grazing is based on resource and livestock conditions. Loss of forage and available AUMs within the proposed SVPP ROW could result in a loss of grazing-related revenue to the federal government; however, ranchers may find alternative forage to offset some of these anticipated losses. Currently, the Beloat and Conley allotments are identified for active livestock grazing. The SDNM RMP (2012) removed 77,485 acres located within the SDNM from the Conley allotment. Each alternative presented for the SVPP would change or reconfigure the livestock grazing allotment boundaries. Reconfiguring livestock grazing allotment boundaries would impact the livestock movement patterns, the allotment permittee, and the BLM. Reconfiguring livestock grazing boundaries may prevent livestock from moving in and out of the existing pasture in site-specific locations (as analyzed in Section 4.12, Livestock Grazing), require new grazing improvement construction, render grazing improvements unusable, and may decrease available acreage for grazing, which could decrease the AUMs and subsequent value of the allotment. This would result in an adverse, long-term impact to the economics generated from livestock grazing on the Conley allotment, both for the allotment permittee as well as the federal government. However, at this time, AUMs and reconfiguration of boundaries by alternative are unknown.

Employment

The construction workforce for the SVPP would be expected to be filled by the available labor supply in Maricopa County and metropolitan Phoenix. Construction employment resulting from the development of the SVPP would be a beneficial, short-term impact to individuals in nearby communities seeking employment, because the project would provide new construction jobs to an area that has recently endured high rates of unemployment. Because total employment from construction would come from the available labor supply in Maricopa County and metropolitan Phoenix, it would have a negligible effect on total employment in the study area. In the long term, development of commercial and industrial centers are planned for Rainbow Valley, and so the Parkway would indirectly benefit employment conditions because it would provide improved access from residences to employment centers.

Unemployment

Although construction of the SVPP may offer short-term employment opportunities to residents of the study area, overall impact on unemployment in the study area would be negligible. During operation of the SVPP, total impacts on unemployment may indirectly be improved because the Parkway would provide access to employment opportunities for residents.

4.18.3.3 Environmental Justice

As discussed in Chapter 3.18, consideration of environmental justice issues is mandated by Executive Order 12898, and is required to be examined by federal agencies by "identifying and addressing…disproportionately high and adverse human health of environmental effects of their programs, policies and activities on minority and low-income populations in the United States." For the purposes of this analysis, EJ populations were identified in areas where minority populations composed over 50% of the general population, or were a significantly greater minority population than the reference population, or where low-income populations (those living below the poverty line) exist in larger proportions than the reference population.

Four potential EJ populations were identified in Census Tracts 7233.06, 9410, 9411, and 9413. These Census Tracts had a proportionately higher population of Hispanic, African-American, or American Indian ethnicities (see Table 3-32). Figure 3-25 identifies these Census Tracts to be located within the area of analysis (Census Tract 7233.06) and tribal lands (Gila River Indian Community, Census Tracts 9410, 9411, and 9413), respectively. Additionally, low-income populations also were identified for two of the four minority population Census Tracts (Census Tracts 9410 and 9413), both of which are located within the Gila River Indian Community (over 12 miles to the east). One additional Census Tract revealed a population of over 20% below the poverty level (Census Tract 7233.04). Though both minority and low-income populations were identified within the area of analysis, it was determined that the SVPP would not disproportionately impact these communities relative to all other non-minority populations in the analysis area, regardless of income. In addition, the identified EJ communities are a minimum of 2 miles from the proposed Parkway, further reducing the chances of disproportionate impacts. It was also determined that the introduction of a Parkway on other environmental resources that could negatively affect environmental justice communities (such as air quality, noise, health and human safety, and visual resources) would also not result in a disproportionate or adverse impact on the EJ communities, since these impacts would largely be minor. The addition of a Parkway or transportation access that can also support public transportation would be a beneficial impact to environmental justice communities as currently no, or limited access exists in this area, and public transit provides a mobility option for those who do not own a vehicle.

Quality of Life

The communities of Goodyear and Maricopa, specifically residents closest to the proposed Parkway, would likely notice impacts to their current rural quality of life in terms of transportation and access, noise, recreation experiences, and visual resources. During construction, traffic would increase in the communities near the vicinity of the SVPP. At the peak of construction, construction-related vehicles and equipment would be traveling to and from the construction site on a daily basis, and additional trucks per day would be making trips to and from the site. During operation, traffic volume along SR 238 would continue to increase as a result of greater access to the roadway from the Parkway for commuters from the Rainbow Valley to and from metropolitan Phoenix. Such increases in traffic volume could adversely affect the quality of life for those who value living in a rural community. Conversely, for those who reside within the Rainbow Valley area and commute to and from greater Phoenix, the quality of life may be improved by improved access that the Parkway would provide along with shorter commute times and less traffic. Also, greater access to SR 238 as provided by the Parkway would provide long-term benefits including a better quality of life to residents, by improving emergency response times as vehicles and utility-related traffic would now have direct access to this area.

Construction and operation of a Parkway in the relatively remote Rainbow Valley area is expected to increase the local noise level above the current conditions, both in intensity of the noise and frequency of events. Noise generated by the Parkway is not anticipated to exceed acceptable noise levels for roads.

Other noise generators, such as Luke Air Force Base, Barry M. Goldwater Range, the Phoenix-Goodyear Municipal Airport, and the Lufthansa Aviation Training facility, are located well outside of the immediate Parkway and are not anticipated to contribute to major noise increases. Noise generated by OHV use is often the biggest contributing factor currently to increased ambient noise in the area. Changes in the soundscape can adversely affect the quality of life for nearby residents and recreationists who experience cumulative increases in noise-generating activities. However, construction and operation of a Parkway is subject to local noise ordinances.

Additionally, during final design and construction, noise-calming techniques such as the use of quiet pavement, noise walls, and other noise abatement measures can be employed both during design and construction and subsequently as necessary. A full discussion of impacts on noise is discussed in Section 4.16.

Recreation experiences can contribute to a person's overall quality of life and/or shape their identity or self-perceptions. Individuals seeking solitude and a primitive recreation experiences could be adversely impacted by the addition of a Parkway during construction and operation. Conversely, during operations, new and improved roads and utility corridors surrounding the SVPP may provide for more opportunities for access, and quicker, safer connections in the Rainbow Valley area for motorized and non-motorized recreationists. The proposed project may therefore be perceived as a beneficial recreational impact for certain user groups. A full discussion of impacts on recreation is discussed in Section 4.13.

From a visual perspective, the proposed project would change the landscape characteristics, existing landforms, and vegetation in the area, which would contribute to an overall change in the sense of place for members in nearby communities. The shift from a rural, desert landscape to a more developed landscape during construction and operation of the SVPP may adversely impact local residents and visitors to the area who are seeking a rural or semiprimitive view or recreation experience. The viewshed within the immediate foreground and middle ground (up to 5 miles away) would have views of a Parkway where none existed previously. The motion of cars and the Parkway itself would present visual contrast which would result in moderate negative impacts within the long term to local populations who seek views of natural and unadulterated landscape. A full discussion of impacts on visual resources is discussed in Section 4.7.

In sum, changes to quality of life would be impacted by the construction and operation of the SVPP, and in some cases, the development of this transportation corridor would improve the quality of life for some local populations, depending on destination and objective. Contrarily, for those seeking a rural and semiprimitive experience, the addition of urbanized features such as a Parkway, accompanied by increased traffic volume (i.e., the two-lane Parkway scenario would allow capacity of approximately 24,000 vehicles per day; four lanes would accommodate 48,000 vehicles per day; and six lanes would accommodate 72,000 vehicles per day) would deteriorate elements that define their quality of life.

4.18.3.4 Two-lane Parkway

The two-lane Parkway would increase access for the area between southern Goodyear and Mobile, Arizona. Currently, no viable access is available for vehicular traffic. Additional transportation access would provide community benefits and spur economic growth. The two-lane scenario would accommodate approximately 24,000 vehicles per day and would allow opportunities for public transit (e.g., buses and paratransit or dial-a-ride) to reach populations located within the Rainbow Valley area. Current transportation conditions in the Rainbow Valley area do not support expected population growth and at the present, many local travelers use the EPNG pipeline road which is unpaved, and unsafe for public traffic.

4.18.3.5 Four-lane Parkway

Impacts from a four-lane Parkway scenario would be the same as the two-lane scenario but would accommodate additional traffic volume. The four-lane Parkway scenario would be constructed dependent upon traffic demand and funding. A four-lane Parkway can accommodate 48,000 vehicles per day. Additional lanes would be added to the two-lane scenario as need is established, or level of service on the Parkway is diminished, and travel time and traffic congestion increases.

4.18.3.6 Six-lane Parkway

The six-lane Parkway scenario would be the ultimate build-out of the road (i.e., no additional through lanes would be accommodated within the ROW). Based upon the City of Goodyear General Plan for land uses in Rainbow Valley at build-out, this area would support 86,000 residential dwelling units, and opportunities for approximately 48,000 commercial or industrial jobs within the 4,200 acres of commercially zoned land. Given these build-out conditions, future growth would generate approximately 1.23 million daily vehicle trips, less than half with an origination or destination within Rainbow Valley, indicating that most of the traffic on the Parkway would be from outside of Rainbow Valley. The six-lane Parkway would accommodate approximately 72,000 vehicles per day and, in tandem with improvements to the overall transportation system in Goodyear and Maricopa County, would support future vehicular traffic demand.

4.18.4 Alternative A, the BLM Preferred Alternative, Direct and Indirect Impacts

Direct and indirect impacts to Alternative A are presented in the above section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.4.1 Two-lane Parkway

The introduction of the two-lane Parkway into an area that currently has no improved transportation access would likely result in increased flow of people and goods from southern Goodyear to Mobile, SR 238, and beyond. This connection could spur population growth through the development of residential and commercial centers. However, quantification of potential residential and commercial development is also dependent upon private funding, market trends, and other factors. Population growth could occur regardless of the Parkway being constructed; as stated in the RFD (see Appendix B, Reasonably Foreseeable Development), population in the Rainbow Valley area is expected to grow exponentially over the next few decades, and thus the addition of a transportation facility that accommodates vehicular traffic as well as transit and pedestrian and bicycle traffic would allow for the efficient circulation within the area. The two-lane scenario allows for approximately 24,000 vehicles per day in bidirectional traffic and represents an important connection for southern Goodyear, Mobile, Maricopa, and the region.

4.18.4.2 Four-lane Parkway

The introduction of the four-lane Parkway would be similar to the two-lane scenario but would also result in increased transportation capacity from 24,000 vehicles per day to 48,000 vehicles per day. The four-lane Parkway scenario would support additional population growth as projected by MAG that is slated to occur in this area (MAG 2010).

4.18.4.3 Six-lane Parkway

The introduction of the six-lane Parkway would be similar to the four-lane scenario and would also result in additional increased transportation capacity to 72,000 vehicles per day. The six-lane Parkway scenario would represent build-out conditions of the Parkway (that is, no additional through-lanes would be constructed within the ROW). In addition to accommodating more traffic, the six-lane Parkway could include consideration of improved public transit and pedestrian and bicycle facilities, providing an additional long-term benefit to the local and regional population.

4.18.5 Alternative C Direct and Indirect Impacts

Direct and indirect impacts to Alternative C are presented in the above section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.5.1 Two-lane Parkway

Impacts from the two-lane Parkway under Alternative C would be the same as under Alternative A. The introduction of the two-lane Parkway into an area that currently has no improved transportation access would likely result in increased flow of people and goods from southern Goodyear to Mobile and SR 238. This connection could spur population growth through the development of residential and commercial centers. However, quantification of potential residential and commercial development is also dependent upon private funding, market trends, and other factors.

4.18.5.2 Four-lane Parkway

Impacts from the four-lane Parkway under Alternative C would be the same as under Alternative A. The introduction of the four-lane Parkway would be similar to the two-lane scenario but would also result in increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.5.3 Six-lane Parkway

Impacts from the six-lane Parkway under Alternative C would be the same as under Alternative A. The introduction of the six-lane Parkway would be similar to the four-lane scenario and would also result in additional increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.6 Alternative H Direct and Indirect Impacts

Direct and indirect impacts to Alternative H are presented in the above section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.6.1 Two-lane Parkway

Impacts from the two-lane Parkway under Alternative H would be the same as under Alternative A. The introduction of the two-lane Parkway into an area that currently has no improved transportation access would likely result in increased flow of people and goods from southern Goodyear to Mobile and SR 238. This connection could spur population growth through the development of residential and commercial centers. However, quantification of potential residential and commercial development is also dependent upon private funding, market trends, and other factors.

4.18.6.2 Four-lane Parkway

Impacts from the four-lane Parkway under Alternative H would be the same as under Alternative A. The introduction of the four-lane Parkway would be similar to the two-lane scenario but would also result in increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.6.3 Six-lane Parkway

Impacts from the six-lane Parkway under Alternative H would be the same as under Alternative A. The introduction of the six-lane Parkway would be similar to the four-lane scenario and would also result in additional increased transportation capacity. This connection could spur population growth through the development of residential and commercial centers.

4.18.7 Sub-alternative F Direct and Indirect Impacts

Sub-alternative F, a 2.8-mile-long segment of the Parkway which would provide the southern connection to SR 238, would have the same impacts as those presented in the Impacts Common to All Action Alternatives section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.8 Sub-alternative G, the BLM Preferred Sub-alternative, Direct and Indirect Impacts

Sub-alternative G, a 2.4-mile-long segment of the Parkway which would provide the southern connection to SR 238 and the BLM Preferred Sub-alternative, would have the same impacts as those presented in the Impacts Common to All Action Alternatives section, since socioeconomic and environmental conditions for each action alternative are the same.

4.18.9 Additional Mitigation Measures

The following mitigation measures, or actions undertaken to avoid or reduce adverse impacts, are recommended for socioeconomic and environmental justice conditions:

- Reimbursement to allotment permittees for lost AUMs and range improvements.

4.18.10 Residual Impacts

Residual impacts are those impacts that remain after applying mitigation measures. No residual impacts resulting from the proposed project with regard to socioeconomic and environmental justice conditions are expected.

4.18.11 Short-term Uses versus Long-term Productivity

Under all action alternatives, social and economic conditions would be altered in both the short and long term, with new and existing transportation constructed and expanded from existing transportation routes. The current transportation routes within the area do not present enough viable options for commuters to and from the Phoenix metropolitan area. Given existing levels of traffic congestion and use of

unauthorized utility roads for commuting, new transportation uses would provide better means of transportation for residents, emergency services, and infrastructure maintenance. This could increase long-term productivity in terms of improving quality of life conditions for commuters in the area.

4.18.12 Irreversible and Irretrievable Commitment of Resources

The introduction of a Parkway would create no irreversible or irretrievable commitment of resources for socioeconomic and environmental justice conditions.

4.19 CUMULATIVE IMPACTS

Based on the list of cumulative actions (Appendix H, SVPP Cumulative Actions), the following discussions identify which of those actions would have a cumulative effect per resource area.

4.19.1 Air Resources

The area of analysis for air resources cumulative impacts is the extent of the SVPA. The SVPA represents a reasonable region in which existing land use types, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented. In this analysis, the SVPA is defined as the area bounded by Patterson Road on the north, the Papago Road Alignment (which lies 4 miles south of SR 238) to the south, the Maricopa–Pinal County boundary on the east, and the SDNM on the west.

The past and present actions in the SVPA have had a direct effect on the air quality in the area. Land in the SVPA is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Past recreation use consists of mostly hiking, hunting, horseback riding, and driving for pleasure. The combination of sparse development, unpaved roadways, and recreation has contributed to the high measured concentrations of coarse particulates (PM_{10}) and the current non-attainment status for this criteria pollutant. Present actions have not significantly changed the rural character of the area.

Reasonably foreseeable actions in the SVPA include the Hassayampa Freeway construction and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would result in increased urbanization of the area and increased proximity of receptors to an expanded local roadway network. Concentrations of CO could potentially increase due to increases in traffic but PM_{10} concentrations could be reduced by providing paved surfaces for local traffic that is currently utilizing the segmented unpaved roadway network.

Under all action alternatives and sub-alternatives, construction and operation of the SVPP would result in additional emissions of criteria pollutants. All air emissions would be appropriately mitigated to comply with the CAA, MACQD Air Pollution Control Regulations, the Arizona SIP, and new SIP revision, titled *MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2012).

4.19.2 Cultural and Heritage Resources

The analysis area for cumulative effects consists of a 1-mile buffer around the ROW for the alternatives and sub-alternatives. Projects that may contribute to cumulative impacts from the construction of the SVPP include increased access to heretofore remote BLM lands, residential development along the SVPP

corridor, and construction of more highways and other roads such as the proposed SR 303L. Increased access and visitation to the resources via the SVPP increases the threat of disturbance from off-road recreational activities and looting. Because the Parkway and future development would change the character and usage of the southern end of Rainbow Valley from backcountry and rural to more suburban and urban, increased development along the SVPP corridor would lead to direct impacts to the resources, such as additional removal of cultural resources from the landscape; and the indirect effect of altering the setting through visual and auditory impacts. The construction of other roads such as the proposed I-11 (Hassayampa Freeway) may cross the Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor and Management Area, which would lead to further fragmentation of the resources.

Cumulative impacts may also include impacts to as-yet undiscovered historic properties as a result of future actions, such as future residential development in the study area, the Rainbow Valley MCFLD plan, the conceptual SR 303L alignment, and the conceptual Hassayampa Freeway alignment. For all of these cumulative actions, the amount and type of disturbance to sites would be the primary impact indicator; however, existing regulations stipulate that all past, present, and future projects, including mining applications, construction of utility lines, fire management, etc., on federal lands are subject first to cultural resources inventory. If sites are found during inventories, disturbance to those sites must be mitigated. Since avoidance is the primary mitigation measure for any project, it can be assumed that the total number of cultural resources that would need to be mitigated further through data recovery or other means for these projects is minimal and would not significantly change the historic or prehistoric character of the analysis area; therefore, cumulative impacts to cultural resources are anticipated under all action alternatives.

4.19.3 Paleontological Resources

The analysis area for cumulative impacts consists of the Rainbow Valley floor surrounding the ROW for the alternatives and sub-alternatives. The sediments on the valley floor are fairly uniform and consist of the same geological units as the overall project area. Actions that may disturb or have disturbed sediments on the valley floor include OHV use, the Sonoran Solar Energy Project, future residential development, the SR 303L alignment, and the Hassayampa Freeway (I-11); however, because the analysis area has a low potential for the presence of paleontological resources (PYFC 2) and no fossils are likely to be present in the analysis area, no cumulative impacts to paleontological resources are anticipated.

4.19.4 Soil Resources

The area of analysis for cumulative impacts to topography, geology, and soils is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing resources, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented. In this analysis, the Rainbow Valley is defined as the Waterman Wash and Rainbow Wash watersheds, bounded generally by the Buckeye Hills and Gila River to the north, the Sierra Estrella Mountains to the east, and the Maricopa Mountains to the south and west.

Land in the Rainbow Valley is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Construction and operation of the SVPP would not increase the amount of groundwater withdrawal and therefore would not have a cumulative effect on the extent or rate of local land subsidence.

Reasonably foreseeable actions in the Rainbow Valley include expansion of the proposed SVPP from a two-lane Parkway up to six lanes, SR 303L construction, Hassayampa Freeway construction, and future

development in the study area (southern Goodyear, Mobile area, town of Maricopa, etc.). While the expansion of the SVPP to six lanes would occur within the 250-foot-wide ROW and would not result in additional impacts to soil resources beyond those described above, the other potential development would result in further impacts to soil resources in the region by additional grading, paving, building, landscaping, and other actions and associated uses.

Increased development in the area could possibly also result in land subsidence depending on the location of the water supply and the rate of groundwater withdrawal for new development. The source of water supplies for future development is unknown at present.

4.19.5 Vegetation Resources

The area of analysis for cumulative impacts to vegetation resources is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The implementation of the SVPP as proposed along with the past and present actions for this area could create a moderate, long-term cumulative impact to vegetation resources. Past and present actions, such as agricultural activities, Butterfield Station Landfill, transportation corridors, and utility ROWs (see Appendix H, SVPP Cumulative Actions, for a complete list of cumulative actions for this project), have contributed to this impact by removal of vegetation and also potentially introducing non-native plant species.

The implementation of the SVPP as proposed along with reasonably foreseeable actions for this area could create a minor, long-term cumulative impact to vegetation resources. These impacts could include an increased loss of acreage to vegetation communities; an increased loss and/or disturbance of special-status species individuals and their habitat; and increased risk of introduction and establishment by noxious and invasive plant species. Future actions, such as the SR 303L construction, Hassayampa Freeway construction, residential developments (including master-planned communities), and renewable developments, could further contribute to this impact by the removal of vegetation and also potentially introducing non-native plants. However, one reasonably foreseeable action, the BLM Programmatic Weed Environmental Assessment—Waterman Wash, has the potential to create a moderate, long-term beneficial impact to vegetation resources by reducing the impact of noxious and invasive species because its intent is to reduce the risk of wildfires through a reduction of fuels, restoring lands damaged by wildfire, and improving ecosystem health.

4.19.6 Visual Resources

The area of analysis for cumulative impacts to visual resources is the extent of Rainbow Valley. Rainbow Valley appropriately constitutes the area within which existing visual resource conditions and visual resource management objectives, when assessed in combination with other cumulative actions, would be moderately impacted if the SVPP were implemented.

Based on the list of cumulative actions (Appendix H), the following discussions identify which of those actions would have an additive and incremental cumulative effect to visual resources.

Reasonably foreseeable actions such as future residential development, SR 303L, and I-11 would also cumulatively contribute to visual resources impacts in the area from each of the KOPs respectively. At this time, the alignments, dimensions, and construction methods of these transportation and future development projects are conceptual and in various stages of planning. Generally, the most evident

cumulative impacts would be from KOP 2 (residence) and KOP 3 (Sierra Estrella Wilderness). From KOP 2 the addition of the proposed Parkway in combination with future residential, commercial, and transportation development would result in dramatic changes to the viewshed which currently is largely flat, open landscape. Line, texture, and color contrast from future roads would result in views of ribbons or bands of roadways that do not blend with the natural landscape. From KOP 3 (Sierra Estrella Wilderness) visual contrast would be located in middle ground and background distance zones, however, views from this point capture the entire panoramic expanse from an elevated position and therefore would afford views of multiple future developments culminating in moderate to strong visual contrast, tempered only by distance. From KOP 3 similar bands of roadway and additional human-made structure contrast would be evident in the viewshed.

4.19.7 Water Resources

The area of analysis for cumulative impacts to water resources is the extent of Rainbow Valley.

The past and present actions in the vicinity of the project that have had a direct effect on water resources are agriculture, and the expansion of the city of Goodyear and annexation of BLM lands. Impacts from these past actions on surface water include the area of ephemeral drainages that have been disturbed or altered with the footprint of an agricultural field or residential/commercial development. Plans that have been put into place that likely will have a positive impact on surface water resources in the area include the Rainbow Valley FCDMC plan of the Metro Phoenix ADMP. The impact to groundwater resources includes the amount of water that has been pumped for agricultural water or residential use or for the Sonoran Solar Energy Project.

Reasonably foreseeable actions in the Rainbow Valley with the potential to affect surface water resources include future residential development within the Waterman Wash watershed; SR 303L construction; and I-11 (Hassayampa Freeway) construction. All linear transportation projects have the potential to impact surface water drainage and quantity if not designed to allow the passing of ephemeral flows to downstream washes.

Reasonably foreseeable actions with the potential to affect groundwater resources include the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. The cumulative effect of expansion of surrounding communities has the potential to reduce groundwater availability with the additional water demands for new residential and commercial use that would be anticipated with the approximate projected population of 60,000 residents (City 2009). For comparison purposes, Phoenix's annual household water usage is approximately 73,000 gallons per year (City of Phoenix 2013). As stated in the RFD (Appendix B), current development has slowed due to the economic recession of 2008–2011.

4.19.8 Wildland Fire Management

The area of analysis for cumulative impacts to wildland fire management is the Rainbow Valley. Foreseeable future actions that would have a combined cumulative impact on wildland fire management within the analysis area are anticipated population growth and the expansion of Goodyear, Buckeye, and Maricopa city/town limits to accommodate future master-planned communities. Population growth would increase human presence within the ROW as traffic increases, and subsequently increase the chance of fire ignition. Urban expansion along the SVPP and other areas adjacent to BLM lands would result in an increase in WUI areas and a subsequent increased focus on achieving WUI wildland management objectives in these areas.

Conversely, future community development (including but not limited to increased population, increased traffic, and increased roadway network) would include the impacts associated with increased ignition risk, hazards to firefighters and other emergency responders, and increased herbaceous fuel load. Therefore, the cumulative effects to wildland fire management would be moderate but long-term.

4.19.9 Wildlife and Special-Status Species

The area of analysis for cumulative impacts to wildlife resources is the extent of Rainbow Valley, which includes the slopes of the surrounding mountains bounding the Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The implementation of the SVPP as proposed along with the past and present actions for this area could create a moderate, long-term cumulative impact to wildlife. These impacts could include an increased loss and/or disturbance of general wildlife and special-status species individuals and their habitat; and an increased risk of displacement and mortality to general wildlife and special-status species due to noise from construction and travel on the Parkway once constructed. Increased loss and/or disturbance of species and their habitat impacts species by limiting the areas in which they can live, forage, or reproduce, thereby turning basic functions into struggling-just-to-survive functions. Similarly, displacement and mortality of species due to noise and Parkway travel can cumulatively result in the area no longer being compatible for certain species. Past and present actions, such as agricultural activities, Butterfield Station Landfill, transportation corridors, and utility ROWs (see Appendix H, SVPP Cumulative Actions, for a complete list of cumulative actions for this project), have contributed to this impact by removal of habitat and increased human presence in the region.

The implementation of the SVPP as proposed along with reasonably foreseeable actions for this area could create a moderate, long-term cumulative impact to wildlife. These impacts could include an increased loss and/or disturbance of general wildlife and special-status species individuals and their habitat; and an increased risk of displacement and mortality to general wildlife and special-status species due to noise from construction and travel on the Parkway once constructed. Future actions, such as the SR 303L construction, Hassayampa Freeway construction, residential developments, including master-planned communities, and renewable developments, could further contribute to this impact by removal of habitat and increased human presence in the region. However, one reasonably foreseeable action, the BLM Sonoran Desert Protection Proposal, has the potential to create a moderate, long-term beneficial impact to wildlife by providing protection and stewardship for species and their habitats (e.g., identification and protection of wildlife movement corridors) on lands administered by the BLM. Category I Sonoran desert tortoise habitat would need to provide a 5:1 compensation for habitat loss (BLM 1991).

4.19.10 Lands and Realty

The area of analysis for cumulative impacts to lands and realty is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in Rainbow Valley have had a direct effect on the conversion of lands from one use to another and on the ability to access the area. Land in the Rainbow Valley is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Past recreation use consists of mostly hiking, hunting, horseback riding, and driving for pleasure. Open desert and

agricultural lands have been converted by past actions to residential, commercial, industrial, and conservation uses. These past actions include historic-era mining and agriculture, expansion of the city of Goodyear into the northern reaches of Rainbow Valley, the Butterfield Station Landfill, utility transmission lines and pipelines, and the designation of the SDNM.

Reasonably foreseeable actions in the Rainbow Valley include SR 303L construction and Hassayampa Freeway construction; Sonoran Desert Wildlife Protection Proposal implementation, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These regional roadways would enable future residential development and would result in further changes to the types of land uses.

The SVPP would convert approximately 475 to 554 acres of existing land use from predominantly undeveloped desert land into a transportation land use. This would further reduce the amount of open space land uses (grazing, recreation, undeveloped land), but would increase the ability and likelihood for nearby communities to expand their current city limits and further convert existing land uses.

4.19.11Livestock Grazing

The area of analysis for cumulative impacts to grazing management is the extent of the Beloat and Conley grazing allotments. The Beloat and Conley grazing allotments represent a reasonable region in which existing grazing management, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in the Beloat and Conley grazing allotments have had a direct effect on the conversion of lands from livestock grazing to another use and on the ability to access the area.

The past and present land uses in the area analyzed for cumulative impacts have had a direct effect on extent of grazing and the amount of forage in the area. Land in the Beloat and Conley allotments is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Open desert and lands used for grazing have been converted by past actions to residential, commercial, industrial, and conservation uses. Commercial and residential development has encroached on lands used for grazing and reduced the amount of land and forage available for cattle in the Beloat and Conley allotments. These past actions include historic-era mining and agriculture, the Butterfield Station Landfill, utility transmission lines and pipelines, and the designation of the SDNM.

Reasonably foreseeable actions in the Beloat and Conley grazing allotments include SR 303L construction, Hassayampa Freeway construction, Sonoran Desert Wildlife Protection Proposal implementation, the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa, and associated population growth. These developments of public, State, and private land would result in further changes to the vegetation communities that are used as forage for cattle grazing in the livestock grazing cumulative impact analysis area. The growth of master-planned communities would convert more lands to structures and urban landscaping. The six-lane Parkway scenario would be the ultimate build-out of the road (i.e., no additional through lanes would be accommodated within the ROW). Based upon the City of Goodyear General Plan for land uses in Rainbow Valley at build-out, this area would support 86,000 residential dwelling units, and opportunities for approximately 48,000 commercial or industrial jobs within the 4,200 acres of commercially zoned land. And, construction and expansions of freeways and roads would result in the removal and transformation of native vegetation communities to roadways, with a mixture of native and urban vegetation restoration in road ROWs. For both allotments, reasonably foreseeable actions including the SR 303L, I-11, and solar development will likely increase urban development throughout the area, potentially causing these two livestock operations to be untenable, particularly for the Conley allotment.

The SVPP would convert approximately 53.2 to 62.1 acres of existing land use from predominantly vacant desert land into a transportation land use. This would further reduce the amount of open space land used for livestock grazing.

Specific cumulative impacts to the Beloat allotment are discussed below. Article 7-4 of the City of Goodyear Code includes increased fencing requirements, which when considered incrementally with the fencing requirements of the SVPP, would result in long-term, adverse cumulative impacts. Article 7-4 has impacted livestock movement and increased forage fragmentation, and has caused economic impacts to the permittee. Cumulatively, all alternatives impact the Beloat permittee economically by decreasing the number of AUMs able to graze and increasing the need for more hands-on management for movement of livestock between the pastures created by the project. Alternative A would have the fewest impacts because there is a clean division of pastures northeast and southwest of the project. Alternatives C and H would likely create more small pastures that would need new water sources developed in order to be usable.

Specific cumulative impacts to the Conley allotment are discussed below. The SDNM RMP closed the SDNM portion of the Conley allotment to livestock grazing starting in fall of 2014. The Lower Sonoran Field Office portion of the Conley allotment currently remains available for livestock grazing. Each of the alternatives further eliminates grazing outside the SDNM boundaries, by 712 to 320 acres, depending on the sub-alternative selected.

4.19.12 Recreation Management

The cumulative effects area of analysis for recreation cumulative impacts is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing recreational resource conditions, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in Rainbow Valley have had a direct effect on the availability to access, and thereby experience, a variety of recreation settings and opportunities. Undeveloped BLM lands may provide opportunities for dispersed recreation and opportunities for solitude. Lands within Rainbow Valley provide opportunities for dispersed recreation, including camping, hunting, wildlife observation, photography, backpacking, horseback riding, hiking, and backcountry driving. Low-density residential and agricultural developments have converted native shrub communities of the Rainbow Valley to urban landscaping and agricultural crops and pastures. Commercial and residential developments have lead to surface disturbances and clearing of vegetation and planting of both native and non-native vegetation. Population growth has increased traffic and pressure in recreational areas. While large parts of Rainbow Valley remain undeveloped, the mixture of land use development has altered the land, its character, and the viewshed. The Arizona Desert Wilderness Act created opportunities for primitive recreation in surrounding mountains that are designated Wildernesses. Additionally, the designation of SDNM created opportunities for both developed and primitive recreation experiences.

Except for the construction of trails, these developments of public, State, and private land would result in a loss of opportunities for dispersed recreation and would impact dispersed recreation and opportunities for solitude by affecting the recreation setting (creating more human developments) and the desired experience.

The population of Goodyear and the surrounding region is expected to grow and correspondingly the demand for areas in which to recreate, though development pressure has recently decreased. Conversion of public lands from open, undeveloped desert to other uses such as housing, energy development, and roadways would limit opportunities for dispersed recreation and opportunities to experience solitude.

Increased recreational use in areas such as the SDNM, the Maricopa Wilderness Complex, Estrella Mountains Regional Park, the Sierra Estrella Wilderness, and the Buckeye Hills Regional Park may create conflicts between users that may be seeking different recreational settings and experiences.

The recent closures of SDNM routes have decreased the amount of OHV use and driving-for-pleasure opportunities in the immediate vicinity of the project area.

Reasonably foreseeable actions in the Rainbow Valley include SR 303L construction, Hassayampa Freeway construction, Sonoran Desert Wildlife Protection Proposal implementation, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would result in impacts to the existing recreation experience, setting, and opportunity.

The SVPP would convert approximately 84 to 98 acres of existing BLM land use from predominantly undeveloped desert land into a Parkway for the two-lane Parkway; approximately 167 to 195 acres of existing BLM land use from predominantly undeveloped desert land into a Parkway for the four-lane Parkway, and approximately 220 to 392 acres of existing BLM land use from predominantly undeveloped desert land into a Parkway for the six-lane Parkway.

4.19.13 Travel Management

The area of analysis for cumulative impacts to travel management is both the extent of Rainbow Valley and the regional transportation planning area bounded by Maricopa County lines.

On a local level, the past and present land uses in Rainbow Valley have had a direct effect on the conversion of vacant lands to designated transportation routes. Past and present actions within the study area relevant to travel management have included the construction of SR 238 and utility roads for both EPNG and Transwestern; and the expansion of the city of Goodyear through the annexation of BLM lands.

On a regional level, the MAG has developed a regional transportation plan in response to urban and exurban growth. Included in MAG's regional transportation planning process, are plans for the SR 303L, a major transportation corridor with three general purpose lanes in each direction and an option for future high-occupancy vehicle lanes and a fourth outside lane. SR 303L will generally extend west from I-17 at Lone Mountain and head southwest to Grand Avenue, south near Cotton Lane to I-10 and terminate near MC-85/Buckeye Road. Recommendations for extending SR 303L from SR 30 south to connect with I-8 are also being considered. Depending on the final alignment of the southernmost portion of SR 303L, this roadway will likely serve as an important connection to and from the Parkway within the context of regional transportation. In addition, the I-11 corridor is also being considered as an interstate connection from Arizona to Nevada. Though the roadway is currently in the initial studies of feasibility and planning, a portion of I-11 could pass through the southern Goodyear area, providing an additional high-capacity transportation corridor. The I-11 and SR 303L roads are currently under study and the final design and construction is not funded, scheduled, or programmed at the time of this analysis.

Reasonably foreseeable actions in the Rainbow Valley include the addition of two major roadway corridors, as well as anticipated residential and commercial growth. This potential development would result in further changes to travel management within the area. Anticipated population growth in the area is one of the primary reasons prompting the expansion of existing and proposed transportation routes such as the SVPP. Such expansion would accommodate existing and future commuters in the area.

4.19.14 Special Designations

The analysis area that was used to assess cumulative impacts to special designations is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing special designations, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present land uses in Rainbow Valley have had a direct effect on the special designations in the area. Agricultural and recreational activities in the Rainbow Valley created the road network still in use today. The SDNM was created to protect some of the natural and cultural resources of the mountains to the west of Rainbow Valley, including the Mormon Battalion Trail/Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor. The Arizona Desert Wilderness Act of 1990 enabled the creation of the North Maricopa Mountains, South Maricopa Mountains, and Sierra Estrella Wilderness areas.

Reasonably foreseeable actions in the Rainbow Valley include SR 303L construction, Hassayampa Freeway construction, Sonoran Desert Wildlife Protection Proposal implementation, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would further alter the existing landscapes and would represent a cumulative impact to special designations. The SDNM and Wilderness areas within the analysis area are managed to protect the biological, scientific, and historical resources and the wilderness character of BLM lands, respectively. Future roadways and community expansion, while not occurring directly within any special designations, are not purposed for management of biological, scientific, and historical resources and wilderness character of BLM lands. Future development in the analysis area would result in the removal of vegetation communities (both native and agricultural) that would impact wildlife and reduce or change their habitat. Future expansion of surrounding communities would convert more lands to structures and urban landscaping. Additional roads and structures reduce available habitat, block or alter wildlife movement, and would likely result in disturbance of cultural and heritage resources. The additive effect to special designations would, over time and as the reasonably foreseeable activities are implemented, result in adverse cumulative effects to the special designations in local area. The cumulative effect would be moderate and long-term.

Further cumulative analysis regarding the biological, scientific, and historical resources of special designations can be found in the Vegetation, Wildlife, and Cultural and Heritage Resources sections of this chapter, respectively.

4.19.15 Noise

The area of analysis for noise-related cumulative impacts is the extent of the SVPA. The SVPA represents a reasonable region in which existing Category B land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The past and present actions in the SVPA have had a direct effect on existing noise levels in the area. Land in the SVPA is largely undeveloped and is characterized by vacant desert, agricultural lands, and by areas used for grazing, mining, utilities, recreation, and widely dispersed, low-density residential development. Past recreation use consists mostly of hiking, hunting, horseback riding, and driving for pleasure. The combination of sparse development and the lack of a substantial transportation network have contributed to the low 1-hour equivalent noise levels measured in the area. Present actions have not significantly changed the rural character of the area.

Reasonably foreseeable actions in the SVPA include the implementation of the Hassayampa Freeway construction and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential developments would result in increased urbanization of the area and the increased proximity of Category B land uses to an expanded local roadway network. Peak hour noise levels could potentially increase due to increases in traffic and roadway design speeds. Future mitigation measures to decrease the impacts of noise (e.g., sound walls, etc.) are unknown at this time.

4.19.16 Hazardous Materials and Public Safety

The area of analysis for hazardous materials and public safety cumulative impacts to land uses is the extent of Rainbow Valley. The Rainbow Valley represents a reasonable region in which existing land uses, when assessed in combination with other cumulative actions, would be impacted if the SVPP were implemented.

The list of identified future actions includes expansion of the SVPP up to six lanes, SR 303L construction, Hassayampa Freeway construction, various pipelines, and the future expansion of the surrounding communities of Goodyear, Mobile, and Maricopa. These potential projects and developments would result in additional use of hazardous materials and increased quantities of generated solid waste during their construction phases, additional transportation of hazardous materials through the area of analysis during their use, and additional generation of solid waste after the communities are developed. However, it should be noted that like the SVPP, these types of projects are also required to implement safety-related plans and programs to ensure safe handling, storage, and use of hazardous materials. Therefore, implementation of proper mitigation measures by the construction companies, as well as compliance with federal, state, and local regulations, would provide sufficient mitigation to ensure that there would be no direct or indirect impacts from the use of hazardous materials or the generation of solid waste by these activities.

4.19.17 Social and Economic Resources

The CEQ defines cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.” The cumulative impacts evaluated for the proposed Parkway for socioeconomic and environmental justice conditions were analyzed within both geographic and temporal boundaries. The geographic area of analysis for cumulative impacts to social and economic conditions includes the communities of Goodyear and Maricopa, as well as the Rainbow Valley area (roughly bounded by Patterson Road to the north, to 4 miles south of SR 238; and to the east, the Maricopa–Pinal County boundary, 6.5 miles west of the existing city of Maricopa, to the boundary of the SDNM to the west). Because census tract information was used to inform the environmental justice analysis, the geographic analysis area does exceed this geographic boundary for population and income data. The temporal bounds of analysis for cumulative impacts are defined by build-out conditions. MAG has forecasted population and commercial growth for the region, so although no exact timeframe exists, for planning purposes the build-out (or the eventual final development scenario) is expected to occur within 35 to 60 years.

The City of Goodyear annexed additional land to the south (the Rainbow Valley Planning Area) for the express purpose of assuring quality development and comprehensive planning for critical land uses, transportation, and infrastructure and to avoid private land “islands” (City 2007). Thus, the contiguous lands to the south of Goodyear that comprise the Rainbow Valley are included in the City of Goodyear General Plan as future residential and commercial development, which is expected to accommodate the increase in the current population of up to 202,000 residents and 57,000 jobs at build-out conditions in

Rainbow Valley alone. As with all cities located in hinterlands of the greater Phoenix metropolitan area, the City of Goodyear continues to plan for inevitable growth in the coming decades. Although this growth is primarily market-driven, planning for future conditions promotes responsible, contiguous, and sustainable growth to avoid "leap-frog" development that promotes inefficiency in circulation and access, longer commutes, and lack of access to city amenities such as transit and infrastructure. As such, one of the primary cumulative effects of the proposed Parkway would be the addition of transportation access, including public transit, to an area where there currently is limited or no access, while additional transportation development (unrelated to the SVPP) is also being considered for future high-capacity transportation development (i.e., Interstate freeway systems), allowing for increased circulation of people, services, and goods locally and regionally.

Several past, present, and future actions could affect social and economic conditions within the area of analysis. The annexation of the Rainbow Valley Planning Area by the City of Goodyear and the inclusion of these lands in the City's General Plan allows for future development where little or no development currently exists. This would result in higher land values, and increased property tax and sales tax revenues. Future actions also include the planned addition of high-capacity, multi-modal transportation corridors that span the region and state. The expansion of the regional and Interstate transportation network is planned for areas where there is demand for new or improved roads and connections. These new transportation facilities are in the process of being evaluated and will include multi-modal considerations such as passenger rail and conventional transit. The addition of transit options enhances mobility, provides economic benefit, and improves air quality conditions through reduced gasoline consumption (American Public Transportation Association 2012).

Transportation and community planning studies are typically a collaboration between local governments, MAG, and other agencies and have implications for the extended planning effort beyond the adopted RTP or General Plan timeframe. Given current and expected population growth, these planning studies provide a perspective on future transportation needs and long-range planning.

Initial population and employment growth projections from 2007 indicate that a portion of the SVPA (from central Goodyear to Mobile along the Waterman Wash) would experience high development. Given the slowdown of development due to the economic downturn, these projections are tentative. However, MPAs and planning agencies are generally certain that population growth and build-out conditions will be met and the slowing of growth is temporary, which allows agencies the opportunity to plan for future growth within a longer timeframe.

Both the Hidden Valley Transportation Framework Study and the Goodyear General Plan indicate that there are several major master planned communities in various stages of development: Estrella (active; 51,070 total dwelling units), King Ranch (active: 5,413 total dwelling units), Amaranth (planned: 41,261 total dwelling units) and Vekol Valley (status unknown). These master-planned communities represent over 100,000 new residential dwelling units of low- and medium-density development. Commercial and employment development is also planned in this area, including the eventual creation of a village core.

MAG socioeconomic projections for 2035 show growth within Goodyear and the SVPA increasing exponentially (Table 4-37). Employment projections for 2035 within Goodyear are also expected to increase to 156,725, and to 36,905 within the SVPA (MAG 2009).

This substantial growth within Goodyear and the SVPA coupled with equally substantial growth projections for Buckeye, Maricopa, and Avondale will result in formidable increases in vehicular travel demand for both home-based and job-based trips within the region. Specifically, over 1 million vehicle trips per day are estimated within the SVPA at build-out conditions, or when Goodyear's General Plan is fully implemented (MAG 2009). Adjacent communities such as Buckeye, Maricopa, and Mobile are also planning for significant population, employment, and land area growth within the next two decades.

Table 4-37. Population Growth within Goodyear and the SVPA

Location	Current Population (2010)	Projected 2035 Population	Projected Build-out Population
City of Goodyear	65,178	358,565	511,000
SVPA	100*	60,629	202,000

Sources: MAG (2009); City of Goodyear (2009).
*Note: Estimated population.

In considering the cumulative effects to economics related to livestock grazing, for both the Beloat and Conley allotments, reasonably foreseeable actions including the SR 303L, I-11, and solar development will likely increase urban development throughout the area, potentially causing these two livestock operations to be untenable, particularly for the Conley allotment. Fragmentation of pastures would require hands-on effort to facilitate livestock movement; a major shift in the current “free-range” nature of the Beloat and Conley allotments (north of Patterson road notwithstanding due to the mandates of Article 7-4). The cumulative impact of the SVPP in combination with other future development would have a major, long-term impact to the economics of livestock grazing in the area of analysis.

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Chapter 5

CONSULTATION AND COORDINATION

5.1 INTRODUCTION

CEQ regulations implementing NEPA require that federal agencies provide meaningful opportunities for the public and stakeholders to provide input and identify their concerns with regard to the EIS process. Federal laws, such as the ESA, CWA, and the NHPA, mandate public involvement and consultation with agencies or federally recognized tribal governments.

This chapter documents the specific consultation and coordination efforts undertaken by the BLM throughout the entire process of developing the SVPP Draft EIS. A complete list of agencies and individuals who received the Draft EIS can be found in the Administrative Record.

5.1.1 Public Involvement

The BLM has taken a variety of steps to inform the public, special interest groups, and local, state, and federal agencies about the proposed action alternatives for the SVPP, and to solicit feedback from these interested parties to help shape the scope and alternatives of this project. The following sections summarize the efforts taken to consult and coordinate with all interested persons, agencies, Tribes, and organizations.

5.1.1.1 Public Scoping Meetings

As part of the NEPA requirements, a notice of intent to prepare the EIS was published in the *Federal Register* on April 2, 2008. Publication of the notice of intent initiated a 60-day formal public and agency scoping period, during which the BLM solicited comments regarding the project and regarding its potential impacts.

Early in the scoping period, the BLM advertised the initiation of the EIS process through the BLM website, advertisements in the local newspapers, media releases, and direct mailings to past project stakeholders, project area stakeholders, and special-interest groups (environmental, elected officials, business interests, recreational, and tribal). Additionally, public meeting information was posted at various community outlets, such as community centers, libraries, city offices, and recreational outlets, in Goodyear and Mobile. Public briefings were held with a variety of interest groups, agencies, etc., to inform them about the project. Table 5-1 includes a list of meetings that took place, the topics discussed, and meeting attendees.

The BLM held public and agency scoping meetings for the EIS in Goodyear, Arizona, on May 28, 2008, and public scoping meetings in Maricopa and Mobile, Arizona, on May 29, 2008. At each meeting, BLM and City of Goodyear staff members were on hand to provide information on project planning activities to date and to answer questions. Meeting attendees were encouraged to provide comments on the issues and alternatives to be analyzed in the EIS.

Table 5-1. List of Meetings, Meeting Topics, and Meeting Attendees

Date	Agency/Group	Discussion/Topic	BLM Attendees
February 27, 2009	City of Goodyear, V3 Companies	Kick-off meeting	Kathleen Depukat, Emily Garber, Cheryl Blanchard, Jack Ragsdale, Jim Andersen
March 10, 2009	City of Goodyear, BrightSource Energy	Project overview	Kathleen Depukat
April 21, 2009	AGFD	Project introduction and invitation to cooperate	Kathleen Depukat, Lori Young
May 7, 2009	AGFD	Site visit	Kathleen Depukat, Cheryl Blanchard, Lori Young
May 15, 2009	City of Goodyear, AGFD, ConTech, V3 Companies	Wildlife corridors/crossings	Kathleen Depukat, Lori Young
September 8, 2009	AGFD	Wildlife corridors/crossings	Kathleen Depukat, Tim Hughes
October 7, 2009	MAG, ADOT	Hassayampa Freeway/SR 303L	Kathleen Depukat
April 6, 2010	City of Goodyear	Project schedule	Kathleen Depukat, Emily Garber
November 18, 2011	BLM Interdisciplinary Team	Alternatives	Kathleen Depukat, Emily Garber, Dave Scarborough, Jack Ragsdale, Steve Bird, Andrea Felton
June 25, 2012	ADOT, AGFD, ASLD, City of Maricopa, MAG, City of Goodyear	Cooperating agency kick-off meeting	Kathleen Depukat, Emily Garber, Cheryl Blanchard, Jack Ragsdale, Andrea Felton
October 17, 2012	City of Goodyear, AGFD	Wildlife crossing recommendations	Kathleen Depukat, Steve Bird, Andrea Felton, Dave Scarborough, Joe Schmitz, Harvey Krauss, Christine McMurdy, Dana Warnecke, Michael Ingraldi, Scott Sprague

5.1.1.2 Scoping Report

A detailed description of the scoping process, planning issues derived from the comments, and analysis of the information received is contained in the BLM April 2009 scoping report (BLM 2009b). The scoping report is available at the BLM Lower Sonoran Field Office. The BLM received 17 scoping letters from individuals and businesses; federal, state, and local agencies; and nongovernment organizations. Informal comments captured through the public scoping meeting notes were also included in the scoping report.

5.1.1.3 Additional Project Outreach

As noted above, scoping meetings were held in 2008. Additional data gathering was conducted during 2009 and 2010, and alternatives development was conducted during 2011 and 2012. A brief project newsletter was developed and posted to the BLM website in fall 2012 to update the public on the status of the project. A postcard with the BLM contact information and website link was also mailed to stakeholders in February 2013.

5.1.2 Agency Coordination/Consultation

5.1.2.1 U.S. Fish and Wildlife Service

Section 7 of the ESA requires federal agencies to ensure that their actions do not jeopardize the continued existence of threatened or endangered species or result in the destruction of their designated critical habitat. It also requires consultation with the USFWS in making that determination.

BLM will initiate Section 7 consultation.

5.1.2.2 U.S. Army Corps of Engineers

Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the U.S., including wetlands and other special aquatic sites. Because this is a linear transportation project, impacts to each wash are anticipated to be treated separately as non-notifying under Nationwide Permit No. 14.

5.1.2.3 Arizona State Historic Preservation Office

BLM consults with the SHPO in accordance with Section 106 of the NHPA when BLM actions may affect cultural properties. Consultations will be initiated when a complete cultural resources inventory report has been completed.

5.1.3 Cooperating Agency Involvement

During April 2012, BLM initiated Memorandum of Understanding (MOU) invitations to local municipalities and agencies, whose purpose would be to establish a formal SVPP cooperating agency partnership.

The cooperating agencies assisted with Draft EIS preparation in a number of ways, including providing up-to-date and relevant studies and inventories, reviewing public involvement documents, identifying issues, assisting with the formulation of alternatives, and reviewing Administrative Draft EIS text and other Draft EIS materials (as specified in 40 CFR 1501.6[b]). BLM and their subcontractor host monthly informational conference calls with the cooperating agencies. Not all of the cooperating agencies participated in all aspects of the EIS preparation. As lead agency, BLM is responsible for the content of the EIS.

Arizona Department of Transportation

Although the SVPP, if constructed, would not become an ADOT-managed roadway (generally, Parkways are locally constructed, maintained, and managed), the Parkway would likely have a cumulative effect on other existing and future ADOT-managed roadways in the SVPA. Therefore, ADOT's expertise in new road construction and access to conceptual plans and designs of future roadways (namely, the future SR 303L and I-11 Freeway) provided an invaluable resource for the BLM and City during the SVPP NEPA process.

Arizona Game and Fish Department

The AGFD participated in the public scoping process and collaborated with the BLM during pre-NEPA wildlife connectivity analysis. Because the SVPP has the potential to impact wildlife within Rainbow Valley and the SVPA, AGFD is a cooperating agency for this Draft EIS.

Arizona State Land Department

Although the ASLD lands would not be subject to BLM NEPA review, the City would nonetheless be required to have ASLD ROW authorization for any ASLD land that would be needed to construct, operate, and maintain the Parkway. Therefore, because of their special expertise regarding the resources within these lands and the State's interest in maximizing revenue from its Trust lands, ASLD has been designated a cooperating agency.

Maricopa Association of Governments

As the designated Metropolitan Planning Organization (MPO) for the Maricopa County Region, MAG plans and finances the regional transportation system, including the preparation of an RTP, the Transportation Improvement Program, and other traffic data, forecasts, and modeling. Because of their involvement in future transportation planning within the SVPA and region, MAG has been designated a cooperating agency.

Flood Control District of Maricopa County

Waterman Wash, the major drainage of Rainbow Valley, serves as the drainage to the Gila River and would be crossed or paralleled by the SVPP, depending on the alternative implemented if a ROW were granted by BLM. Because of Waterman Wash's relatively natural and undisturbed state, identification as a wildlife corridor by AGFD and the BLM, and the fact that FCDMC has committed a substantial effort to the *Rainbow Valley Area Drainage Master Plan*, FCDMC has been designated as a cooperating agency.

City of Maricopa

The City of Maricopa is located approximately 8 miles east of the community of Mobile on SR 238. The City of Maricopa has been intimately involved with RTP public involvement, county-level planning, and ADOT transportation planning. Currently, the City of Maricopa includes two points of access from the greater Phoenix metropolitan area: one from the northeast and one from the west. The SVPP, if constructed, would provide a vital third access point connection to the greater metropolitan Phoenix area. Therefore, the City of Maricopa has been designated as a cooperating agency.

5.1.4 Tribal Consultation

The BLM Lower Sonoran Field Office initiated tribal consultation in July 2008 by sending out letters to the chairmen of five tribes. These included the Ak-Chin Indian Community, the Gila River Indian Community, the Tohono O'odham Nation, the Salt River Pima-Maricopa Indian Community, and the Hopi Tribe. Courtesy copies were sent to each tribal cultural resources staff member under separate cover. The letters indicated that consultation would be initiated under NEPA, NHPA, and AIRFA and that an EIS would be written that would analyze the impacts to natural and cultural resources. New letters were sent out in March 2013, to update the information and provide copies of the cultural survey for review. Follow-up telephone calls were made by the BLM Phoenix District to gather information on any concerns the tribes may have.

5.1.4.1 Specific Tribal Consultation Actions

None are identified at this time; however tribal consultation is ongoing and specific tribal consultation actions would be determined during the Final EIS.

5.1.5 Recipients of this Draft Environmental Impact Statement

Pursuant to CEQ regulations (40 CFR 1502.19) the BLM is circulating this Draft EIS to 1) agencies having jurisdiction by law or special expertise with respect to any environmental impact involved and any appropriate federal, state, or local agency authorized to develop and enforce environmental standards, 2) the applicant, and 3) any agencies, organizations, or individuals requesting a copy of the document.

The SVPP EIS distribution list was developed from the stakeholders lists compiled prior to and during the scoping process, which was then supplemented throughout the planning process. Those interested in receiving project updates were able to note their interest on scoping comment forms or to submit their information to Kathleen Depukat via email, telephone, fax, or in writing. A complete list of all recipients of the Draft EIS can be found in the Administrative Record.

Those reviewing the Draft EIS have 45 days in which to provide comments. Comments should be as specific as possible. According to CEQ (40 CFR 1503.4), the BLM must respond in writing to every comment, even if such a response necessitates substantial changes to the EIS. These responses will be published as part of the Final EIS.

5.1.6 List of Preparers

The SVPP EIS was written by a team composed of BLM and third-party contractor personnel. Under direction of the BLM, the consulting team prepared alternatives, collected data for the analysis, assessed potential effects of the alternatives, and prepared other chapters with additional comments and critiques from the cooperating agencies. The BLM has approved the content of this EIS. Table 5-2 identifies the agencies and individuals involved with the preparation and review of this EIS.

Table 5-2. List of Preparers

Entity		Responsibility	Title	Years of Experience
Bureau of Land Management				
Andersen	Jim	Lands Use/Access	Lead Realty Specialist	32
Baker	Leah	NEPA Adequacy	NEPA Coordinator	15
Bickauskas	Tom	Travel Management	Travel Management Coordinator	9
Bird	Steve	Wildlife	Wildlife Biologist	11
Blanchard	Cheryl	Cultural Resources	Archaeologist	5
Depukat	Kathleen	Project Manager	Project Manager	30
Felton	Andrea	Livestock Grazing	Range Conservationist	7
Garber	Emily	Project Management	Field Manager	30
Hanson	Rich	Project Management	SDNM Manager	30
Horyza	Chris	NEPA Adequacy	NEPA Coordinator	33
Hughes	Tim	Wildlife	Wildlife Biologist	26
Johnson	Michael	Social, Economic, and Environmental Justice	Zone Social Scientist	26
Lambeth	Bryan	Livestock Grazing	Range Specialist	7

Table 5-2. List of Preparers (Continued)

Entity		Responsibility	Title	Years of Experience
Bureau of Land Management, cont'd.				
Scarborough	Dave	Wilderness, National Monuments, Special Designations, Visual Resources	Recreation Planner	30
Ragsdale	Jack	Recreation	Recreation Planner	30
Young	Lori	Wildlife		7
SWCA Environmental Consultants				
Bellavia	Cara	Project Manager, Social and Economic Conditions	SWCA Southwest Planning Lead	15
Bell	Shari	Document Formatting	Formatter	5
Cecere	Pamela	Visual Resources, Travel Management, Social and Economic Conditions	Environmental Planner	11
Desruisseaux	Danielle	Technical Editing	Technical Editor	10
Gladding	Eleanor	Vegetation Resources, Wildlife and Special-Status Species	Biologist	15
O'Brien	Steve	Soil Resources, Hazardous Materials / Public Safety	Environmental Specialist	16
Orcutt-Gachiri	Heidi	Technical Editing	Technical Editor	12
Query	Chris	Maps and Figures	GIS/CADD Specialist	14
Rausch	Ryan	Assistant Project Manager, Lands and Realty, Recreation Management, Special Designations	Environmental Planner	8
Rietz	DeAnne	Water Resources	Hydrologist	12
Rigg	Jonathan	Livestock Grazing/Wildland Fire	Planning Specialist	6
Tremblay	Adrienne	Cultural and Heritage Resources, Paleontological Resources	Archaeologist	11
Whitley	Dan	Air Resources, Noise	Environmental Specialist	6

Chapter 6

LITERATURE CITED

Agee, J.K. 1993. *Fire Ecology of Pacific Northwest Forests*. Washington, D.C.: Island Press.

All about Birds (AAB). 2009. Species information. Available at: http://www.allaboutbirds.org/guide. Accessed July 29, 2009.

American Public Transportation Association. 2012. *Economic Recovery: Promoting Growth. The Benefits of Public Transportation*. Available at: http://www.apta.com/resources/reportsandpublications/Documents/Economic-Recovery-APTA-White-Paper.pdf. Accessed December 4, 2012.

American Society for Testing and Materials (ASTM). 2005. *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. Document No. E 1527-05.

Anyon, R., T.J. Ferguson, and C. Colwell-Chanthaphonh. 2005. *Natural Setting as Cultural Landscapes: The Power of Place and Tradition*. USDA Forest Service Proceedings RMRS-P-36.

Arizona Bureau of Mines. 1960. Geologic map of Maricopa County, Arizona.

Arizona Department of Agriculture (ADA). 2005. Protected Arizona Native Plants. Available at: http://www.azda.gov/esd/nativeplants.htm. Accessed August 10, 2009.

Arizona Department of Commerce (ADOC). 2009a. Profile: Pinal County. Available at: http://www.azcommerce.com/doclib/commune/pinal%20county.pdf. Accessed July 22, 2009.

———. 2009b. 2010, 2020, 2030 Maricopa sub-county projections. Available at: http://www.azcommerce.com/doclib/econinfo/FILES/2006MaricopaProjectionsJURI.xls. Accessed July 22, 2009.

———. 2009c. 2006–2055 Pinal sub-county projections. Available at: http://www.azcommerce.com/doclib/econinfo/FILES/2006PinalProjectionsJURI.xls. Accessed July 22, 2009.

———. 2010. Profile: Maricopa County. Available at: http://www.azcommerce.com/doclib/commune/maricopa%20county.pdf. Accessed November 18, 2010.

Arizona Department of Environmental Quality (ADEQ). 2004. *2004 Air Quality Annual Report*.

———. 2008a. *2008 Air Quality Annual Report*.

———. 2008b. Arizona Pollutant Discharge Elimination System (AZPDES) Fact Sheet. Available at: http://www.azdeq.gov/environ/water/permits/download/2008_fact.pdf. Accessed January 17, 2013.

———. 2009a. *2009 Air Quality Report*.

———. 2009b. Surface water quality data. Available at: http://www.azdeq.gov/index.html. Accessed August 9, 2009.

———. 2009c. Interactive GIS eMaps. Available at: http://www.azdeq.gov/function/about/gis.html. Accessed June 1, 2009.

Arizona Department of Revenue (ADOR). 2012. FY 2012 Annual Report. Available at: http://www.azdor.gov/Portals/0/AnnualReports/FY12_Annual_Report_Web.pdf. Accessed December 17, 2012.

Arizona Department of Transportation (ADOT). 2001. *Impact of Highways on Property Values: Case Study of the Superstition Freeway Corridor*: Final Report 516. Prepared in coordination with U.S. Department of Transportation, Federal Highway Administration. October.

———. 2008a. *Draft Air Quality Analysis for SR 303L, SR 801 to I-10*. On file, Environmental Planning Group. Phoenix.

———. 2008b. *ADOT Post-Construction Best Management Practices Manual for Highway Design and Construction.* Available at: http://www.azdot.gov/Highways/Roadway_Engineering/Roadside_Development/PDF/ADOT_Post-Construction_BMPs_Manual.pdf. Accessed March 11, 2013.

———. 2009a. Average Annual Daily Traffic, multimodal planning home page. Available at: http://tpd.az.gov/data/aadt.php. Accessed August 19, 2009.

———. 2009b. State Highway System traffic log 2009. Available at: http://tpd.az.gov/data/documents/SHSAADT060809.xls. Accessed August 19, 2009.

———. 2011. *Noise Abatement Policy.* December 5.

———.2013. *ADOT Roadway Native Plant Salvage and Replanting Evaluation Guide.* Available at: http://www.azdot.gov/Highways/Roadway_Engineering/Roadside_Development/PDF/Roadside_Native_Plant_Salvage.pdf. Accessed March 18, 2013.

Arizona Department of Water Resources (ADWR). 1994. *Arizona Water Resources Assessment*, Vol. 2: *Hydrologic Summary*. Hydrology Division, Arizona Department of Water Resources.

———. 2009. Arizona Water Atlas Section 8.1 – Phoenix Active Management Area.

———. 2010. Arizona Atlas Volume 8 Section 8.1 – Phoenix AMA. April 2010.

———. 2012a. Hydrology Division, Geophysics and Surveying Unit. Land Subsidence Summary. Available at: http://www.azwater.gov/AzDWR/Hydrology/Geophysics/LandSubsidenceInArizona.htm Accessed December 13, 2012.

———. 2012b. Well 55 and groundwater site inventory GIS data. Available at: https://gisweb.azwater.gov/waterresourcedata/Default.aspx. Updated April 27, 2012.

Arizona Game and Fish Department (AGFD). 2002. *The Economic Importance of Fishing and Hunting: Economic data on fishing and hunting for the State of Arizona and for each Arizona County.* Prepared in cooperation with Arizona State University West School of Management. On file, Arizona Game and Fish Department.

———. 2006. DRAFT. Arizona's Comprehensive Wildlife Conservation Strategy: 2005-2015. Arizona Game and Fish Department, Phoenix.

———.2007a. *Draft Bighorn Sheep Management Plan*. Phoenix.

———. 2007b. *Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects.* Revised October 23, 2007. Available at: http://www.azgfd.gov/hgis/pdfs/Tortoisehandlingguidelines.pdf. Accessed December 4, 2012.

———. 2008. Track survey data for proposed Sonoran Valley Road Project.

———. 2009. Project-specific HDMS request for Sonoran Valley Parkway EIS. Manuscript on file, SWCA Environmental Consultants, Tucson. June 23.

———. 2012. Arizona State Wildlife Action Plan: 2012–2022 (SWAP). Available at: http://www.azgfd.gov/w_c/swap.shtml. Accessed December 12, 2012.

———. 2013. Project-specific HDMS request for Sonoran Valley Parkway EIS. Manuscript on file, SWCA Environmental Consultants, Tucson. December 26, 2012 and January 8, 2013.

Arizona Geological Survey (AGS). 2012a. Arizona's Earth Fissure Center. Available at: http://www.azgs.az.gov/EFC.shtml. Accessed December 13, 2012.

———. 2012b. AZMap Earth Fissures Viewer Interactive Mapping. Available at: http://services.azgs.az.gov/OnlineMaps/fissures.html. Accessed December 13, 2012.

Arizona Heritage Geographic Information System (AZHGIS). 2012. Arizona Game and Fish Department environmental review online tool. Available at: http://www.azgfd.gov/hgis. Accessed December 10, 2012.

Arizona Interagency Desert Tortoise Team. 2008. *Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat*. Available at: http://www.azgfd.gov/pdfs/w_c/tortoise/MitigationMeasures.pdf. Accessed December 4, 2012.

Arizona Office of Employment and Population Statistics. 2012. Population and Employment statistics. Available at: http://azstats.gov/laus-data-query-tool/. Accessed December 12, 2012.

Arizona Office of Tourism. 2012. Travel and Tourism Works for Arizona factsheet. Available at: http://www.azot.gov/system/files/710/original/Tourism%20Works_Power%20of%20Travel_2012.pdf?1342118441. Accessed December 10, 2012.

Arizona Partners in Amphibian and Reptile Conservation (AZPARC). 2008. Field guide to the reptiles and amphibians of Arizona. Available at: http://www.reptilesofaz.org/. Accessed August 19, 2009.

Arizona Rare Plant Committee (ARPC). n.d. [2002]. *Arizona Rare Plant Field Guide*. Arizona Rare Plant Committee. Phoenix.

Arizona State Land Department (ASLD), Natural Resources Division. 2009. Recreational permits. Available at: http://www.land.state.az.us/programs/natural/recreation_permit.htm. Accessed July 30, 2009.

Arizona State Parks. 2003. *Economic Importance of Off-Highway Vehicle Recreation to Arizona.* Available at: http://www.azparks.gov/OHV/downloads/OHV_Economic.pdf. Accessed February 12, 20013.

Arizona Tax Research Foundation. 2009. The facts on Arizona's tax climate. Available at: http://www.taxfoundation.org/research/topic/13.html. Accessed July 22, 2009.

Arizona Wildlands Invasive Plant Working Group (AZ-WIPWG). 2005. *Invasive Non-native Plants that Threaten Wildlands in Arizona*. Flagstaff: U.S. Department of the Interior and U.S. Geological Survey, Colorado Plateau Research Station.

Arizona Wildlife Linkages Assessment Workgroup. 2006. Arizona's wildlife linkages assessment. Available at: http://www.azdot.gov/inside_adot/OES/AZ_WildLife_Linkages/assessment.asp. Accessed October 1, 2012.

Bainbridge, D.A. 2007. *A Guide for Desert and Dryland Restoration: New Hope for Arid Lands.* Science and Practice of Ecological Restoration Series. Washington, D.C.: Island Press.

Basso, K. 1996. *Wisdom Sits in Places.* Albuquerque: University of New Mexico Press.

Beier, P. 1996. Metapopulation models, tenacious tracking and cougar conservation. In *Metapopulations and Wildlife Conservation*, edited by D.R. McCullough, pp. 293–323. Washington, D.C.: Island Press.

Beier, P., E. Garding, and D. Majka. 2008. *Arizona Missing Linkages: Gila Bend–Sierra Estrella Linkage Design*. Prepared for Arizona Game and Fish Department. Flagstaff, Arizona: School of Forestry, Northern Arizona University.

Belke, J. 2009. GIS Specialist, BLM Phoenix District Office, Arizona. Written communication.

Belnap, J., J.H. Kaltenecker, R. Rosentreter, J. Williams, S. Leonard, and D. Eldridge. 2001. *Biological Soil Crusts: Ecology and Management*. Technical Reference No. 1730-2. U.S. Department of the Interior.

Berman, D.R. 1998. The growth management challenge in Arizona. Morrison Institute for Public Policy. Available at: http://www.asu.edu/copp/morrison/public/APC98.pdf. Accessed July 17, 2009.

Boarman, W.I., and M. Sazaki. 1996. Highway mortality in desert tortoises and small vertebrates: success of barrier fences and culverts. In *Trends in Addressing Transportation Related Wildlife Mortality: Proceedings of the Transportation Related Wildlife Mortality Seminar*, edited by G.J. Evink, P. Garrett, D. Zeigler, and J. Berry, pp. 169–173. Tallahassee, Florida: Environmental Management Office, Department of Transportation.

———. 2006. A highway's road-effect zone for desert tortoises (*Gopherus agassizii*). *Journal of Arid Environments* 65:94–101.

Bristow, K., and M. Crabb. 2008. *Evaluation of Distribution and Trans-Highway Movement of Desert Bighorn Sheep: Arizona Highway 68*. Final Report No. 588. Prepared for Arizona Department of Transportation. Available at: http://www.azdot.gov/TPD/ATRC/publications/project_reports/PDF/AZ588.pdf. Accessed September 18, 2012.

Brown, D.E. (ed.). 1994. *Biotic Communities: Southwestern United States and Northwestern Mexico*. Salt Lake City: University of Utah Press.

Brown, D.E., and C.H. Lowe. 1994. Biotic Communities of the Southwest. Map. Salt Lake City: University of Utah Press.

Brown, J.K., and J.K. Smith. 2000. *Wildland Fire in Ecosystems: Effects of Fire on Flora*. General Technical Report RMRS-42. Vol. 2. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Bureau of Land Management (BLM). 1986a. *Visual Resource Contrast Rating*. BLM Handbook 8431-1. Washington, D.C.: U.S. Department of the Interior, Bureau of Land Management.

———. 1986b. *Visual Resource Inventory Handbook*. H-8410-1. Washington, D.C.: U.S. Department of the Interior, Bureau of Land Management.

———. 1988. *Lower Gila South Resource Management Plan/Environmental Impact Statement.* Phoenix: U.S. Department of the Interior, Bureau of Land Management, Phoenix District Office.

———. 1991. *Compensation for the Desert Tortoise.* Prepared for the Desert Tortoise Management Oversight Group. Desert Tortoise Compensation Team. November.

———. 1992. *Visual Resource Management*. BLM Handbook 8400. Washington, D.C.: U.S. Department of the Interior, Bureau of Land Management.

———. 1995. *Maricopa Complex Wilderness Management Plan, Environmental Assessment and Decision Record. Lower Gila Resource Area.* Phoenix District.

———. 2002. Public land statistics. Available at: http://www.blm.gov/natacq/pls02/. Accessed December 6, 2012.

———.2002c. (From the citation provided in the *Lower Sonoran RMP*. September 2012). Public Land Statistics 2002. Available at: http://www.blm.gov/natacq/pls02/.

———. 2003. Arizona Route Inventory Data Dictionary: Arizona BLM, Arizona State Lands, Region 3 (AZ Only) Forest Service.

———. 2004a. National Landscape Conservation System. Available at: http://www.blm.gov/nlcs/brochure/index.htm. Accessed July 2009.

———. 2004b. *Arizona Strip Fire Management Zone Fire Management Plan*.

———. 2005a. *Land Use Planning Handbook H-1601-1*. U.S. Department of the Interior, Bureau of Land Management. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/ak/aktest/planning/planning_general.Par.65225.File.dat/blm_lup_handbook.pdf. Accessed December 1, 2012.

———. 2005b. *Approved Amendment to the Lower Gila North Management Framework Plan and Lower Gila South Resource Management Plan and Decision Record*. Phoenix: U.S. Department of the Interior, Bureau of Land Management, Phoenix Field Office.

———. 2006. Travel and Transportation Management: Planning and Conducting Route Inventories. Technical Reference 9113-1. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Planning_and_Renewable_Resources/recreation_images/national_programs/travel_management/cttm_guidance___tech.Par.16249.File.dat/TR9113-1.pdf. Accessed October 3, 2012.

———. 2007. *Instruction Memorandum No. IM-2008-009—Potential Fossil Resource Classification System for Paleontological Resources on Public Lands.* Washington, D.C.: U.S. Department of the Interior, Bureau of Land Management. Available at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/20080/im_2008-009.html. Accessed December 2, 2012.

———. 2008a. *BLM National Environmental Policy Act Handbook H-1790-1*. Washington, D.C.: U.S. Department of the Interior, Bureau of Land Management, National Environmental Policy Act Program.

———. 2008b. *North Maricopa Mountains–Anza National Historic Trail Recreation Restoration and Enhancement Plan.* Environmental Assessment No. AZ-240-2008-001. Phoenix: U.S. Department of the Interior, Bureau of Land Management, Phoenix District Office. June.

———. 2009a. Sonoran Desert National Monument. Available at: http://www.blm.gov/az/st/en/prog/blm_special_areas/natmon/son_des.html. Accessed July 2009.

———. 2009b. *Sonoran Valley Parkway Environmental Impact Statement: Scoping Report*.

———. 2011. *Phoenix District Integrated Weed Management Environmental Assessment (*DOI-BLM-AZ-P000-2011-001-EA). On file, Lower Sonoran Field Office.

———. 2012a. *Lower Sonoran Resource Management Plan*. Phoenix: U.S. Department of the Interior, Bureau of Land Management, Phoenix District Office. September.

———. 2012b. *Sonoran Desert National Monument Resource Management Plan*. Phoenix: U.S. Department of the Interior, Bureau of Land Management, Phoenix District Office.

City of Goodyear (City). 1999. City of Goodyear Zoning Ordinance. Available at: http://www.goodyearaz.gov/index.aspx?NID=2172. Accessed December 2, 2012.

———. 2003. *City of Goodyear General Plan 2003–2013.* Available at: http://www.ci.goodyear.az.us/index.asp?NID=2173. Accessed April 2, 2009.

———. 2006. *Traffic Analysis Report for the Sonoran Valley Planning Area. Proposed Major General Plan Amendment.* City of Goodyear, Arizona. December 13.

———. 2007. *Sonoran Valley Planning Area Proposed Major General Plan Amendment*. Dated January. Available at: http://www.ci.goodyear.az.us/DocumentView.asp?DID=3298. Accessed November 18, 2010.

———. 2009a. Goodyear City Code, Article 3, Section 7, Emergency Services and Disaster. March 23.

———. 2009b. City of Goodyear land use plan update. December 23. Available at: http://www.ci.goodyear.az.us/DocumentCenter/Home/View/5183. Accessed March 13, 2013.

———. 2009c. Engineering Department. Available at: http://www.ci.goodyear.az.us/index.aspx?NID=36. Accessed August 19, 2009.

———. 2012. *Goodyear 2025: City of Goodyear General Plan*. *Existing Conditions Report*. Arizona State University School of Geographical Sciences and Urban Planning. Available at: http://www.goodyearaz.gov/index.aspx?NID=3662. Accessed December 2, 2012.

City of Maricopa. 2006. *City of Maricopa General Plan.* Available at: http://www.maricopa-az.gov/web/developmentservices/resource-center/category/14-planning-zoning. Accessed November 23, 2012.

———. 2008. *Regional Transportation Plan.* Phoenix.

City of Phoenix. 2013. City of Phoenix Water Sources Website: Historical Population and Water Use. Available at: http://phoenix.gov/waterservices/wrc/yourwater/histuse.html. Accessed March 27, 2013.

Claggett, M., and T.L. Miller. 2011. *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives.* U.S. Department of Transportation, Federal Highway Administration. Last updated July 2011. Available at: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm. Access January 11, 2013.

Clevenger, A.P., and N. Waltho. 2005. Performance indices to identify attributes of highway crossing structures facilitating movement of large mammals. *Biological Conservation* 121:453–464.

Conway, Brian. 2012. Supervisor of the Geophysics/Surveying Unit, Arizona Department of Water Resources. The potential for land subsidence features in the Rainbow Valley. Written communication with Steve O'Brien (SWCA Environmental Consultants). Email dated December 11, 2012.

Council on Environmental Quality (CEQ). 1981. Forty most asked questions concerning National Environmental Policy Act regulations. *Federal Register* 46:18026.

Crooks, K.R. 2000. Mammalian carnivores as target species for conservation in southern California. In *Second Interface between Ecology and Land Development in California,* edited by J.E. Keeley, M. Baer-Keeley, and C.J. Fotheringham, pp. 105–112. Open-File Report 00-62. U.S. Geological Survey.

———. 2002. Relative sensitivities of mammalian carnivores to habitat fragmentation. *Conservation Biology* 16:488–502.

Cunningham, S.C., and J.C. DeVos. 1992. Mortality of mountain sheep in the Black Canyon area of northwest Arizona. *Desert Bighorn Council Transactions* 36:27–29.

Dean Runyan. 2006. *Arizona Travel Impacts: 1998-2005*. Prepared for the Arizona Office of Tourism. On file, Arizona Game and Fish Department Region VI. April.

Dickson, B.G., and P. Beier. 2002. Home range and habitat selection by adult cougars in southern California. *Journal of Wildlife Management* 66:1235–1245.

Economic Profile System (EPS). 2012. A socioeconomic profile, Maricopa County, Arizona. Available at: http://eps.sonoran.org/. Accessed January 18, 2013.

Esque, T.C., C.R. Schwalbe, L.A. DeFalco, R.B. Duncan, and T.J. Hughes. 2003. Effects of desert wildfires on desert tortoise (*Gopherus agassizii*) and other small vertebrates. *Southwestern Naturalist* 48(1):103–111.

Federal Emergency Management Agency (FEMA). 2009. Online map service center. Available at: http://www.msc.fema.gov/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=10001&storeId=10001&categoryId=12001&langId=-1&userType=G&type=1&dfirmCatId=12009. Accessed August 24, 2009.

Federal Highway Administration (FHWA). 1996. *Measurement of Highway-Related Noise.* FHWA-PD-96-046/DOT-VNTC-FHWA-96-5.

———. 1998. FHWA Traffic Noise Model (TNM) Technical Manual. Available at: http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/old_versions/tnm_version_10/tech_manual/tnm10techmanual.pdf. Accessed December 16, 2012.

———. 2005. Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. (SAFETEA-LU). Federal Highway Administration Office of Legislation and Intergovernmental Affairs. August 25. Available at: http://www.fhwa.dot.gov/safetealu/. Accessed November 16, 2012.

Federal Interagency Committee on Urban Noise (FICUN). 1980. *Guidelines for Considering Noise in Land Use Planning and Control.*

Federal Transit Administration (FTA). 1995. *Transit Noise and Vibration Impact Assessment*. Available at: http://ntl.bts.gov/data/rail05/cover.pdf. Accessed September 6, 2012.

Felton, Andrea. 2013. Range Conservationist, Bureau of Land Management. Personal communication via email with E. Gladding, SWCA Biologist. Biological soil crusts. January 17, 2013.

Ferguson, T.J., C. Colwell-Chanthaphonh, and R. Anyon. 2004a. One valley, many histories: Tohono O'odham, Hopi, Zuni, and Western Apache history in the San Pedro Valley. *Archaeology Southwest* 18 (1).

———. 2004b. *Tohono O'odham, Hopi, Zuni, and Western Apache Ethnohistory in the San Pedro Valley of Southeast Arizona: Where Landscapes Are History and Sites Are Monuments*. Tucson: Center for Desert Archaeology.

Flood Control District of Maricopa County (FCDMC). 2006. *Floodplain Regulations for Maricopa County*. Phoenix.

———. 2011. *Rainbow Valley Area Drainage Master Plan.* Available at: http://www.fcd.maricopa.gov/Projects/PPM/projStructDetails.aspx?ProjectID=165. Accessed November 11, 2012.

Gober, P. 1998. The demographics of urban growth in Phoenix. Morrison Institute for Public Policy. Available at: http://www.asu.edu/copp/morrison/public/APC98.pdf. Accessed July 17, 2009.

Gough, P.L. 2012. *Juan Bautista de Anza National Historic Trail Resource Study*. Prepared for the National Park Service. Department of History, University of Nevada, Las Vegas.

Guo, Q. 2004. Slow recovery in desert perennial vegetation following prolonged human disturbance. *Journal of Vegetation Science* 15:757–762.

HabiMap ™ Arizona (HabiMap). 2013. SCGN and ABBA query tools and results. Available at: http://habimap.org/. Accessed March 20-21, 2013.

Hammett, B.A., and R.L. Herther. 1995. Maps showing groundwater conditions in the Phoenix active management area, Maricopa, Pinal, and Yavapai Counties, Arizona—1992. Hydrologic Map Series Report No. 27. Arizona Department of Water Resources.

Hann, W., S. Barrett, D. Havlina, J. Jones, C. Frame, D. Hamilton, K. Schon, T. Demeo, L. Hutter, and J. Menakis. 2008. Interagency and The Nature Conservancy Fire Regime Condition Class website. USDA Forest Service, U.S. Department of the Interior, The Nature Conservancy, and Systems for Environment Management. Available at: www.frcc.gov. Accessed December 3, 2012.

Harper-Lore, B.L. n.d. [2007]. A lesson in ecology. In *Roadside Weed Managemen*t, edited by B.L. Harper-Lore, M. Johnson, and M.W. Skinner, pp. 60–61. Publication No. FHWA-HEP-07-017. Washington, D.C.: U.S. Department of Transportation, Federal Highway Administration.

Harris, L.D., and P.B. Gallagher. 1989. New initiatives for wildlife conservation: the need for movement corridors. In *Preserving Communities and Corridors*, edited by G. Mackintosh, pp. 11–34. Washington, D.C.: Defenders of Wildlife.

Hedquist, S., D.R. Mitchell, and R.F. Ryden. 2009. *Archaeological Survey of Three Alternatives for the Proposed Sonoran Valley Parkway, Maricopa County, Arizona*. Phoenix: SWCA Environmental Consultants.

Heitschmidt, R.K., and J.W. Stuth. 1991. *Grazing Management: An Ecological Perspective*. Available at: http://cnrit.tamu.edu/rlem/textbook/textbook-fr.html. Accessed October 2012.

Heritage Data Management System (HDMS). 2012. Arizona Game and Fish Department species of concern list. Available at: http://www.azgfd.gov/w_c/edits/species_concern.shtml. Accessed December 2012.

Huijser, M.P., P. McGowen, J. Fuller, A. Hardy, A. Kociolek, A.P. Clevenger, D. Smith, and R. Ament. 2007. *Wildlife-Vehicle Collision Reduction Study*. Report to Congress. Washington D.C.: U.S. Department of Transportation, Federal Highway Administration.

Jett, S.C. 1992. An introduction to Navajo sacred places. *Journal of Cultural Geography* 13(1):29–39.

Kade, A., and S.D. Warren. 2002. Soil and plant recovery after historic military disturbances in the Sonoran Desert, USA. *Arid Land Research and Management* 16:231–243.

Kellogg, M. 2010. FE Fuller/Hydrology and Geomorphology, Inc. Memorandum to Elliot Silverston and Marc McIntosh referencing Rainbow Valley ADMP. October 5.

Knowles, B. 2009. Habitat Specialist, Arizona Game and Fish Department. Verbal communication to Geoff Soroka, SWCA Environmental Consultants. June 15, 2009.

Krauss, H. 2007. City of Goodyear, Director of Community Development. Personal communication, meeting at BLM Phoenix District Office to discuss proposed Sonoran Valley Parkway. October 30.

Lambeth, B. 2009. Personal communication, Range Specialist, BLM Lower Sonoran Field Office. September 15, 2009.

Latta, M.J., C.J. Beardmore, and T.E. Corman. 1999. *Arizona Partners in Flight Bird Conservation Plan*. Version 1.0. Technical Report No. 142. Phoenix: Nongame and Endangered Wildlife Program, Arizona Game and Fish Department.

Levick, L., J. Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, R. Leidy, M. Scianni, D.P. Guertin, M. Tluczek, and W. Kepner. 2008. *The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest*. U.S. Environmental Protection Agency and U.S. Department of Agriculture/ARS Southwest Watershed Research Center. EPA/ 600/R-08/134, ARS/233046, 116 pp.

McAuliffe, J.R. 1995. Landscape evolution, soil formation, and ecological patterns and process in Sonoran Desert bajadas. Ecological Monographs. Vol. 64.

McKinney, T., and T.W. Smith. 2007. *Distribution, Movements, and Trans-highway Crossings of Desert Bighorn Sheep in Northwestern Arizona*. Final Report. Phoenix: Arizona Department of Transportation.

Maricopa Association of Governments (MAG). 2000. Valley Vision 2025. Available at: http://www.mag.maricopa.gov/archive/vv2025/New%20Pages/vvFrameSet.html. Accessed April 2, 2009.

———. 2003. *Regional Transportation Plan*.

———. 2007a. Hassayampa Framework Study. Available at: http://www.bqaz.org/hasReports.asp?mS=m3. Accessed November 1, 2011.

———. 2007b. *2007 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area*.

———. 2007c. *Regional Transportation Plan, Final 2007 Update.* Available at: http://www.mag.maricopa.gov/project.cms?item=411. Accessed April 30, 2009.

———. 2009. *Hidden Valley Transportation Framework Study (HVTFS).*

———. 2010. *Regional Transportation Plan (RTP), Final 2010 Update.* Available at: http://www.azmag.gov/Documents/RTP_2010-Annual-Report_Final_v17.pdf. Accessed November 7, 2012.

———. 2012. *MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area.* Available at: http://www.azmag.gov/Documents/EP_2012-06-06_FINAL-MAG-2012-Five-Percent-Plan-for-PM10-for-the-Maricopa-County-Nonattainment-Area.pdf. Accessed December 8, 2012.

Maricopa County. 2007. Drainage Policies and Standards for Maricopa County, Arizona. Available at: http://www.fcd.maricopa.gov/Pub/Manuals/downloads/DPSM_Adopted_041807.pdf. Accessed May 2, 2012

Maricopa County Department of Transportation (MCDOT). 2004. *Roadway Design Manual.* Available at: http://www.mcdot.maricopa.gov/manuals/eng_manuals/roadDesign. Accessed August 19, 2009.

———. 2007. *Maricopa County Department of Transportation Enhanced Parkway Study, Final Report*. Available at: http://www.bqaz.org/pdf/parkway/Report%201-General.pdf. Accessed November 10, 2012.

———. 2008a. *Arizona Parkway Intersection/Interchange Operational Analysis and Design Concepts Study. Final Report*. Available at: http://www.bqaz.org/pdf/parkway/BQAZ_Arizona-Parkway-Intersection-Interchange-Study.pdf. Accessed October 13, 2011.

———. 2008b. *Noise Abatement.* Policy Document #T3103. April.

———. 2009. Traffic Counts: Map B-2. Available at: http://www.mcdot.maricopa.gov/manuals/trafCounts/maps/close-ups/B-2.htm. Accessed August 19, 2009.

Meffe, G.K., and R.C. Carroll. 1997. *Principles of Conservation Biology*. Sunderland, Massachusetts: Sinauer Associates, Inc.

Morgan P., C. Hardy, G. Long, M.G. Rollins, and M.G. Swetnam. 2001. Mapping fire regimes across time and space: understanding coarse and fine-scale fire patterns. *International Journal of Wildland Fire*. Vol.10.

Morrison Institute for Public Policy. 2012. Arizona Indicators cost of living index. Available at: http://arizonaindicators.org/content/cost-living-index. Accessed December 12, 2012.

Nadeau, T., and M.C. Rains. 2007. Hydrological connectivity between headwater streams and downstream waters: how science can inform policy. *Journal of the American Water Resources Association* 43(1):118–133. DOI: 10: 10.1111/j.1752-1688.2007.00010.x.

National Park Service. 2006. *Juan Bautista de Anza National Historic Trail Comprehensive Management and Use Plan*. Washington, D.C.: U.S. Department of the Interior, National Park Service.

National Wildfire Coordinating Group (NWCG), 2008. Glossary of Wildland Fire Terminology. Available at: http://www.nwcg.gov/pms/pubs/glossary/index.htm. Accessed November 19, 2012.

Natural Resources Conservation Service (NRCS). 1974. Soil Survey of Eastern Maricopa and Northern Pinal Counties Area, Arizona

———. 1977. Soil Survey for Maricopa County, Central Part.

———. 1997. Soil Survey for Gila Bend – Ajo Areas, Parts of Maricopa and Pima Counties.

———. 2007. Soils data. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed June 1, 2009.

Noss, R.F., H.B. Quigley, M.G. Hornocker, T. Merrill, and P.C. Paquet. 1996. Conservation biology and carnivore conservation in the Rocky Mountains. *Conservation Biology* 10:949–963.

Rascona, S.J. 2003. Maps showing groundwater conditions in the Phoenix active management area, Maricopa, Pinal and Yavapai Counties, Arizona, November 2002 through February 2003. ADWR HMS #35.

Rogers, G.F., and J. Steele. 1981. *Sonoran Desert Fire Ecology*. U.S. Forest Service General Technical Report RM-81.

Rosen, P.C., and C.H. Lowe. 1994. Highway mortality of snakes in the Sonoran Desert of southern Arizona. *Biological Conservation* 68:143–148.

Rosentreter, R., M. Bowker, and J. Belnap. 2007. *A Field Guide to Biological Soil Crusts of Western U.S. Drylands*. Denver: U.S. Government Printing Office.

Rudolph, D.C., S.J. Burgdorf, R.N. Conner, and J.G. Dickson. 1998. The impact of roads on the timber rattlesnake, (*Crotalus horridus*), in eastern Texas. In *Proceedings of the International Conference on Wildlife Ecology and Transportation*, edited by G.L. Evink, P. Garrett, D. Zeigler, and J. Berry, pp. 236–240. Fort Myers, Florida.

Saunders, D.A., R.J. Hobbs, and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: a review. *Conservation Biology* 5:18–32.

Sheley, R.L., and J.K. Petroff (eds.). 1999. *Biology and Management of Noxious Weeds.* Corvallis: Oregon State University Press.

Singer, F.J., L.C. Zeigenfuss, and L. Spencer. 2001. Role of patch size, disease, and movement in rapid extinction of bighorn sheep. *Conservation Biology* 15:1347–1354.

Southwick and Associates. 2003. *Economic Impact Analysis of Nonconsumptive Wildlife-Related Recreation in Arizona.* In conjunction with the Responsive Management Project, *Arizona Residents' Attitudes Toward Nongame Wildlife*. On file, Arizona Game and Fish Department. May.

State Tax Climate Index. 2012. Available at: http://taxfoundation.org/article/2012-state-business-tax-climate-index. Accessed December 12, 2012.

Stein, P. 1994. *Historic Trails in Arizona from Coronado to 1940*. Phoenix: Arizona State Historic Preservation Office.

SWCA Environmental Consultants (SWCA). 2007. *Phase I Environmental Site Assessment for Sonoran Valley Road*.

———. 2009a. *Biological Evaluation of the Sonoran Valley Parkway Project near the City of Goodyear, Maricopa County, Arizona*. Phoenix: SWCA Environmental Consultants.

———. 2009b. *Visual Resource Management Visual Contrast Rating Sheets*. August.

———. 2009c. *Phase I Environmental Site Assessment for Sonoran Valley Parkway Alternative B*. July.

———. 2009d. *Phase I Environmental Site Assessment for Sonoran Valley Parkway Alternative* C. July.

———. 2009e. Technical memorandum: preliminary jurisdictional delineation of Sonoran Valley Parkway right-of-way for Alternative B, Maricopa County, Arizona. Phoenix: SWCA Environmental Consultants.

———. 2009f. Technical memorandum: preliminary jurisdictional delineation of Sonoran Valley Parkway right-of-way for Alternative C, Maricopa County, Arizona. Phoenix: SWCA Environmental Consultants.

———. 2009g. Technical memorandum: preliminary jurisdictional delineation of Sonoran Valley Parkway right-of-way for Alternative A, Maricopa County, Arizona. SWCA Environmental Consultants, Phoenix.

———. 2009h. *Archaeological Survey of Three Alternatives for the Proposed Sonoran Valley Parkway, Maricopa County, Arizona*. July 2009.

Transportation Research Board. 2000. *Highway Capacity Manual 2000.* Washington, D.C.

URS Corporation. 2011a. Sediment Transport Analysis for Waterman Wash. Technical Memorandum to Flood Control District of Maricopa County. June 28.

———. 2011b. Initial Hydrology Memorandum. Prepared for Flood Control District of Maricopa County Rainbow Valley Area Drainage Master Plan.

U.S. Census Bureau (Census Bureau). 2010. Census 2010 Summary File (SF 3) 100 percent data: City of Goodyear. Available at: http://factfinder.census.gov. Accessed December 4, 2012.

———. 2011. American Community Survey (ACS). Available at: http://www.census.gov/acs/www/. Accessed November 1, 2012.

———. 2012. Poverty Thresholds. Available at: http://www.census.gov/hhes/www/poverty/data/threshld/index.html. Accessed September 1, 2012.

U.S. Department of Agriculture, Soil Conservation Service. 1974. Soil Survey of Eastern Maricopa and Northern Pinal Counties Area, Arizona.

U.S. Department of the Interior (DOI). 2007. *GPRA Strategic Plan, Fiscal Years 2007–2012*. Available at: http://www.doi.gov/ppp/Strategic%20Plan%20FY07-12/strat_plan_fy2007_2012.pdf. Accessed October 19, 2010.

U.S. Environmental Protection Agency (EPA). 1974. Information on levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety. Available at: http://nepis.epa.gov/Exe/ZyNET.exe/2000L3LN.TXT?ZyActionD=ZyDocument&Client=EPA&Index=Prior+to+1976&Query=&SearchMethod=1&QField=&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C70thru75%5CTxt%5C00000001%5C2000L3LN.txt&User=ANONYMOUS&Password=anonymous&Display=p%7Cf&DefSeekPage=x&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL. Accessed December 1, 2012.

———. 1994. Executive Order (EO) 12898. 59 *Federal Register* 7629. Summary available at: http://www.epa.gov/lawsregs/laws/eo12898.html. Accessed October 29, 2012.

———. 1999. *Storm Water Management Fact Sheet Spill Prevention Planning*. EPA Doc. No. 832-F-99-071. Available at: http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_spillprv.pdf. Accessed January 17, 2013.

———. 2012. Approved diesel retrofit technologies. Available at: http://www.epa.gov/otaq/retrofit/verif-list.htm. Accessed January 11, 2013.

U.S. Fish and Wildlife Service (USFWS). 2001. *Biological Opinion: Livestock Grazing on the Conley and Beloat Allotments.* On file, Lower Sonoran Field Office.

———. 2008. *Birds of Conservation Concern 2008.* Arlington, Virginia: U.S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management.

———. 2012. List of threatened and endangered species for Maricopa County, updated October 3, 2012. Available at: http://www.fws.gov/ southwest/es/arizona/Threatened.htm#CountyList. Accessed December 12, 2012.

U.S. Geological Survey (USGS). 2004. National Gap Analysis Program: Provisional Digital Land Cover Map for the Southwestern United States. Version 1.0. RS/GIS Laboratory, College of Natural Resources, Utah State University.

———. 2008. Earthquake Hazards Program: Arizona seismic activity map. Available at: http://earthquake.usgs.gov/regional/states/arizona/hazards.php. Accessed July 28, 2009.

———. 2012. Earthquake Hazards Program Quaternary Fault and Fold Database Interactive Map. Available at: http://geohazards.usgs.gov/qfaults/map.php. Accessed December 13, 2012.

V3 Companies of Arizona, Ltd. (V3). 2007. *Sonoran Valley Road Final Drainage Report*. Phoenix: V3 Companies of Arizona, Ltd.

Vest, M.J. 2002. Statewide economic study 2002: how does Arizona's cost of living compare? Tucson: Eller College of Business and Public Administration, University of Arizona. Available at: http://www.azcommerce.com/doclib/prop/codb.pdf. Accessed July 22, 2009.

Washington-Allen, R.A., T.G. Van Niel, R.D. Ramsey, and N.E. West. 2004. *Remote Sensing-based Piosphere Analysis*. Available at: http://www.gis.usu.edu/~doug/pubs/Piosphere.pdf. Accessed October 2012.

WebMET. 2008. 1961–1992 historical wind speed and direction: Phoenix Sky Harbor International Airport, Phoenix, Arizona. Available at: http://www.webmet.com/State_pages/met_az.htm. Accessed July 28, 2009.

Weinstein, L.L. (ed.). 2001. *Native Peoples of the Southwest: Negotiating Land, Water, and Ethnicities.* Westport, Connecticut: Bergin and Garvey.

Western Regional Climate Center. 2006. Recent Climate in the West. Available at: http://www.wrcc.dri.edu/. Accessed July 28, 2009.

———. 2008. Climate data summary: 1933–2007 and 1983–2008. Weather Service Forecast Office, Sky Harbor International Airport, Phoenix.

White, N.D. 1963. *Ground-water Conditions in the Rainbow Valley and Waterman Wash Areas Maricopa and Pinal Counties, Arizona*. Geological Survey Water Supply Paper 1669-F.

Whittlesey, S.M., R. Ciolek-Torrello, and J.H. Altschul. 1997. *Vanishing River: Landscapes and Lives of the Lower Verde Valley*. Tucson: SRI Press.

Wilcox, B., and D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. *American Naturalist* 125:879–997.

Wildland Fire Leadership Council (WFLC). 2009. *Guidance for Implementation of Federal Wildland Fire Management Policy.* Washington, D.C.

Woodroffe, R., and J.R. Ginsberg. 1998. Edge effects and the extinction of populations inside protected areas. *Science* 280:2126–2128.

Yanes, M., J.M. Velasco, and F. Suárez. 1995. Permeability of roads and railways to vertebrates: the importance of culverts. *Biological Conservation* 71:217–222.

Appendix A

ACRONYMS AND ABBREVATIONS

ACRONYMS AND ABBREVIATIONS

Document Abbreviations

Approved Amendment to the Gila North and South Plans and Decision Record	*Approved Amendment to the Lower Gila North Management Framework Plan and the Lower Gila South Resource Management Plan and Decision Record* (BLM 2005)
City General Plan	*City of Goodyear General Plan 2003–2013* (City 2003)
City General Plan Amendment	*Sonoran Valley Planning Area Proposed Major General Plan Amendment: City of Goodyear, Arizona* (City 2007)
Final Drainage Report	*Sonoran Valley Road Final Drainage Report* (V3 2007)
Lower Gila North RMP	*Lower Gila North Management Framework Plan* (BLM 1983)
Lower Gila South RMP/EIS	*Lower Gila South Resource Management Plan/Environmental Impact Statement* (BLM 1988), as amended (BLM 2005a, 2009a)
Lower Sonoran RMP	*Lower Sonoran Resource Management Plan* (BLM 2012a)
MAG 2007 Plan	*MAG 2007 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2007c)
MAG 2012 Plan	*MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2012**)
MAG Regional Transportation Plan	*Regional Transportation Plan, Final 2010 Update* (MAG 2010)
MAG Transportation Plan	*Regional Transportation Plan, Final 2007 Update* (MAG 2007a)
SDNM RMP	*Sonoran Desert National Monument Resource Management Plan* (BLM 2012b)
Strategic Plan	*GPRA Strategic Plan, Fiscal Years 2007–2012* (DOI 2007)
SWAP	*Arizona State Wildlife Action Plan: 2012–2022* (AGFD 2012)

Other Abbreviations

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
AAC	Arizona Administrative Code
AADT	Average Annual Daily Traffic
ADT	Average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACEC	Area of Critical Environmental Concern
ADA	Arizona Department of Agriculture
ADEQ	Arizona Department of Environmental Quality
ADMP	area drainage master plan
ADOC	Arizona Department of Commerce
ADOR	Arizona Department of Revenue
ADOT	Arizona Department of Transportation
ADT	average daily traffic
ADWR	Arizona Department of Water Resources

AGFD	Arizona Game and Fish Department
AGS	Arizona Geological Survey
AIRFA	American Indian Religious Freedom Act
AMA	Active Management Area
amsl	above mean sea level
ANPL	Arizona Native Plant Law
APE	Area of Potential Effects
ARPC	Arizona Rare Plant Committee
ARS	Arizona Revised Statutes
ASLD	Arizona State Land Department
ASM	Arizona State Museum
ASTM	American Society for Testing and Materials
AUM	Animal Unit Month
AZHGIS	Arizona Heritage Geographic Information System
AZPARC	Arizona Partners in Amphibian and Reptile Conservation
AZPDES	Arizona Pollutant Discharge Elimination System
AZ-WIPWG	Arizona Wildlands Invasive Plant Working Group
BCC	Birds of Conservation Concern
BE	biological evaluation
BEA	Bureau of Economic Analysis
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practice
BP	BLM Priority. Animal and plant species listed in the LSFO and SDNM RMP as inhabiting the Planning Area
B.P.	before present
BS	BLM Sensitive
CAA	Clean Air Act
CC	Condition Class
Census Bureau	U.S. Census Bureau
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CGP	Construction General Permit
City	City of Goodyear
CLOMR	Conditional Letter of Map Revision
CO	carbon monoxide
COLI	Cost of Living Index
CORRACTS	Corrective Action Sites
CWA	Clean Water Act

dB	decibel(s)
dBA	A-weighted decibel scale
DOI	U.S. Department of the Interior
EDR	Environmental Data Resources, Inc.
EIS	environmental impact statement
El Paso	El Paso Corporation
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPNG	El Paso Natural Gas
EPS	Sonoran Institute Economic Profile System
ERNS	Emergency Response Notification System
ESA	Endangered Species Act
FCDMC	Flood Control District of Maricopa County
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FICUN	Federal Interagency Committee on Urban Noise
FIRM	Flood Insurance Rate Map
FLPMA	Federal Land Policy and Management Act
FO	Field Office
Forest Service	U.S. Forest Service
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FY	fiscal year
GAP	Gap Analysis Program
GIS	geographic information system
GMU	Game Management Unit
GWSI	Groundwater Site Inventory
HC	hydrocarbon
HDMS	Heritage Data Management System
HR	Harvest Restricted
HS	Highly Safeguarded
HUD	U.S. Department of Housing and Urban Development
Hz	Hertz
I-	Interstate
IC/EC	IC/EC = Institutional Controls / Engineering Controls
ID Team	interdisciplinary team
IM	Instructional Memorandum
ITS	Intelligent Transportation Society
KOP	key observation point

kV	kilovolt(s)
LCRV	Lower Colorado River Valley
L	Loop
L_{dn}	day-night average sound level
L_{eq}	equivalent noise levels
L_{eq1h}	hourly noise level
L_{max}	maximum sound level
L_{min}	minimum sound level
LOMR	Letter of Map Revision
LORS	laws, ordinances, regulations, and standards
LOS	level of service
LSRMP	*Lower Sonoran Resource Management Plan* (BLM 2012a)
LUA	land use authorization
LUST	leaking underground storage tank
MAG	Maricopa Association of Governments
MBTA	Migratory Bird Treaty Act
MC	Maricopa County Road
MCAQD	Maricopa County Air Quality Division
MCAQR	Maricopa County Air Quality Rules
MCDOT	Maricopa County Department of Transportation
mm	millimeters
MOU	Memorandum of Understanding
MPA	Municipal Planning Area
mph	mile(s) per hour
MPO	Metropolitan Planning Organization
MSATs	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAP	Noise Abatement Policy
NCHRP	National Cooperative Highway Research Program
NEP	Nonessential Experimental Population
NEPA	National Environmental Policy Act
NFRAP	no further remedial action planned
NHPA	National Historic Preservation Act
NIPTS	noise-induced permanent threshold shift
NHT	National Historic Trail
NO_x	nitrogen oxides
NO_2	nitrogen dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWCG	National Wildfire Coordinating Group
O_3	ozone
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PFYC	Potential Fossil Yield Classification
Phase I ESA	Phase I Environmental Site Assessment
PL	Public Law
PM	particulate matter
$PM_{2.5}$	particulate matter smaller than 2.5 microns in diameter
PM_{10}	particulate matter from 2.5 to 10 microns in diameter
POD	plan of development
PPE	personal protective equipment
ppm	parts per million
Q	Quaternary alluvium
Qy	Holocene surficial deposits
RCRA	Resource Conservation and Recovery Act
RFA	reasonably foreseeable action
RFD	Reasonably Foreseeable Development
RMIS	Recreation Management Information System
RMP	resource management plan
RMZ	recreation management zone
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
RTP	regional transportation plan
RW-RU	right-of-way (roadway – utility)
SA	Salvage Assessed
SCP	spill control plann
SDNM	Sonoran Desert National Monument
SF	Standard Form
SGCN: Tier 1a, 1b, or c	Species of Greatest Conservation Need. An AGFD status listing defined as wildlife of conservation priority—described nationally as Wildlife of Greatest Conservation Need, with a tiered listing regarding the species level of vulnerability and the AGFD's priority level for management where "a" is the highest vulnerability ranking.
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLM	sound level meter
SMA	special management area

SO_2	sulfur dioxide
SOP	standard operating procedure
SPP	spill prevention plan
SPRR	Southern Pacific Railroad
SR	Salvage Restricted
SR	State Route
SRMA	special recreation management area
SVPA	Sonoran Valley Planning Area
SVPP	Sonoran Valley Parkway Project
SWAP	State Wildlife Action Plan
SWCA	SWCA Environmental Consultants
SWPPP	stormwater pollution prevention plan
TCE	temporary construction easement
TCP	traditional cultural property
TI	traffic interchange
TSC	Treatment, Storage, and Disposal
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
V3	V3 Companies of Arizona, Ltd.
VCP	voluntary cleanup program
VMT	vehicle miles traveled
VOCs	volatile organic compounds
vpd	vehicles per day
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WFLC	Wildland Fire Leadership Council
WSC	Wildlife of Special Concern
WUI	Wildland Urban Interface
WUS	waters of the U.S.
Xg	Early Proterozoic granitic rock
Xm	metamorphic rock
Xms	metasedimentary rock

Appendix B

REASONABLY FORESEEABLE DEVELOPMENT

REASONABLY FORESEEABLE DEVELOPMENT

INTRODUCTION

Purpose

The purpose of the reasonably foreseeable development (RFD) analysis is to provide a prediction of the level and type of reasonably foreseeable future development activity that would influence the ultimate traffic capacity of the proposed Sonoran Valley Parkway (e.g., up to six lanes). The RFD is based on a summation of the results of transportation and community development planning documentation indicating growth patterns, local land use planning, population and employment projections, and a multitude of factors that create pressures on the existing transportation system, natural ecosystem, and community resources. The RFD was developed through a comprehensive review of approved planning documents generated by State, regional, and local agencies such as the Arizona Department of Transportation (ADOT), Maricopa Association of Governments (MAG), the City of Goodyear, and other affected nearby communities.

Scope

Generally, transportation planning projects, such as the Sonoran Valley Parkway Project (SVPP), are derived from regional or statewide transportation planning processes to avoid the de novo effect, or disconnection from long-range transportation planning. The SVPP is currently referenced as part of the regional transportation network as a proposed parkway providing a connection through Goodyear's annexed Sonoran Valley Planning Area (SVPA), an area expected to experience significant growth within the next two decades (MAG 2007).

This RFD provides an assumption based on the known or inferred development potential of the municipal planning areas within, or directly adjacent to, the SVPP study area using planning documents that address existing and planned transportation and development conditions. The RFD includes the most current available information; as such, it is subject to change as additional data becomes available or as the built environment changes.

Study Area

A complete description of the study area for the SVPP is included in Chapter 1 (Figure 1.1.1). Because the proposed SVPP will serve as a connection between multiple communities, the RFD analysis will include the City of Goodyear and the SVPA, as well as the adjacent communities of Maricopa, Buckeye, and Avondale. Generally, the SVPP corridor lies within the City of Goodyear's SVPA, providing a southeasterly connection from central Goodyear to the southeast in the vicinity of State Route (SR) 238.

REVIEW OF PLANS AND STUDIES

Statewide

In 2010, ADOT accepted the Building a Quality Arizona Statewide Transportation Framework Study (BqAZ) as the long-range transportation plan for Arizona (ADOT 2010). BqAZ was a statewide transportation planning effort resulting in the creation of a "vision" for the future of transportation in Arizona by 2050. Though BqAZ focused on statewide transportation outside of Maricopa County, this effort did include the collaboration between the public, agency stakeholders, and regional governments in the evaluation of transportation opportunities linking the region. Results of the BqAZ effort showed that improving mobility and accessibility and supporting economic growth are priorities for transportation planning throughout the State.

Regional

As the regional metropolitan planning organization, MAG is charged with the authority to develop plans, strategies, and programs that address the changing regional landscape. This includes responding to anticipated commercial and residential growth by building transportation networks that support regional connections. A substantial lag in implementing needed transportation facilities typically results in significant traffic capacity deficiencies.

The *MAG Regional Transportation Plan Update* (MAG 2010) is a comprehensive, performance-based, multimodal, coordinated regional transportation plan (RTP) which provides a blueprint for transportation planning in the MAG region up to FY 2026. Additionally, the RTP's transportation program maintains consistency with state and local planning growth patterns.

Included in the RTP are plans for Loop 303, a major transportation corridor with three general purpose lanes in each direction and an option for a future high-occupancy vehicle lane and a fourth outside lane. Loop 303 will extend west from Interstate 17 (I-17) at Lone Mountain, traversing southwest to Grand Avenue, south in the vicinity of Cotton Lane to Interstate 10 (I-10) and terminating near MC-85/Buckeye Road. The City of Goodyear has provided recommendations to extend Loop 303 from SR 30 south to connect with Interstate 8 (I-8). Depending on the final alignment of the southernmost portion of Loop 303, this roadway will likely serve as an important connection to and from the SVPP within the regional transportation network.

Transportation planning studies such as corridor studies and area plans are the foundation of the MAG regional transportation planning process. These transportation planning studies cover an inventory of land use, population growth, and economic development factors based on quantitative analysis (e.g., socioeconomic projection modeling) as well as wide-ranging consultation with the public, local governments, and affected stakeholders. During the evaluation process, existing and future land use and population conditions are taken into account in order to derive new transportation corridors or improve existing facilities and services.

In 2009, MAG updated the 2030 socioeconomic projections to reflect 2035 conditions. MAG typically provides on-going updates to reflect a 25-year planning horizon and support accurate socioeconomic conditions for use in transportation planning. Using projections for 2035, MAG provided population forecasts for Municipal Planning Areas (MPAs) and Regional Analysis Zones (RAZs). This update was approved by MAG's Regional Council in 2009. According to the updated 2035 projections, MAG

reported that Goodyear's resident population would increase from 65,178 (2010) to 358,565 (2035), while the SVPA population would increase from approximately 100 (2010) to 60,629 (2035) (MAG 2009a).

The *I-8 and I-10/Hidden Valley Transportation Framework Study* (MAG 2009b) is the second long-range transportation planning study that MAG has completed. The Hidden Valley study area is approximately 3,000 square miles located in Maricopa and Pinal counties, and includes the SVPP study area. The purpose of this study was to establish a conceptual network of freeways, parkways, and arterial roads that would be capable of meeting long-range traffic demand within the Hidden Valley. According to the study, population and employment projections for the Hidden Valley study area show a significant increase (Table 1).

Table 1: Population and Employment Conditions in the Hidden Valley Study Area

Year	Population	Employment
2005	90,000	49,000
2030	448,000	224,000
Build Out*	2,500,000	1,100,000

Source: MAG (2009)
*Build out is defined as when the City of Goodyear's General Plan is fully implemented, there is no set timeframe but is generally assumed to be within the next 40 to 60 years (e.g., 2051 to 2071).

The Hidden Valley transportation framework study indicates that the SVPP is a "high priority" parkway with a total of six lanes (three lanes in each direction) at build out. The SVPP is not currently funded or included in the MAG RTP; however the transportation framework study states that the anticipated study timeframe for the SVPP is 2010 to 2015, with right-of-way preservation occurring between 2010 and 2020 (MAG 2009a).

The Hidden Valley Transportation Framework Study identifies the SVPP as an "illustrative corridor." Illustrative projects are helpful in guiding transportation and land use provisions for the development of potential future transportation facilities in general plans. The SVPP was identified through the transportation planning process and is considered a regionally significant project and is a corridor link in the regional transportation system that enhances mobility in the region.

The I-10/Hassayampa Valley Transportation Framework Study (MAG 2007) preceded the Hidden Valley transportation framework study and includes a portion of the SVPP study area. This transportation framework study includes the analysis of 160 communities. Projected population growth within the study area shows significant growth and high growth potential from Goodyear to Mobile in particular.

The I-10 Hassayampa Transportation Framework Study recommends adopting the parkway as a new functional roadway classification, recognizing the Arizona Parkway as a type of roadway with unique operating characteristics for congestion and air quality planning purposes.

Local

The City of Goodyear General Plan (City of Goodyear 2003, 2009) indicates three major growth areas. Though the proposed SVPP is located outside of these designated growth areas, it would serve as an important transportation connection in an area where no urbanized roadway currently exists.

The City of Goodyear developed a General Plan Amendment (GPA) for the SVPA which includes a Traffic Analysis Report (City of Goodyear 2006, 2007). The SVPA is 67 square miles located between the Sonoran Desert National Monument and the Maricopa–Pinal county lines and south from the previous Goodyear MPA boundary to approximately 2 to 4 miles south of SR 238.

According to the SVPA GPA (City of Goodyear 2007) the projected population and employment of the Sonoran Valley Planning Area is estimated to have over 202,000 residents and 57,000 jobs at build out. A village center, located south of SR 238 and west of 91st Avenue, would serve as the employment, recreational, and entertainment core for the Sonoran Valley community. Employment centers would support light industrial and commercial development opportunities and residential development would be contained within master planned communities zoned as Planned Area Developments. Currently, four master planned communities are in various stages of development within the SVPA (Table 2).

Table 2: Master Planned Communities Within or Adjacent to the Sonoran Valley Planning Area

Master Planned Community	Development Status	Total New Dwelling Units
Estrella*	Active	51,070
King Ranch*	Active	5,413
Amaranth	Planned	41,261
Vekol Valley	Planned	N/A

*Note: These MPCs are outside of the SVPA boundary but will generate traffic within the study area.

The Sonoran Valley Planning Area Traffic Analysis Report provides an evaluation of the amount of traffic expected to be generated in the SVPA (City of Goodyear 2006). Land uses within the SVPA are expected to generate over 1 million daily trips in total, with over 500,000 being home-based trips, 400,000 commercial-based, 250,000 employment-based, and an additional 38,000 trips. The traffic analysis report assumes that land within U.S. Bureau of Land Management jurisdiction would remain native desert and would not generate additional traffic.

In general, significant growth has also occurred within the City of Goodyear, which grew 244% from 2000 to 2010 with the population growing from 18,911 to 65,178 within the decade. Within the jurisdictional boundaries of Goodyear, growth is occurring to the north and south with plans for additional annexation of land to the south to accommodate proposed master planned communities such as Amaranth (estimated 41,000 new dwelling units) and, in the future, Vekol Valley, a large mixed-use development. Given this trend, future travel demand will require added roadway capacity, as the existing road network is limited and without a direct connection from central Goodyear to Mobile.

Located west of the City of Goodyear, the Town of Buckeye has developed a Transportation Master Plan to link the town's General Plan with MAG's regional vision. Buckeye anticipates a significant population increase by 2030, making it one of the largest cities in Arizona (Arizona State Land Department 2000). Buckeye also anticipates substantial increases in its land area, school enrollment, employment, and traffic. Both population and land area growth in Buckeye will result in pressures to the existing transportation network and the need for connections to neighboring towns. Buckeye, Arizona has experienced a 173% increase in population from 2000 to 2010 (U.S. Census 2010).

The City of Maricopa has currently experienced growth of 756% since its incorporation in 2003, with the population increasing from 5,088 to 43,598 (U.S. Census 2010). Additionally, the City of Maricopa is planning for significant population, employment, and land area growth within the next two decades (City

of Maricopa 2006). Maricopa is also planning for employment centers and master planned communities located along SR 238.

FUTURE TRENDS AND DEVELOPMENT

Summary of Development Trends

Transportation and community planning studies are typically a collaboration between local governments, MAG, and other agencies and have implications for the extended planning effort beyond the adopted RTP or General Plan timeframe. Given current and expected population growth, these planning studies provide a perspective on future transportation needs and long-range planning.

Both the Hidden Valley Transportation Framework Study and the Goodyear General Plan indicate that there are several major master planned communities in various stages of development: Estrella (active – 51,070 total dwelling units), King Ranch (active – 5,413 total dwelling units), Amaranth (planned – 41,261 total dwelling units) and Vekol Valley (status unknown). These master planned communities represent over 100,000 new residential dwelling units of low- and medium-density development. Commercial and employment development is also planned in this area, including the eventual creation of a village core.

MAG socioeconomic projections for 2035 show growth within Goodyear and the SVPA increasing exponentially (Table 3). Employment projections for 2035 within Goodyear are also expected to increase to 156,725, and to 36,905 within the SVPA (MAG 2009).

Table 3: Population Growth within Goodyear and SVPA

Location	Current Population (2010)	Projected 2035 Population	Projected Build-Out Population
City of Goodyear	65,178	358,565	511,000
Sonoran Valley Planning Area	100*	60,629	202,000

Sources: MAG (2009); City of Goodyear (2009)
*Note: Estimated population.

This substantial growth within Goodyear and the SVPA coupled with equally substantial growth projections for Buckeye, Maricopa, and Avondale will result in formidable increases in vehicular travel demand for both home-based and job-based trips within the region. Specifically, over one million vehicle trips per day are estimated within the SVPA at build-out conditions, or when Goodyear's General Plan is fully implemented (MAG 2009). Adjacent communities such as Buckeye, Maricopa, and Mobile are also planning for significant population, employment, and land area growth within the next two decades.

As the far West Valley experiences additional growth, significant demand will be placed on the transportation network, further requiring a transportation link to adjacent communities and metropolitan Phoenix.

Potential Challenges

Funding

Because the SVPP is currently not included in programmed funding from the RTP, the parkway will need to be funded from other sources. Funding transportation projects often presents a challenge to communities and MPAs, however, several funding opportunities, such as public–private partnership, and private sector funding, can be explored further during the planning and design stages.

Economic Growth

Initial population and employment growth projections from 2007 indicate that a portion of the Sonoran Valley Planning Area (from central Goodyear to Mobile along the Waterman Wash) would experience high development. Given the slowdown of development due to the economic downturn, these projections are tentative. However, MPAs and planning agencies are generally certain that population growth and build-out conditions will be met and the slowing of growth is temporary, which allows agencies the opportunity to plan for future growth within a longer timeframe.

REFERENCES

Arizona Department of Transportation (ADOT). 2010. *Building a Quality Arizona Statewide Transportation Planning Framework Study*. October.

Arizona State Land Department. 2000. *Buckeye Conceptual Planning*. March.

City of Avondale. 2011. *2030 General Plan Working Draft*. July.

City of Goodyear. 2003. *City of Goodyear General Plan 2003-2013.* December.
_____.2006. Sonoran Valley Planning Area Traffic Analysis Report. December.
_____. 2007. *Sonoran Valley Planning Area General Plan Amendment.* January.
_____. 2009. *General Plan Update*. December.

City of Maricopa. 2006. *2006 General Plan*. January.

Maricopa Association of Governments (MAG). 2007. *I-10 Hassayampa Transportation Framework Study*. September.
_____. 2009a. *Socioeconomic Projections for 2035*. January.
_____. 2009b. *I-8 and I-10 Hidden Valley Transportation Framework Study*. October.
_____. 2010. *Regional Transportation Plan Update*. October.

Town of Buckeye. 2008. *2007 General Plan Update*. January.

Unites States Census Census Bureau. 2010. Buckeye Fact Sheet. Available at: http://factfinder.census.gov/servlet/ACSSAFFFacts?_event=Search&geo_id=&_geoContext=&_street=&_county=buckeye&_cityTown=buckeye&_state=04000US04&_zip=&_lang=en&_sse=on&pctxt=fph&pgsl=010. Accessed September 14, 2011.

Appendix C

AGFD DESIGN RECOMMENDATIONS

ATTACHMENT

ARIZONA GAME AND FISH DEPARTMENT RECOMMENDATIONS FOR THE SONORAN VALLEY PARKWAY - WILDLIFE MITIGATION STRATEGIES

Introduction

Wildlife move across the landscape to meet their basic survival needs. Anthropogenic barriers to wildlife movement, such as roads, pose a significant threat to the long-term persistence of wildlife populations worldwide by fragmenting habitat (Noss 1983, Wilcox and Murphy 1985, Noss 1987). The rapid expansion of the U.S. road system to approximately 3.9 million miles (Forman et al. 2003) has exacerbated the effect of habitat fragmentation on wildlife populations by creating barriers to movement (Noss and Cooperrider 1994, Forman and Alexander 1998). Other impacts of roads on wildlife populations include habitat loss within the road's physical footprint, reduced habitat quality adjacent to the roadway, increased exploitation of wildlife resources by human populations, direct mortality (i.e., road kill), pollution, establishment of invasive species, increased development, and reduced landscape connectivity (Spellerberg 1998, Tombulak and Frissell 2000, Foreman et al. 2003).

Wildlife crossing structures with funnel fencing have the potential to make roads safer for motorists and wildlife by reducing wildlife-vehicle collisions and maintaining landscape connectivity (i.e., the degree to which a landscape facilitates or impedes the movement of organisms among distinct resource patches; Taylor et al. 1993). From a wildlife conservation perspective, effective wildlife crossing structures can reduce the impacts of habitat fragmentation resulting from the isolation of core habitat (e.g., decreased population numbers, loss of genetic variation, loss of population viability, extirpation/extinction). Effectiveness is dictated by the assemblage of species present, the types of crossing structures installed, and the placement of those structures relative to animal movements.

The City of Goodyear has identified the need for a new parkway in the Rainbow Valley to service future development in and around Mobile, Arizona, which was annexed by the City of Goodyear. The Rainbow Valley, located between the Sierra Estrella Mountains and the Sonoran Desert National Monument (SDNM), functions as a critical link for a variety of sensitive wildlife species, including desert bighorn sheep (*Ovis canadensis nelsoni*), desert mule deer (*Odocoileus hemionus*), and desert tortoises (*Gopherus agasizzii*), and provides habitat for numerous other species such as the Western shovel-nosed snake (*Chionactis occipitalis*).

Given the awareness of the planned parkway's potential impacts on wildlife connectivity, a data-driven approach to maximizing the effectiveness of mitigation measures in terms of conservation benefit and financial resources is most desirable. A pilot-study was developed during July 2008 to provide preliminary information on wildlife movement across the El Paso Gas Pipeline Road. While this effort was brief, it indicated that wildlife move across the alignment in specific locations (Figure 1). This effort represents the only wildlife movement data available from Arizona Game and Fish Department (AGFD) in this area to date. Wildlife movement studies should be conducted to inform future design recommendations during parkway expansion projects that optimize wildlife passage, reduce wildlife/vehicle collisions and reduce wildlife mortality. Pre-construction and/or post-construction monitoring of wildlife movement across the 2 lane parkway and within recommended bridge and culvert crossing structures could inform future recommendations for additional design features such as funnel fencing and escape ramps. Funnel fencing is a critical component of crossing structure designs as traffic

volumes increase and the parkway is expanded to 6 lanes. Wildlife movement data should be incorporated into the pre-design phase of future expansion projects.

The recommended research approach includes road kill assessments, track surveys, and traffic volume analyses to finalize location and design of crossing structures and other fencing or flood control designs; followed by post-construction monitoring of crossing structures to evaluate effectiveness and apply adaptive management and design strategies if necessary.

At this time, the AGFD will not provide recommendations for locating wildlife crossing structures suitable for bighorn sheep as parkway mitigation. The modeled linkage design includes bighorn sheep. The only mitigation for Bighorn that will work is a wildlife overpass structure. However, AGFD does not believe we could accurately recommend siting for this mitigation without telemetry data to better understand movement patterns between suitable habitats in the mountainous terrain of the area. There is no source for telemetry research at this time. Therefore, AGFD is not recommending mitigation solutions for bighorn within the Linkage Zone at this time; however, we consider connectivity of bighorn sheep habitat between the Sierra Estrellas and Sonoran Desert National Monument (SDNM) a future priority that should be addressed prior to future interstate highway expansions in the area.

Mitigation Recommendations

The AGFD recommends construction of a series design features along the SVPP alignment that will facilitate wildlife movement within the Sierra Estrella-SDNM Linkage Zone (Maximum BLM alternative) and important natural wash movement corridors associated with Waterman Wash and larger tributaries. The overall connectivity goal is to provide multiple crossing structures, suitable for a variety of species (large and small mammals, reptiles and amphibians) and spaced at distances that accommodate species with small and large home range sizes, associated with washes and upland habitats. Decisions on the parkway alignment should strive to minimize the distance traversed across the Linkage Zone in such a way as to consolidate future transportation and utility corridor ROWs and avoid excessive fragmentation of the Linkage Zone, thereby minimizing the need for mitigation.

Design features identified in project planning mitigation discussions include a variety of solutions including: bridges or span arch culverts, box and pipe culverts, crossing structure funnel fencing, wildlife permeable flood control features, wildlife friendly Right-of-Way (ROW) fencing, and reptile exclusion fencing where necessary for reducing impacts to special status species. Recommendations for the locations of structures have not been finalized and are contingent on which alignment alternative is chosen for implementation. The AGFD recommends coordination during the parkway engineering and design phase to finalize site and design specifications of wildlife crossing structures. Recommendations will be based on findings from relevant wildlife research, site specific wildlife movement information, existing wildlife habitat values, field expertise from AGFD, wildlife habitat modeling and AGFD bridge, culvert and fence guidelines (http://www.azgfd.gov/hgis/guidelines.aspx) for wildlife passage. Considerations will include future land use plans within the City of Goodyear and Maricopa County Flood Control District plans for future flood control designs within the Rainbow Valley area. Design specifications for wildlife crossing structures should optimize the movement of wildlife while not impeding the management of flood water.

Wildlife mitigation recommendations are based on a phased implementation approach; tiered to the phased construction approach proposed by the City of Goodyear. Initial construction will be for a 2 lane road, with posted speeds of 55 mph, with plans for future expansion to a 6 lane parkway.

Design Recommendations for Large Sized Mammal (Mule Deer) Crossing Structures

AGFD research indicates that deer are very adverse or sensitive to crossing roadways and need the largest underpass as possible (bridges). There has been some deer passage documented through culverts, and it is possibly enough to maintain gene flow and functional genetic connectivity; but not true permeability in the sense that resident populations would have the ability to move through home ranges for feeding, breeding, dispersal and in response to climatic or episodic events. The best case scenario within the Linkage Zone would be a wildlife overpass (land bridge type structure) that does not arch but remains at natural grade; with a roadway that tunnels underneath; a structure such as this would accommodate all species including bighorn. Goodyear has stated this is not economically feasible.

The recommended solution is construction of multiple large arch span type culverts within the Linkage Zone and associated with priority wash corridors outside the linkage. Culverts should have clear visibility to the other side, large openness ratio, a 12 foot recommended minimum height to avoid a tunneling effect, and sloped walls as opposed to vertical. Wide cross-sectional areas should provide for out of channel wildlife movement when wash corridors are flowing, an important design consideration. Center grates on medians should be considered to enhance natural lighting.

This option should provide better passage than a box culvert 10x10 foot box type structure. Ongoing AGFD research in Twin Peaks, Arizona, to evaluate mule deer use of a 2-cell, 10’ high x 12’ wide x 130’ long culvert underpasses indicates deer come approach, but do not use it.

AGFD recommends a phased implementation approach, that utilizes designs that can be easily upgraded as opposed to reconstructed. There is potential to identify suitable locations within the Linkage Zone at the 2 lane phase. However, in a build out future, it may be best to site crossing structures towards the middle of the Linkage Zone away from the disturbances of the urban fringes, in addition/or in lieu of wash corridors. *AGFD recommends further analysis for timing and location of structures during the engineering and design phases of the project.* At a minimum, construction of large mammal crossing structures should occur when the parkway is expanded to 4 or 6 lanes, and when traffic volume across the linkage increases. It may not be cost effective for the 2-lane phase of the project.

AGFD recommends approaching bighorn sheep mitigations for the Linkage Zone as part of Phase 2 implementation of the project. This will require collaboration on bighorn sheep movement research with multiple stakeholders and project proponents including the Arizona Department of Transportation (ADOT); and in coordination with other local transporation projects including but not limited to the future SR 303, I-11 and/or Hassayampa freeway through the Linkage Zone.

Design Recommendations for Medium and Small Sized Wildlife Crossing Structures

AGFD recommends maximizing the number and size of medium and small sized culverts within the Linkage Zone; and as required for roadway design outside of the linkage. AGFD research has demonstrated that culverts are used by mountain lions, bobcat, javelina and other medium to small mammals, reptiles and amphibians for passage under roadways. A study funded by the Pima County Transportation Authority (Grandmaison 2012) provides background on passage rates for small vertebrates (i.e., lizards, snakes, small mammals, meso-carnivores). Similar to large mammals, small critter fencing (eg. Tortoise fencing) can be used to funnel movement and as an additional safe-guard for special status species such as Desert tortoise (see further discussion on tortoise fencing below).

Design culverts with at grade natural substrate bottoms and avoid use of large rip rap in front of or adjacent to culverts; and/or backfill with topsoil and stabilize with vegetation to optimize movement of barrier sensitive species such as Desert tortoise. Design culverts so as to avoid sharp drop offs and scour at the downstream end.

Structural dimensions for culverts suitable for medium sized wildlife should have *openness ratios >0.4 and heights of at least 3-6 feet*. Structures should be placed frequently (*every 500-1000 ft.)* to correspond with smaller home range sizes over roadway distances greater than ½ mile. For a six lane or larger roadway, *AGFD recommends a cross-sectional opening of >30 square feet for medium sized mammal culvert locations.* Installing a structure suitable for a six lane road will require little to no retro-fitting and reduce the need to fully reconstruct crossing structures when the parkway is expanded up to six lanes. Culverts should be easily accessible (at natural channel grade) with natural vegetation surrounding the approach and entrance. Avoid use of large rip rap at approach and entrance and/or design with ramps to facilitate movement if constructed above grade.

Small mammals, reptiles and amphibians will utilize small pipe, box culvert and/or pipe culvert designs. Structural dimensions should have smaller cross-sectional areas, 2-4 sq. feet, with heights of at least 1 foot.

Small Sized "Upland" Crossing Structures Suitable for Amphibians and Reptiles

There are several species of reptiles and amphibians that utilize habitat within the Rainbow Valley area. Small sized crossing structures (see above) in upland locations are suitable for these species and could be easily incorporated into parkway designs. AGFD recommends placing a few crossing structures for these species in *upland locations* to compliment the distribution of large, medium and small culverts and bridges within the Linkage Zone. However, additional structures would be beneficial further north, proximate to City of Goodyear open space plans, to maintain distribution and abundance of these species within open space areas fragmented by the parkway. Optimum placement is every 150-300 feet. Small pipes or box culverts with natural substrates should be fitted with grated open top designs or slotted drain culverts that are flush with roadways and allow natural light, air and rain to infiltrate without water pooling. Crossing structures outside of floodplains would provide safe passage for species that don't typically use wash habitats and/or have small home ranges. Funnel fencing will be an important design component for these passage structures. We recommend further discussion on how these features could be incorporated into a connectivity strategy within the Linkage Zone. (See also discussion on tortoise fencing below)

Funnel Fencing and ROW Fencing and Tortoise Fencing

AGFD strongly recommends funnel fencing at all wildlife crossing structures designed for wildlife mitigation to ensure they are effective; without funnel fencing research has shown wildlife will continue to cross the roadway at grade. Funnel fencing is a critical component of successful wildlife crossings. Fencing is generally placed to compliment natural topographic features and encourage wildlife to move through a crossing structure and to prevent entrapment along medians. Escape mechanisms (such as fencing that leads to a slope and allows an animal to jump down but not up) are often used to compliment funnel fencing objectives and prevent roadway entrapment. Fence heights will need to be a minimum of 7 ft. for deer and sheep and 3-6 ft. for medium to small mammals. Livestock can be excluded from funnel areas by placing ROW fencing across and setback from the funnel/wildlife crossing structure area.

AGFD recommends use of roadway exclusion fencing as an additional mitigation to minimize roadway mortality of Desert tortoise as a Linkage Zone design mitigation and outside the linkage where the parkway overlaps high quality Category I tortoise habitat identified in the EIS. Roads impede tortoise movements and have been identified as a significant threat to tortoise populations throughout their distribution (AGFD unpublished data, AIDTT 2000, Berry 1986a, Berry 1986b, Boarman 1991, Boarman et al. 1993, Nicholson 1979, von Seckendorff Hoff and Marlow 2002). Desert tortoises occur at relatively low density, have low reproductive rates, and low mobility, three characteristics that heighten their sensitivity to road-induced habitat loss (Trombulak and Frissell 2000, Gibbs and Shriver 2002). Exclusion fencing could be co-located with ROW fencing and funnel fencing associated with culverts, pipes and reptile/amphibian upland crossing structures. Exclusion fencing is typically not more than 3 feet in height and constructed of heavy gauge 1 x 2' horizontal welded wire; partially buried in the ground and with a angled lip at the top to prevent climbing (see *Recommended Specifications for Desert Tortoise Exclusion Fencing* September 2005, USFWS).

Results from future wildlife movement monitoring should be used to inform where other fencing needs might become critical to minimize wildlife/vehicle collisions, wildlife mortality and enhance the use of the constructed wildlife crossing structures. Due to the flat topography of the Rainbow Valley, it will be difficult to predict the extent and/or location of fencing without current wildlife movement data. It is feasible that the entire Linkage Zone may require funnel fencing at build out conditions to safely move wildlife through crossing structures due to expected high volumes of traffic. We anticipate that as development and traffic volumes increases in the Rainbow Valley there will be a greater need to construct funnel fencing and escape ramp features along all transportation corridors within the Linkage Zone. *AGFD recommends monitoring/research on wildlife movement within Rainbow Valley to provide information necessary for placement of funnel fencing. AGFD recommends interim strategies to design arch span culvert crossings with a limited amount of funnel fencing, and monitoring/research discussed below to evaluate additional needs at all wildlife crossing structure locations.*

ROW fencing becomes problematic to wildlife as a result of design and location. Wildlife friendly design recommendations (http://www.azgfd.gov/hgis/pdfs/FencingGuidelines.pdf) should be used for all ROW fencing. AGFD recommends ROW fences be setback as far from the roadway as practicable. Where ROW fences cross drainages and parallel wildlife crossing structures, fences should be set back as far as practical, but at least 50 yards from the entrance of the structure and retrofitted with PVC or alternate materials to create "jumps".
Fence design recommendations for this area should meet requirements for desert bighorn:

- 3-strand barbed and barbless wire
- Bottom strand 20" from ground; middle 15" from bottom strand; top strand 4" above middle strand
- Maximum height of 39" with minimum of 18-20 inches ground clearance on bottom wire; top and bottom wire barbless and middle strands barbed
- T-posts should be space 20-25" apart and at least 3 stays equally space between

Vegetation and Crossing Structure Design Recommendations

Maintaining natural vegetation along the approach and exits of structures and natural substrates through culverts has demonstrated increased wildlife use. Vegetation provides wildlife with security cover. *AGFD recommends a non-clear cut approach to wash habitats during construction and post-construction restoration.*

Scouring is common on the downstream side of concrete or pipe culverts along washes. The changes in elevation from floodway bottom to culvert/pipe bottom often compromise wildlife access through the culverts/pipe. Tortoise have been shown to be particularly sensitive to this situation on Highway 87. *AGFD recommends design solutions that prevent scour and promote access and safe passage by small mammals, reptiles and amphibians.*

Wildlife Monitoring/research Recommendations for Project Implementation

AGFD recommends research on wildlife movement to optimize design and placement of crossing structures that fit the need of the local wildlife and their movement patterns and reduce impact to and address human health and safety issues; as part of the phased implementation approach to the project. Further evaluation is imperative to identify hotspots for roadway mortality and to evaluate if construction and future expansion of the parkway and increasing traffic volumes merit the need for additional mitigation measures, what types and where; in order to be successful.

Evaluation of crossing structure utilization is critical to determine effectiveness and to identify if there are any design modifications that would increase the effectiveness, and suitability as a future mitigation measure for roadway expansions and new projects.

Information gained from evaluation should be used to help decide timing and future steps towards mitigating increasing levels of development and traffic volume in the planning area as it relates to managing the Linkage Zone for the long-term. There are several approaches that should be explored and partnerships should be developed to find the resources to accomplish through shared commitments.

Approaches to consider:

- Track, Scat and Roadkill surveys to identify “hot spots” for mortality and vehicle collisions
- Wildlife movement studies (telemetry) to identify movement patterns
- Traffic Volume using traffic counters to examine the potential influence of traffic volume on wildlife movement and mortality across the parkway and in response to phase implementation of wildlife crossing structures
- Post-construction monitor of crossing structures using digital cameras and/or track plates to evaluate success and/or need for adaptive management measures.

Mitigation for Loss of Water Sources

Local wildlife is extremely dependent on stock tanks in the area as an ephemeral and/or semi-permanent source of water. If parkway construction will eliminate existing stock tanks along the project alignment we recommend replacement of in-kind values and redevelopment at the nearest alternate location.

Roadway Grading

Research suggests that roadkill of small terrestrial vertebrate species decreased by 93% on roads raised on embankments compared to roads at natural grades (Clevenger et al. 2003). This roadway design may be beneficial to small mammals, reptiles and amphibians throughout Rainbow Valley and through the Linkage Zone. Used in combination with wildlife friendly bridge and culvert designs, this design strategy may be an effective way to minimize impacts, while enhancing permeability.

Literature Cited

Arizona Interagency Desert Tortoise Team. 2000. Averill-Murray, R.C., (ed.). Status of the Sonoran population of the desert tortoise in Arizona: an update. Arizona Interagency Desert Tortoise Team and Arizona Game and Fish Department, Phoenix, AZ, USA.

Berry, K.H. 1986a. Desert tortoise (Gopherus agassizii) research in California. Herpetologica 42:62-67.

Berry, K.H. 1986b. Desert tortoise (Gopherus agassizii) relocation: implications of social behavior and movements. Herpetologica 42:113-125.

Boarman, W.I. 1991. Effectiveness of fences and culverts for protecting desert tortoises along California State Highway 58: final report on study design. California Energy Commission Contract No. 700-89-007.

Boarman, W.I., M. Sazaki, K.H. Berry, G.O. Goodlett, W.B. Jennings, and A.P. Woodman. 1993. Measuring the effectiveness of a tortoise-proof fence and culverts: status report from the first field season. Proceedings of the Desert Tortoise Council Symposium 1992:126-142.

Clevenger, A.P., B. Chruszcz, and K.E. Gunson. 2003. Spatial patterns and factors influencing small vertebrate fauna road-kill aggregations. Biological Conservation 109:15-26.

Forman, R.T.T., and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29:207-231.

Forman, R.T.T., D. Sperling, J.A. Bissonette, A.P. Clevenger, C.D. Cutshall, V.H. Dale, and L. Fahrig. 2003. Road Ecology: Science and Solutions. Island Press, Washington, DC, USA.

Gibbs, J.P., and W.G. Shriver. 2002. Estimating the effects of road mortality on turtle populations.

Grandmaison, D. 2012. Wildlife Linkage Research in Pima County – Crossing structures and fencing to reduce wildlife mortality. Arizona Game and Fish Department, Phoenix, Arizona.

Nicholson, L. 1979. The effects of roads on desert tortoise populations. Proceedings of the Desert Tortoise Council Symposium 1978:127-129. Conservation Biology 16:1647-1652.

Noss, R.F. 1983. A regional landscape approach to maintain diversity. BioScience 33:700-706.

Noss, R.F. 1987. Protecting natural areas in fragmented landscapes. Natural Areas Journal 7:2-13.

Noss, R.F., and A.Y. Cooperrider. 1994. Saving Nature's Legacy: Protecting and Restoring Biodiversity. Island Press, Washington, D.C., USA.

Spellerberg, I.F. 1998. Ecological effects of roads and traffic: a literature review. Global Ecology and Biogeography Letters 7:317-333.

Taylor, P.D., L. Fahrig, K. Henein, and G. Merriam. 1993. Connectivity is a vital element of landscape structure. Oikos 68:571-573.

Trombulak, S.C., and C.A. Frissell. 2000. Review of ecological effects of roads on terrestrial and aquatic communities. Conservation Biology 14:18-30.

von Seckendorff Hoff, K., and R.W. Marlow. 2002. Impacts of vehicle road traffic on desert tortoise populations with consideration of conservation of tortoise habitat in southern Nevada. Chelonian Conservation and Biology 4:449-456.

Wilcox, B.A., and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. American Naturalist 125:879-887. References:

Appendix D

ENGINEERING PLANS

SONORAN VALLEY PARKWAY ALIGNMENTS PLANS FOR CITY OF GOODYEAR

TOWNSHIP 3 & 4 SOUTH, RANGE 1 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

SHEET INDEX

DESCRIPTION	SHEET
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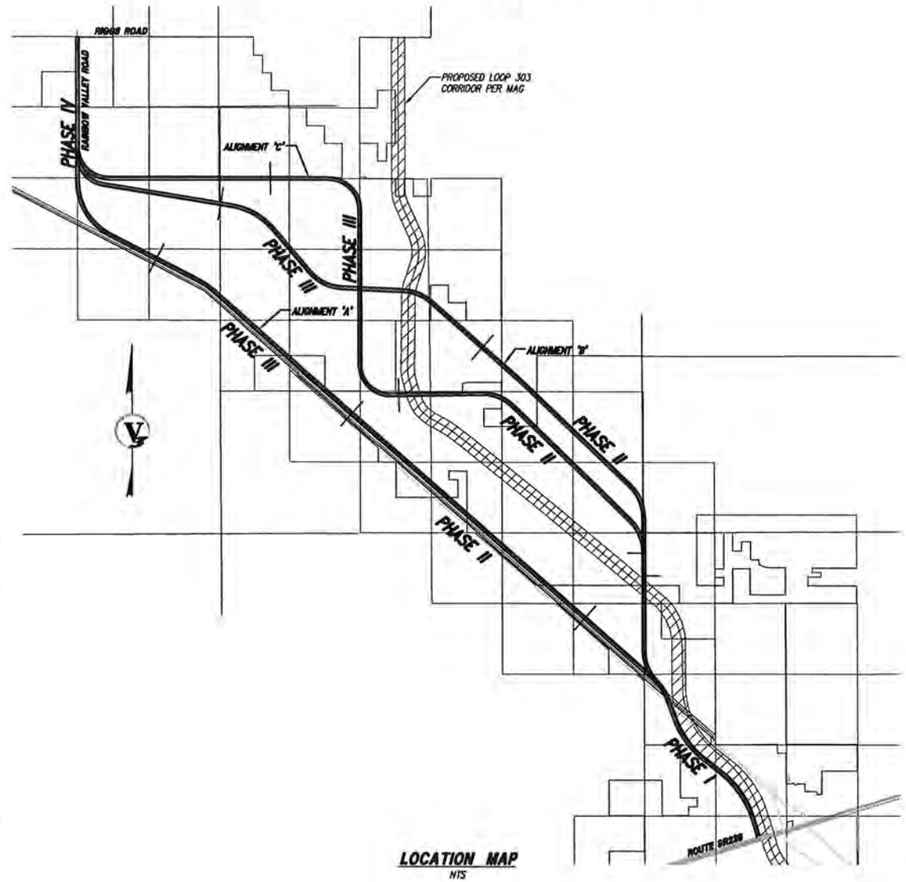
NOTES AND LEGEND SHEET	2
SITE PROJECT OVERVIEW SHEET	3
INDEX MAP AND DETAIL SHEET	4
ROAD SECTIONS AND DETAILS SHEETS	5–6
PLAN AND PROFILES PLANS	7–46

UTILITY COMPANY SUBMITTALS

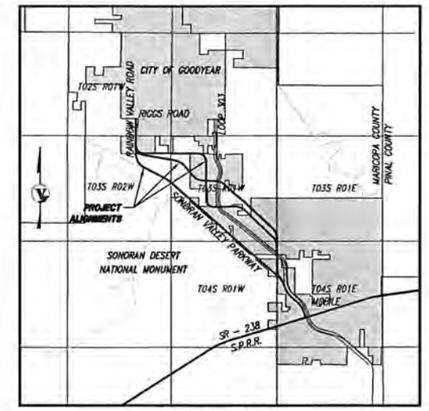
1. THESE PLANS HAVE BEEN SUBMITTED TO THE FOLLOWING UTILITY COMPANIES AND THE WORK CONTAINED IN THESE PLANS HAS BEEN APPROVED BY THESE COMPANIES WITHIN THEIR AREA OF INTEREST. THE SIZE AND LOCATIONS AS SHOWN, OF THE GAS, TELEPHONE AND POWER LINES AND CONNECTIONS, AGREE WITH THE INFORMATION CONTAINED IN THE UTILITY COMPANY'S RECORDS. WHERE THE WORK TO BE DONE CONFLICTS WITH ANY OF THESE UTILITIES, THE CONFLICTS SHALL BE RESOLVED AS SPECIFIED IN THE SPECIAL PROVISIONS AND/OR AS OTHERWISE NOTED ON THESE PLANS. CONFLICTS ARISING DURING THE COURSE OF CONSTRUCTION FROM UNFORESEEN CIRCUMSTANCES SHALL BE REPORTED TO THE INTERESTED UTILITY COMPANY AND BE RESOLVED BY THEM AND THE DESIGN ENGINEER.

2. THE CITY WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATIONS.

QWEST UTILITY COMPANY (602) 630-0496	CONFLICT REVIEW LIAISON COMPANY REPRESENTATIVE	/ /2009 DATE SUBMITTED	/ /2009 DATE RECEIVED
COX COMMUNICATION (623) 328-3514	TERRAN GUTIERREZ COMPANY REPRESENTATIVE	/ /2009 DATE SUBMITTED	/ /2009 DATE RECEIVED
SRP IRRIGATION (602) 236-12962	BOB MAURER COMPANY REPRESENTATIVE	/ /2009 DATE SUBMITTED	/ /2009 DATE RECEIVED
SRP ELECTRIC COMPANY (602) 236-0690	CRAIG EITEL COMPANY REPRESENTATIVE	N/A DATE SUBMITTED	DATE RECEIVED
APS UTILITY COMPANY – WEST (623) 975-5742	LINDA PARK COMPANY REPRESENTATIVE	/ /2009 DATE SUBMITTED	/ /2009 DATE RECEIVED
EL PASO GAS COMPANY (602) 438-4221	RONNIE BROWN COMPANY REPRESENTATIVE	/ /2009 DATE SUBMITTED	/ /2009 DATE RECEIVED
ROOSEVELT IRRIGATION DISTRICT (623) 386-2046	STAN ASHBY COMPANY REPRESENTATIVE	/ /2009 DATE SUBMITTED	/ /2009 DATE RECEIVED



LOCATION MAP
NTS



VICINITY MAP
T.3 & 4 S., R. 1 W & E., G.&S.R.B.& M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

CLIENT
CITY OF GOODYEAR
190 N. LITCHFIELD ROAD
GOODYEAR, AZ 85338

CIVIL ENGINEER
V3 COMPANIES OF ARIZONA
CONTACT: KEITH P. KESTI, P.E.
1048 NORTH 44TH STREET, SUITE 100
PHOENIX, ARIZONA 85008
PHONE: 602-648-4800

GEOTECHNICAL ENGINEER
ALPHA GEOTECHNICAL & MATERIALS, INC.
CONTACT: ARMANDO ORTEGA, P.E.
2504 WEST SOUTHERN AVENUE
TEMPE, ARIZONA 85282
PHONE: 602-453-3265

SURVEYOR
V3 COMPANIES OF ARIZONA
CONTACT: ROBERT JOHNSTON, R.L.S.
1048 NORTH 44TH STREET, SUITE 100
PHOENIX, ARIZONA 85008
PHONE: 602-648-4800

DATA CERTIFICATION
I HEREBY CERTIFY THAT THE DESIGN IS BASED ON ACCURATE FIELD DATA WHICH HAS BEEN CHECKED IN THE FIELD PRIOR TO SUBMISSION OF THESE PLANS TO THE CITY FOR APPROVAL.

BY: _____ DATE

CITY OF GOODYEAR - PLAN APPROVAL
REVIEW AND RECOMMENDED APPROVAL BY:

FIRE DEPT.		GRADING & DRAINAGE	
LANDSCAPING & PLANNING		WATER & SEWER	
TRAFFIC		PAVING	
STREET LIGHTS		SIGNING & STRIPING	

APPROVED BY:

PLANS EXAMINER _____ DATE

DESIGN ASSUMPTIONS
DESIGN SPEED = 65 MPH
Kmin (SAG) = 157
Kmin (CREST) = 193

BENCHMARK
BRASS CAP FLUSH AT THE INTERSECTION OF RAINBOW ROAD AND SOUTHERN AVENUE
ELEV = 904.31' (NAVD 88 DATUM)

BASIS OF BEARING
ALONG THE SOUTH LINE OF THE NORTH HALF OF SEC. 28, T4S, R1E, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA

COUNTY APPROVAL
BY: BY LETTER
MARICOPA COUNTY DEPT. OF TRANSPORTATION DATE

"AS-BUILT" CERTIFICATION
I HEREBY CERTIFY THAT THE "AS BUILT" INFORMATION SHOWN HEREON WAS OBTAINED UNDER MY DIRECT SUPERVISION AND IS CORRECT AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME _____ (SEAL)

REGISTRATION NO. _____ DATE _____

REVIEWED BY : _____
FIELD ENGINEERING

(602) 263-1100
1-800-STAKE-IT

REVISIONS/SUBMITTALS	
1 30% SUBMITTAL TO C.O.G.	04-03-09

V3 COMPANIES OF ARIZONA
1048 North 44th Street
Suite 100
Phoenix, Arizona 85008
P. 602.648.4800
www.V3co.com

COVER SHEET
SONORAN VALLEY PARKWAY
TOWNSHIP 3 & 4 SOUTH, RANGE 1 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

PRELIMINARY NOT FOR CONSTRUCTION

36279
KEITH P. KESTI
ARIZONA, U.S.A.
EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
DESIGNED	KPK
DRAWN	CCS
ACAD FILE	6119- D1CS
CHECKED	MSW
ORIG SUB DATE	04-03-09

HTE 07-5987

GENERAL NOTES FOR CONSTRUCTION (CITY OF GOODYEAR)

A. ALL CONSTRUCTION SHALL CONFORM TO THE CITY EDS&PM, CITY STANDARD DETAILS, AND CURRENT M.A.G. UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION.

B. THIS SET OF PLANS HAS BEEN REVIEWED FOR COMPLIANCE WITH CITY REQUIREMENTS PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS. HOWEVER, SUCH REVIEW SHALL NOT PREVENT THE CITY FROM REQUIRING CORRECTION OF ERRORS IN PLANS FOUND TO BE IN VIOLATION OF ANY LAW OR ORDINANCE.

C. THE CITY DOES NOT WARRANT ANY QUANTITIES SHOWN ON THESE PLANS.

D. THE CITY APPROVAL IS FOR GENERAL LAYOUT IN THE RIGHT-OF-WAY ONLY. THIS APPROVAL IS VALID FOR A PERIOD OF ONE YEAR. CONSTRUCTION PERMITS SHALL BE OBTAINED DURING THIS PERIOD OR THE PLANS SHALL BE RESUBMITTED FOR REVIEW AND APPROVAL.

E. AN APPROVED SET OF PLANS SHALL BE AVAILABLE ON THE JOB SITE AT ALL TIMES.

F. THE CITY SHALL BE NOTIFIED 48 HOURS PRIOR TO ANY CONSTRUCTION WORK AND INSPECTIONS (623-882-7979). CONSTRUCTION WORK CONCEALED WITHOUT INSPECTION BY THE CITY SHALL BE SUBJECT TO EXPOSURE AT THE CONTRACTOR'S EXPENSE.

G. RIGHT-OF-WAY IMPROVEMENTS SHALL NOT BE ACCEPTED UNTIL "AS-BUILT" PLANS HAVE BEEN SUBMITTED AND APPROVED BY THE CITY. (SEE AS-BUILT REQUIREMENTS)

H. THE DEVELOPER IS RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL OBSTRUCTIONS WITHIN THE RIGHT-OF-WAY PRIOR TO STARTING NEW CONSTRUCTION.

I. THE DEVELOPER IS RESPONSIBLE FOR ARRANGING THE RELOCATION AND ASSOCIATED COSTS OF ALL UTILITIES. A UTILITY RELOCATION SCHEDULE SHALL BE SUBMITTED PRIOR TO THE ISSUANCE OF PERMITS.

J. THE DEVELOPER IS RESPONSIBLE FOR OBTAINING OR DEDICATING ALL REQUIRED RIGHTS-OF-WAY AND EASEMENTS TO THE CITY PRIOR TO ISSUANCE OF PERMITS.

K. THE CONTRACTOR SHALL CONTACT BLUE STAKE (602-263-1100) AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

L. THE CONTRACTOR SHALL BARRICADE CONSTRUCTION SITES AT ALL TIMES PER THE CITY OF PHOENIX TRAFFIC BARRICADE MANUAL. WHEN REQUIRED BY THE CITY, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED FOR APPROVAL IN ADVANCE OF CONSTRUCTION.

M. THE CONTRACTOR MUST REQUEST A METER FOR FILLING AND TESTING OF NEW WATER LINES FROM THEIR ASSIGNED ENGINEERING INSPECTOR. THIS METER SHOULD BE ORDERED 2 WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. POTABLE WATER IS NOT AVAILABLE FOR ANY OTHER CONSTRUCTION USE. THE UNLAWFUL REMOVAL OF WATER FROM A FIRE HYDRANT OR ANY OTHER SOURCE IS A VIOLATION OF THE MUNICIPAL CODE, PUNISHABLE BY FINE AND/OR IMPRISONMENT.

N. PRIOR TO MOVING OR DESTROYING PROTECTED NATIVE PLANT SPECIES, THE CONTRACTOR SHALL FILE A FORMAL NOTICE OF INTENT WITH THE ARIZONA DEPARTMENT OF AGRICULTURE (602-542-6408).

O. THE CONTRACTOR SHALL COMPLY WITH THE ENVIRONMENTAL PROTECTION AGENCY NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER REQUIREMENTS ESTABLISHED FOR CONSTRUCTION SITES.

P. THE CONTRACTOR SHALL PROVIDE DUST CONTROL TO THE SATISFACTION OF THE CITY ENGINEER. THE CONTRACTOR SHALL OBTAIN A DUST CONTROL PERMIT FROM THE MARICOPA COUNTY AIR QUALITY DEPARTMENT.

Q. PRIVATE ON-SITE WATER AND SEWER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, N.F.P.A. AND THE UNIFORM FIRE CODE AS ADOPTED BY THE CITY.

GENERAL NOTES FOR STREET CONSTRUCTION (CITY OF GOODYEAR)

A. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY EDS&PM, CITY STANDARD DETAILS, AND CURRENT M.A.G. UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION.

B. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION.

C. CITY OF GOODYEAR INSPECTORS SHALL BE NOTIFIED 48 HOURS PRIOR TO STARTING EACH PHASE OF CONSTRUCTION, AND EACH INSPECTION REQUESTED (623-882-7979).

D. ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE CITY ENGINEER, AND ANY WORK/MATERIAL NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION AND ELEVATION OF ANY UTILITY LINES BEFORE STARTING CONSTRUCTION. IF THE EXISTING LINE IS FOUND TO BE IN A SUBSTANTIALLY DIFFERENT LOCATION, OR WILL ADVERSELY AFFECT THE OPERATION OF THE UTILITY, THE CONTRACTOR SHALL NOTIFY THE CITY OF GOODYEAR PRIOR TO MAKING THE CONNECTIONS.

F. CONSTRUCTION SHALL HAVE ALL EXISTING UNDERGROUND UTILITIES LOCATED (BLUESTAKE - 602-236-1100) AND SHALL ELIMINATE ALL CONFLICTS PRIOR TO CONSTRUCTION.

G. CITY OF GOODYEAR IS NOT LIABLE FOR DELAYS OR DAMAGES TO UTILITIES RELATED TO THIS CONSTRUCTION; NEITHER WILL THE CITY PARTICIPATE IN THE COST OF UTILITY CONSTRUCTION OR RELOCATION.

H. AS-BUILT DRAWINGS (1 SET MYLARS AND 2 SETS OF PRINTS), CERTIFIED BY THE DEVELOPER'S ENGINEER, SHALL BE SUBMITTED TO AND ACCEPTED BY THE CITY ENGINEER BEFORE FINAL ACCEPTANCE OF THE WORK. (SEE AS-BUILT REQUIREMENTS.)

I. CONTRACTOR SHALL CONTINUOUSLY REFERENCE LOCATION OF ALL VALVES DURING CONSTRUCTION.

J. ALL UNDERGROUND UTILITIES LOCATED IN THE ROADWAY SHALL BE COMPLETED BEFORE PAVING.

K. BASE COURSE SHALL NOT BE PLACED UNTIL SUBGRADE HAS BEEN APPROVED BY CITY INSPECTORS.

L. GUTTERS SHALL BE WATER TESTED FOR DRAINAGE IN THE PRESENCE OF THE CITY INSPECTOR.

M. EXACT POINT OF MATCHING TERMINATION AND OVERLAY SHALL BE DETERMINED IN THE FIELD BY THE CITY ENGINEER.

N. CURB, GUTTER, SIDEWALK, AND PAVEMENT SHALL BE SWEPT CLEAN OF DIRT AND DEBRIS.

O. THE CONTRACTOR SHALL OBTAIN AN AIR POLLUTION PERMIT FROM THE MARICOPA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY. THE CONTRACTOR SHALL COMPLY WITH ALL MARICOPA COUNTY DUST CONTROL PERMIT REQUIREMENTS, TO THE SATISFACTION OF THE GOODYEAR CITY ENGINEER AND THE MARICOPA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY.

P. CONTRACTOR IS TO INSTALL A BLUE REFLECTOR AT ALL FIRE HYDRANT LOCATIONS. REFLECTOR TO BE GLUED TO THE FINISHED PAVING AT THE APPROPRIATE LOCATION.

MARICOPA COUNTY GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE MOST CURRENT UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION PUBLISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS (MAG), TOGETHER WITH THE MCDOT SUPPLEMENT TO THE MAG STANDARD SPECIFICATIONS AND THE PROJECT SPECIAL PROVISIONS. ALL WORK MUST ALSO COMPLY WITH RESOLUTION 2001-01 – MARICOPA COUNTY RESOLUTION FOR PERMITS TO WORK IN DEDICATED RIGHT-OF-WAY AND RESOLUTION 2001-02 MARICOPA COUNTY RESOLUTION FOR STREET IMPROVEMENTS, INSTALLATION OF UTILITIES AND TRAFFIC CONTROL. ANY EXCEPTIONS MUST RECEIVE EXPLICIT APPROVAL FROM MCDOT AND SHALL BE IDENTIFIED ON THE PLANS AS HAVING EXPLICIT APPROVAL FROM MCDOT.
2. THE ENGINEERING DESIGNS ON THESE PLANS ARE ONLY APPROVED BY MCDOT IN CONCEPT AND NOT IN DETAIL. CONSTRUCTION QUANTITIES ON THESE PLANS ARE NOT VERIFIED BY MCDOT. APPROVAL OF THESE PLANS ARE FOR PERMIT PURPOSED ONLY AND SHALL NOT PREVENT MCDOT FROM REQUIRING CORRECTION OF ERRORS IN THE PLANS WHERE SUCH ERRORS ARE SUBSEQUENTLY FOUND TO BE IN VIOLATION OF ANY LAW, ORDINANCE, HEALTH, SAFETY, MCDOT ROADWAY DESIGN MANUAL, OR OTHER DESIGN ISSUES.
3. AN APPROVED SET OF PLANS SHALL BE ON THE SITE DURING CONSTRUCTION AND AVAILABLE TO MCDOT AND OTHER INSPECTORS.
4. ALL BOX CULVERTS CONSTRUCTED IN THE PUBLIC RIGHT-OF-WAY SHALL COMPLY WITH ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT) LATEST DESIGN SPECIFICATIONS AND STANDARDS. MINIMUM CLEAR HEIGHT OF BOX CULVERT SHALL BE 4 FEET.
5. CONTRACTOR TO OBTAIN NECESSARY MCDOT PERMITS PRIOR TO CONSTRUCTION WITHIN COUNTY RIGHT-OF-WAY, AND ALL NECESSARY PERMITS FROM LOCAL GOVERNMENTS FOR WORK WITHIN THEIR JURISDICTION.
6. CONTRACTOR SHALL NOTIFY THE MCDOT INSPECTION DEPT. AT LEAST 24 HOURS IN ADVANCE OF ANY CONSTRUCTION AT (602) 506-8806.
7. CONTRACTOR PERFORMING CONSTRUCTION OR EXCAVATION OPERATIONS IS RESPONSIBLE FOR LOCATION AND RELOCATING ALL UTILITIES IN CONFLICT OR WITHIN THE CLEAR ZONE, AT NO EXPENSE TO MARICOPA COUNTY. THE CONTRACTOR SHALL CONTACT BLUE STAKE AT (602) 263-1100 PRIOR TO BEGINNING CONSTRUCTION.
8. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY REQUIRED PERMITS FOR EARTH MOVING FROM MARICOPA COUNTY AIR QUALITY DEPARTMENT'S DUST COMPLIANCE DIVISION (602) 506-6010 PRIOR TO CONDUCTING EXCAVATION OPERATIONS. A COPY OF THE PERMIT AND DUST CONTROL PLAN SHALL BE SUBMITTED TO THE COUNTY ENGINEER PRIOR TO COMMENCEMENT OF ANY EARTHMOVING ACTIVITIES.
9. PRIOR TO CONDUCTING EXCAVATION OPERATIONS, THE CONTRACTOR SHALL OBTAIN FROM THE ARIZONA STATE HISTORICAL PRESERVATION OFFICER (602) 542-4009, RECOMMENDATIONS REGARDING THE NEED FOR CULTURAL RESOURCES (ARCHAEOLOGICAL) CLEARANCE. ALL DISCOVERIES OF HUMAN REMAINS, CULTURAL ARTIFACTS, OR PALEONTOLOGICAL REMAINS SHALL BE REPORTED TO THE ARIZONA STATE MUSEUM AND MCDOT. UPON DISCOVERY, CONTRACTOR SHALL CEASE OPERATIONS IN THE VICINITY OF THE FIND AND PROTECT THE DISCOVERY AREA FROM FURTHER DISTURBANCE UNTIL THE FIND CAN BE PROFESSIONAL INVESTIGATED BY THE ARIZONA STATE MUSEUM AND MCDOT.
10. EXCEPT UNDER EMERGENCY CONDITIONS, ROADS SHALL NOT BE CLOSED FOR CONSTRUCTION ACTIVITY UNLESS PRIOR APPROVAL IS OBTAINED FROM THE MCDOT TRANSPORTATION DIRECTOR OR HIS REPRESENTATIVE.
11. PRIOR TO MOVING OR DESTROYING PROTECTED NATIVE PLANT SPECIES, THE CONTRACTOR SHALL FILE A FORMAL NOTICE OF INTENT WITH THE ARIZONA DEPARTMENT OF AGRICULTURE NATIVE PLANTS (602) 542-6408.
12. PRIOR TO INSTALLATION OF CURB, GUTTER, SIDEWALK, BASE COURSE AND WEARING SURFACE, SUBMIT SOIL TEST(S) OF SUB-GRADE AND REVISED PAVEMENT DESIGN/CALCULATIONS TO MCDOT FOR REVIEW AND APPROVAL. IF SUB-GRADE STABILIZATION IS REQUIRED, THE AREA STABILIZED SHALL BE FROM BACK OF SIDEWALK TO BACK OF SIDEWALK AND MATCH THE STABILIZATION DEPTH OF THE PAVEMENT STRUCTURE.
13. ASPHALT MIX DESIGN SHALL BE SUBMITTED TO MCDOT A MINIMUM OF 48 HOURS PRIOR TO PLACING ANY ASPHALT COURSES. (TRENCH WORK EXCLUDED). ALL PAVED TURNOUTS SHALL HAVE THE SAME ASPHALT AND BASE REQUIREMENTS AS THE ADJACENT ROADWAY UNLESS NOTED OTHERWISE.
14. ALL COMPACTION AND BACKFILL WITHIN COUNTY RIGHT-OF-WAY SHALL CONFORM TO THE MCDOT SUPPLEMENT TO MAG SPECIFICATIONS. BACKFILL UNDER EXISTING PAVEMENT, CURB AND GUTTER OR WITHIN TWO FEET (2') OR LESS FROM THE EDGE OF PAVEMENT SHALL CONSIST OF ONE-HALF (1/2) SACK CLSM.
15. ALL STRUCTURES, SUCH AS MANHOLES, VALVE BOX & COVERS, AND MONITORING WELLS MUST BE MARKED WITH AT LEAST TWO REFLECTIVE YELLOW FLEX POSTS WHEN STRUCTURES ARE LOCATED OUTSIDE THE TRAVELED WAY AND WITHIN THE RIGHT-OF-WAY. (APPLIES ONLY WHEN THERE IS NOT CURB).
16. ANY SAW CUT ALONG EXISTING ROADWAY EDGE WHICH REMOVES THE EDGE OF THE ROADWAY SHALL BE A MINIMUM OF 1' FROM THE EDGE OF THE EXISTING ROADWAY. THE CUT DISTANCE MAY BE GREATER, BASED ON PAVEMENT CONDITIONS OR ROADWAY ELEVATIONS BUT SHALL NOT BE LOCATED WITHIN A LANE WHEEL PATH, AND IF NEEDED SHALL BE IN HALF LANE INCREMENTS.
17. ALL EXISTING PAVEMENT MARKING, TRAFFIC SIGNS AND SIGNAL EQUIPMENT THAT NEEDS TO BE REMOVED, REPLACED, RELOCATED OR REPAIRED BECAUSE OF CONTRACTOR'S WORK WILL BE DONE BY THE CONTRACTOR AT HIS EXPENSE. ALL SALVAGED SIGNS SHALL BE DELIVERED TO THE TRAFFIC OPS BUILDING AT 2909 W. DURANGO ST. ARRANGEMENTS CAN BE MADE FOR DELIVERY BY CALLING (602) 506-8662. ALL NEW STREET NAME SIGNS SHALL BE PROVIDED AND INSTALLED BY PERMITTEE AT NO EXPENSE TO MARICOPA COUNTY.
18. PAVEMENT MARKING, SIGNING AND SIGNAL WORK WILL BE INSPECTED AND SHALL MEET COUNTY STANDARDS BEFORE RELEASE OF BOND.
19. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS WITHIN THE RIGHT-OF-WAY TO A CONDITION EQUAL TO OR BETTER THAN EXISTING IMPROVEMENTS PER MAG 107.9 DISPOSAL OF ALL WASTE MATERIAL WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

ENGINEERS NOTES

1. ALL GRADING, EXCAVATION,PAVING, TRENCHING, PIPE BEDDING AND BACKFILL SHALL COMPLY WITH THE RECOMMENDATIONS SET FORTH IN THE SOILS (GEO-TECHNICAL) REPORT FOR THIS PROJECT AND THE REFERENCED REQUIRED SPECIFICATIONS AND DETAILS. SOILS REPORT AND PAVEMENT DESIGN WERE PREPARED BY: _____ DATED: _____ JOB NO: _____

OVERALL LEGEND

RIGHT-OF-WAY
STORM DRAIN
STREET SIGN BASE
GRADE BREAK
SURVEY MONUMENT
EXISTING CONTOUR LINES
EXISTING ELEVATIONS
PROPOSED ELEVATIONS
CROSS SECTION
VEGETATION – TREE
VEGETATION – BRUSH
VEGETATION – CACTUS
EXISTING OVERHEAD ELECTRIC
EXISTING FENCE
GUARDRAIL
EXISTING A.C. PAVEMENT
PROPOSED A.C. PAVEMENT
RIP-RAP

ABBREVIATIONS

BC	BACK OF CURB
BRW	BOTTOM OF RETAINING WALL
BTM	BOTTOM
CB	CATCH BASIN
CF	CUBIC FEET
CL	CENTERLINE
CY	CUBIC YARDS
DE	DRAINAGE EASEMENT
DTL	DETAIL
EA	EACH
EG	EXISTING GROUND
EL	ELEVATION
EP	EDGE OF PAVEMENT
ESMT	EASEMENT
EX	EXISTING
FC	FACE OF CURB
FG	FINISH GRADE
FL	FLOW LINE
FO	FIBER OPTIC
GL	GAS LINE
HDWL	HEADWALL
HL	HYDRANT LINE
HW	HIGH WATER
IE	INVERT ELEVATION
IRR	IRRIGATION
LF	LINEAL FEET
LL	LOT LINE
LS	LANDSCAPING
LT	LEFT
MH	MANHOLE
MIN	MINIMUM
NG	NATURAL GROUND
OFF:	OFFSET
OHE	OVERHEAD ELECTRIC LINES
PI	POINT OF INTERSECTION
PL	PROPERTY LINE
PUE	PUBLIC UTILITY EASEMENT
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
RT	RIGHT
RW	RIGHT-OF-WAY
RTW	RETAINING WALL
SI	STREET INTERSECTION
SC	SCUPPER
SD	STORM DRAIN
SF	SQUARE FOOTAGE
SHDR	SHOULDER
STA:	STATION
STD	STANDARD
SW	SIDEWALK
SY	SQUARE YARDS
TB	TOP OF BERM
TL=	TRUE LENGTH
TOP	TOP OF PIPE
TRW	TOP OF RETAINING WALL
TS	TRAFFIC SIGNAL
TTL	TOTAL (LF, CF, CY, SF, SY)
TYP	TYPICAL
VC	VERTICAL CURVE
W=	WIDTH

(602) 263-1100
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REVISIONS/SUBMITTALS	
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NOTES AND OVERALL LEGEND
SONORAN VALLEY PARKWAY
TOWNSHIP 3 & 4 SOUTH, RANGE 1 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

PRELIMINARY NOT FOR CONSTRUCTION

36279
KEITH P. KESTI
ARIZONA, U.S.A.
EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
DESIGNED	KPK
DRAWN	CCS
XREF FILE	6119- 02NS
CHECKED	MSW
ORIG SUB DATE	04-03-09

HTE 07-5987

END PROJECT
RIGGS ROAD
RAINBOW VALLEY ROAD
T.2S.
T.3S.
R.2W.
R.1W.
ALTERNATE C
ALTERNATE A
ALTERNATE B
CITY OF GOODYEAR
LOOP 303 CORRIDOR PER MAG
BULLARD AVE
MATCH BELOW
MATCH ABOVE
T.3S.
T.4S.
R.1E.
R.1W.
STATE HIGHWAY 238
BEGIN PROJECT
LOOP 303 CORRIDOR PER MAG
SONORAN DESERT NATIONAL MONUMENT
SRP EASEMENT 330'
50' TRANSCONTERN EASEMENT
65' BLM RW GRANT

T2S R1W SEC 34
T2S R1W SEC 35
T3S R2W SEC 3
T3S R2W SEC 2
T3S R2W SEC 1
T3S R1W SEC 6
T3S R1W SEC 5
T3S R2W SEC 11
T3S R2W SEC 12
T3S R1W SEC 7
T3S R1W SEC 8
T3S R1W SEC 9
T3S R2W SEC 14
T3S R1W SEC 18
T3S R1W SEC 17
T3S R1W SEC 16
T3S R1W SEC 15
T3S R1W SEC 20
T3S R1W SEC 21
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T3S R1W SEC 29
T3S R1W SEC 28
T3S R1W SEC 27
T3S R1W SEC 26
T3S R1W SEC 25
T3S R1W SEC 33
T3S R1W SEC 34
T3S R1W SEC 35
T4S R1W SEC 3
T3S R1E SEC 36
T3S R1E SEC 31
T4S R1W SEC 2
T4S R1W SEC 1
T4S R1E SEC 6
T4S R1W SEC 11
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T4S R1E SEC 7
T4S R1E SEC 8
T4S R1E SEC 9
T4S R1E SEC 18
T4S R1E SEC 17
T4S R1E SEC 16
T4S R1E SEC 19
T4S R1E SEC 20
T4S R1E SEC 21
T4S R1E SEC 29
T4S R1E SEC 28

2000 1000 0 2000 4000
SCALE 1" = 2000'

JURISDICTION LEGEND

- CITY OF GOODYEAR
- WILDNERNESS AREA
- SONORAN DESERT NATIONAL MONUMENT
- WILDLIFE LINKAGE

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REVISIONS/SUBMITTALS	
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PROJECT OVERVIEW
SONORAN VALLEY PARKWAY

TOWNSHIP 3 & 4 SOUTH, RANGE 1 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

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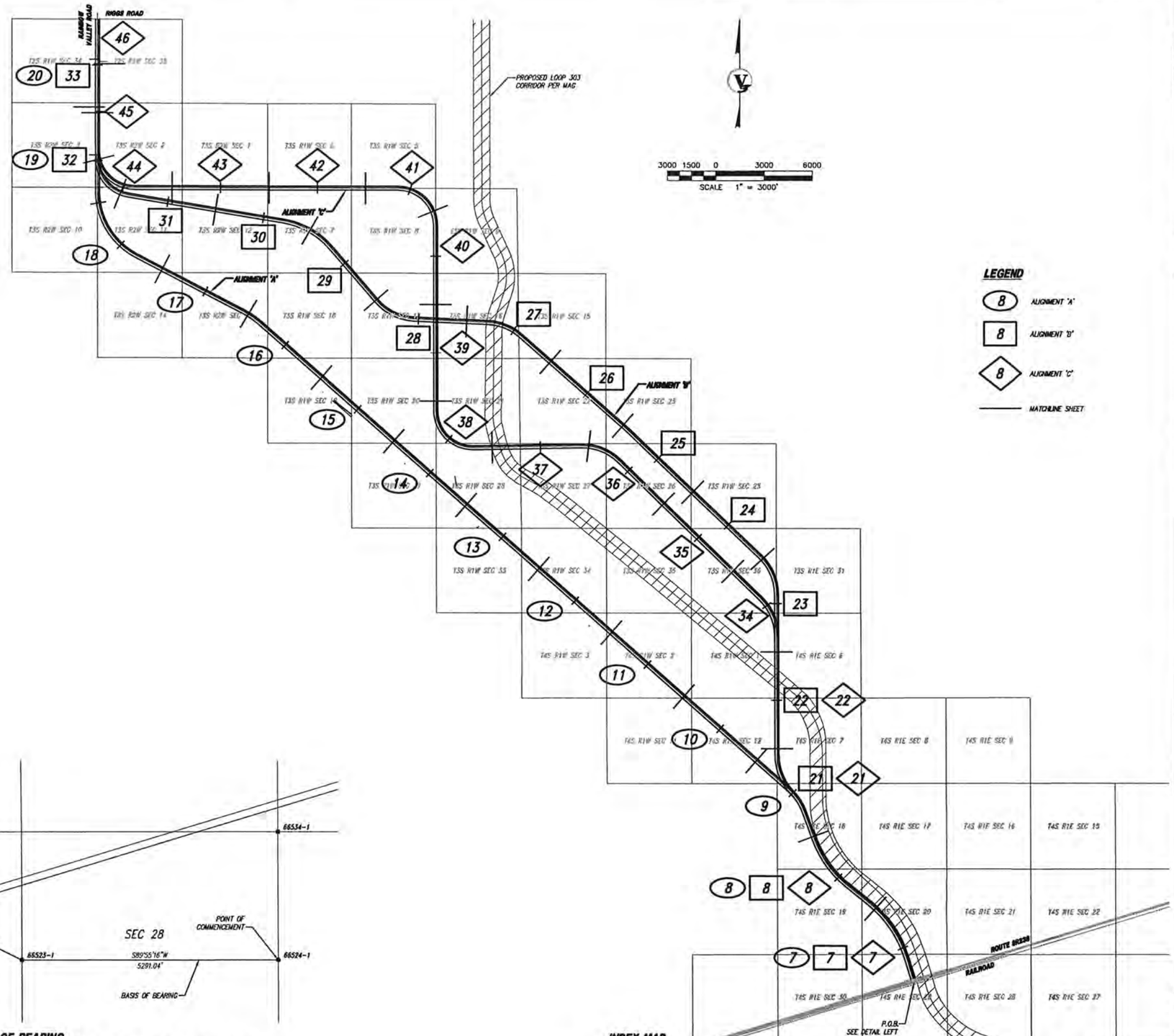
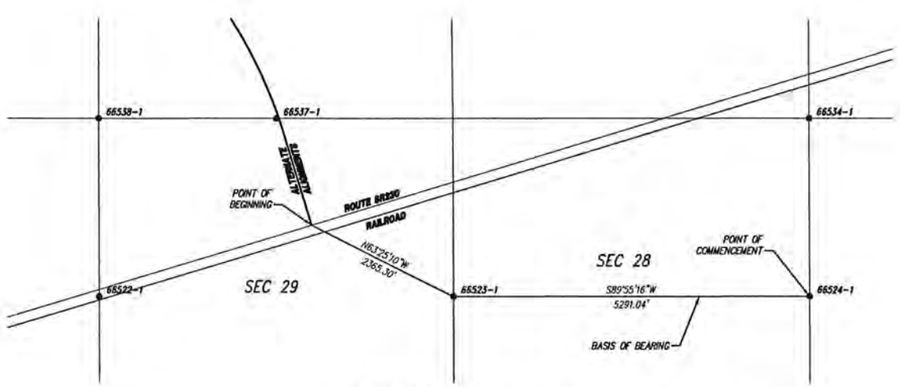
DESIGNED	KPK
DRAWN	CCS
ACAD FILE	6119- 03PO
CHECKED	MSW
CHG SUB DATE	04-03-09

HTE 07-5987



INDEX MAP
1" = 3000'



BASIS OF BEARING
1" = 1000'

NOTE: SECTION CORNERS AS RECORDED IN BOOK 746, PAGE 6, MARICOPA COUNTY, ARIZONA.

REVISIONS/SUBMITTALS	
1 30% SUBMITTAL TO CLIENT	04-03-09

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INDEX MAP AND DETAIL
SONORAN VALLEY PARKWAY

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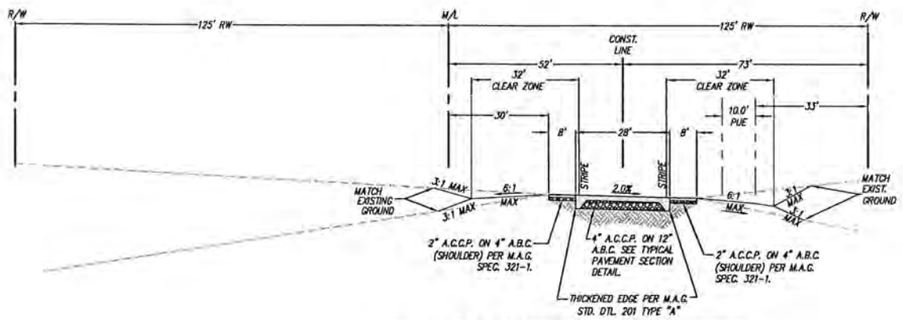
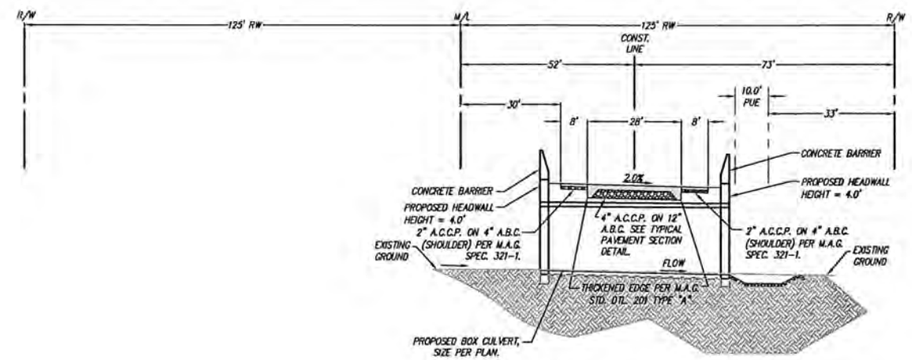
(OUTSIDE MARICOPA COUNTY)

Q:\2006\A06119\A06119.SWCA\CD\04IS\[20A2C29\]20A2D1A3\[6119-04IS.dwg (A) 1:1=25Mm-mcsmith] 10-Apr-2006 - 11:25AM



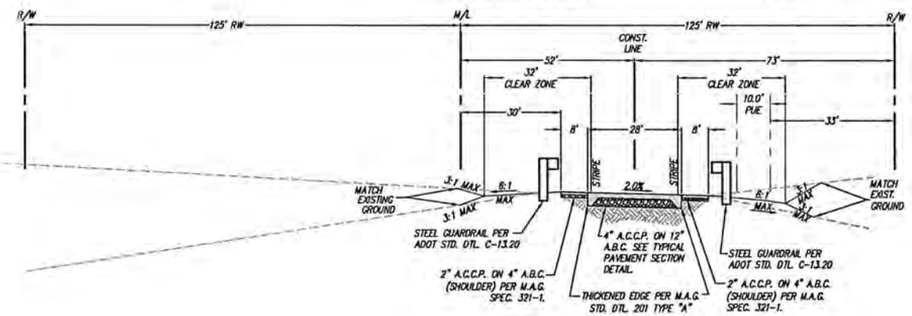
SONORAN VALLEY PARKWAY SECTION

LOOKING NORTH OR WEST N.T.S



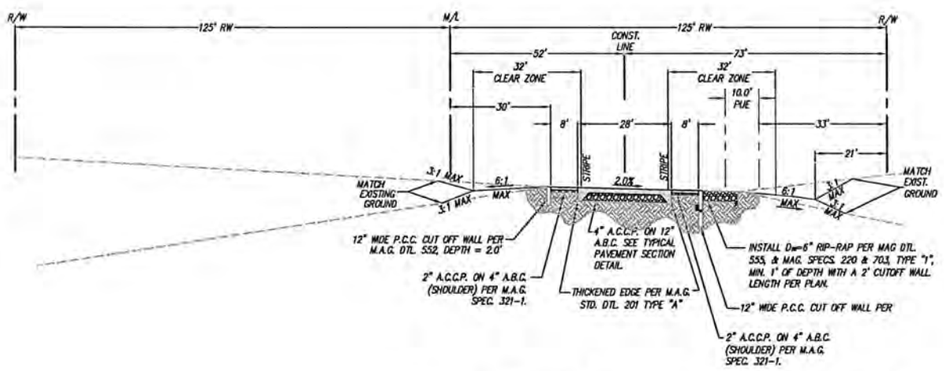
TYPICAL BOX CULVERT CROSS-SECTION

LOOKING NORTH OR WEST N.T.S



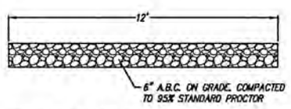
BOX CULVERT APPROACH

LOOKING NORTH OR WEST N.T.S



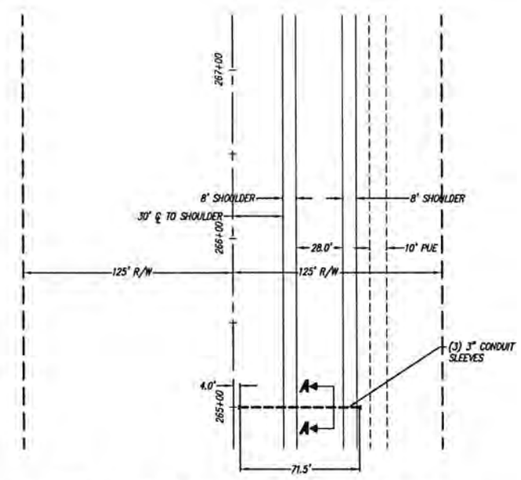
SONORAN VALLEY PARKWAY TYPICAL DIP SECTION

LOOKING NORTH OR WEST N.T.S



TYPICAL GRAVEL ROAD SECTION

N.T.S.



(3) 3" CONDUIT SLEEVES - PLACEMENT DETAIL

N.T.S.

NOTE:
1. PLACEMENT SHALL BE AT APPROXIMATE 1500' INTERVALS.
2. CONDUIT ENDS SHALL BE MARKED WITH METAL 2x4 OR 20 GAUGE COPPER WIRE FOR FUTURE LOCATING.

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ROADWAY SECTIONS AND DETAIL SHEET
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CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

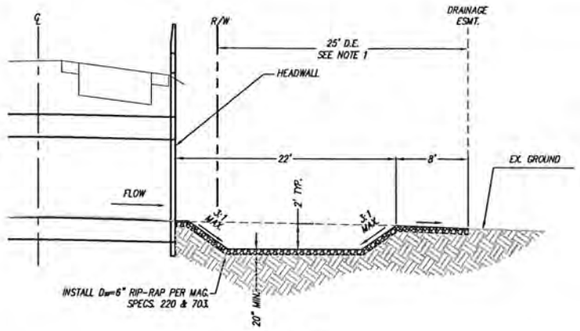
PRELIMINARY NOT FOR CONSTRUCTION

36278 KEITH P. KESTI ARIZONA U.S.A.

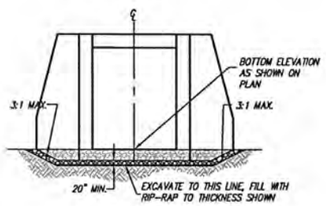
EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
DESIGNED	KPK
DRAWN	CCS
ACAD FILE	6119- 05DS
CHECKED	MSW
CRD SUB DATE	04-03-09

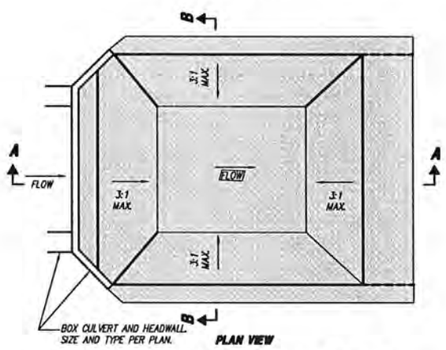
HTE 07-5987



SECTION A-A



SECTION B-B



PLAN VIEW

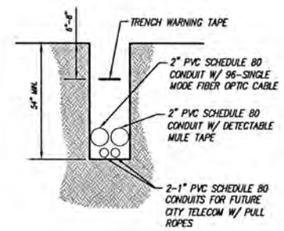
TYPICAL SCOUR HOLE WITH RIP RAP

N.T.S.

NOTE

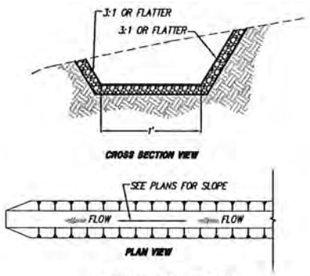
35' DRAINAGE EASEMENT FROM STA: 241+54.24
TO STA: 243+03.67

35' DRAINAGE EASEMENT FROM STA: 366+25.06
TO STA: 372+25.06



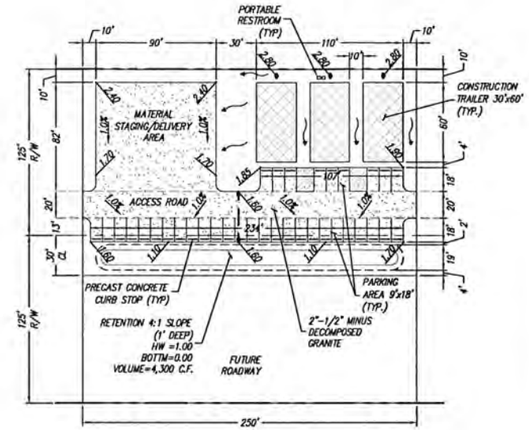
CITY OF GOODYEAR TRAFFIC SIGNAL DUCT BANK DETAIL

N.T.S.



DRAINAGE SWALE

N.T.S.



TYPICAL CONSTRUCTION YARD

SCALE 1"=50'

REVISIONS/SUBMITTALS

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DETAIL SHEET
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GRD SUB DATE	04-03-09

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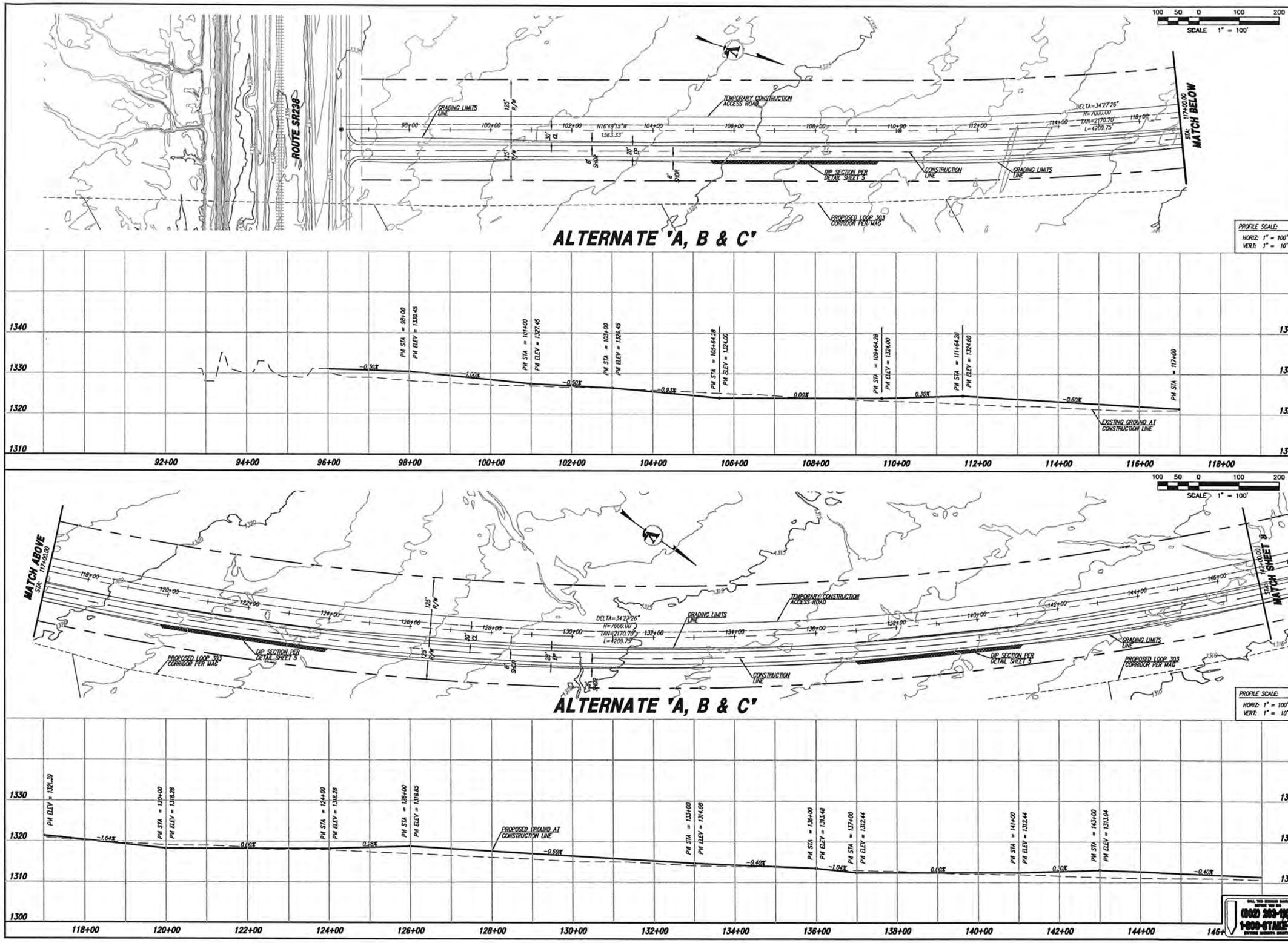
1-800-STAKE-IT
(NOT FOR LOCATION OF CABLE TELEVISION)

HTE 07-5987



REVISIONS/SUBMITTALS

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PLAN AND PROFILE
SONORAN VALLEY PARKWAY

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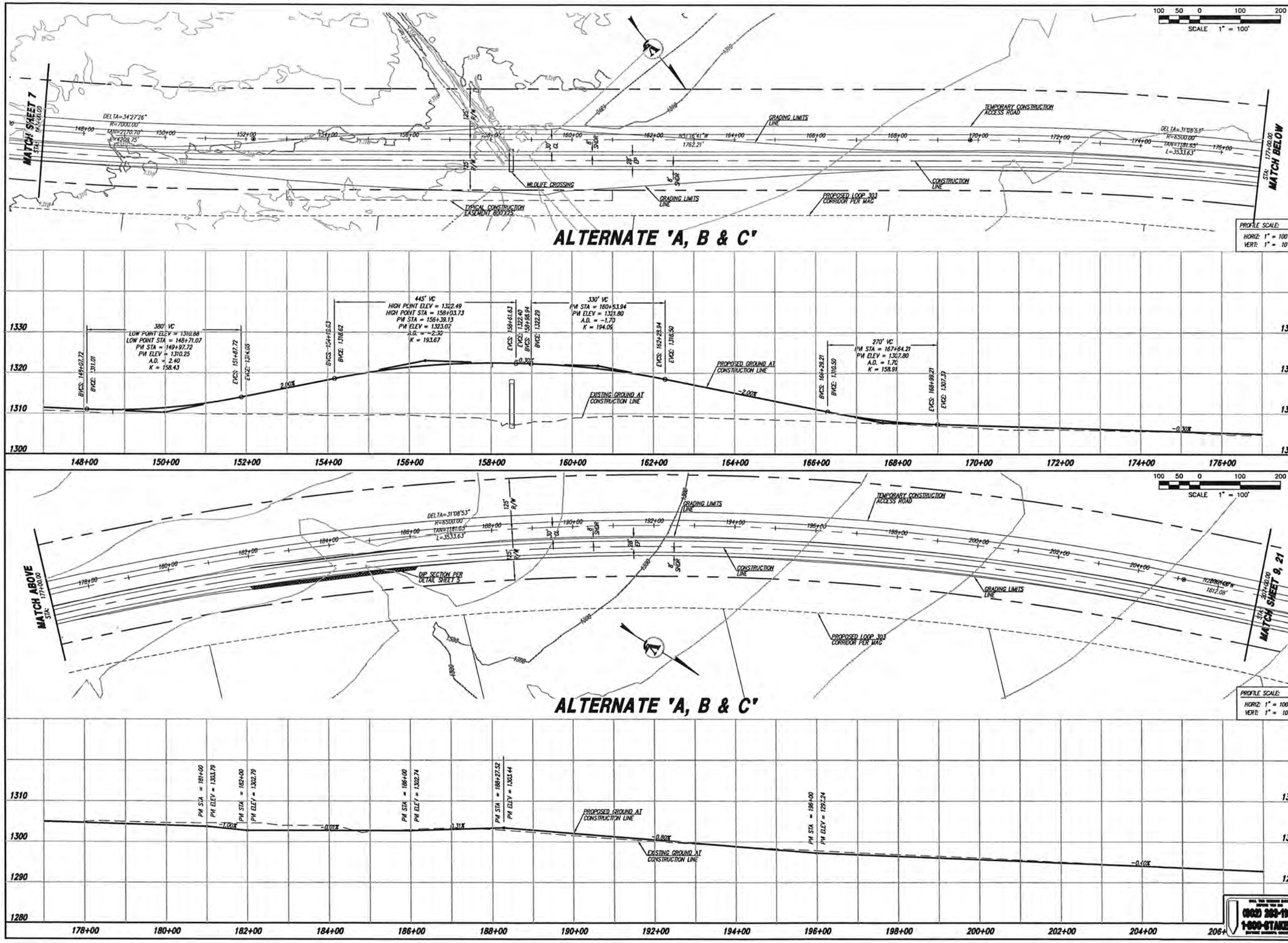
7 OF 46 SHEETS

HTE 07-5987



REVISIONS/SUBMITTALS

1	30% SUBMITTAL TO C.O.E.	04-03-09

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PLAN AND PROFILE
SONORAN VALLEY PARKWAY

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CHECKED	MSW
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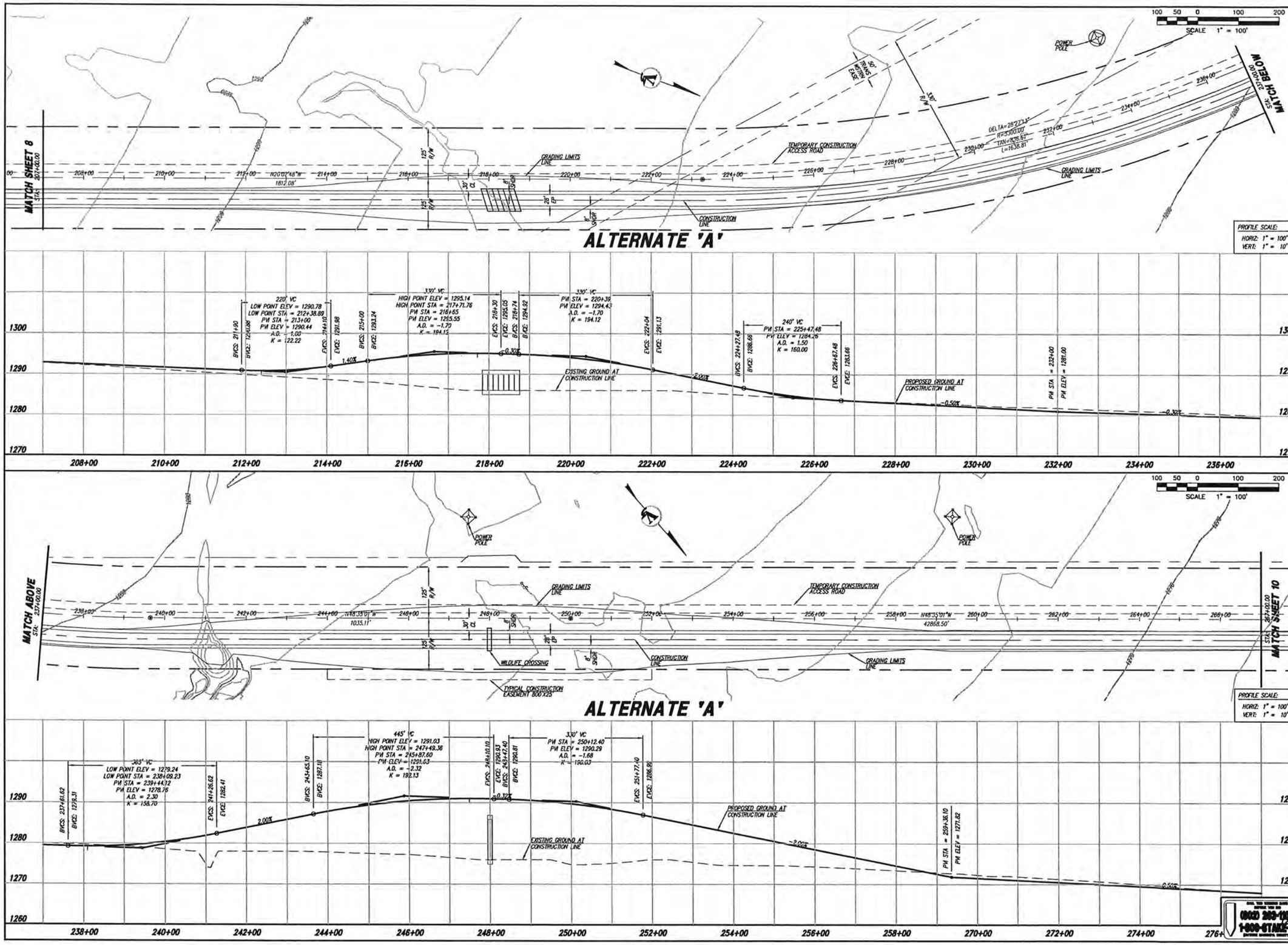
(OUTSIDE MARICOPA COUNTY)

HTE 07-5987



REVISIONS/SUBMITTALS

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36279
KEITH P. KESTI
ARIZONA, U.S.A.
EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
DESIGNED	KPK
DRAWN	CCS
ACAD FILE	6119-09PP
CHECKED	MSW
ORIG SUB DATE	04-03-09

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9 OF 46 SHEETS

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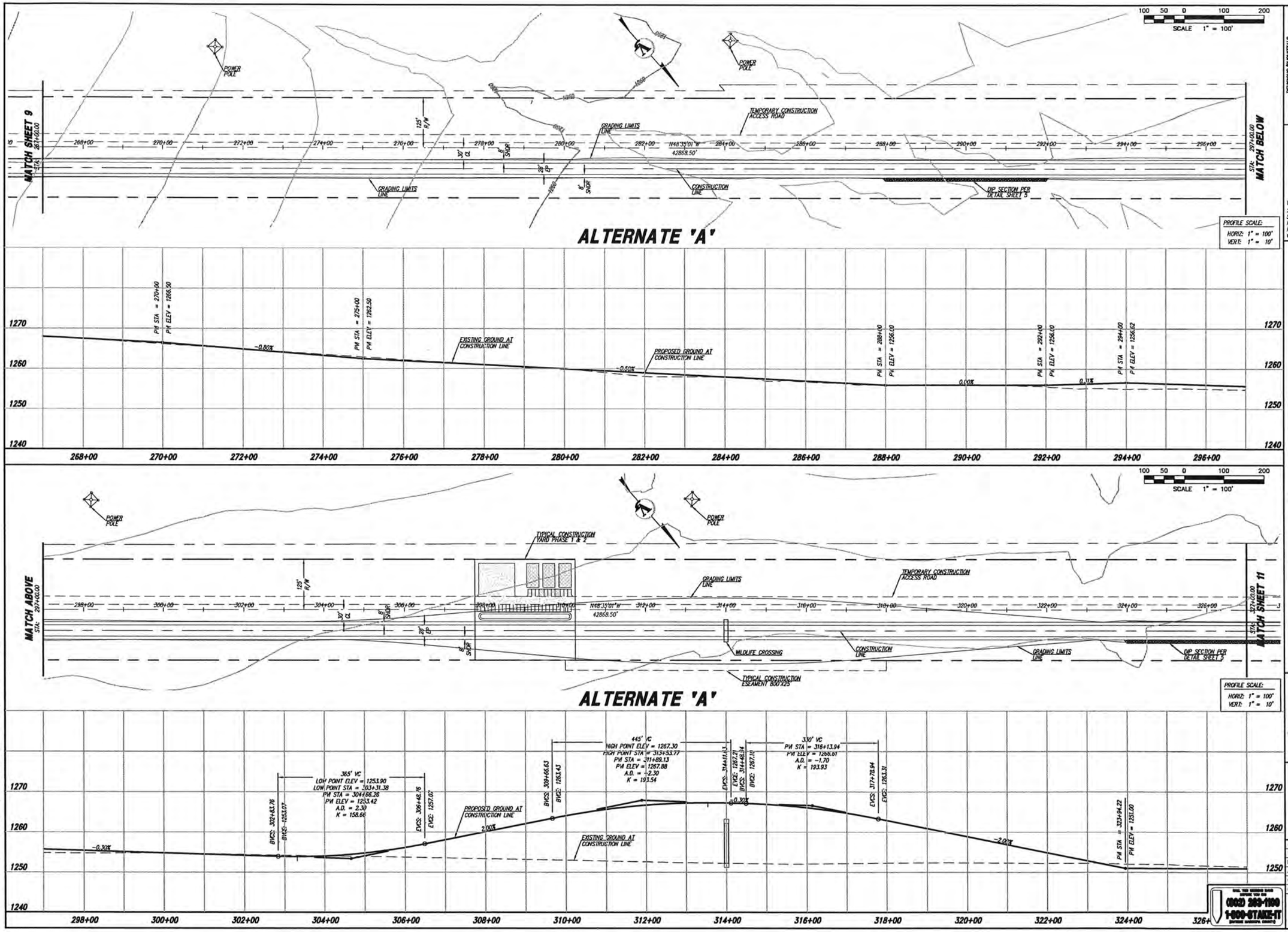

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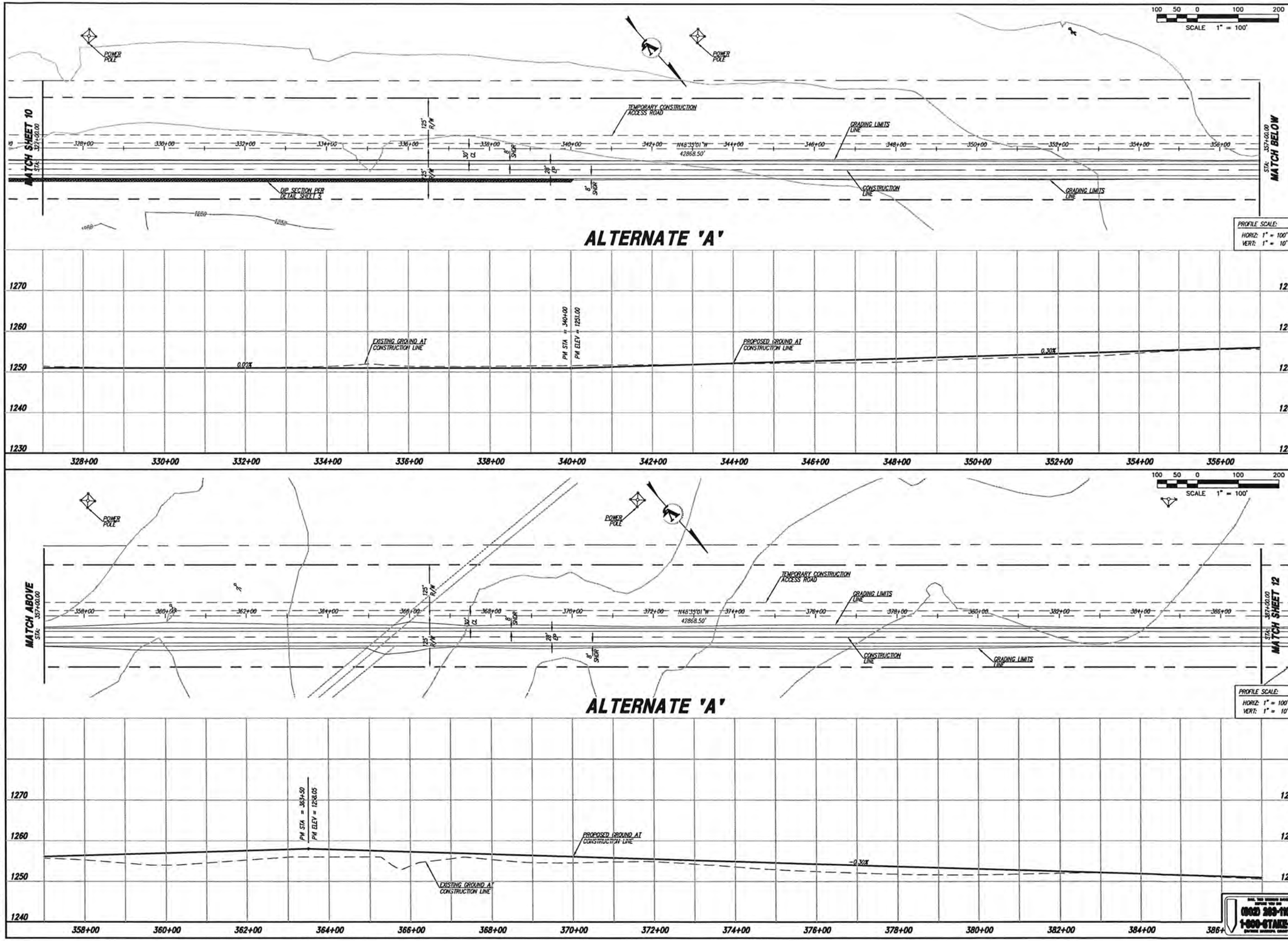

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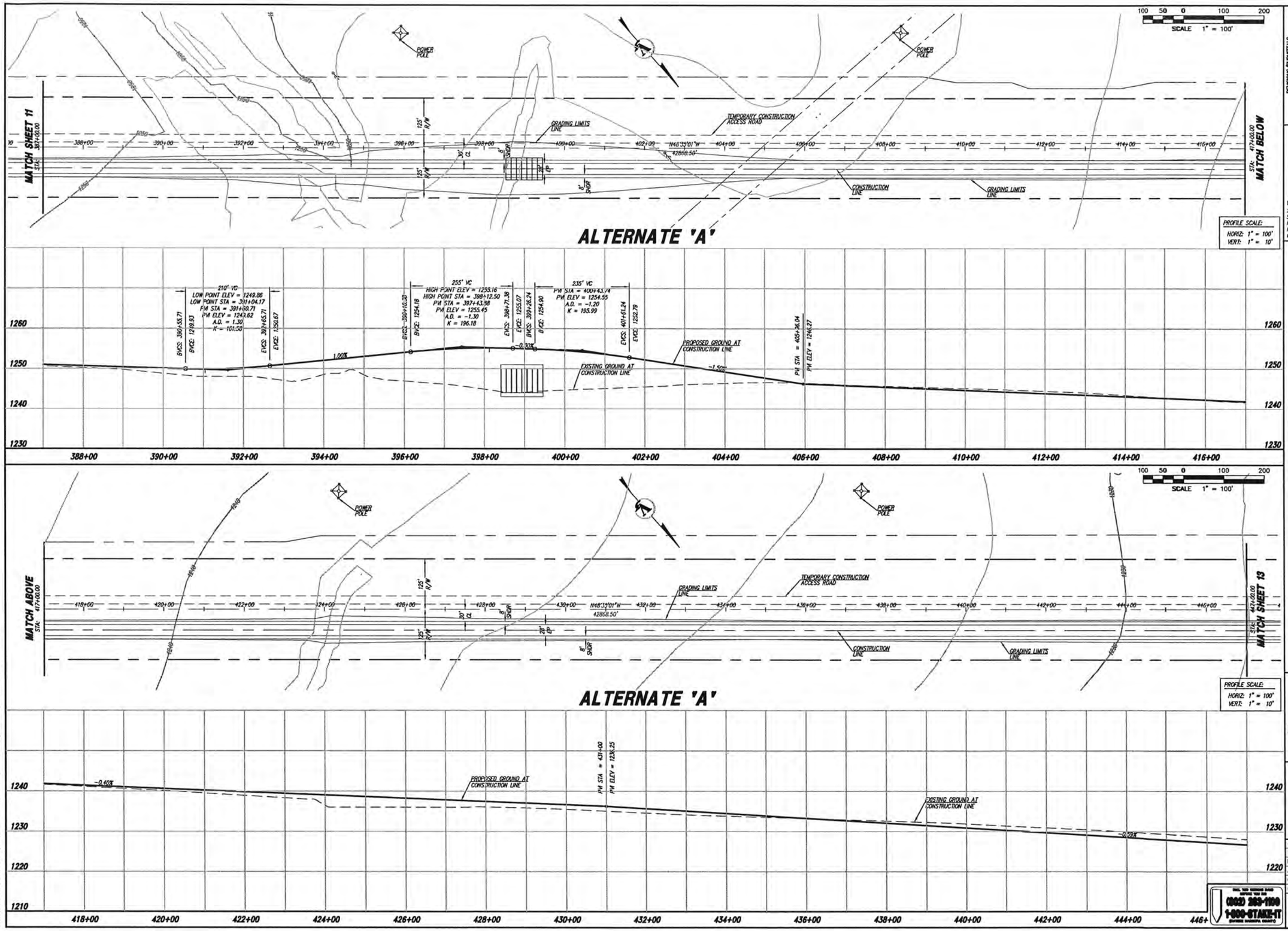

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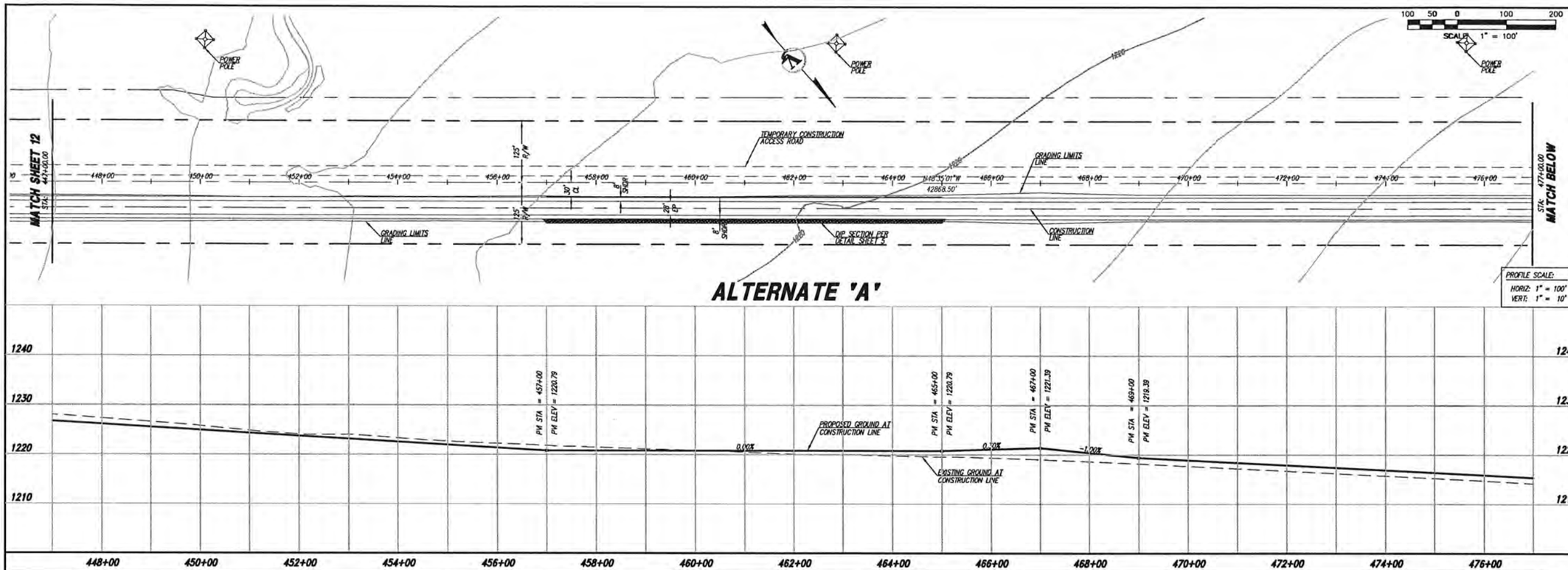

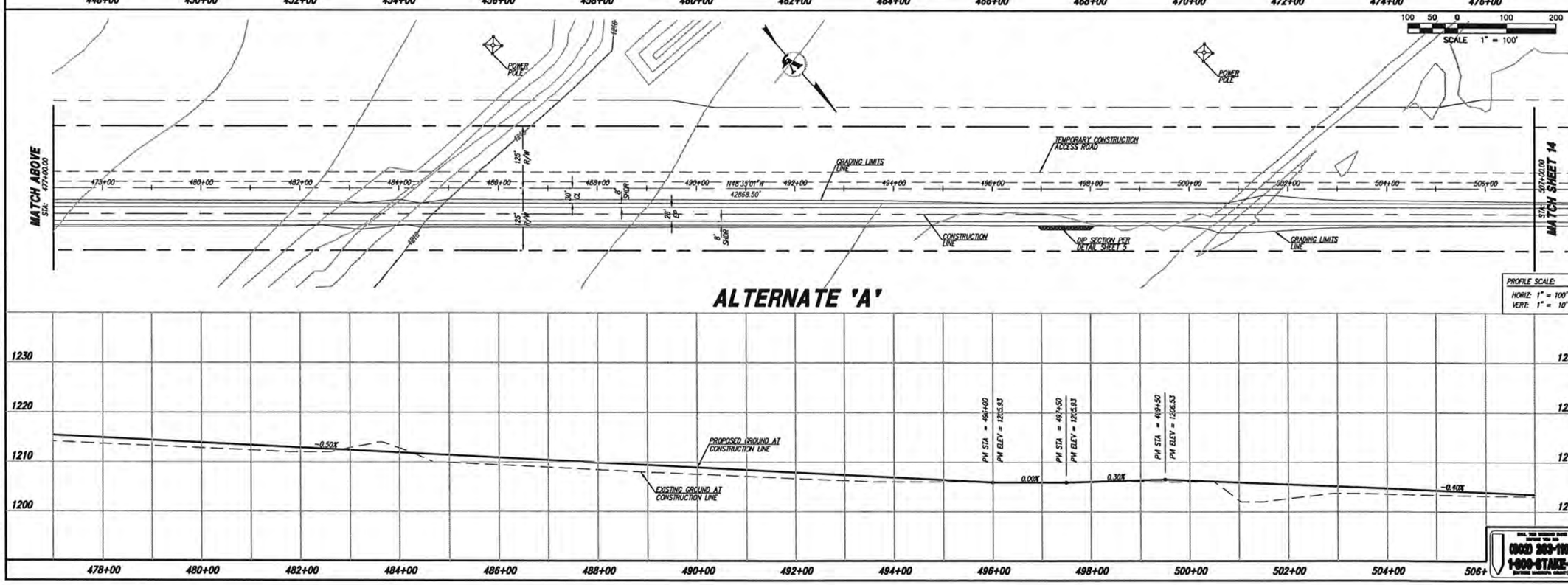

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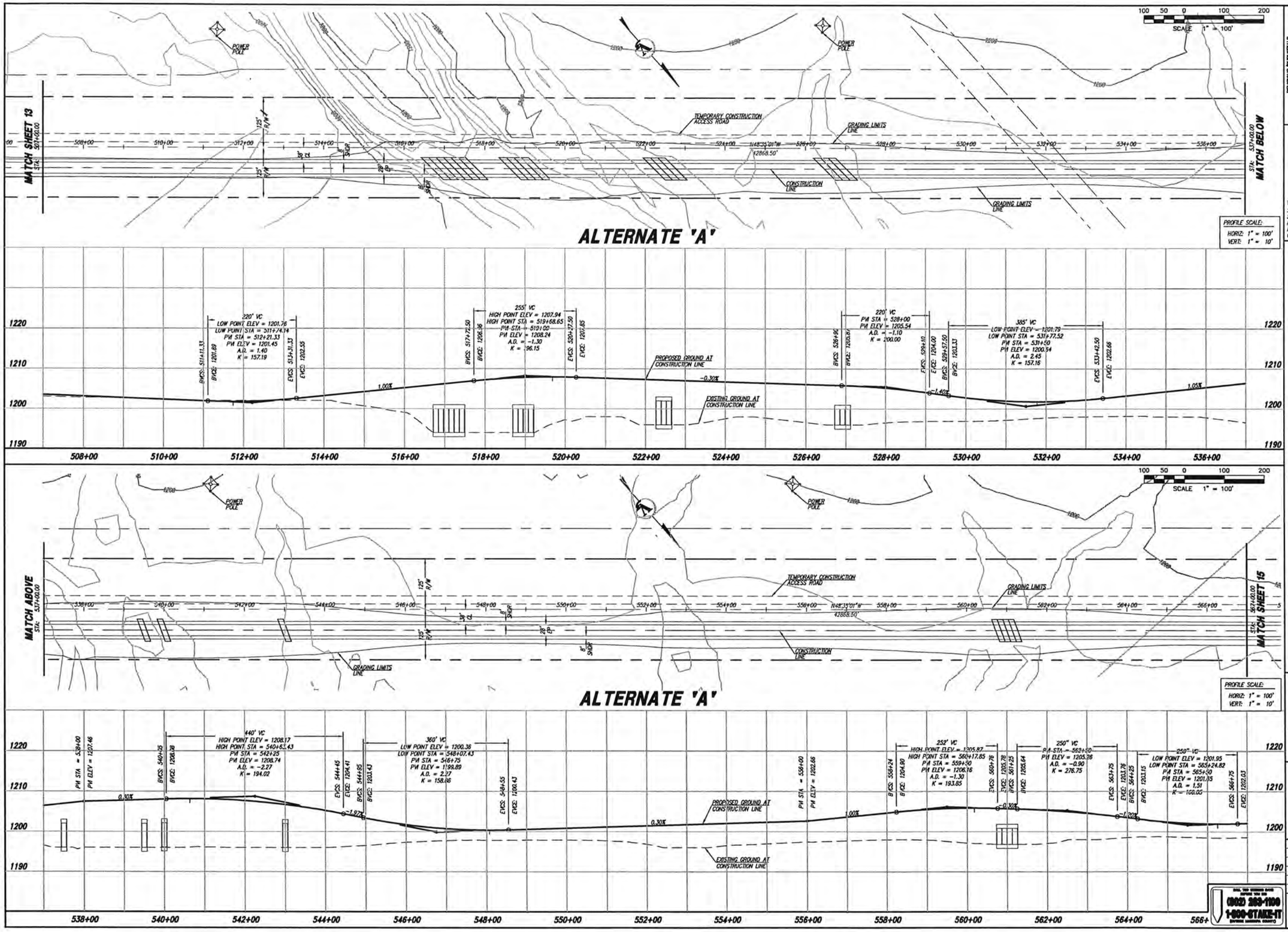

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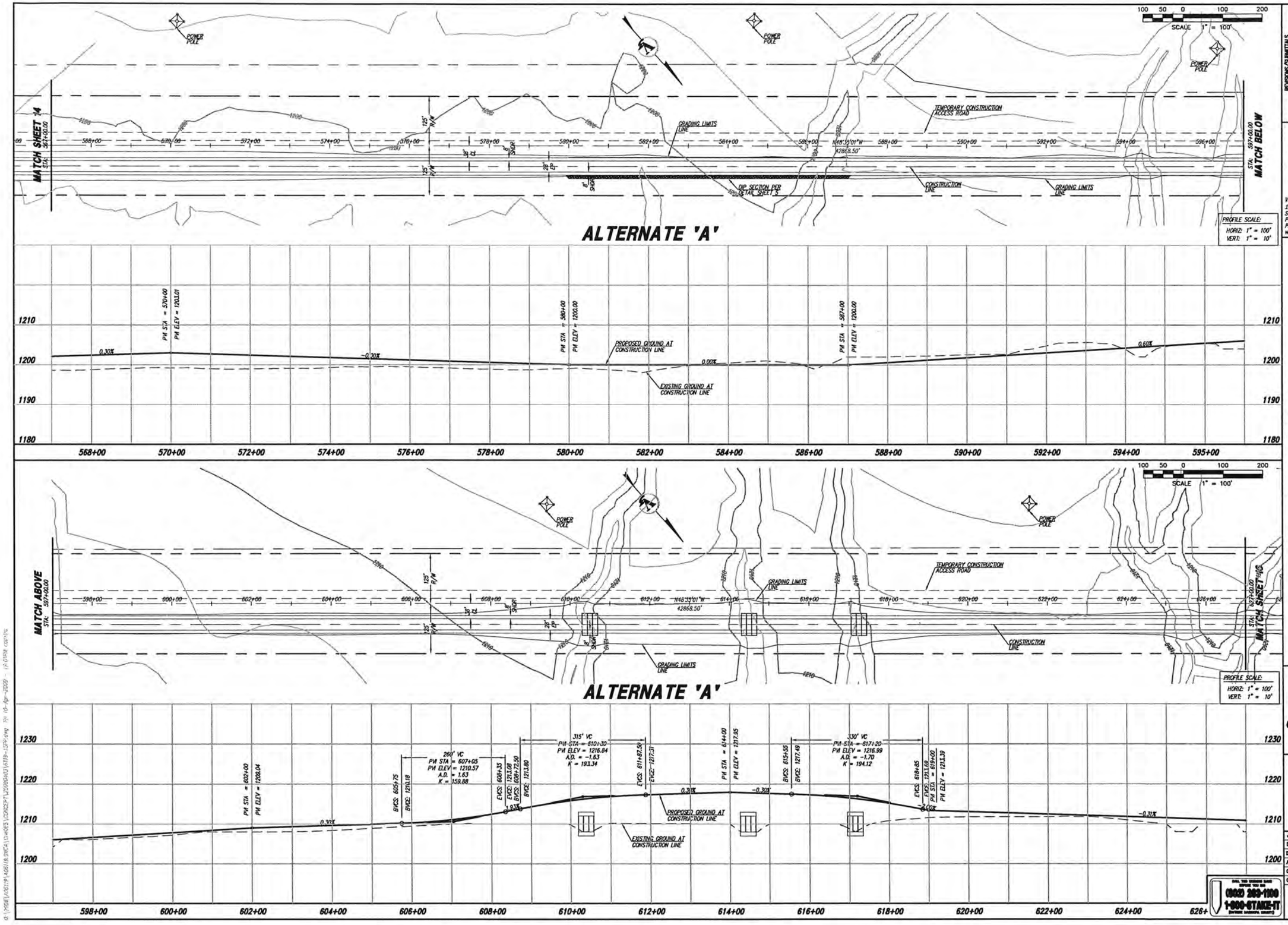

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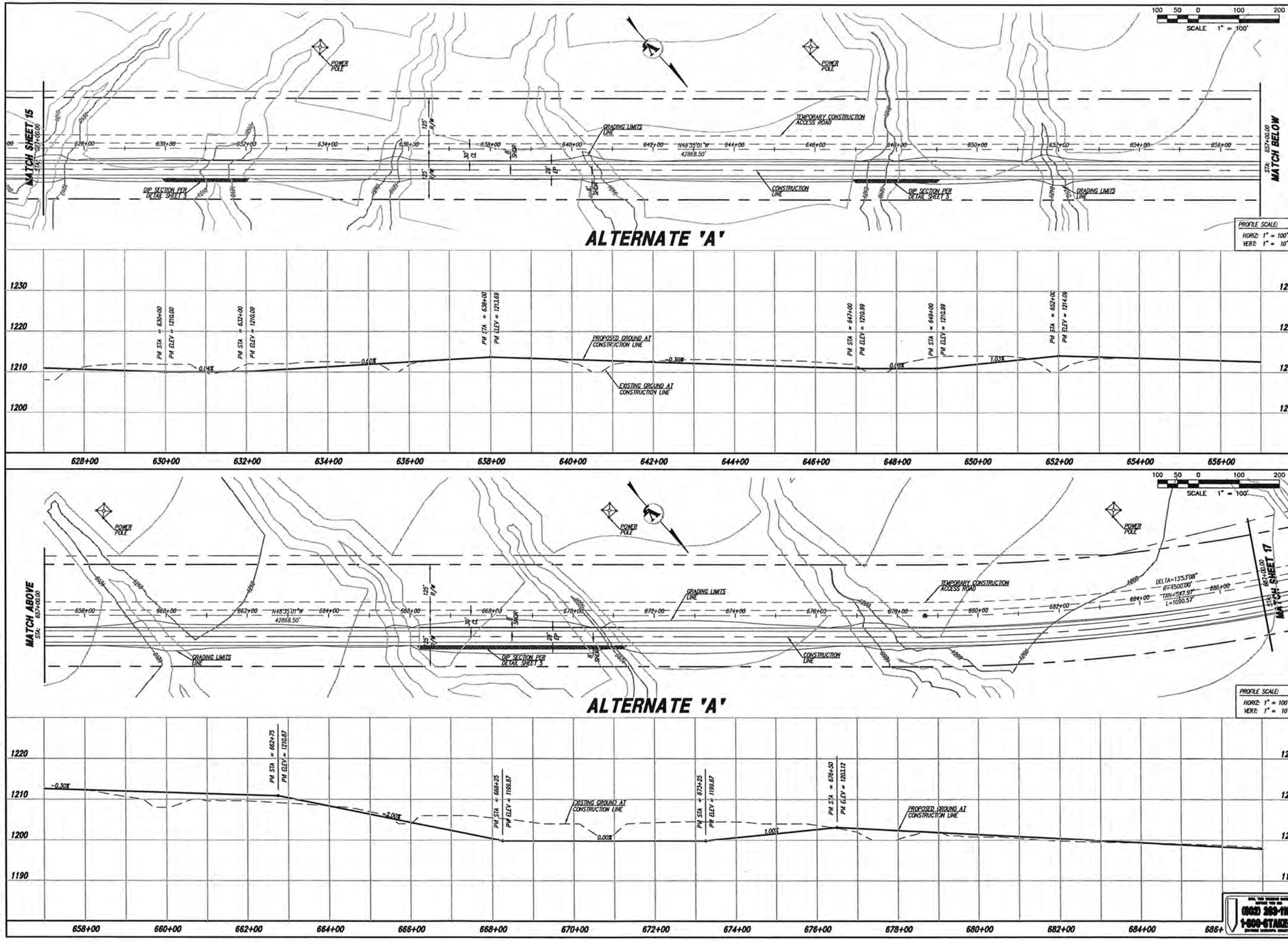

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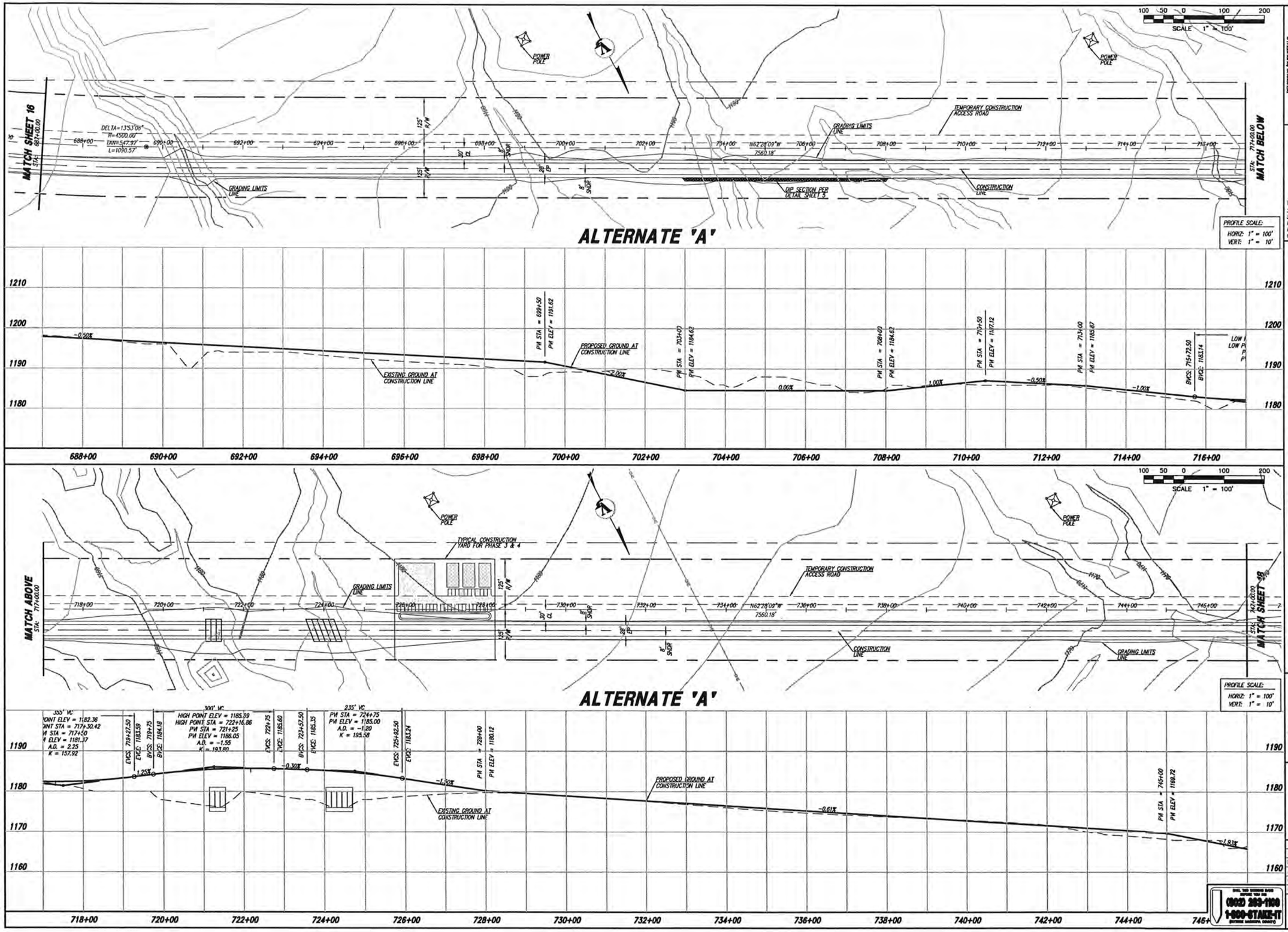

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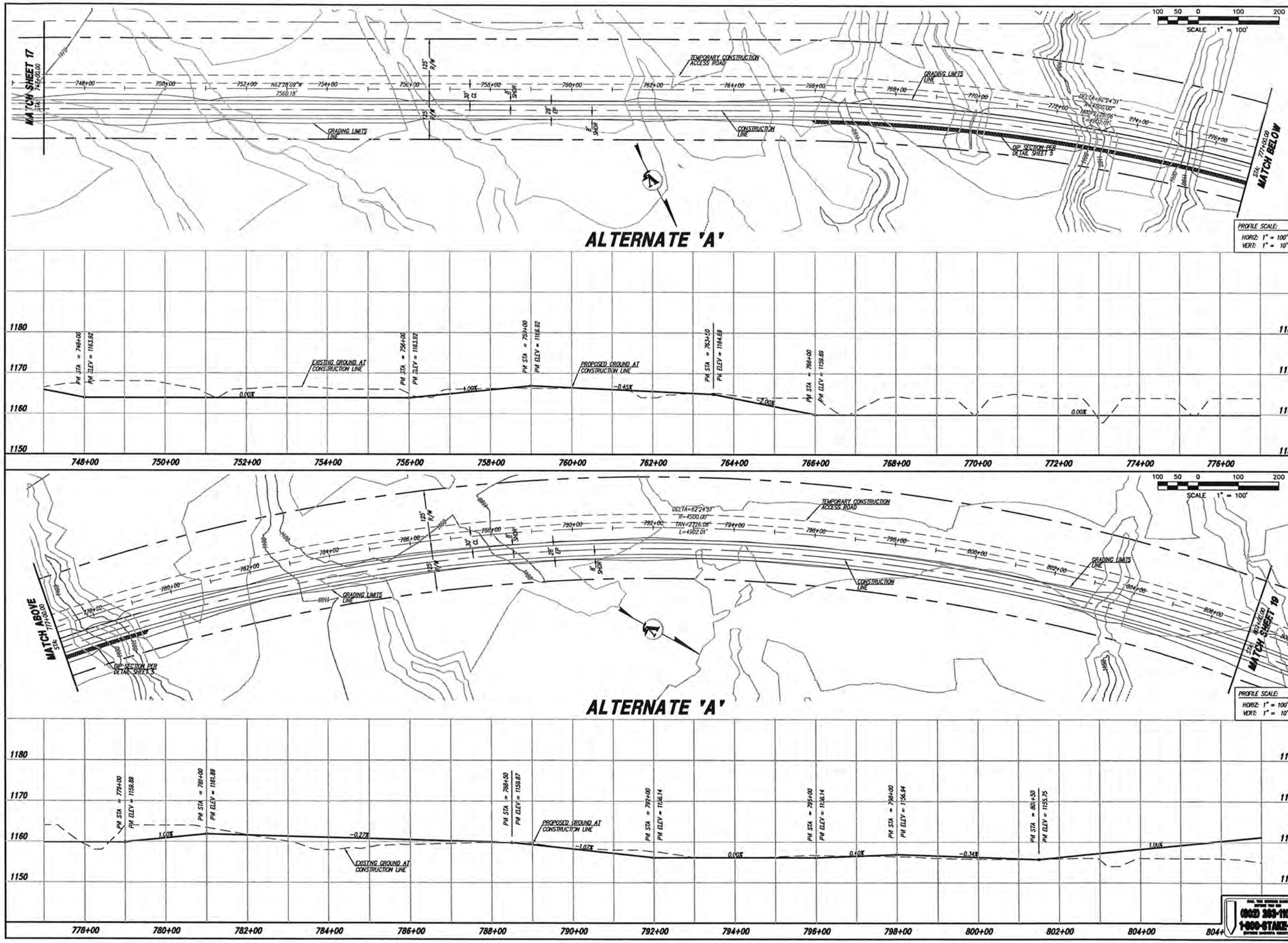

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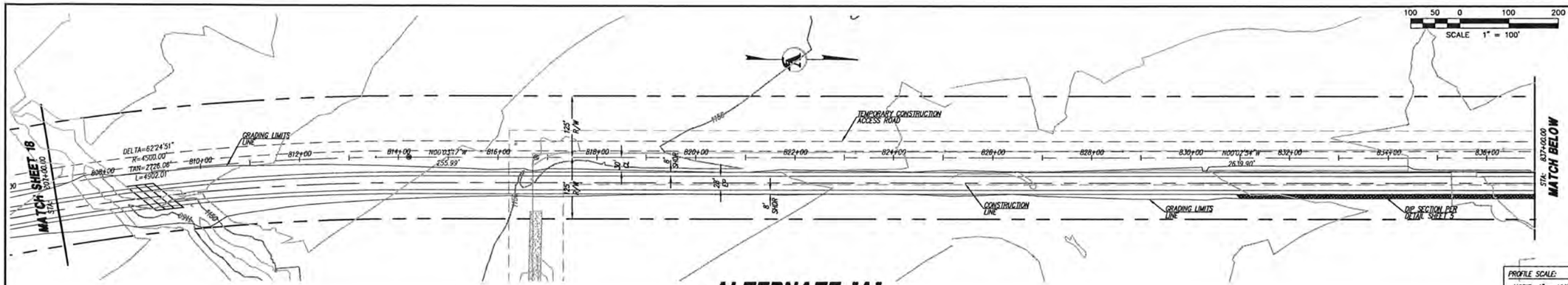
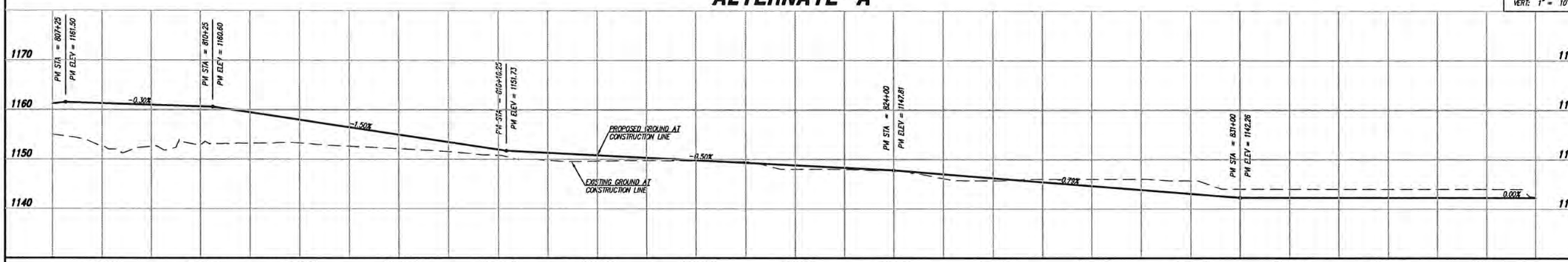
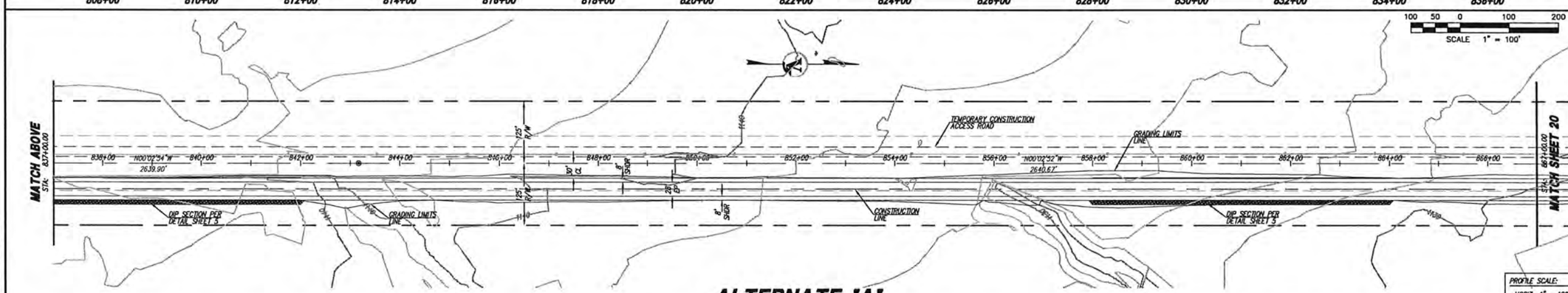


ALTERNATE 'A'

PROFILE SCALE:
HORIZ: 1" = 100'
VERT: 1" = 10'





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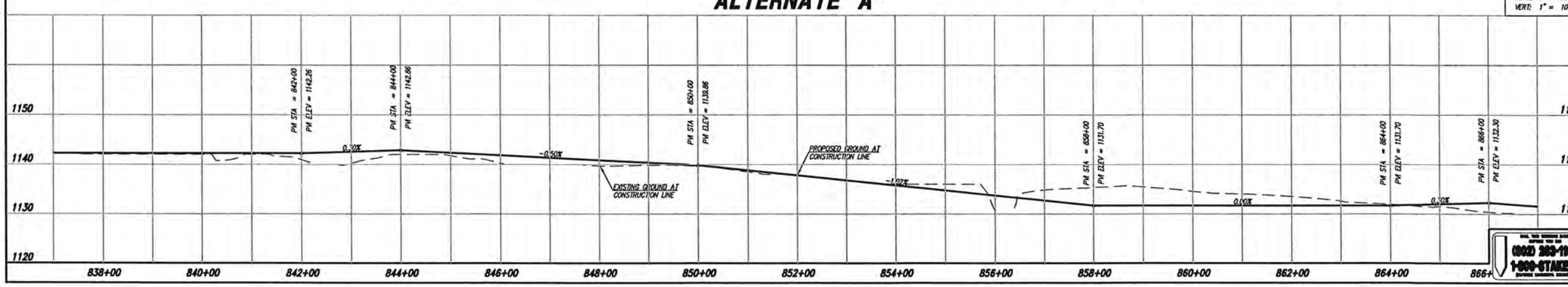

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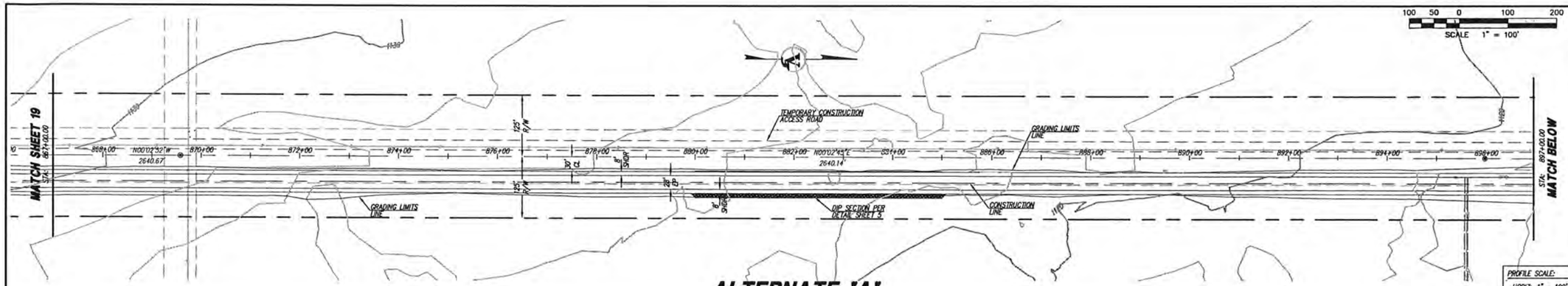

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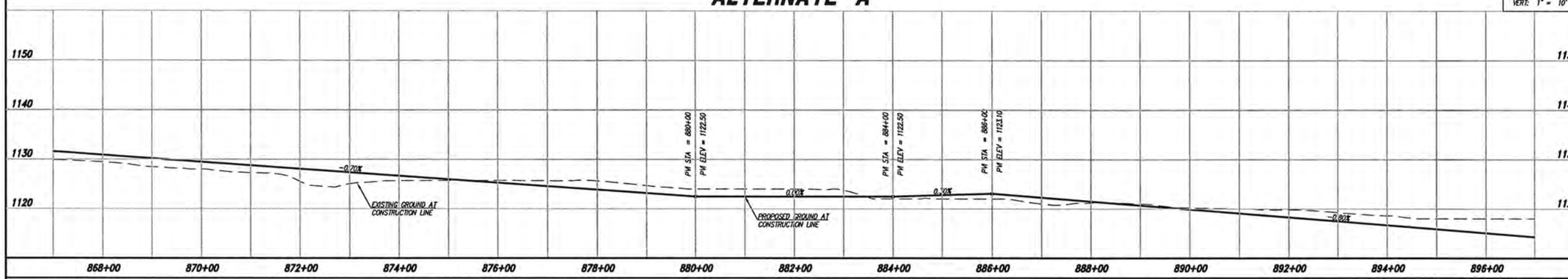

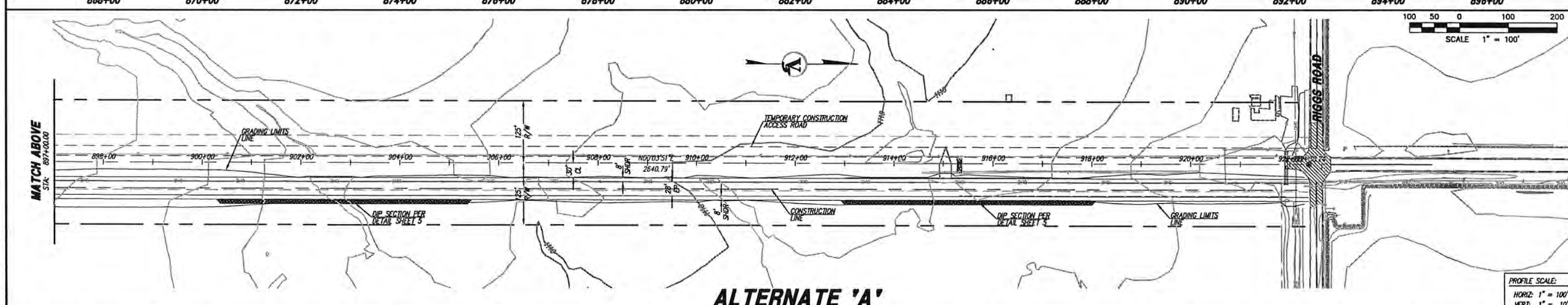

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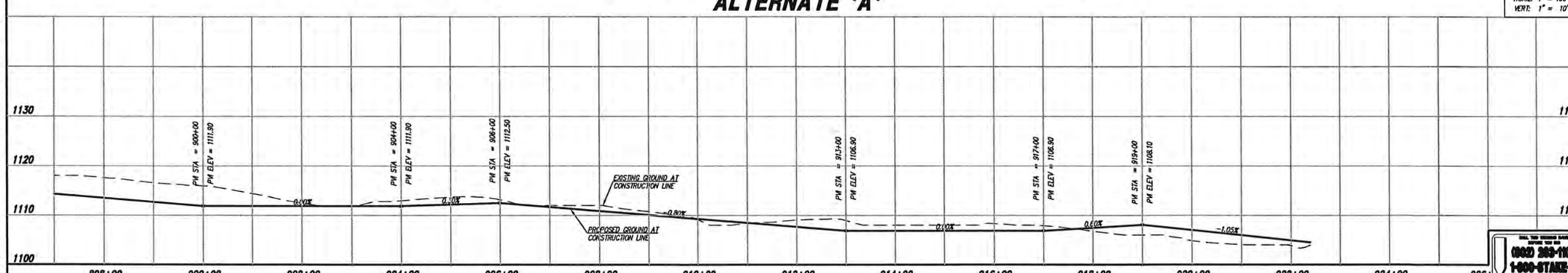

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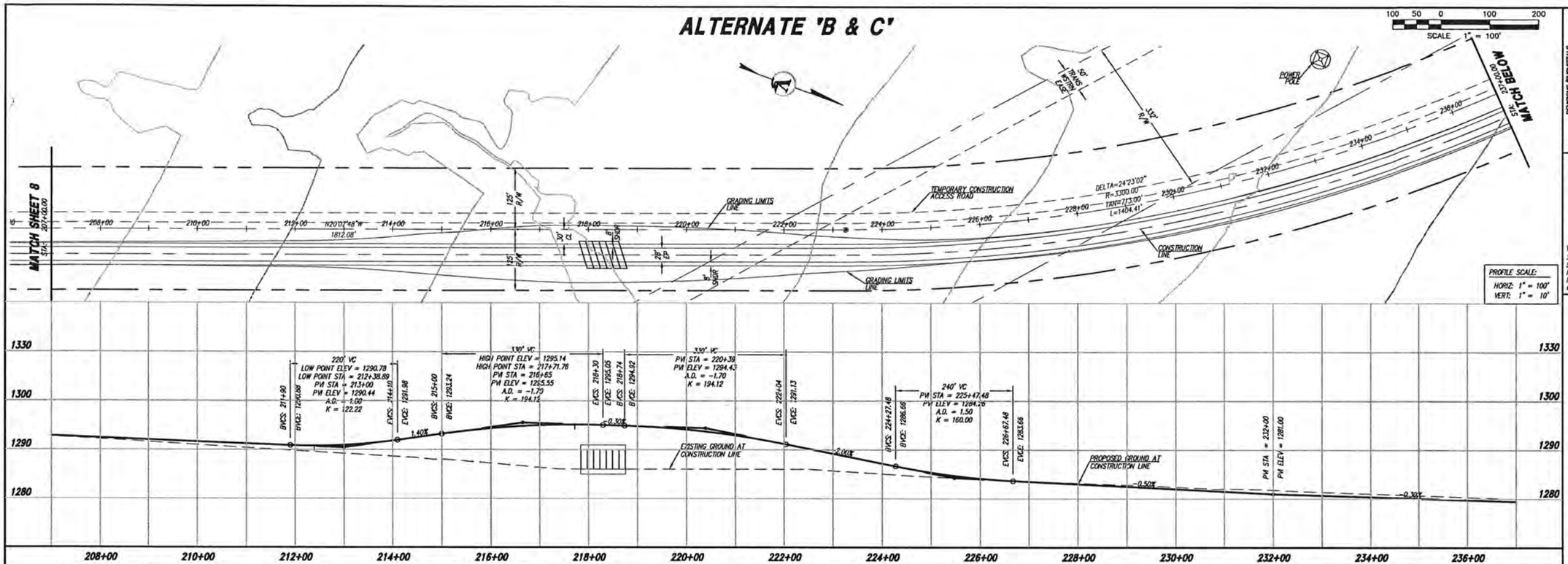
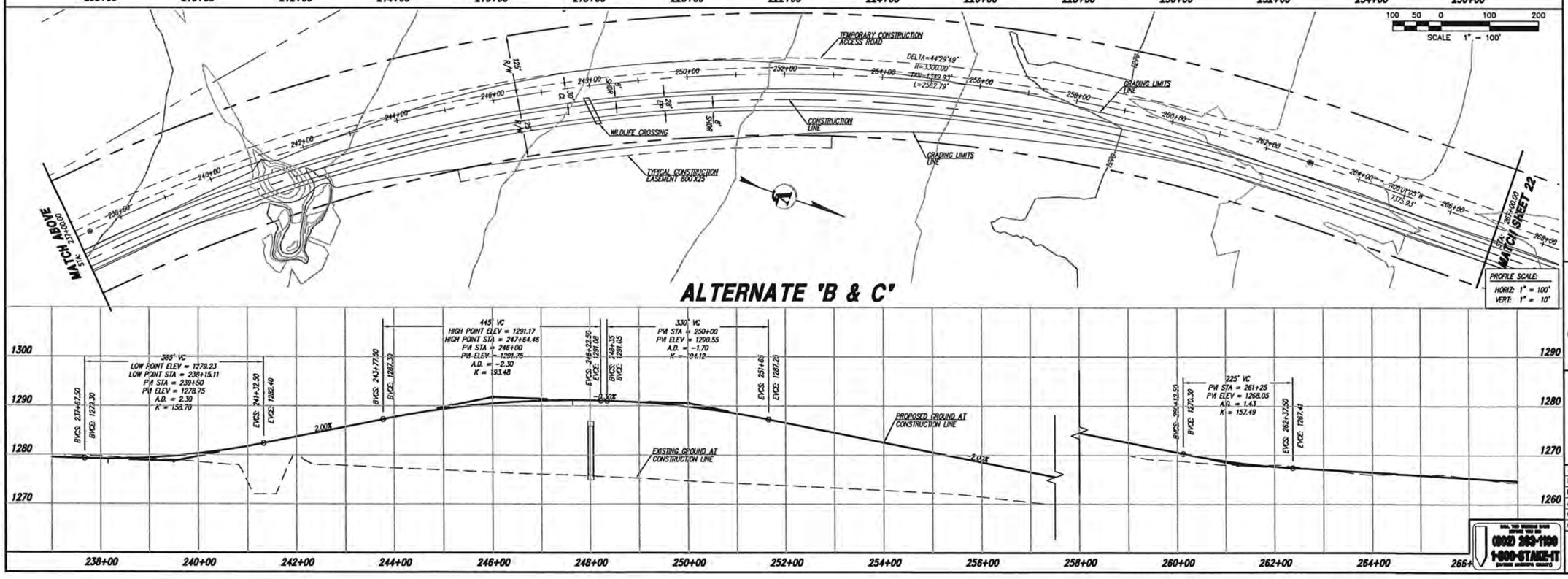
ALTERNATE 'B & C'





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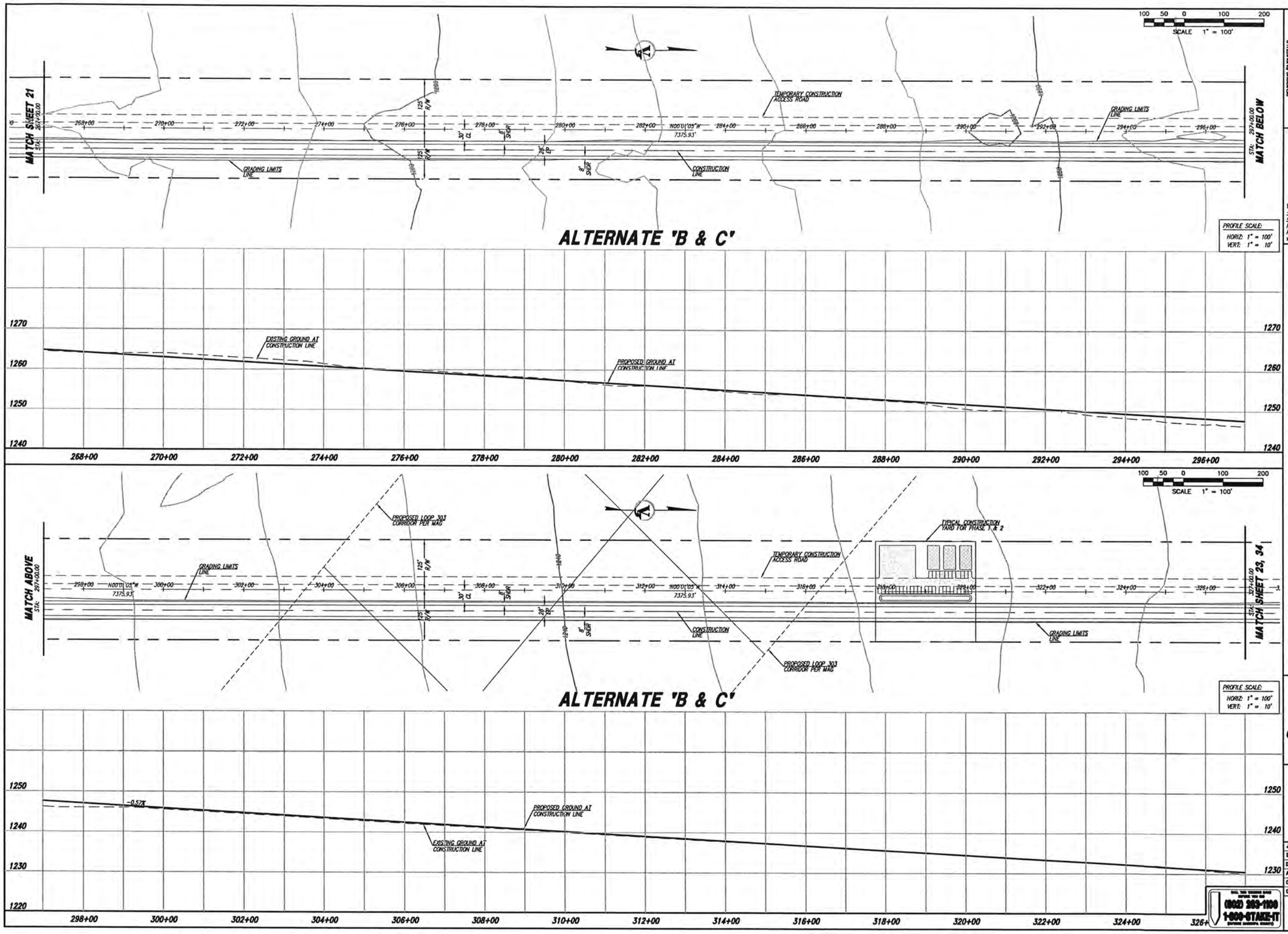

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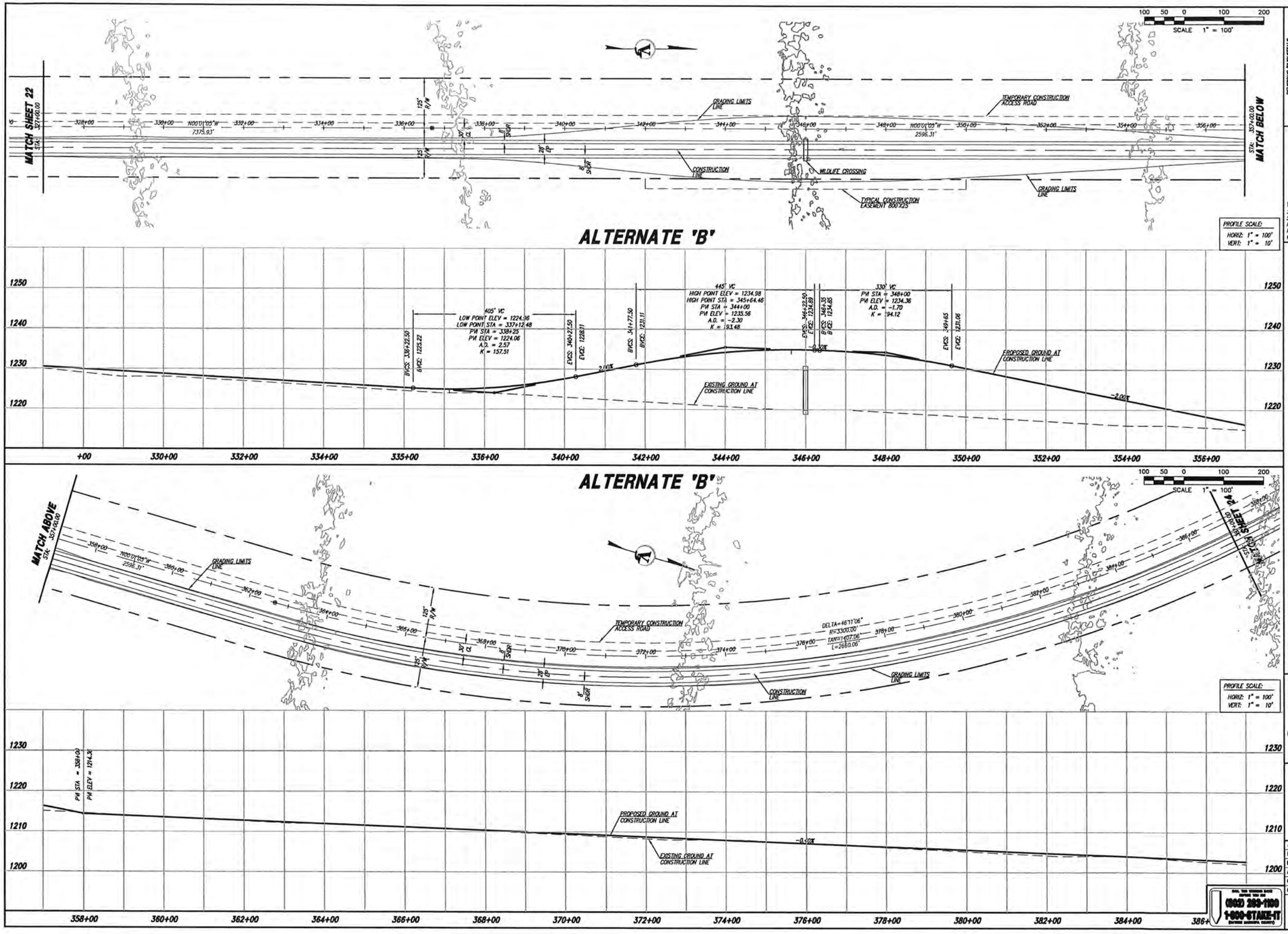

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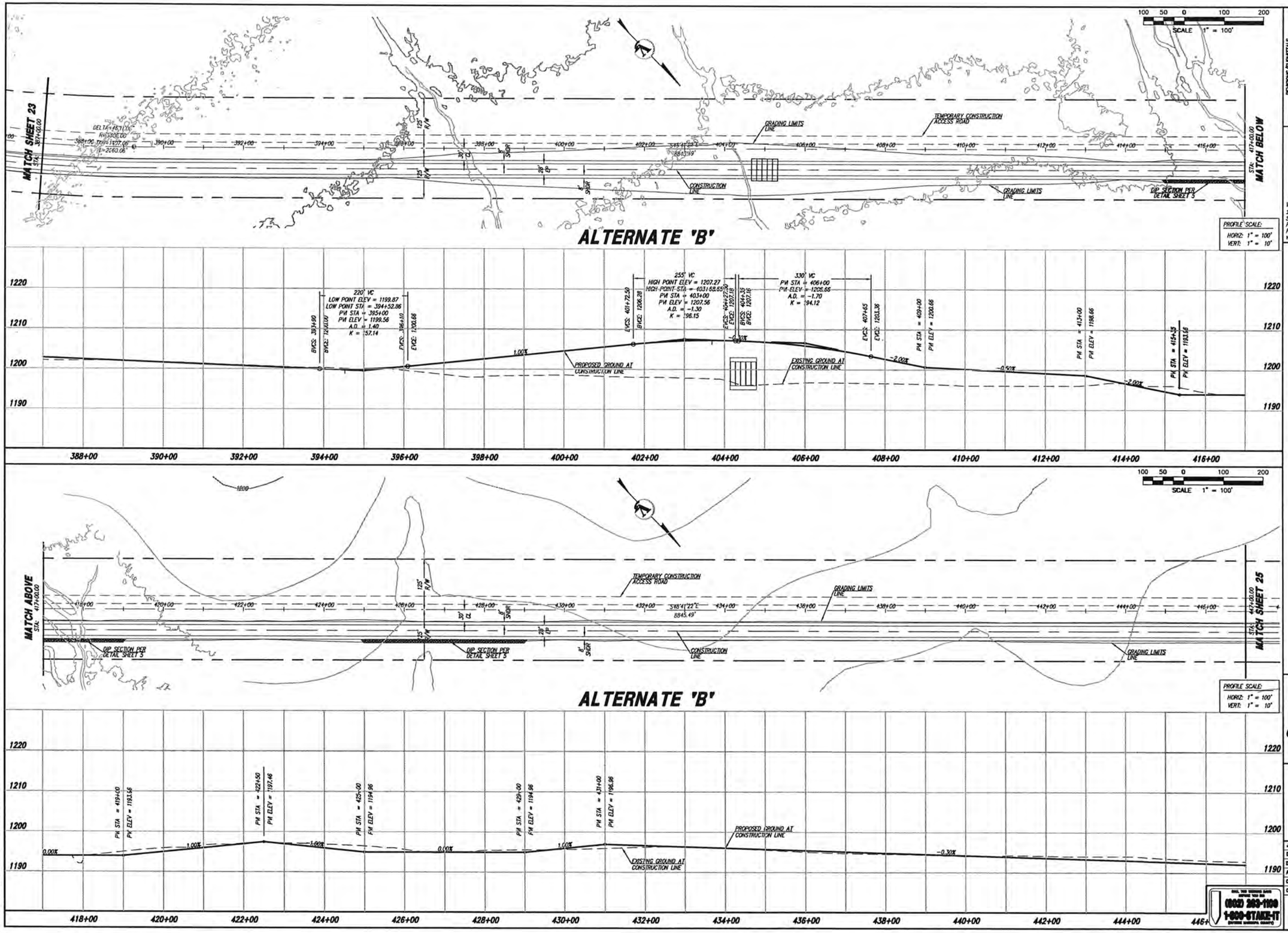

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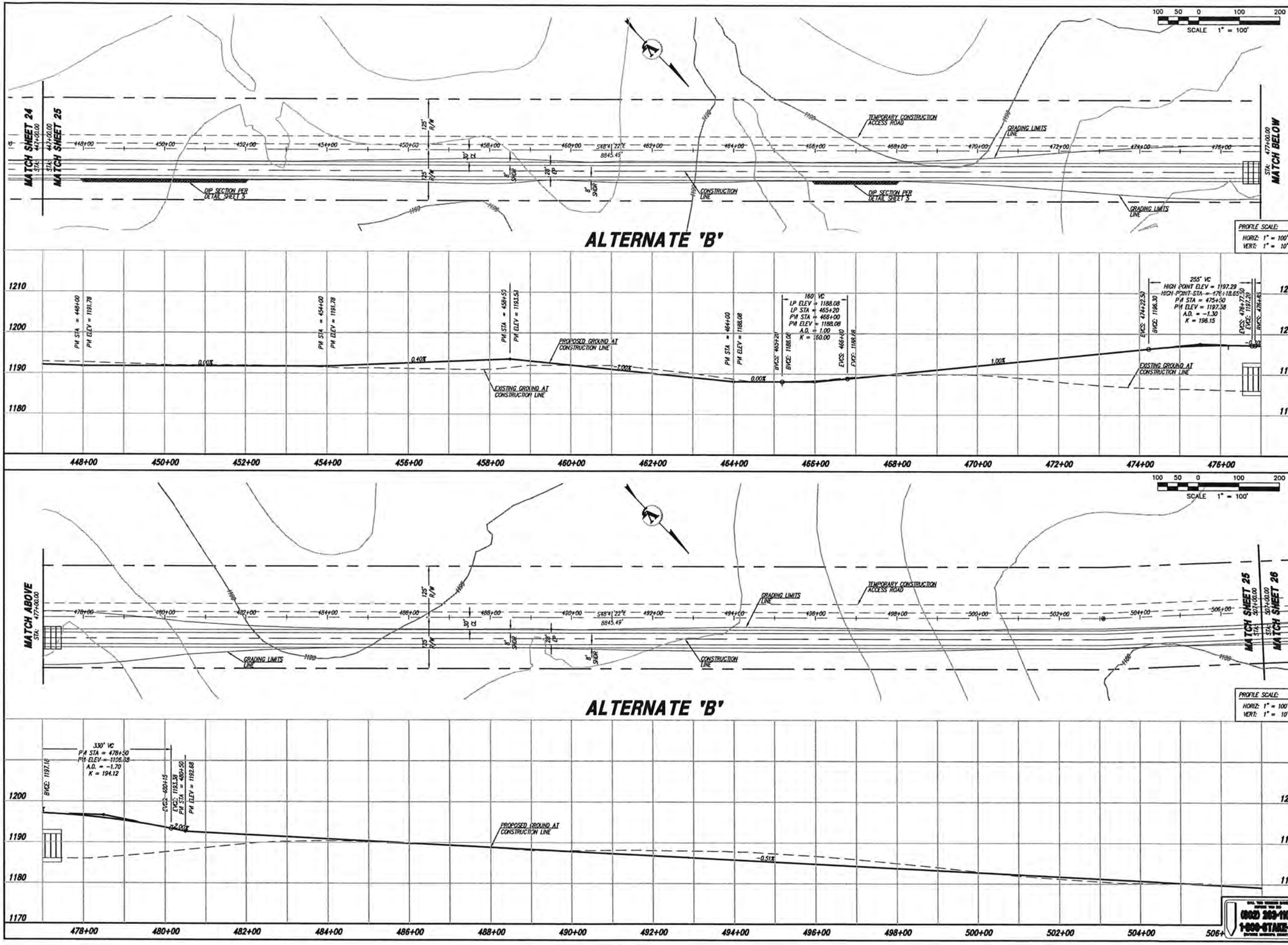

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36279
KEITH P. KESTI
ARIZONA, U.S.A.
EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
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DRAWN	CCS
ACAD FILE	6119-25PP
CHECKED	MSW
ORIG SUB DATE	04-03-09

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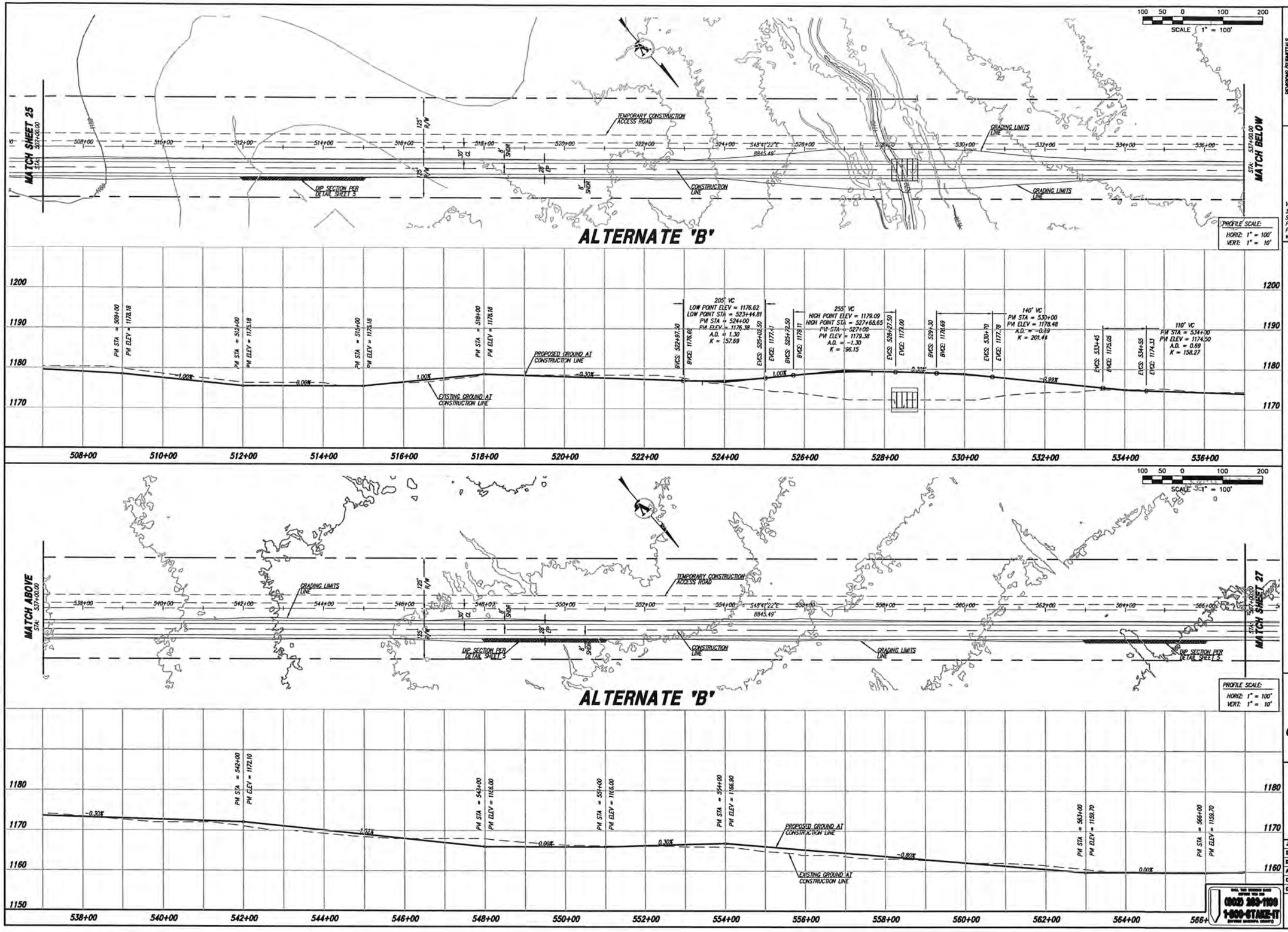

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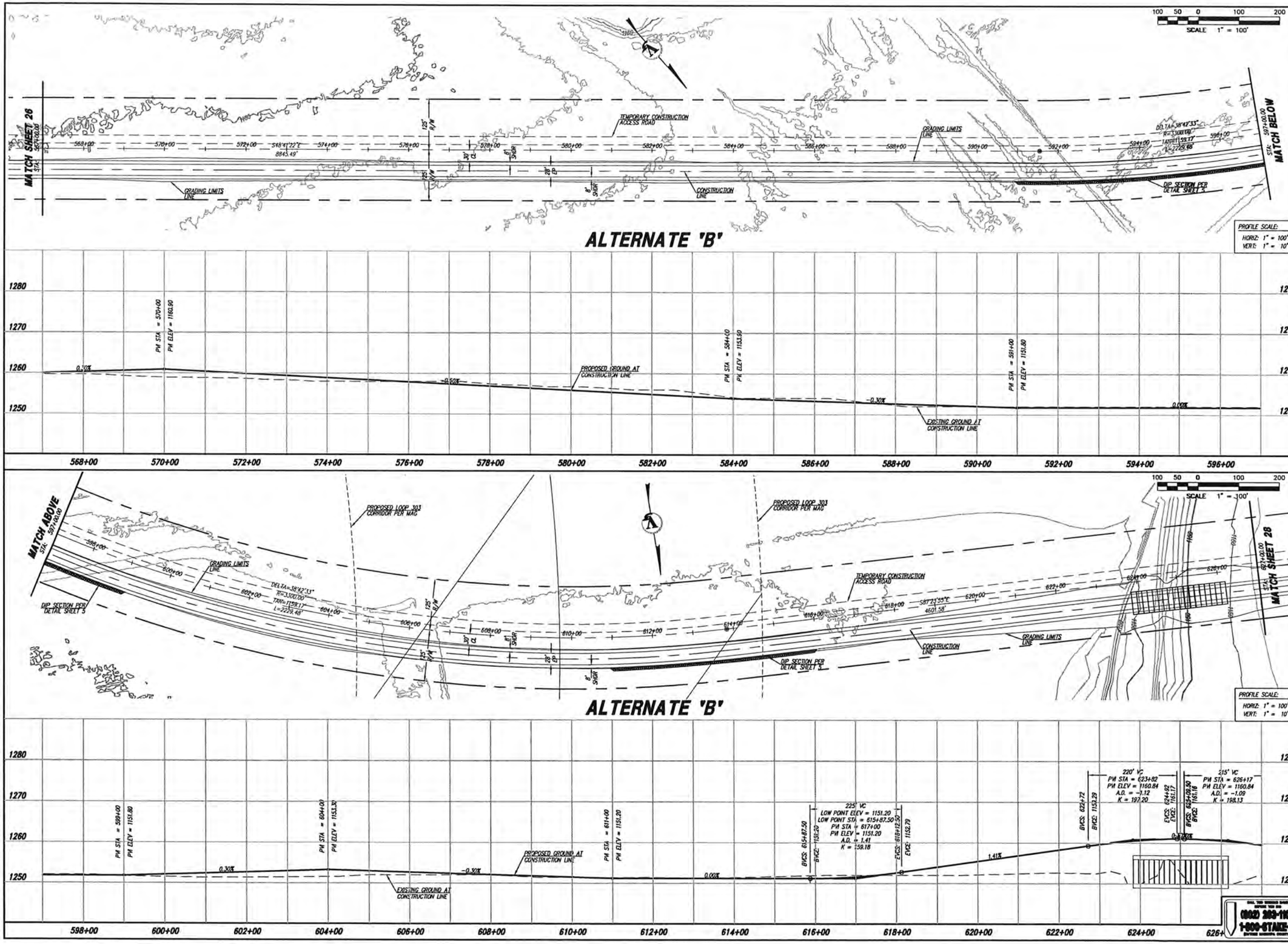

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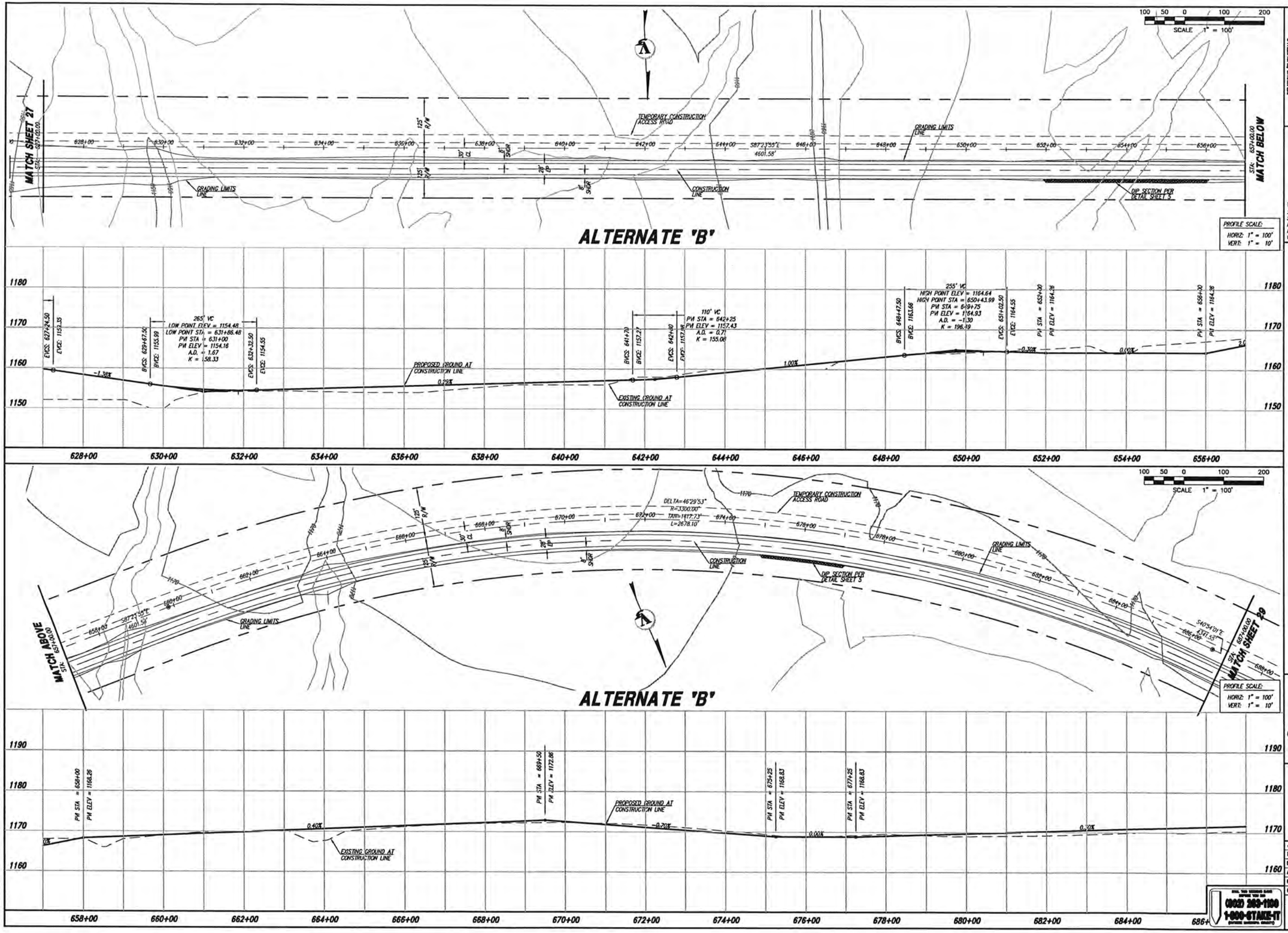

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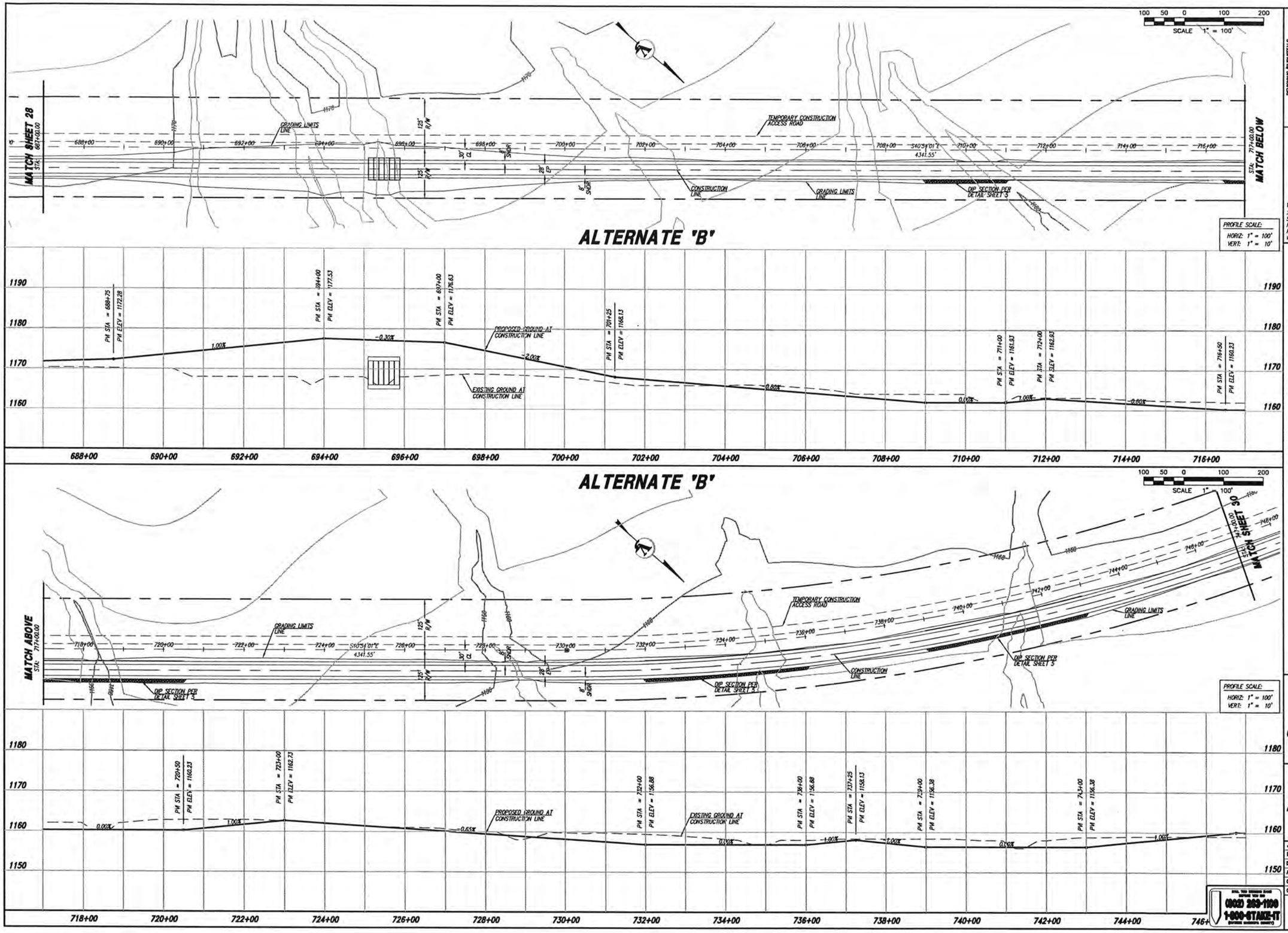

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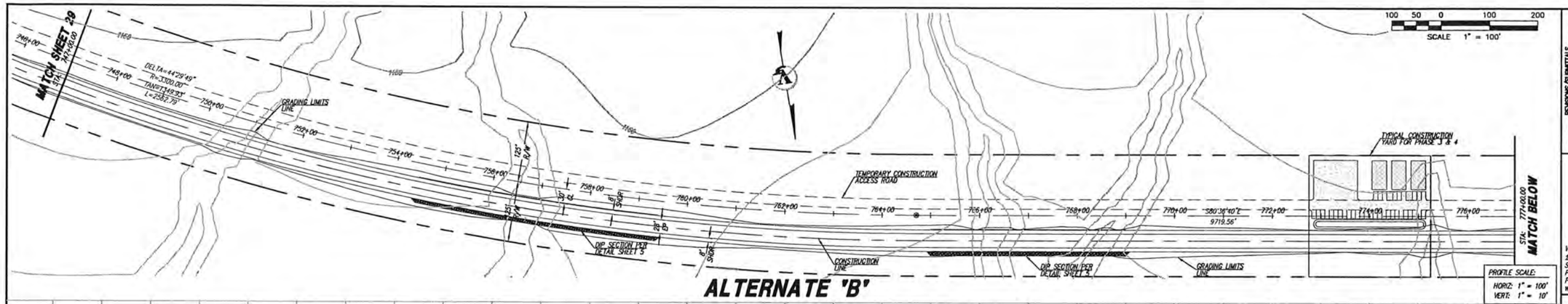

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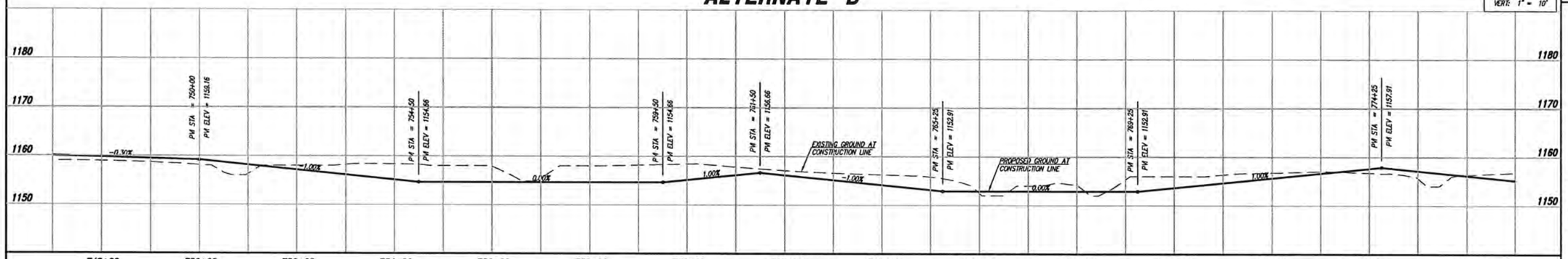

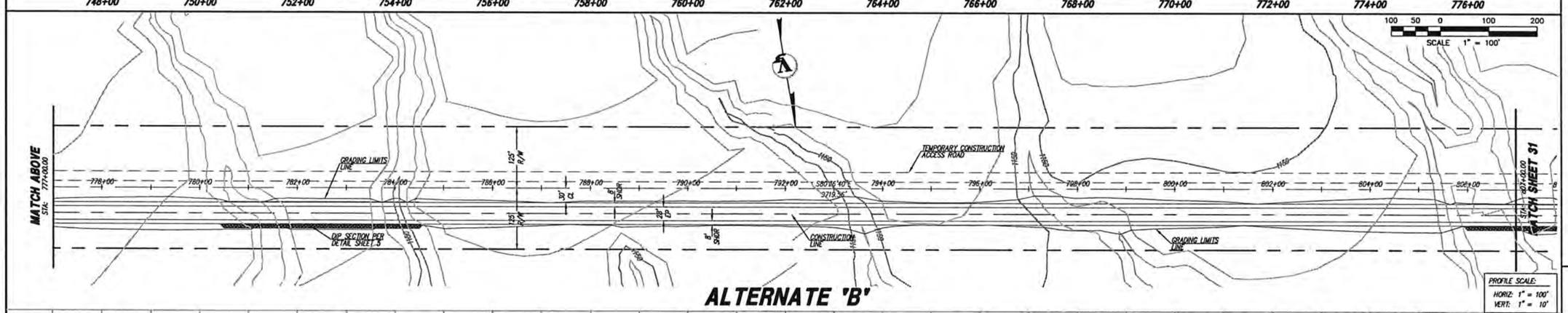

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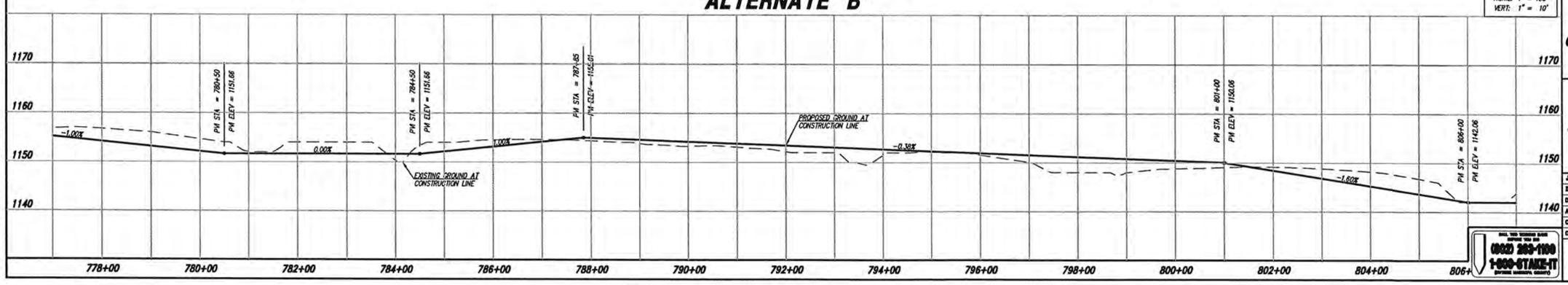

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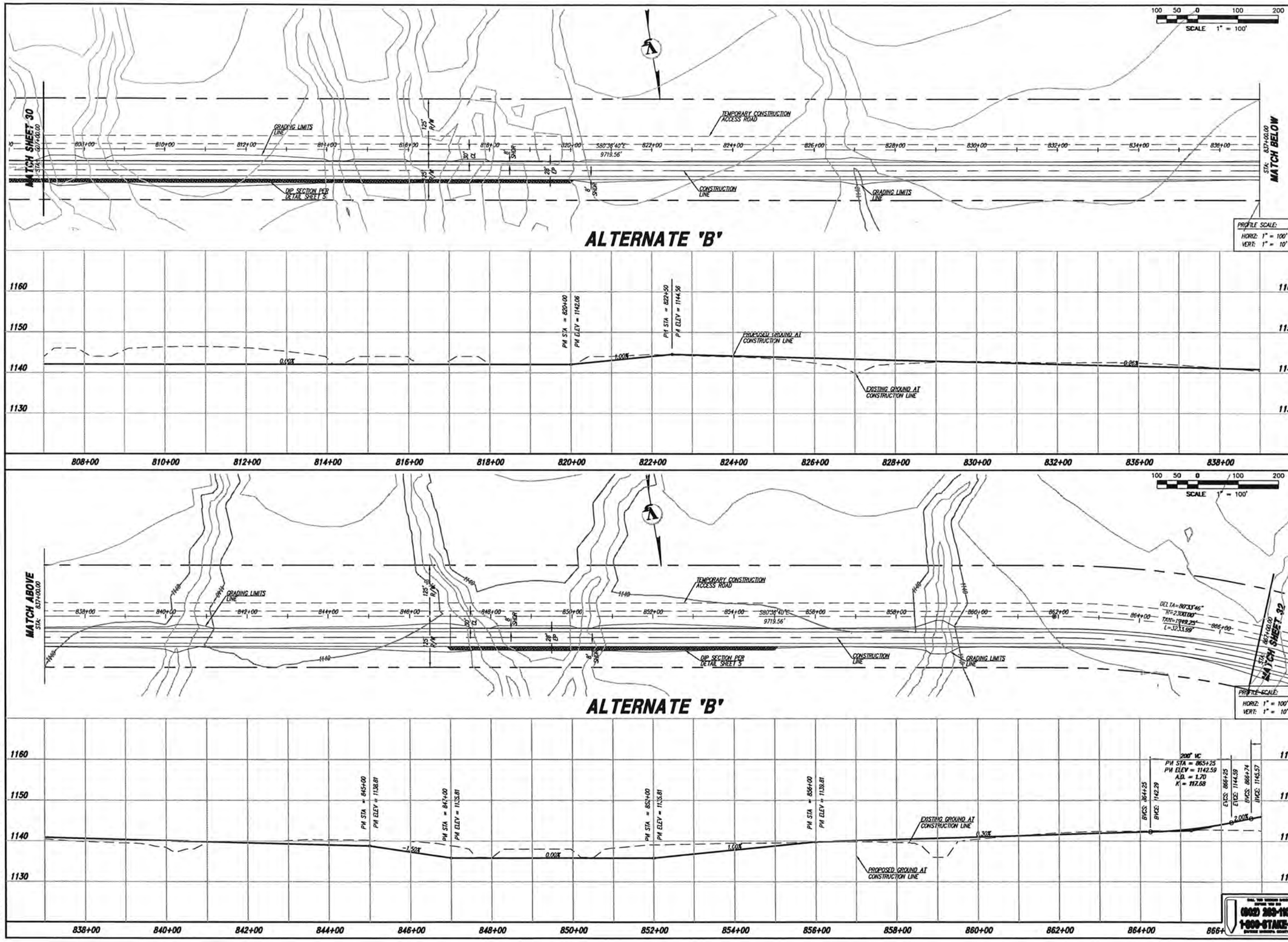

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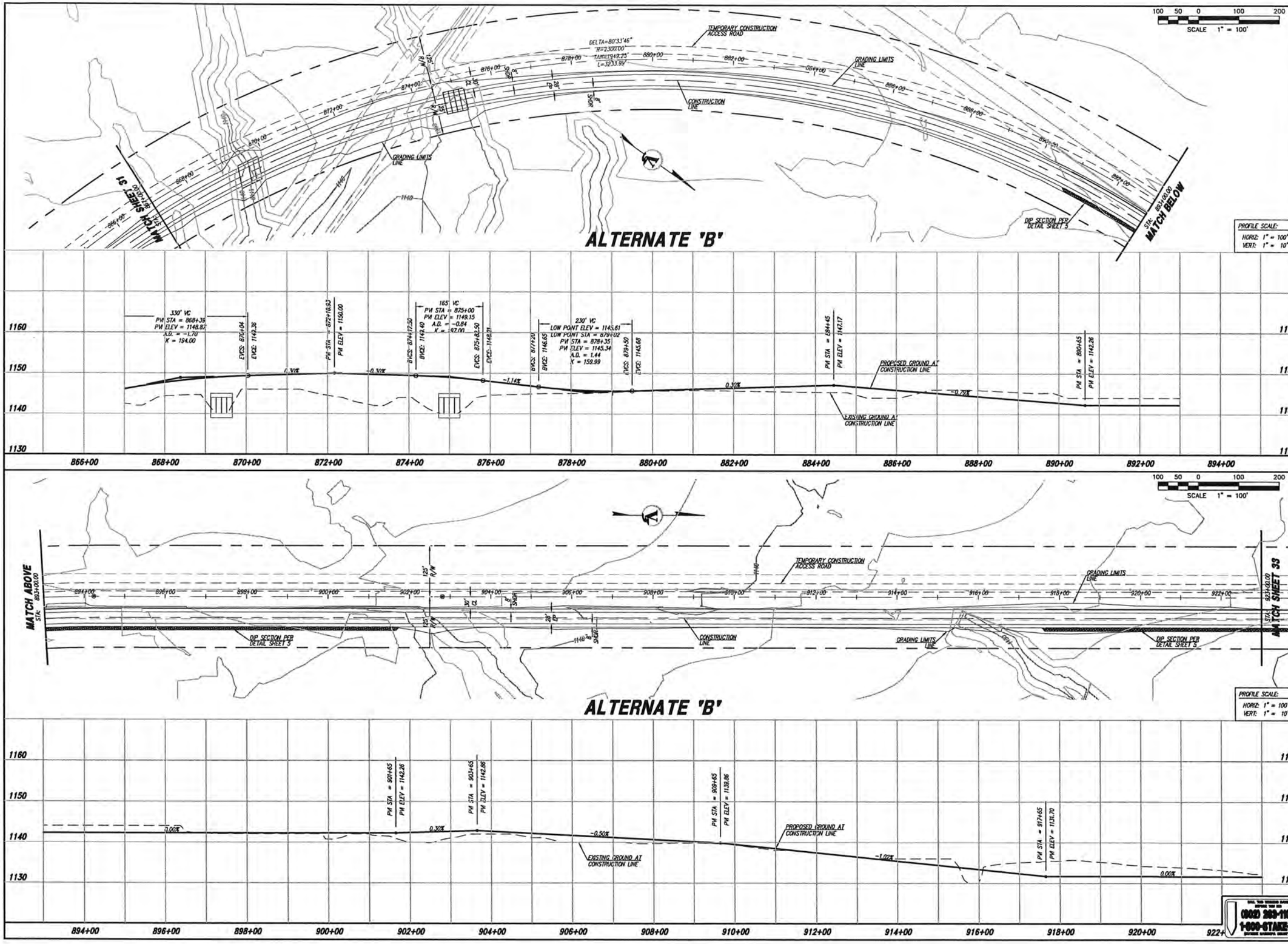

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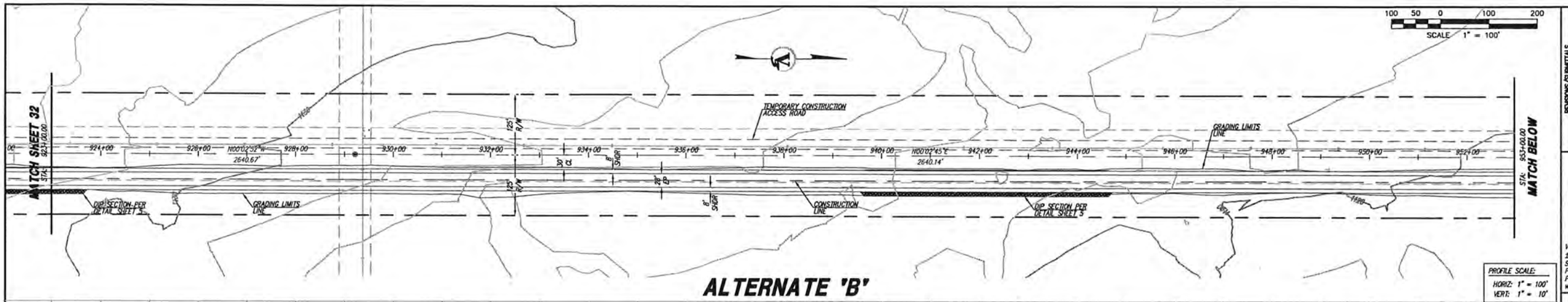

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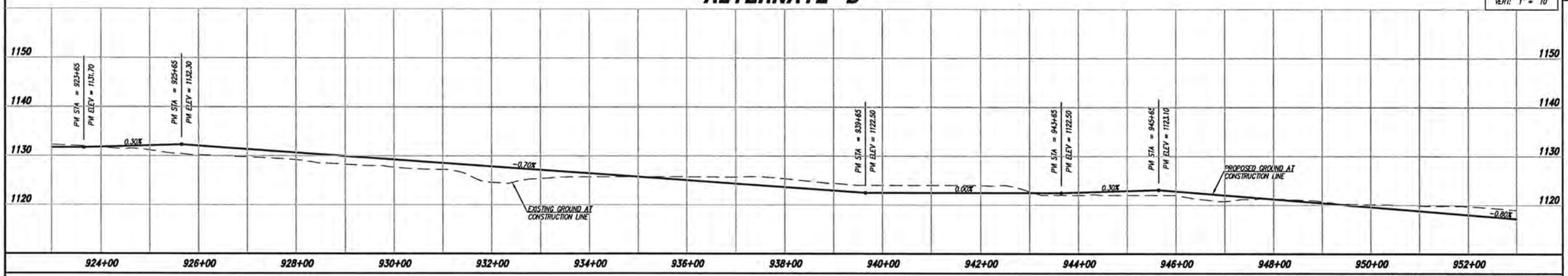

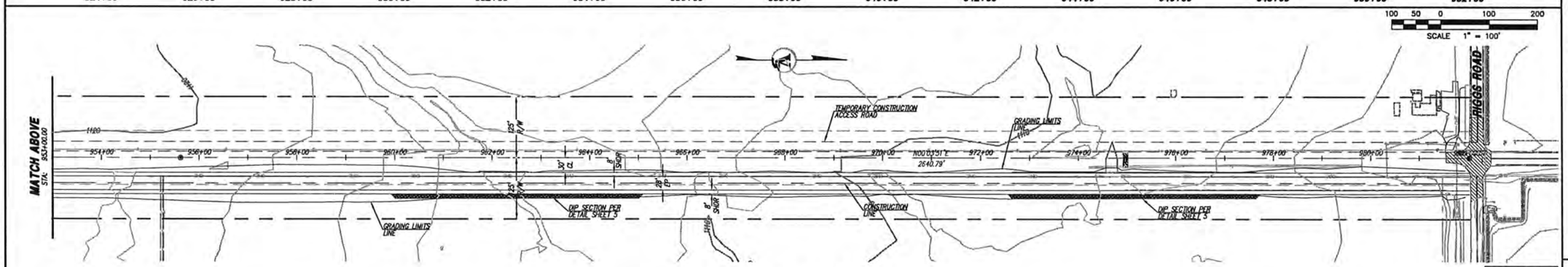

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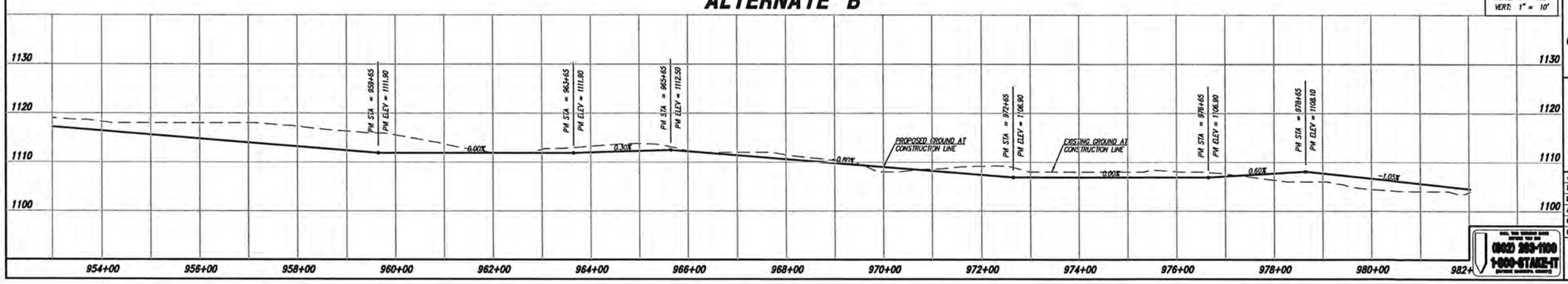

REVISIONS/SUBMITTALS	
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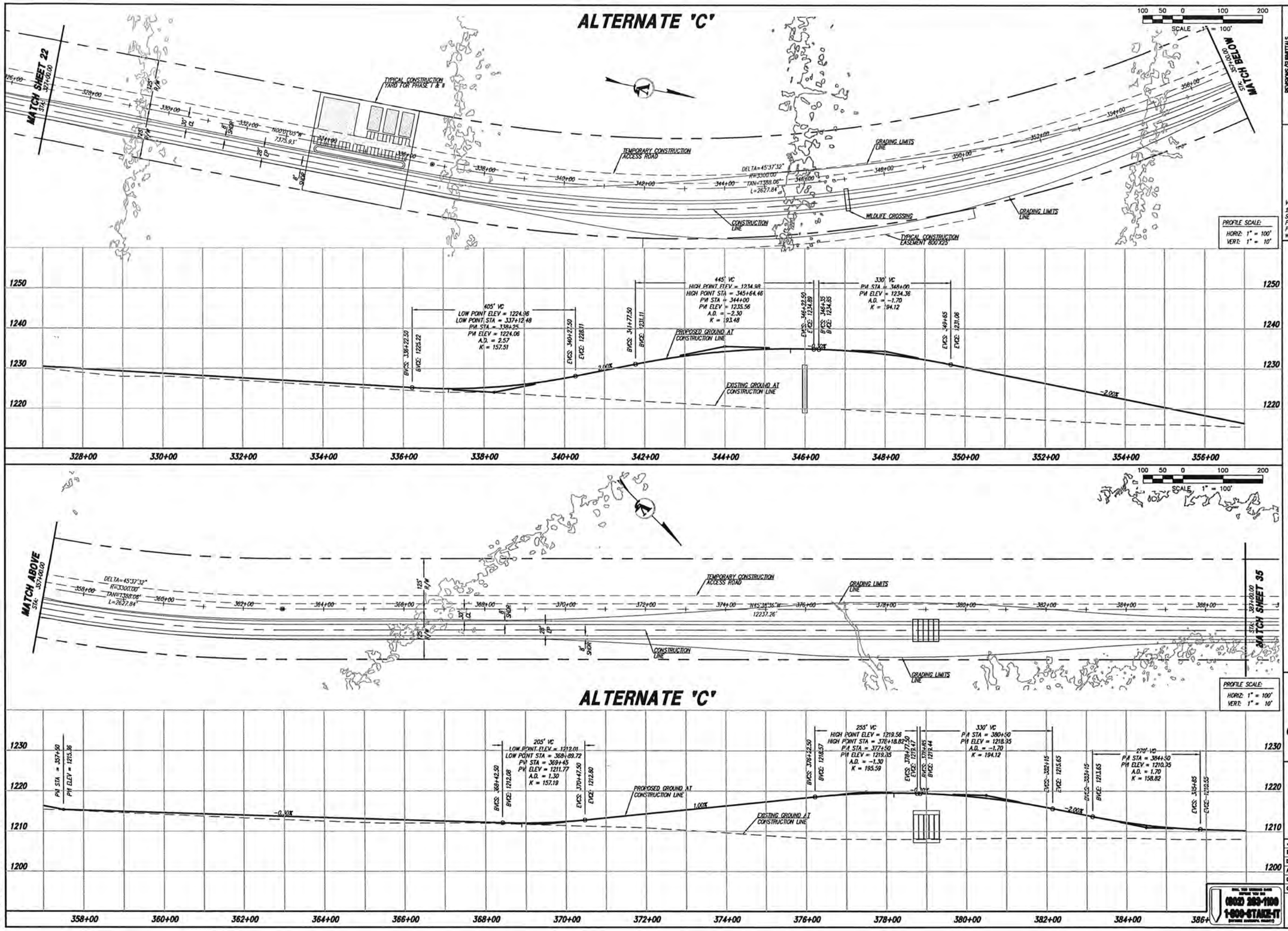

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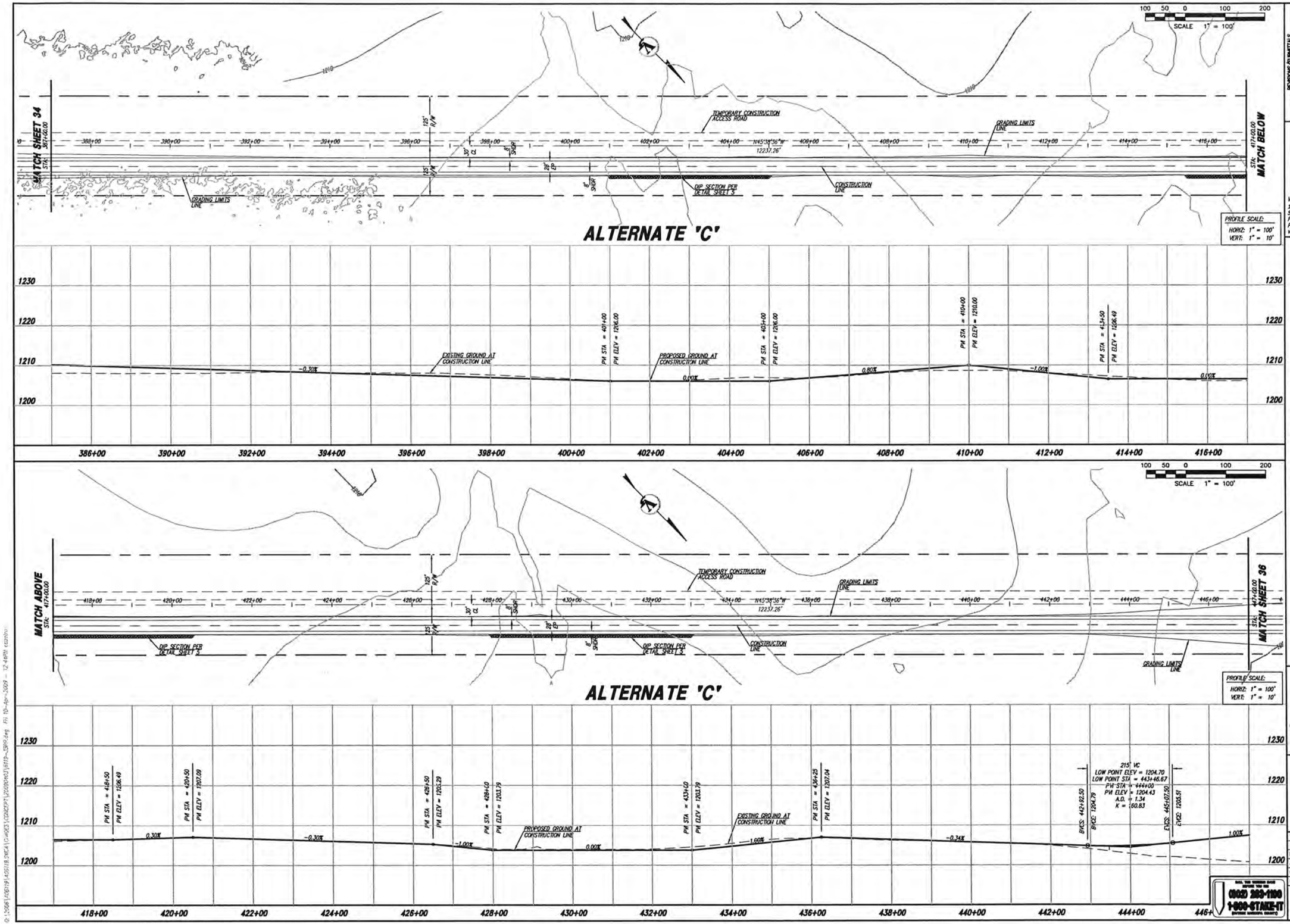

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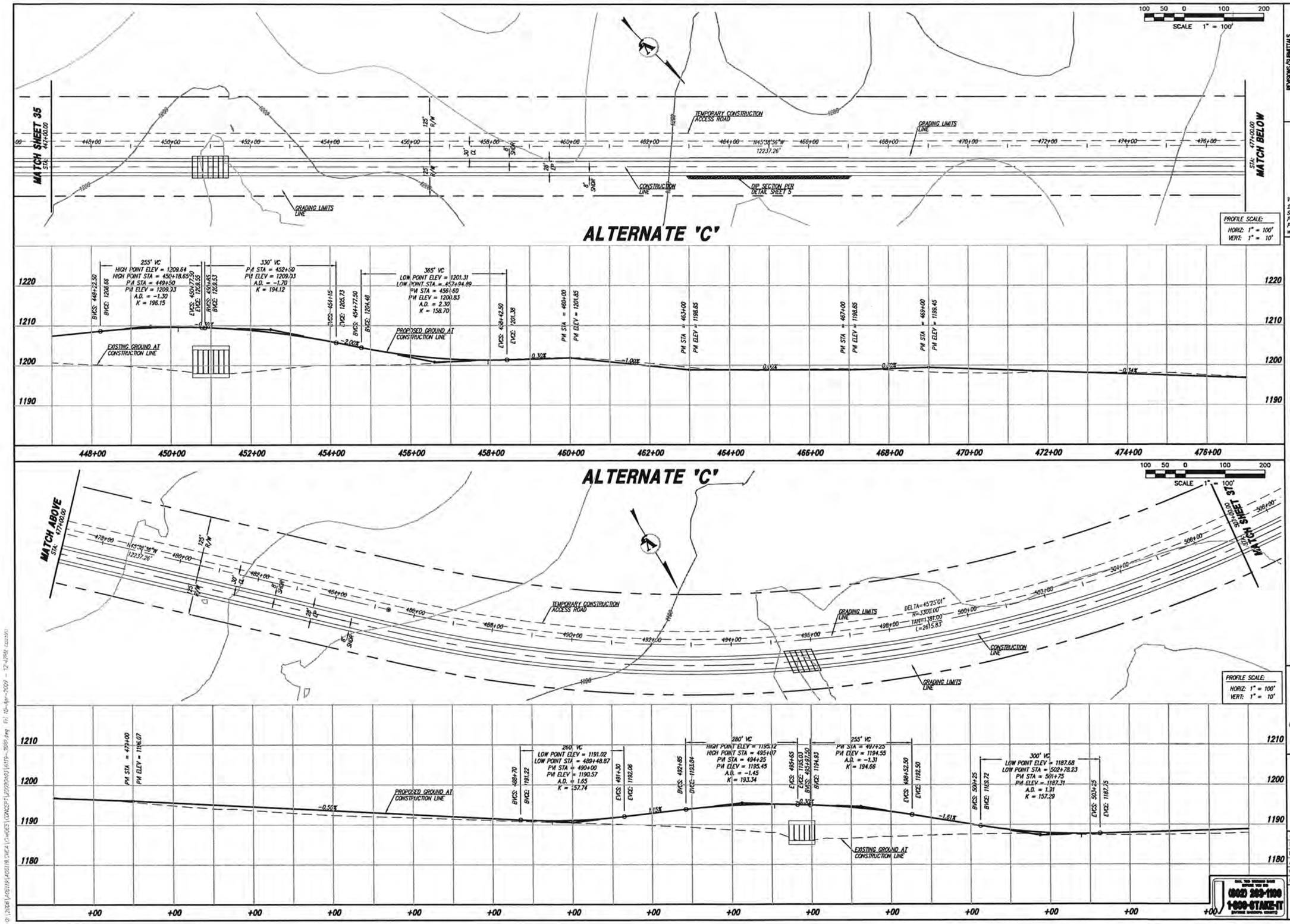

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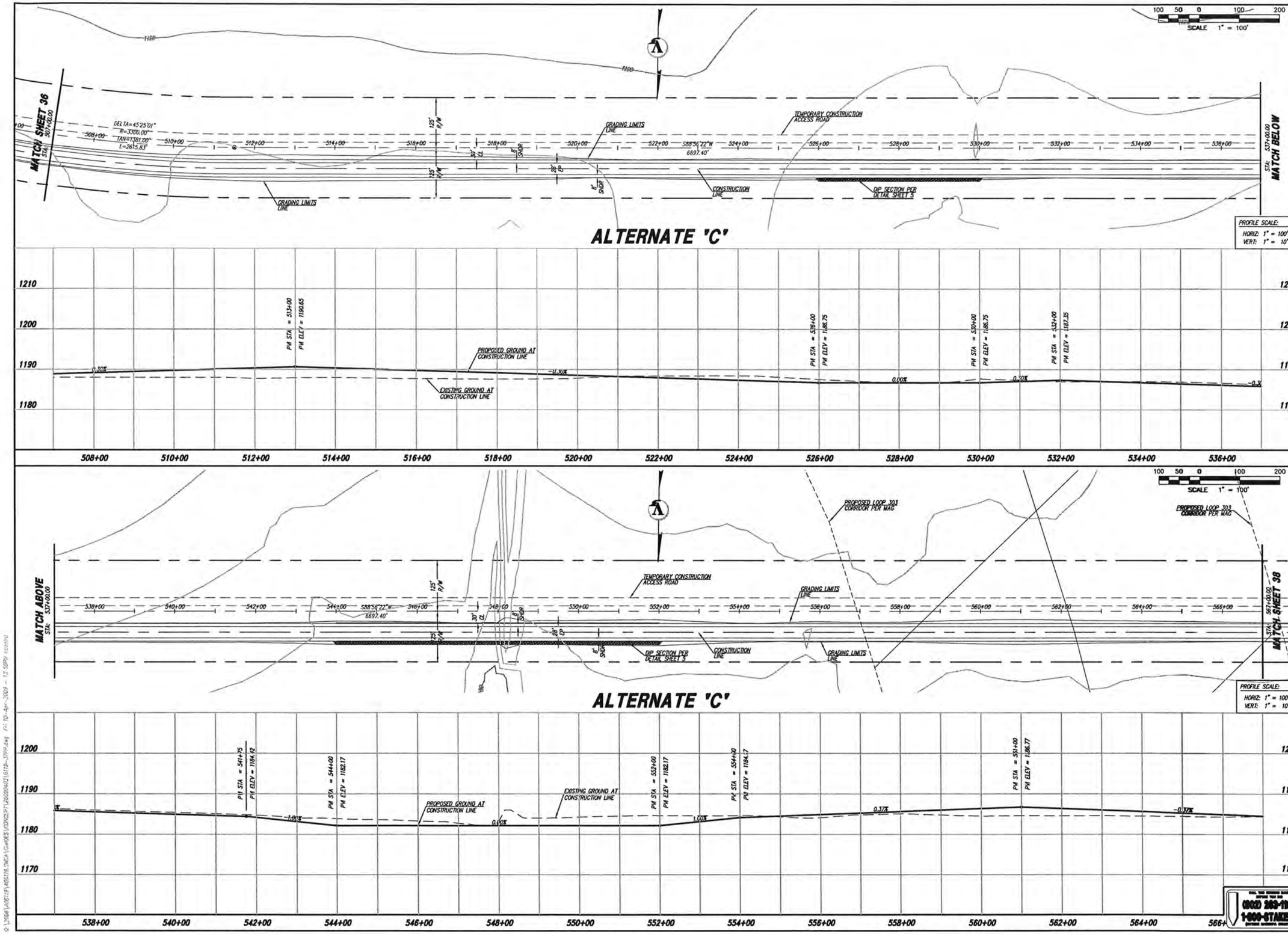

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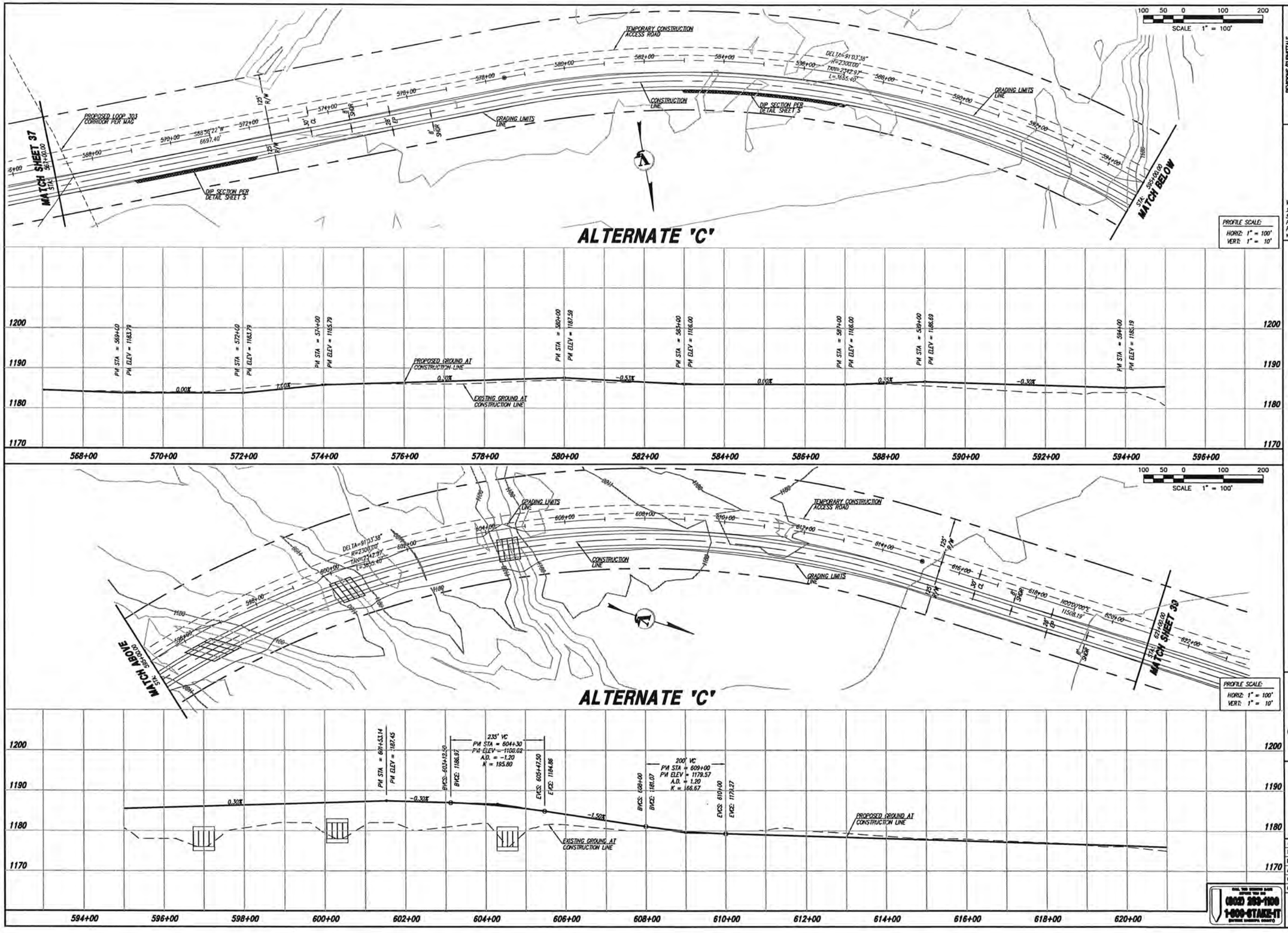

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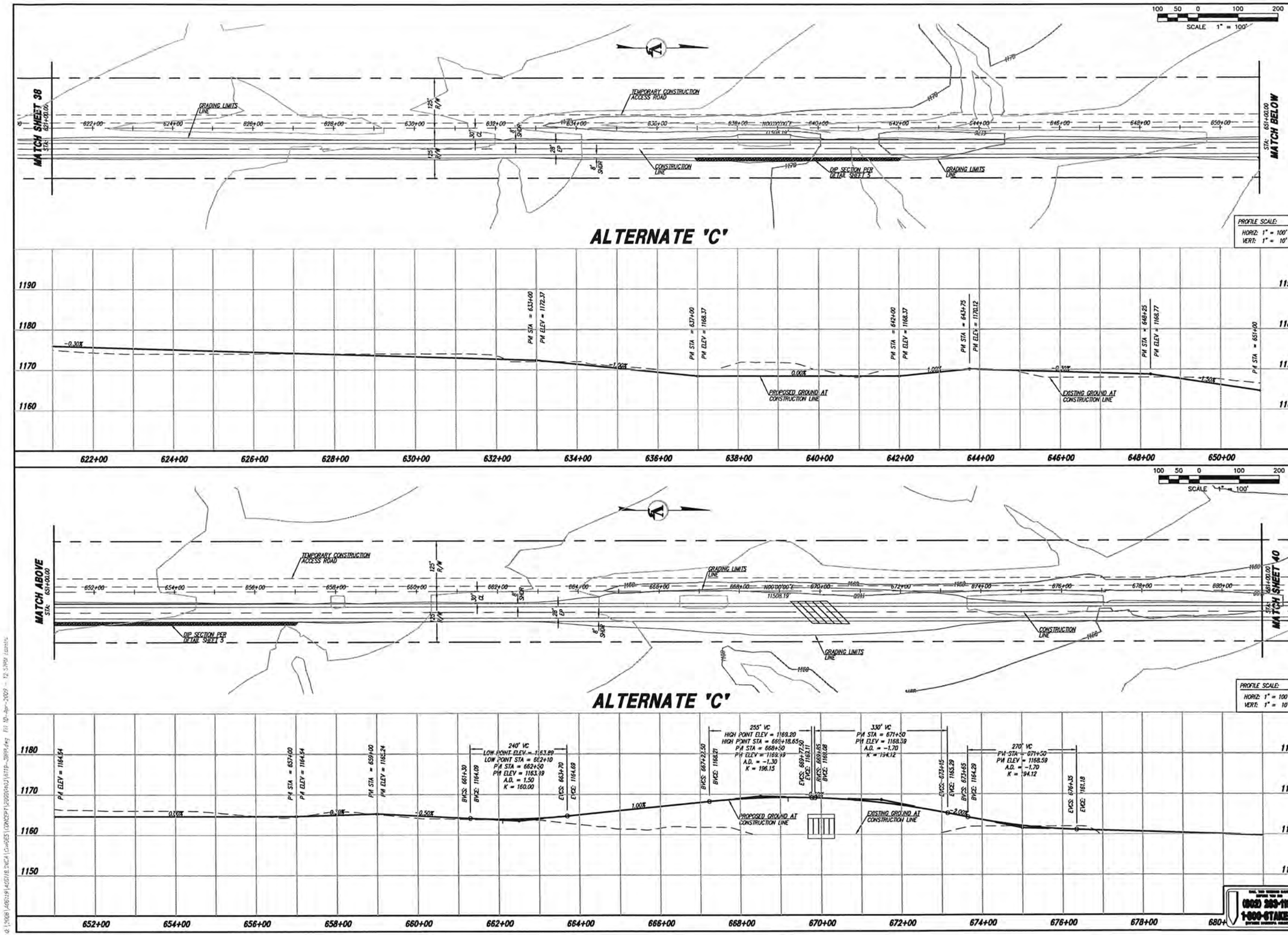

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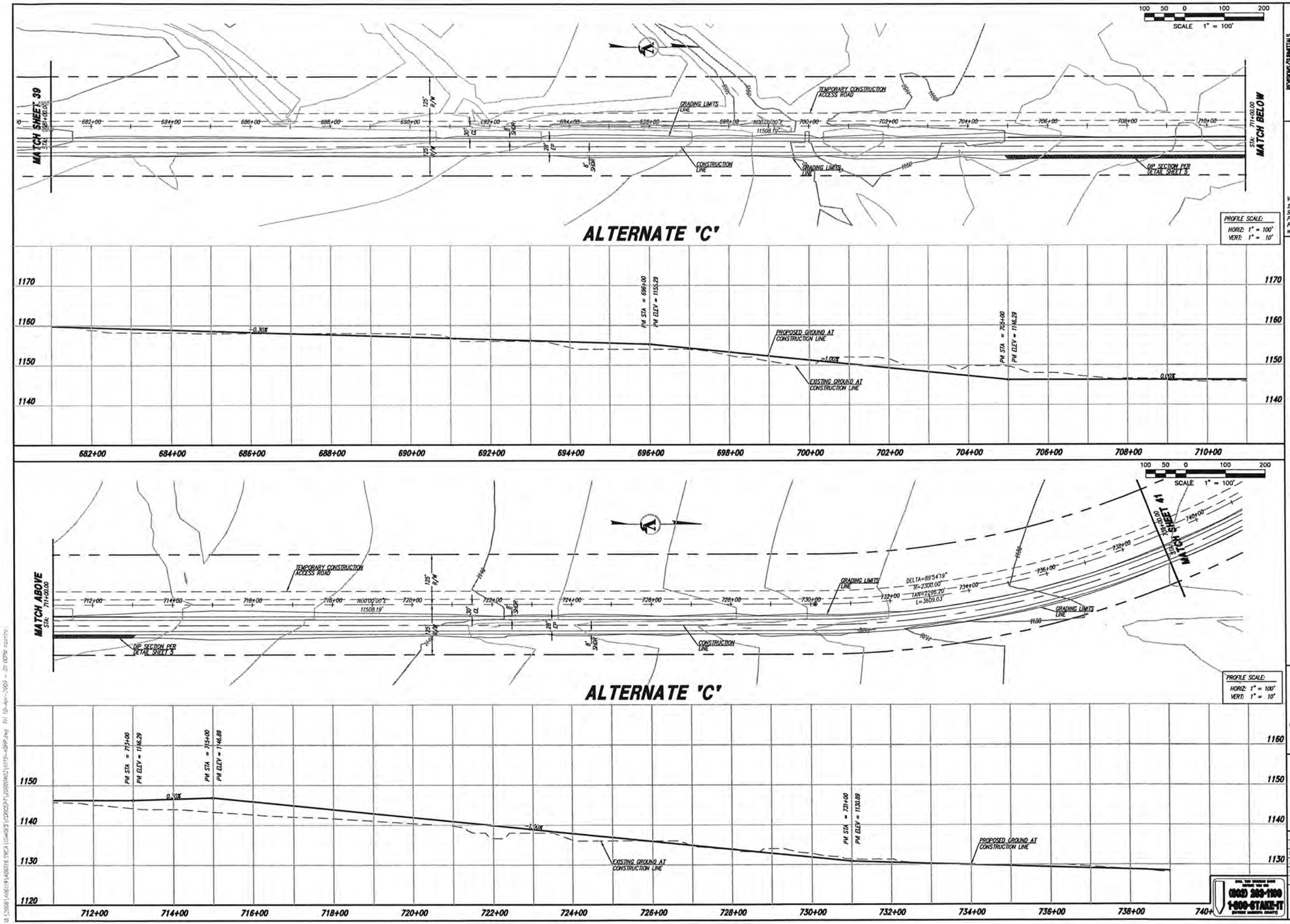

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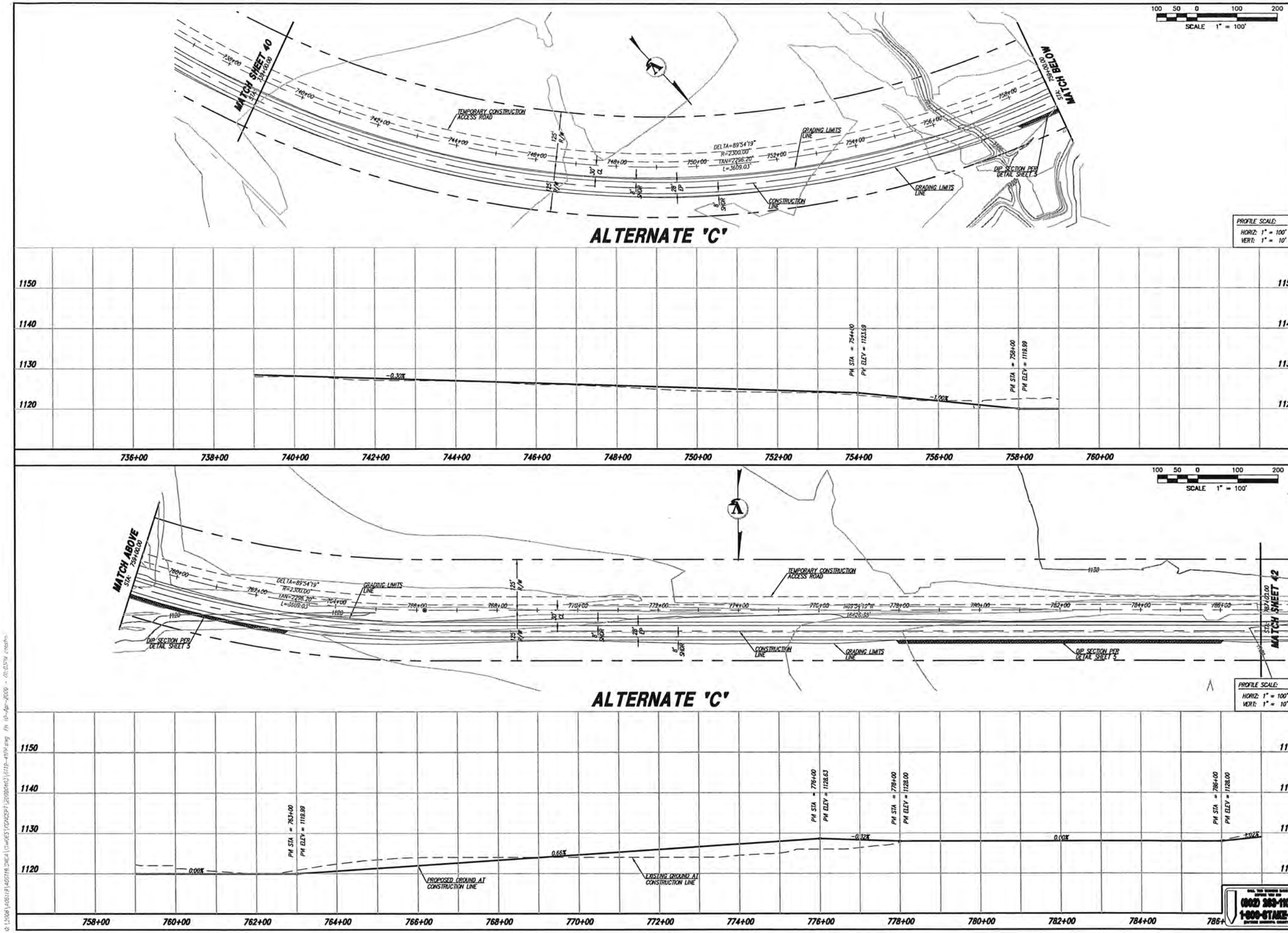

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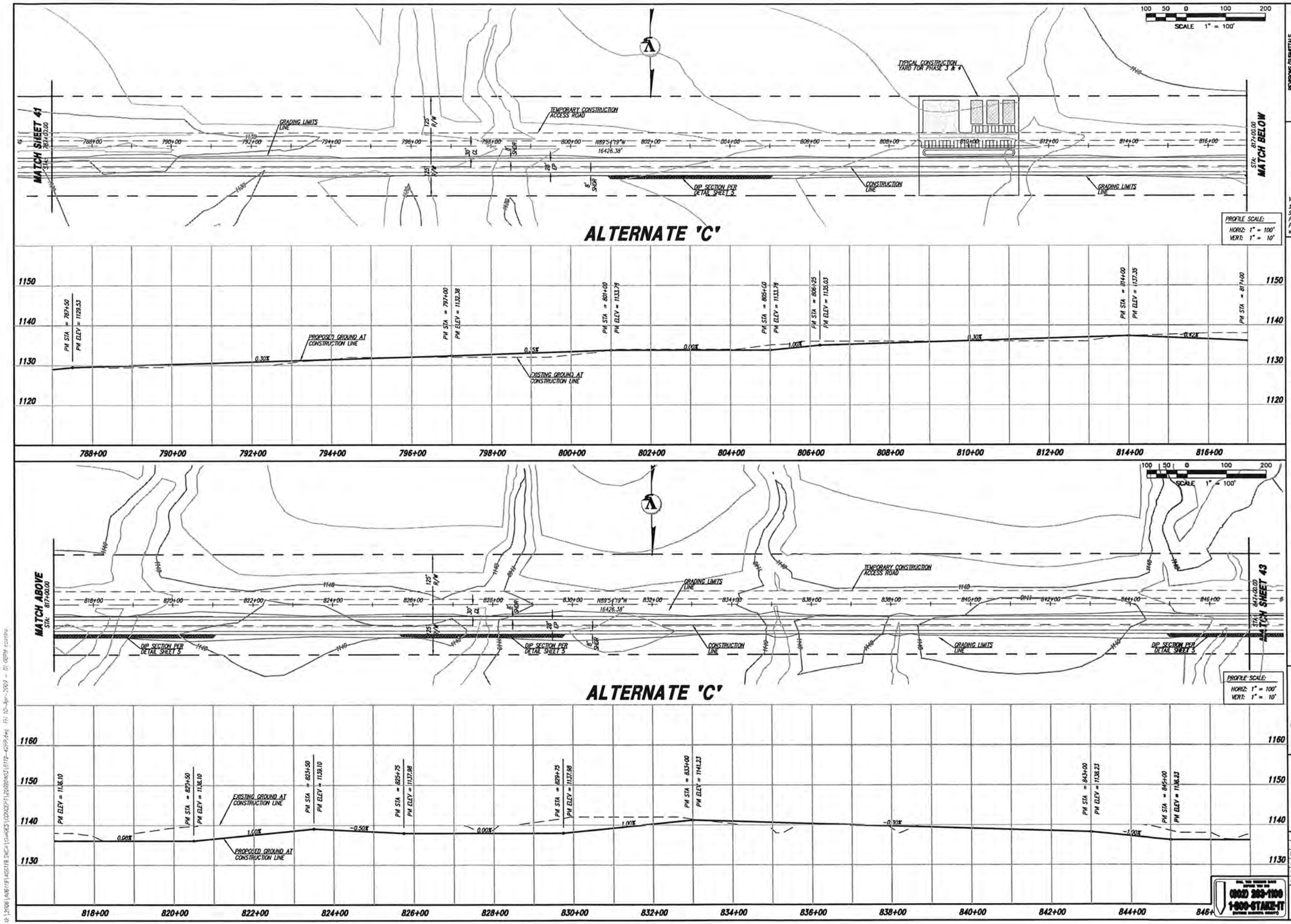
41 OF 46 SHEETS

HTE 07-5987



REVISIONS/SUBMITTALS	
1	30% SUBMITTAL TO COCo. 04-03-09

V3 COMPANIES OF ARIZONA
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Suite 100
Phoenix, Arizona 85008
P. 602.648.4800
www.V3co.com

PLAN AND PROFILE
SONORAN VALLEY PARKWAY

TOWNSHIP 3 & 4 SOUTH, RANGE 2 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

PRELIMINARY NOT FOR CONSTRUCTION

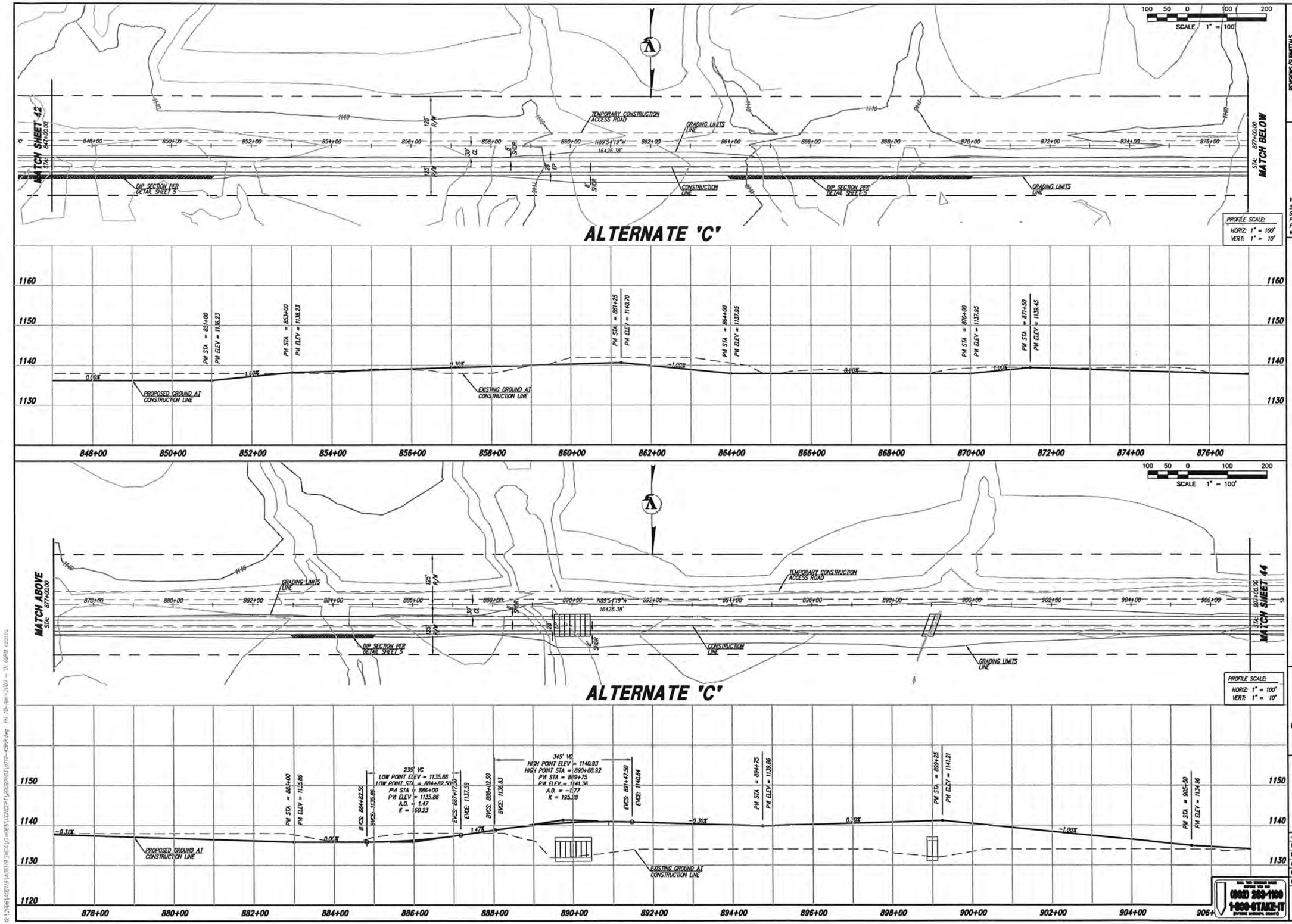
REGISTERED PROFESSIONAL ENGINEER
36279
KEITH P. KESTI
ARIZONA

EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
DESIGNED	KPK
DRAWN	CCS
ROAD FILE	6119-42PP
CHECKED	MSW
CONS SUB DATE	04-03-09

BEFORE YOU DIG
(602) 263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

HTE 07-5987



REVISIONS/SUBMITTALS

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PLAN AND PROFILE

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CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

PRELIMINARY NOT FOR CONSTRUCTION

36279
KEITH P. KESTI
ARIZONA, U.S.A.
EXPIRES 06-30-2010

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DRAWN	CCS
ACAD FILE	6119-43PP
CHECKED	MSW
CMO SUB DATE	04-03-09

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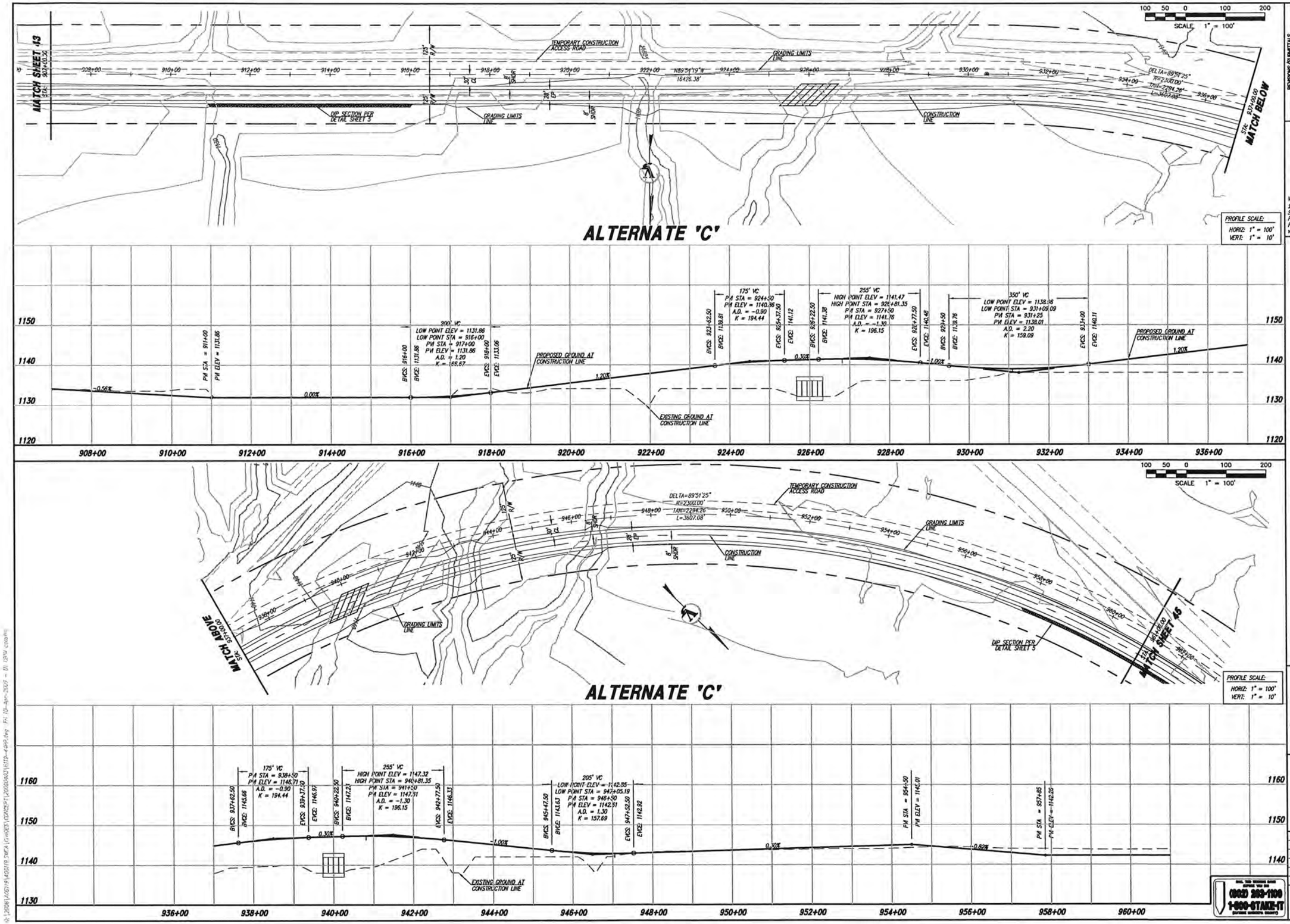
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

HTE 07-5987



REVISIONS/SUBMITTALS	
1. 30% SUBMITTAL TO CCS	04-03-09

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SONORAN VALLEY PARKWAY

TOWNSHIP 3 & 4 SOUTH, RANGE 1 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

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DESIGNED	KPK
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ACAD FILE	6119-44PP
CHECKED	MSW
CHG SUB DATE	04-03-09

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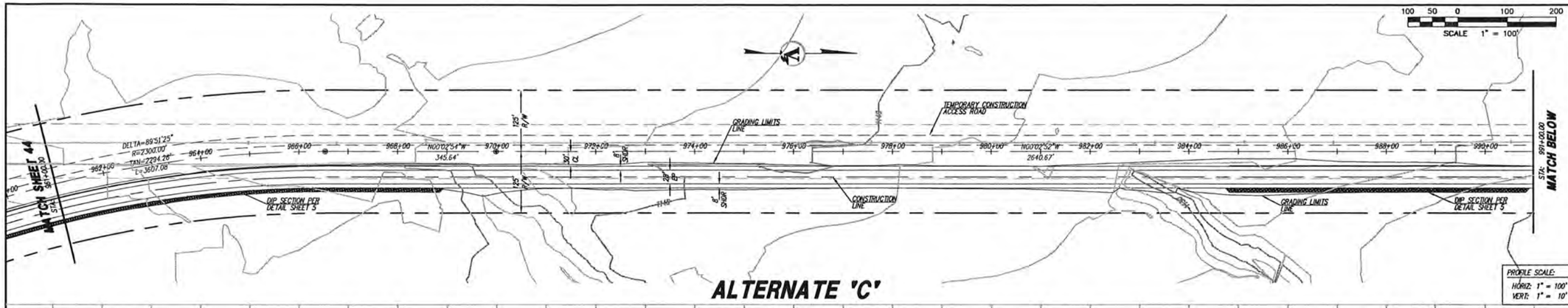
1-800-STAKE-IT

HTE 07-5987



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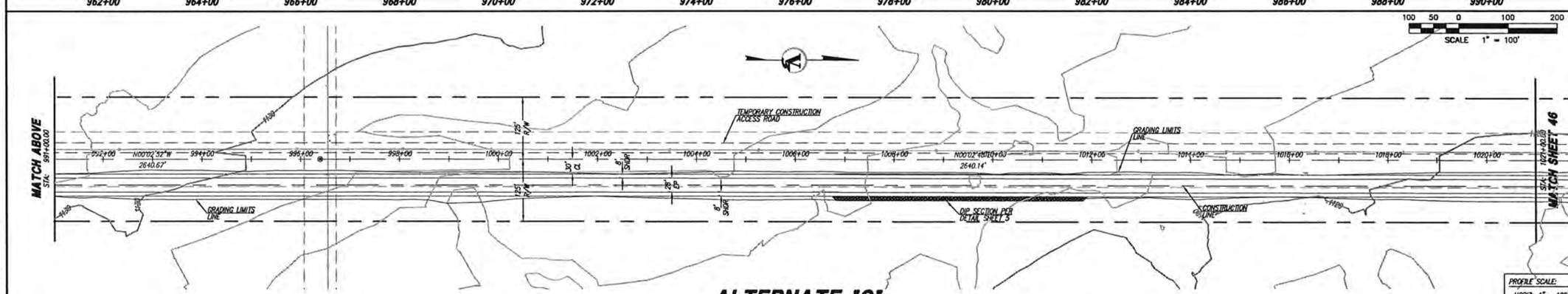

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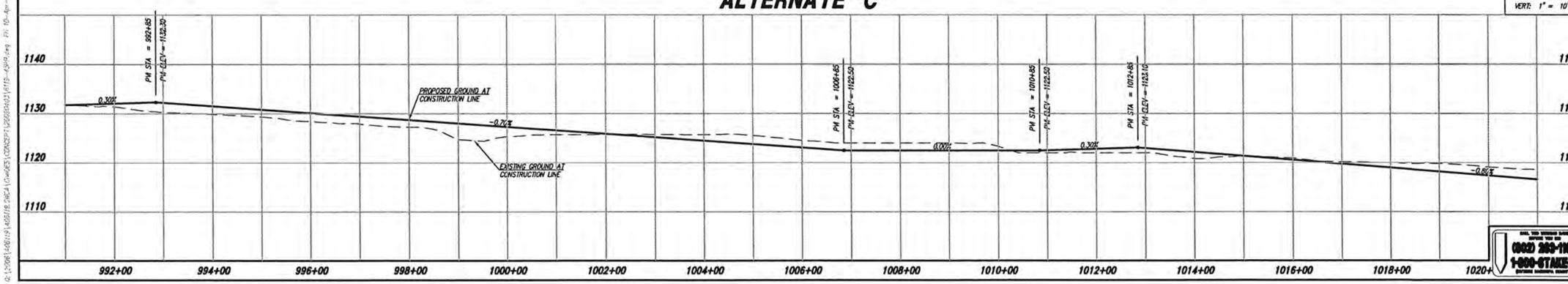

REVISIONS/SUBMITTALS	
1	1ST SUBMITTAL TO C.O.S. 04-03-09

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PLAN AND PROFILE
SONORAN VALLEY PARKWAY

TOWNSHIP 3 & 4 SOUTH, RANGE 1 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

PRELIMINARY NOT FOR CONSTRUCTION

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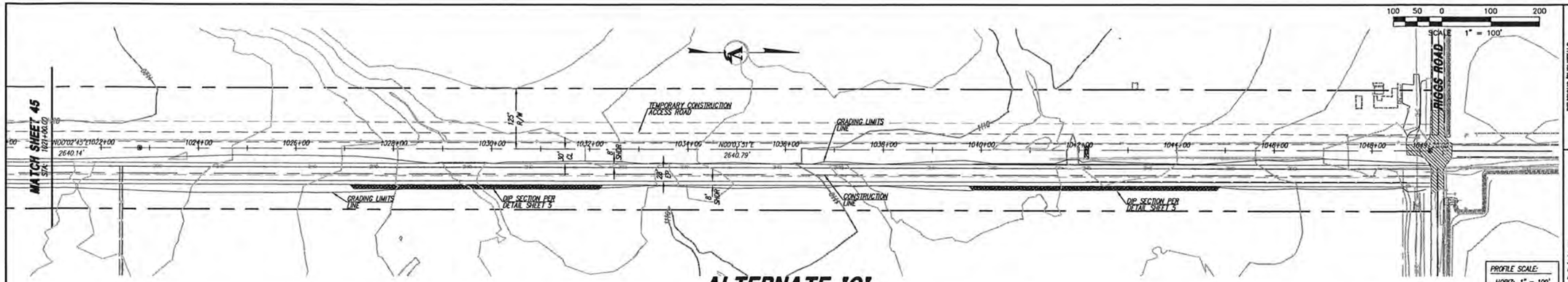
KEITH P. KESTI
ARIZONA, U.S.A.
4/1/09
EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
DESIGNED	KPK
DRAWN	CCS
ACAD FILE	6119-45PP
CHECKED	MSW
CNG SUB DATE	04-03-09

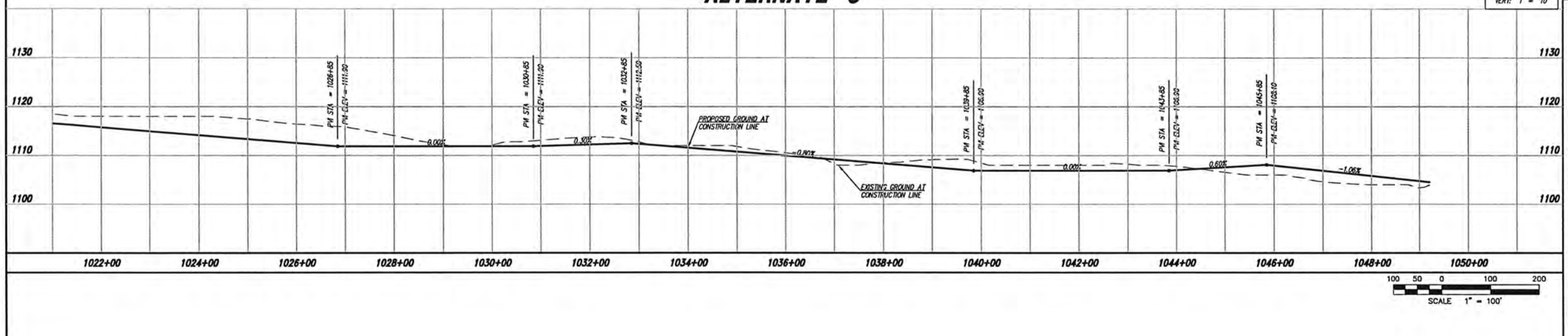
CALL TWO WORKING DAYS BEFORE YOU DIG
(602) 263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

HTE 07-5987



ALTERNATE 'C'

PROFILE SCALE:
HORIZ: 1" = 100'
VERT: 1" = 10'



PROFILE SCALE:
HORIZ: 1" = 100'
VERT: 1" = 10'

CALL THE NUMBER BELOW BEFORE YOU DIG
(602) 263-1100
1-800-STAKE-IT
(outside Maricopa County)

+00

REVISIONS/SUBMITTALS	
1	30% SUBMITTAL TO CLIENT 04-03-09

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1048 North 44th Street
Suite 100
Phoenix, Arizona 85008
P. 602.648.4800
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PLAN AND PROFILE
SONORAN VALLEY PARKWAY

TOWNSHIP 3 & 4 SOUTH, RANGE 1 WEST & EAST, OF THE G.&S.R.B.&M.
CITY OF GOODYEAR
MARICOPA COUNTY, ARIZONA

PRELIMINARY NOT FOR CONSTRUCTION

36279
KEITH P. KESH
ARIZONA, U.S.A.
EXPIRES 06-30-2010

JOB NO.	A06119.SWCA
DESIGNED	KPK
DRAWN	CCS
ACAD FILE	6119-46PP
CHECKED	MSW
CIRC SUB DATE	04-03-09

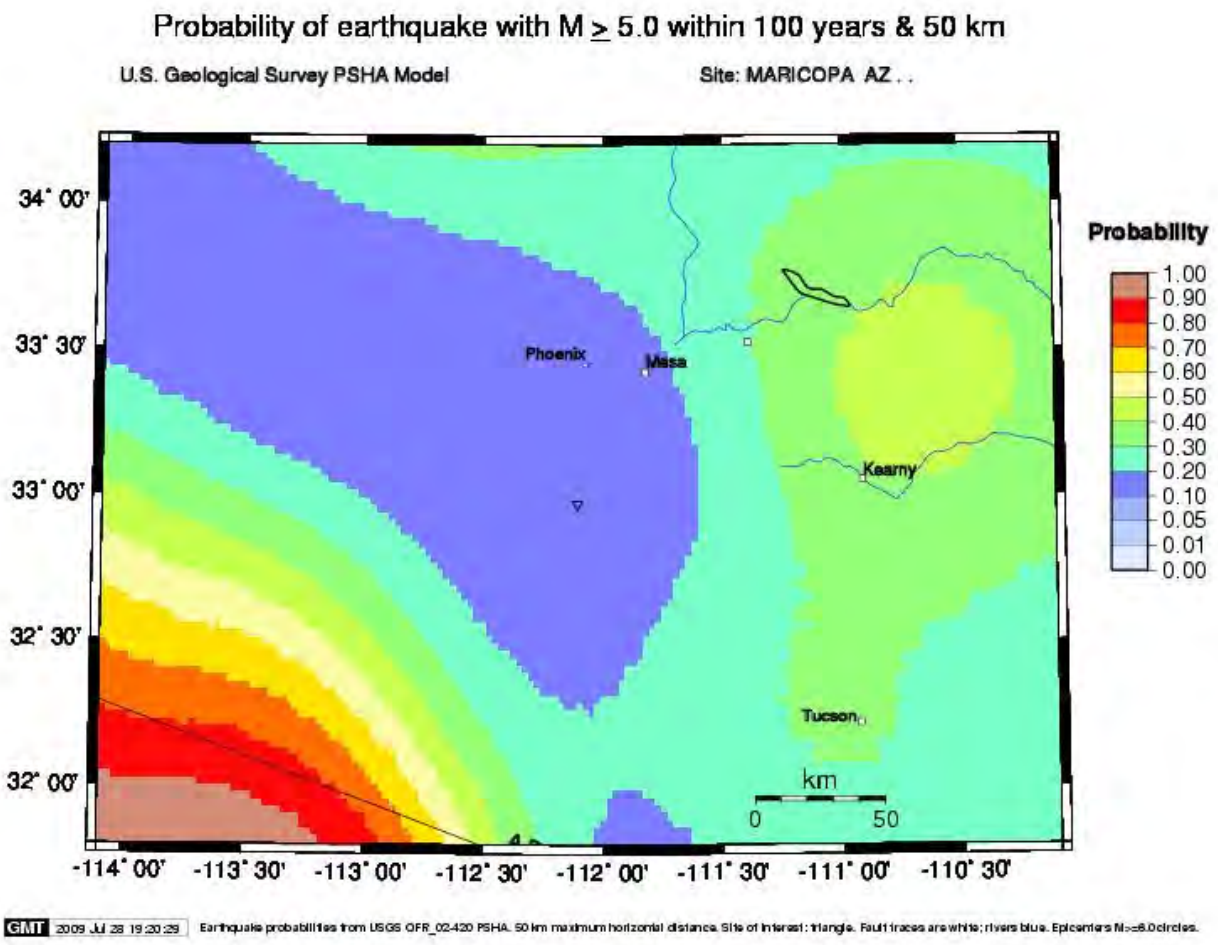
46 OF 46 SHEETS

HTE 07-5987

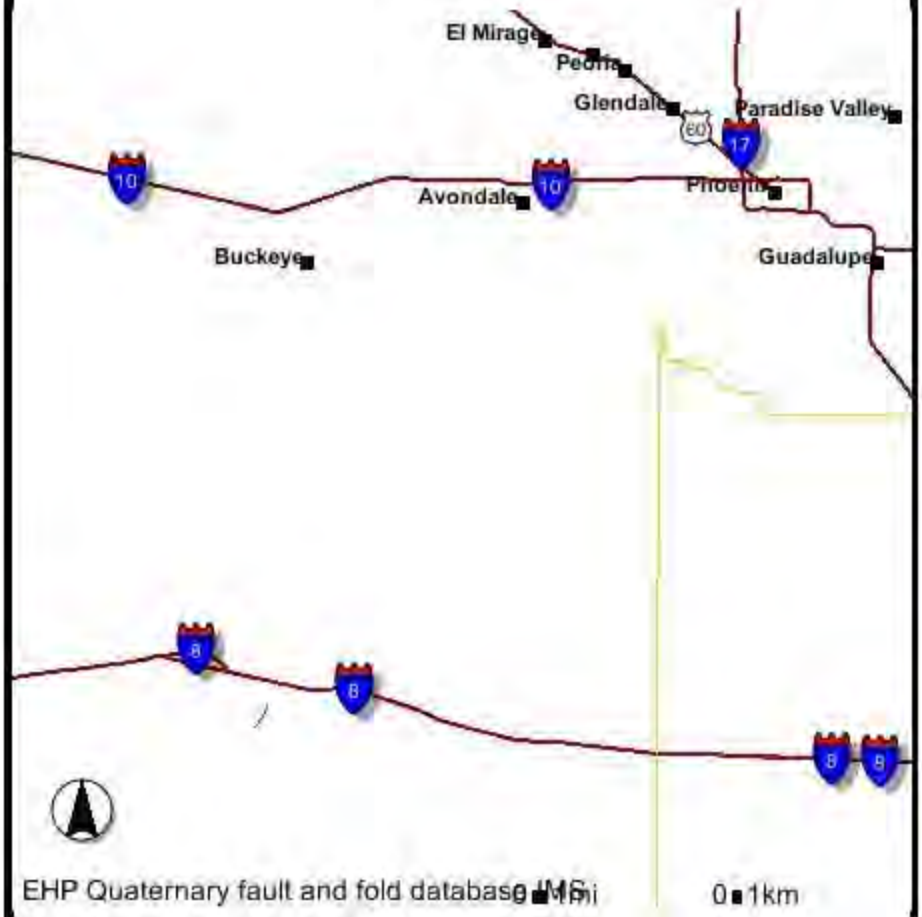
10:\JOBS\A06119\6119SWCA\DWG\6119-46PP.DWG FT: 10-Apr-2009 - 01:16PM c.ccs

Appendix E

GEOLOGIC MAPS


Probability of earthquake with M ≥ 5.0 within 100 years & 50 km
U.S. Geological Survey PSHA Model
Site: MARICOPA AZ . .
34° 00'
33° 30'
33° 00'
32° 30'
32° 00'
-114° 00'
-113° 30'
-113° 00'
-112° 30'
-112° 00'
-111° 30'
-111° 00'
-110° 30'
Phoenix
Mesa
Kearny
Tucson
km
0
50
Probability
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.05
0.01
0.00
GMT 2009 Jul 28 19:20:29
Earthquake probabilities from USGS OFR_02-420 PSHA. 50 km maximum horizontal distance. Site of interest: triangle. Fault traces are white; rivers blue. Epicenters M>=6.0 circles.

Quartenary Faults and Folds



Legend

Faults

- Historic
- <15,000 - latest Quaternary
- <130,000 - late Quaternary
- <750,000 - mid and late Quaternary
- <1600,000 - Quaternary
- Class B

Fault areas

- Central Virginia seismic zone
- Cooked Creek fault (Class B)
- Fluorspar Area fault complex
- Gulf Coast normal faults, AL and FL (Class B)
- Gulf Coast normal faults, LA and AR (Class B)
- Gulf Coast normal faults, MS (Class B)
- Gulf Coast normal faults, TX (Class B)
- Kentucky River fault system (Class B)
- Moors fault
- Monroe uplift (Class B)
- Newbury Massachusetts liquefaction features
- Overlap area
- Pembroke faults (Class B)
- Reelfoot scarp and New Madrid seismic zone
- Saline River fault zone (Class B)
- South Carolina liquefaction features
- St. Louis-Cape Giradeau liquefaction features
- Thebes Gap faults
- Wabash Valley liquefaction features
- Western Lowlands liquefaction features
- Wiggins uplift (Class B)

- Counties
- Large Towns
- Major Roads
- Cities
- Interstate Highways_
- States

Map Introduction

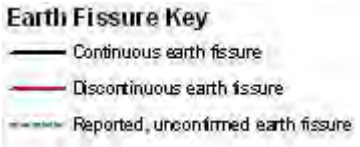
Map Introduction

This is earth fissure map prepared by the Arizona Geological Survey ("AZGS") in accordance with Ariz. Rev. Stat. § 27-152.01(3). AZGS collected location information from previously conducted earth fissure studies, reviewed available remote-sensing aerial and satellite imagery, and conducted surface site investigations throughout the study area. A reasonable effort was made to identify all earth fissures in each study area. Nonetheless, some fissures may remain unmapped as a result of one or more of the following:

(1) Existing fissures may have been masked by construction or agricultural activities;
(2) Incipient fissures may lack clear surface expression; and
(3) The surface expression of fissures changes constantly as new earth fissures develop and old earth fissures fill in.

A blank area on the map does not guarantee earth fissures are not present. However, blank areas within a study area boundary have been investigated, and no surface evidence of fissures was found as of the date of publication for that particular study area. Determining the presence or absence of a fissure at any specific site may require additional mapping and/or geotechnical analysis.

Map Index



Solid black lines represent the location of **continuous earth fissures** manifested as open cracks or gullies.

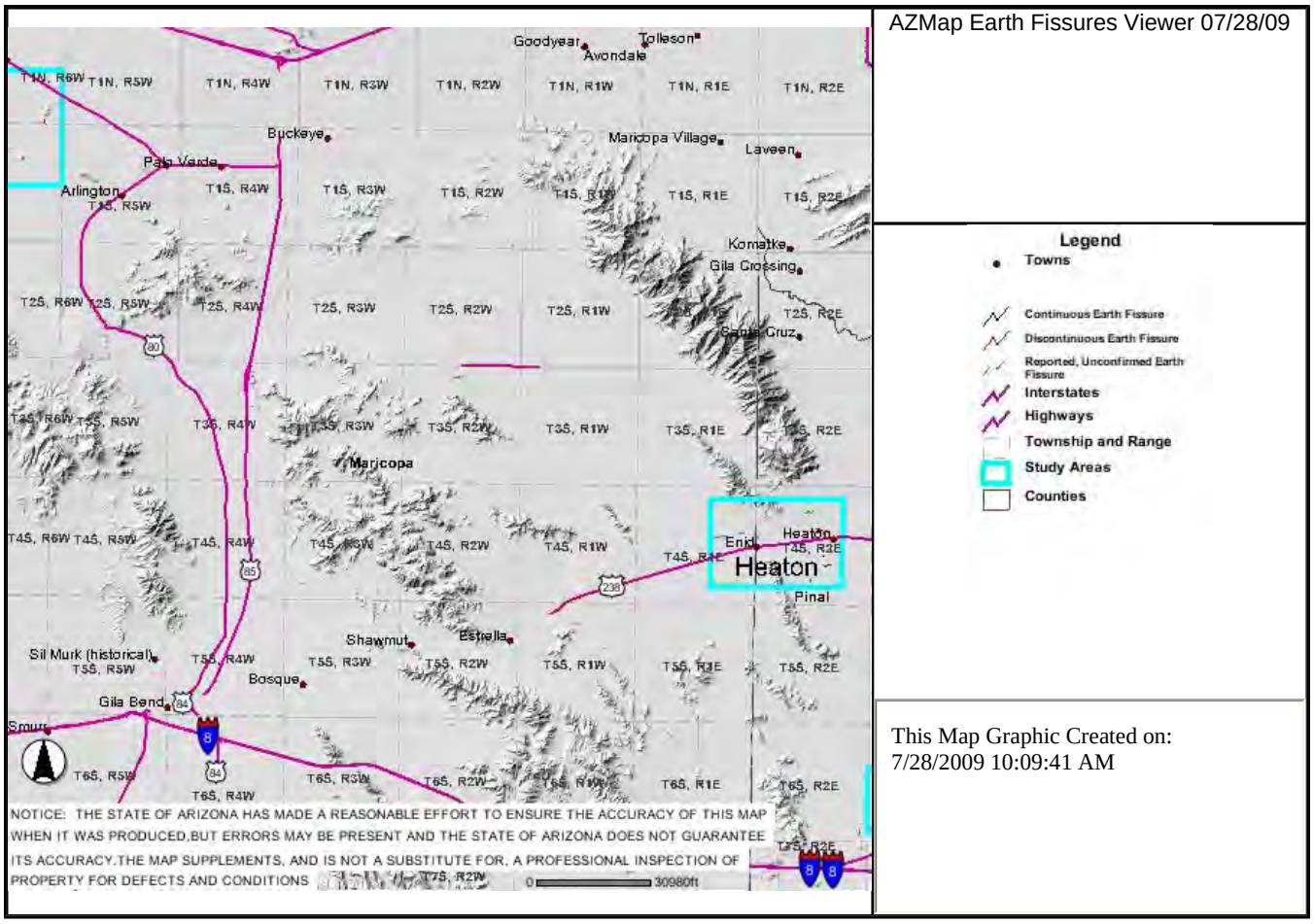
Solid red lines represent the location of **discontinuous earth fissures** manifested as elongated to circular depressions or as abbreviated or irregular linear depressions. These discontinuous surface features frequently represent an incipient surface expression of an earth fissure.

Dashed green lines represent the approximate locations of **unconfirmed earth fissures**, defined as fissures which could not be confirmed by surface investigations by AZGS geologists, but which have been previously reported by Professional Geologists in published documents or

maps.

The blue borders outline **study areas** inspected for earth fissures. Historical and modern aerial photos taken of each study area were searched for anomalous lineaments. Lineaments were then investigated in the field to determine if there was any evidence of earth fissures

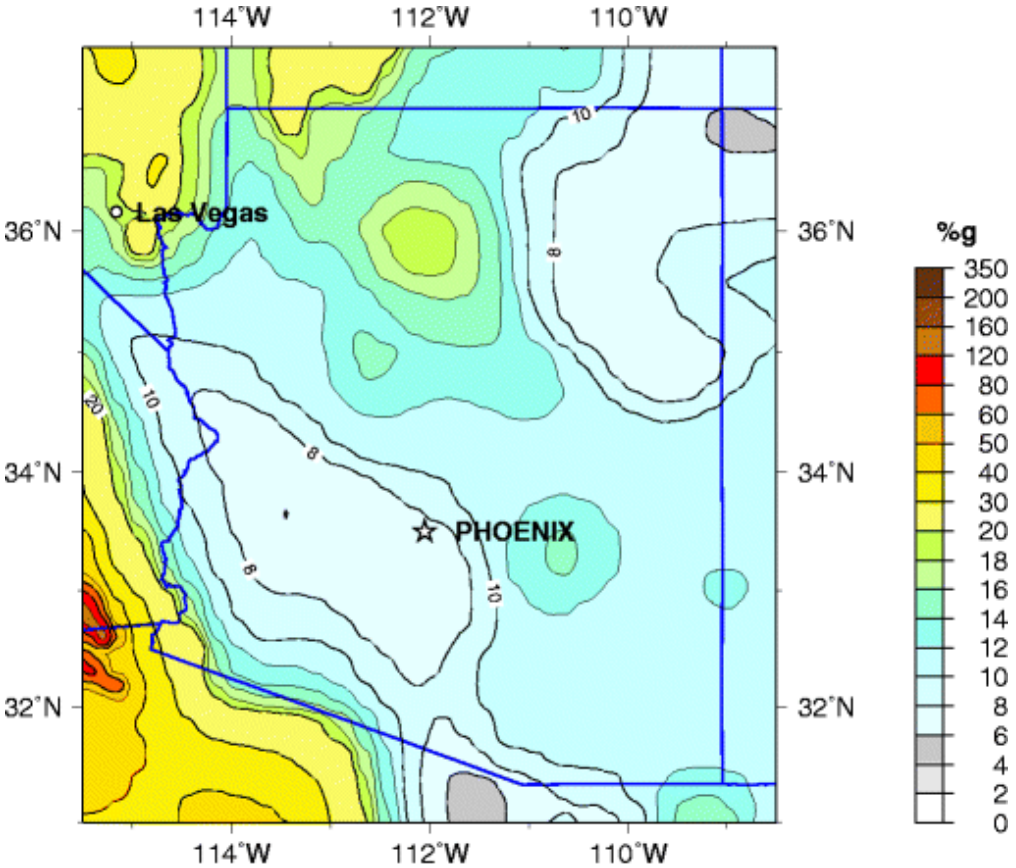
The brown shaded areas represent Indian Communities. No effort was made to identify or confirm earth fissures within these areas, however reported earth fissures within these areas are shown on the map as dashed green lines.


AZMap Earth Fissures Viewer 07/28/09
Legend
Towns
Continuous Earth Fissure
Discontinuous Earth Fissure
Reported, Unconfirmed Earth Fissure
Interstates
Highways
Township and Range
Study Areas
Counties
This Map Graphic Created on:
7/28/2009 10:09:41 AM
Goodyear
Tolleson
Avondale
Buckeye
Maricopa Village
Laveen
Palo Verde
Arlington
Komatke
Gila Crossing
Santa Cruz
Maricopa
Enid
Heaton
Pinal
Shawmut
Estrella
Sil Murk (historical)
Bosque
Gila Bend
Sauro
NOTICE: THE STATE OF ARIZONA HAS MADE A REASONABLE EFFORT TO ENSURE THE ACCURACY OF THIS MAP WHEN IT WAS PRODUCED,BUT ERRORS MAY BE PRESENT AND THE STATE OF ARIZONA DOES NOT GUARANTEE ITS ACCURACY.THE MAP SUPPLEMENTS, AND IS NOT A SUBSTITUTE FOR, A PROFESSIONAL INSPECTION OF PROPERTY FOR DEFECTS AND CONDITIONS
0
30980ft

Earthquake Hazards Program

Arizona

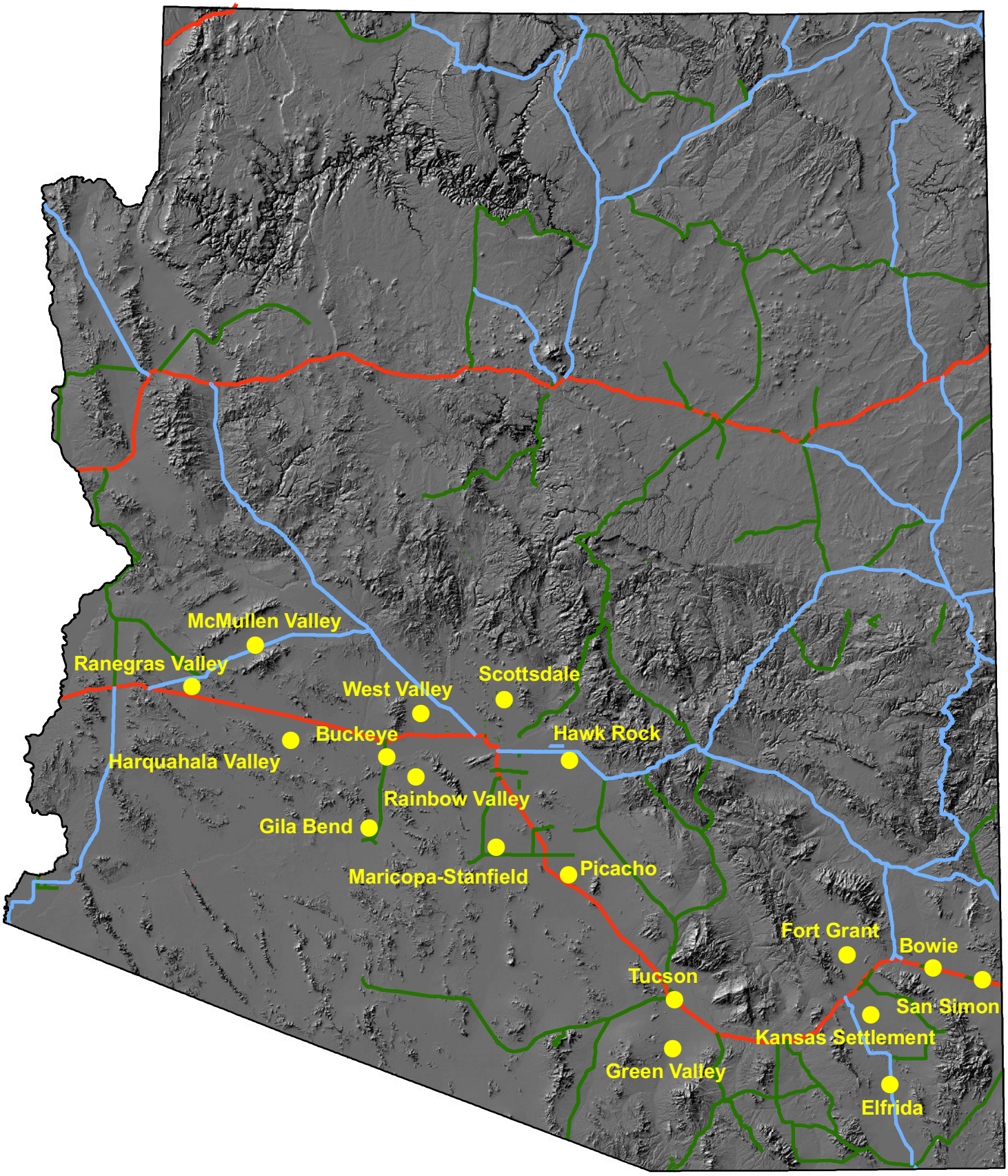
Seismic Hazard Map



Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years
site: NEHRP B-C boundary
National Seismic Hazard Mapping Project (2008)

USGS National Seismic Hazard Maps

U.S. Department of the Interior | U.S. Geological Survey
URL: http://earthquake.usgs.gov/regional/states/arizona/hazards.php
Page Contact Information: EHP Web Team
Page Last Modified: January 30, 2009 00:33:35 UTC
, 2009 00:33:35 UTC



Active Land Subsidence Areas in Arizona Based on ADWR InSAR Data
InSAR Data is Processed and Analyzed By the Geophysics/Surveying Unit of the Hydrology Division

Arizona Land Subsidence Areas

Arizona Highways and Interstates

Interstate
US
State

1:2,832,259

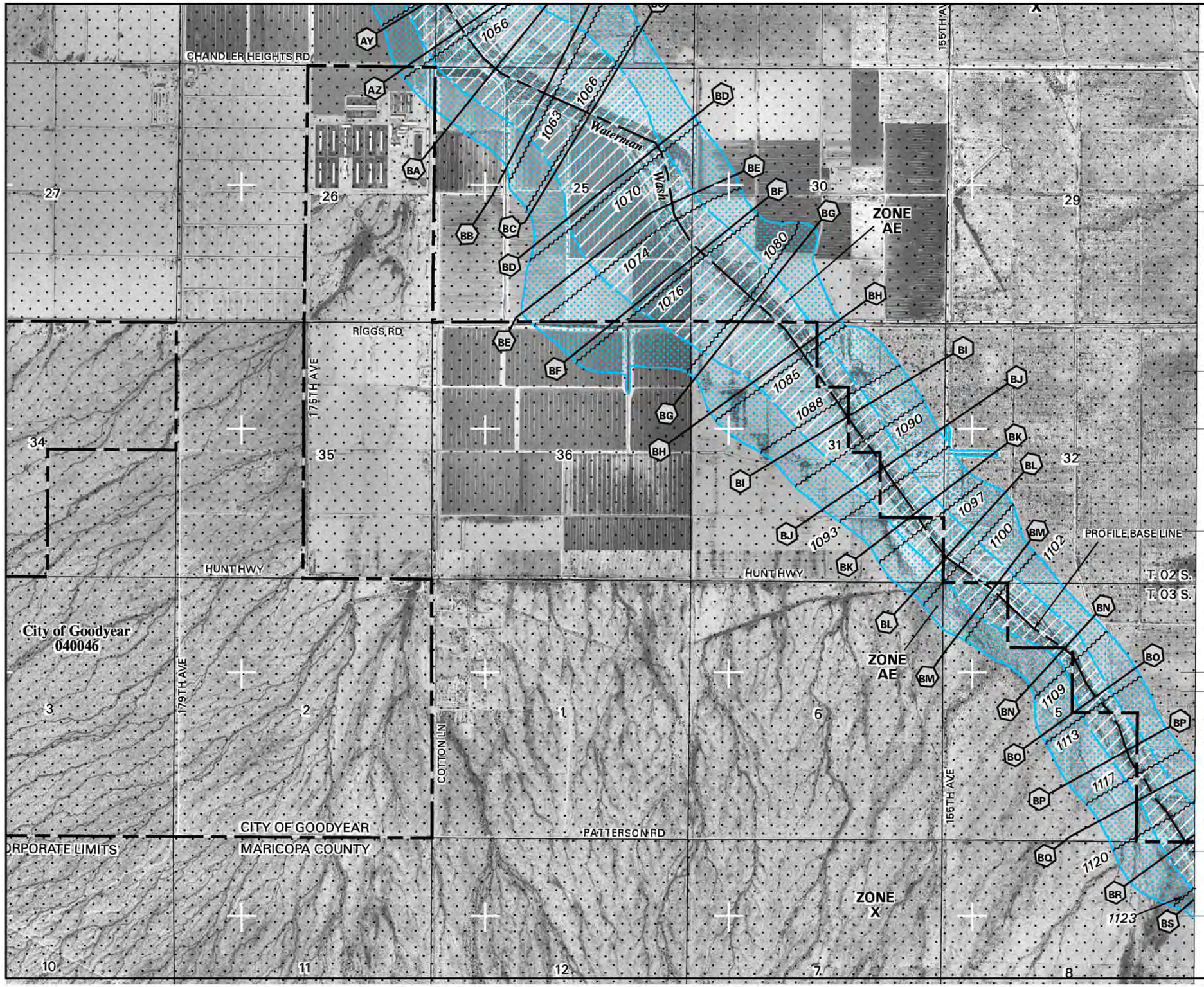
0 15 30 60 90 120 Miles

©

ARIZONA DEPARTMENT OF WATER RESOURCES

Appendix F

FEMA MAPS



MAP SCALE 1" = 2000'

0 2000 4000 FEET

0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2925G

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 2925 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GOODYEAR, CITY OF	040046	2925	G
MARICOPA COUNTY	040037	2925	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER

04013C2925G

MAP REVISED

SEPTEMBER 30, 2005

Federal Emergency Management Agency

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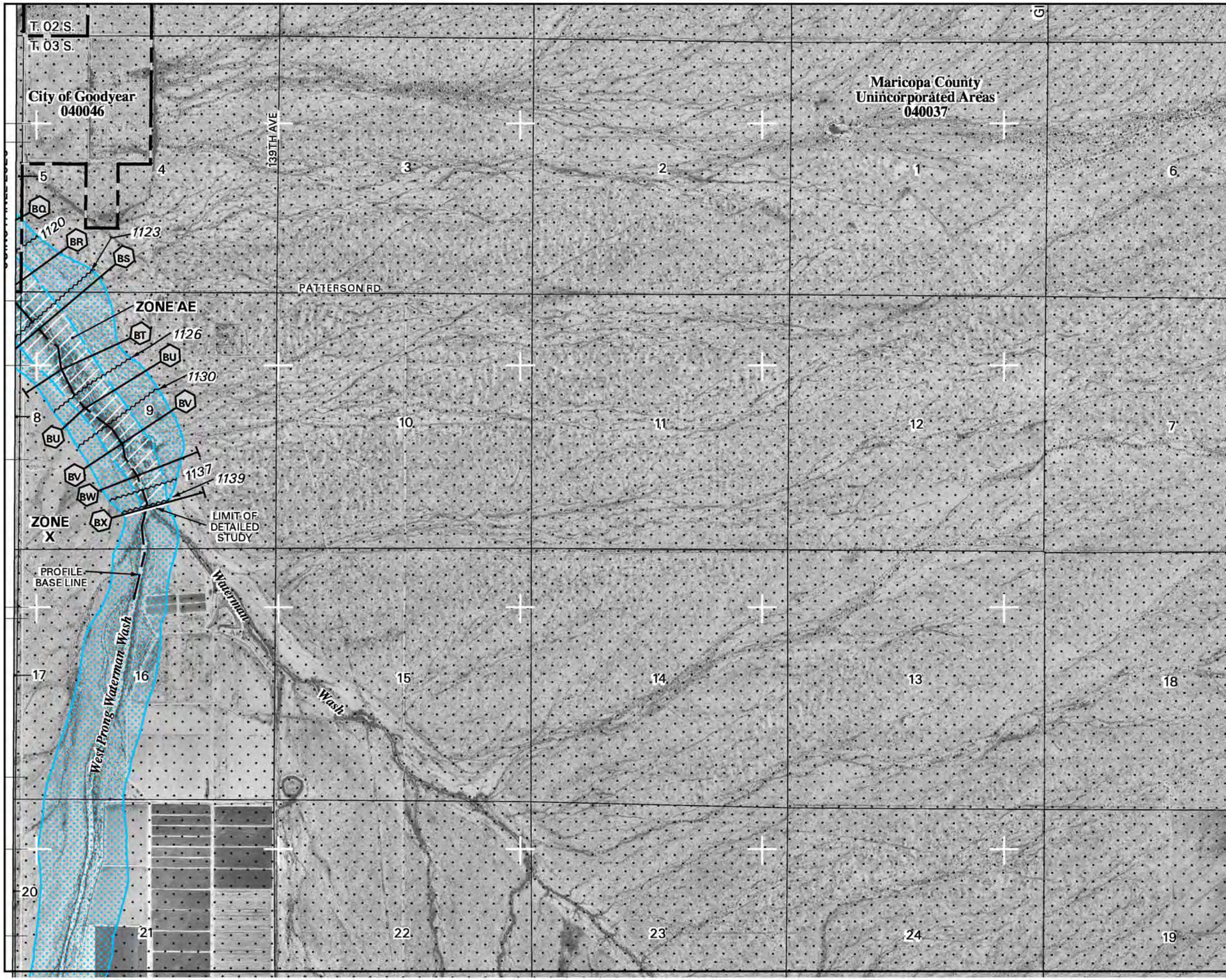

MAP SCALE 1" = 2000'

0 2000 4000 FEET

0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2950G

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 2950 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GOODYEAR, CITY OF	040046	2950	G
MARICOPA COUNTY	040037	2950	G

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MAP NUMBER

04013C2950G

MAP REVISED

SEPTEMBER 30, 2005

Federal Emergency Management Agency

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MAP SCALE 1" = 2000'

0 2000 4000 FEET

0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2950G

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 2950 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GOODYEAR, CITY OF	040046	2950	G
MARICOPA COUNTY	040037	2950	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER

04013C2950G

MAP REVISED

SEPTEMBER 30, 2005

Federal Emergency Management Agency

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Appendix G

SPECIES TABLES

Table G-1. Federally Listed Wildlife Species Potentially Occurring in Maricopa County, Arizona

Range or habitat information is from HDMS (2012); USFWS Arizona Ecological Services Field Office (USFWS 2012); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
California least tern (*Sterna antillarum browni*)	E MBTA	Occurs in bays and lagoons and forms breeding colonies in the adjacent open sandy beaches, dunes, or disturbed sites within their normal range; however, also documented to use open, sandy flat areas along shorelines of inland watercourses.	Unlikely to occur. The project area and vicinity do not contain water sources suitable for this species. The nearest recorded location of the California least tern to the project area is near the Agua Fria River in west Phoenix (personal communication, G. Beatty, USFWS 2009 and personal communication, K. Robertson, USFWS and T. Corman, AGFD 2013).	No impact.
Desert pupfish (*Cyprinodon macularius*)	E	Found in shallow waters of desert springs, small streams, and marshes at elevations below 5,000 feet amsl. One natural population still occurs in Quitobaquito Spring and Quitobaquito Pond in Pima County, and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai counties in Arizona. New introductions continue.	Unlikely to occur. The project area and vicinity do not contain water sources suitable for this species. The nearest extant population of the desert pupfish is more than 100 miles south of the project area near the Mexico-Arizona border. Also, the nearest reintroduced population is approximately 14 miles northwest of the project area near Robbins Butte (AGFD 2012).	No impact.
Desert tortoise (*Gopherus agassizii* [Sonoran population])	C BS SGCN: Tier 1b	Rocky slopes and bajadas of Mojave and Sonoran desertscrub at elevations from approximately 510 to 5,300 feet amsl. Range includes all individuals south and east of the Colorado River.	May occur. Although unlikely to frequently inhabit the project area, it is possible that this species could pass through the project area during movement events between suitable habitat areas in the nearby mountain ranges. The nearest historical (1976) recorded location of the Sonoran Desert tortoise is less than0.5 mile of the project area in the North Maricopa Mountains, whereas the nearest non-historical (2000) recorded location is within approximately 7 miles southwest of the project area (AGFD 2012). Additionally, the southern portions (near the Espanto Mountains) of the alternatives are located within BLM-designated Category 1 tortoise habitat, which is the most valuable habitat category (Arizona Interagency Desert Tortoise Team 1996). Alternative A contains 82.5 acres, Alternative C contains 25.9 acres, Alternative H contains 82.0 acres, and Sub-alternative F contains 10.8 acres has of Category I tortoise habitat within the 250-foot-wide ROW; however, Sub-alternative G is not within a BLM-designated tortoise habitat category.	The project would remove habitat for the desert tortoise, including high-quality Category I habitat, which would result in a site-specific, major, long-term impact. In addition, the project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to desert tortoise movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to desert tortoise movement patterns for the 4- and 6-lane roadway of all alternatives.

Table G-1. Federally Listed Wildlife Species Potentially Occurring in Maricopa County, Arizona (Continued)

Range or habitat information is from HDMS (2012); USFWS Arizona Ecological Services Field Office (USFWS 2012); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Gila topminnow (*Poeciliopsis occidentalis occidentalis*)	E SGCN: Tier 1a	Occurs in small streams, springs, and cienegas at elevations below 4,500 feet amsl, primarily in shallow areas with aquatic vegetation and debris for cover. In Arizona, most of the remaining native populations are in the Santa Cruz River system.	Unlikely to occur. The project area and vicinity do not contain water sources suitable for this species. The nearest extant population of the desert pupfish is approximately 52 miles north in the Bradshaw Mountains. Also, the nearest reintroduced population is approximately 30 miles north-northeast of the project area in Peoria (AGFD 2012).	No impact.
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	E BS SGCN: Tier 1a	Found seasonally (April–September) in southern Arizona from the Picacho Mountains southwesterly to the Agua Dulce Mountains and southeasterly to the Galiuro and Chiricahua mountains at elevations between 1,600 and 11,500 feet amsl. Roosts in caves, abandoned mines, and unoccupied buildings at the base of mountains where agave, saguaro, and organ pipe cacti are present. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti. The foraging radius of *Leptonycteris* bats may be 30 to 60 miles or more.	Unlikely to occur. Although the project area is within the current range of this species, the lack of foraging and roosting resources in the project area makes it highly unlikely that this species would inhabit the area. The nearest recorded location of the lesser long-nosed bat to the project area is a maternity roost more than 40 miles to the southeast near Casa Grande (AGFD 2012).	No impact.
Mexican spotted owl (*Strix occidentalis lucida*)	T MBTA SGCN: Tier 1a	Found in mature, montane forests and woodlands and steep, shady, wooded canyons. Can also be found in mixed-conifer and pine-oak vegetation types. Generally nests in older forests of mixed conifers or ponderosa pine–Gambel oak. Nests in live trees on natural platforms (e.g., dwarf mistletoe brooms), snags, and canyon walls at elevations between 4,100 and 9,000 feet amsl.	Unlikely to occur. The project area and vicinity do not contain any forests or woodlands suitable for this species. The nearest recorded breeding locations of the Mexican spotted owl are approximately 67 miles north of the project area in the Bradshaw Mountains and approximately 68 miles northeast of the project area in the Mazatzal Mountains (AGFD 2012).	No impact.
Razorback sucker (*Xyrauchen texanus*)	E SGCN: Tier 1a	Found in backwaters, flooded bottomlands, pools, side channels, and other slower-moving habitats at elevations below 6,000 feet amsl. In Arizona, populations are restricted to Lakes Mohave and Mead and the lower Colorado River below Havasu in the Lower Basin. In the Upper Basin, small, remnant populations are found in the Green, Yampa, and main stem Colorado rivers. In addition, several introduced populations exist.	Unlikely to occur. The project area and vicinity do not contain water sources suitable for this species. The nearest extant population of the desert pupfish is approximately 71 miles northeast near Horseshoe Reservoir. Also, the nearest reintroduced population is approximately 51 miles north-northwest of the project area in the vicinity of the Vulture Mountains (AGFD 2012).	No impact.

Table G-1. Federally Listed Wildlife Species Potentially Occurring in Maricopa County, Arizona (Continued)

Range or habitat information is from HDMS (2012); USFWS Arizona Ecological Services Field Office (USFWS 2012); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Roundtail chub (*Gila robusta*)	C SGCN: Tier 1b	Found in cool to warm water, mid-elevation streams and rivers with pools adjacent to swifter riffles and runs. Occurs at elevations between 1,210 to 7,220 feet amsl in two tributaries of the Little Colorado River, several tributaries of the Bill Williams River basin, the Salt River and four of its tributaries, the Verde River and five of its tributaries, Aravaipa Creek, and Eagle Creek.	Unlikely to occur. The project area and vicinity do not contain water sources suitable for this species. The nearest historical (1929) recorded location of the roundtail chub is approximately 19 miles west of the project area in the Gila River, whereas the nearest non-historical (2003) recorded location is within approximately 31 miles east of the project area in the Arizona Canal (AGFD 2012).	No impact.
Sonoran pronghorn (*Antilocapra americana sonoriensis*)	E/NEP SGCN: Tier 1a	Found in Sonoran Desertscrub within broad, intermountain alluvial valleys with creosote-bursage and palo verde–mixed cacti associations at elevations between 2,000 and 4,000 feet amsl. The only extant U.S. population is in southwestern Arizona. In 2011, the USFWS announced a plan to reintroduce this species into several new areas to create a Nonessential Experimental Population (NEP) beginning in the winter of 2012 and extending through 2020. The reestablishment areas chosen are Area A: Kofa NWR and Area D: near Hat Mountain in the Midway Well area.	Unlikely to occur. The project area and vicinity contain vegetation communities similar to ones in which this species is known to occur; however, the project area is outside the currently known geographic range of this species. The current population of this species does not extend north of Interstate 8 (personal communication, E. Fernandez, USFWS 2007). The nearest recorded location of the Sonoran pronghorn is approximately 52 miles southwest of the project area Cabeza Prieta Mountains (AGFD 2012). However, the project area is located within the newly established 10(j) area and potential reintroductions could occur in future years once the roadway is built but the individuals would be in captive pens and once released in either Area A or D, the USFWS does not expect the species to cross Highway 85 or Interstate 8 because roadways are consider barriers to the species.	No impact.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E MBTA SGCN: Tier 1a	Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder, saltcedar, Russian olive, buttonbush, and arrowweed are present. Nests are found in thickets of trees and shrubs, primarily those that are 13 to 23 feet tall, among dense, homogeneous foliage. Habitat occurs at elevations below 8,500 feet amsl.	Unlikely to occur. The project area and vicinity do not contain water sources that support the dense riparian vegetation community necessary for this species. The nearest recorded breeding season locations of the southwestern willow flycatcher to the project area are approximately 12 miles north-northeast of the project area near the Buckeye Valley and approximately 19 miles west of the project area in the Buckeye Hills (AGFD 2012).	No impact.

Table G-1. Federally Listed Wildlife Species Potentially Occurring in Maricopa County, Arizona (Continued)

Range or habitat information is from HDMS (2012); USFWS Arizona Ecological Services Field Office (USFWS 2012); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Sprague's pipit (*Anthus spragueii*)	C BS SGCN: Tier 1b	Winters mainly in San Rafael, Sonoita, and Sulphur Springs grasslands in southeastern Arizona. A few individuals have also been found wintering in grassy (sometimes mixed with alfalfa) fields along the lower Colorado River from north of Yuma to Parker and grass and alfalfa fields near Phoenix and Sierra Vista. Arrives on wintering grounds by mid-October and is usually gone by early April.	Unlikely to occur. The project area does not contain grassland habitat to support this species. The nearest recorded wintering location of the Sprague's pipit is approximately 140 miles southeast of the project area (AGFD 2012).	No impact.
Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*)	C BS SGCN: Tier 1b	A small, banded snake found in the low deserts of Maricopa, Pinal, and Pima counties, Arizona. Currently four subspecies are recognized; however, there is uncertainty regarding the genetics of the species. They typically exhibit nocturnal or crepuscular activity and prefer to burrow in the sand while foraging and for shelter. They are found in arid deserts areas with sandy washes, dunes, and rocky hillsides. This species prefers floodplain areas with scattered mesquite-creosote bush at elevations between 0 and 4,700 feet amsl.	May occur. The project area is located within the intergrade zone between two of the subspecies; thus, the Tucson shovel-nosed snake or an intergrade form may occur within the project area. Mesquite-creosote bush vegetation and sandy areas are present in the project area (mostly along Waterman Wash and its tributaries, such as West Prong, near the southern portions of the project area) providing suitable habitat for this species. The nearest recorded location of the Tucson shovel-nosed snake is approximately 20 miles southwest of the project area in the Sand Tank Mountains; whereas the nearest recorded location of the Western shovel-nosed snake (*Chionactis occipitalis*), i.e., the full species, is within approximately one mile of the project area (AGFD 2012).	The project would remove habitat for the Tucson shovel-nosed snake, which would result in a site-specific, major, long-term impact. In addition, the project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to Tucson shovel-nosed snake movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to Tucson shovel-nosed snake movement patterns for the 4- and 6-lane roadway of all alternatives.
Woundfin (*Plagopterus argentissimus*)	E SGCN: Tier 1a	Found in shallow, warm, turbid, fast-flowing rivers at elevations below 4,500 feet amsl. Extirpated from almost all of its historical range except the main stem Virgin River from Pah Tempe Springs to Lake Mead in northwestern Arizona. In Arizona, Critical Habitat accounts for approximately 31.6 miles of the main stem Virgin River and its 100-year floodplain in Mohave County, Arizona. Experimental, nonessential designation in portions of the Verde, Gila, San Francisco, and Hassayampa rivers and Tonto Creek.	Unlikely to occur. The project area and vicinity do not contain water sources suitable for this species. The nearest recorded location of the woundfin is an experimental population that is approximately 75 miles northwest of the project area; whereas, the nearest extant population of this species is approximately 262 miles north-northwest of the project area in the Virgin River.	No impact.

Table G-1. Federally Listed Wildlife Species Potentially Occurring in Maricopa County, Arizona (Continued)

Range or habitat information is from HDMS (2012); USFWS Arizona Ecological Services Field Office (USFWS 2012); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Yellow-billed cuckoo (*Coccyzus americanus*)	C MBTA BS SGCN: Tier 1a	Typically found in riparian woodland vegetation (cottonwood, willow, or saltcedar) at elevations below 6,600 feet amsl. Dense understory foliage appears to be an important factor in nest site selection. The highest concentrations in Arizona are along the Agua Fria, San Pedro, upper Santa Cruz, and Verde river drainages and Cienega and Sonoita creeks.	Unlikely to occur. The project area and vicinity do not contain water sources that support the dense riparian vegetation community necessary for this species. The nearest recorded breeding season location of the yellow-billed cuckoo to the project area is approximately 11 miles northwest of the project area in the Buckeye Valley (AGFD 2012).	No impact.
Yuma clapper rail (*Rallus longirostris yumanensis*)	E MBTA SGCN: Tier 1a	In Arizona, found in freshwater marshes that are often dominated by cattails, bulrushes, and sedges at elevations below 4,500 feet amsl. The range includes the Colorado River from Lake Mead to Mexico; the Gila and Salt rivers upstream to the area of the Verde confluence; Picacho Reservoir; and the Tonto Creek arm of Roosevelt Lake. This species may be expanding into other suitable marsh habitats in western and central Arizona.	Unlikely to occur. The project area and vicinity do not contain water sources that support the marsh vegetation community necessary for this species. The nearest recorded breeding season location of the Yuma clapper rail to the project area is approximately 11 miles northwest of the project area in the Buckeye Valley (AGFD 2012).	No impact.

*USFWS Status Definitions

BGEPA = Bald and Golden Eagle Protection Act. The BGEPA protects against take including nests, eggs, and any part of bald and golden eagles.

C = Candidate. Candidate species are those for which USFWS has sufficient information on biological vulnerability and threats to support proposals to list as endangered or threatened under the ESA. However, proposed rules have not yet been issued because they are precluded by other listing activity that is a higher priority. This listing category has no legal protection.

E = Endangered. The ESA specifically prohibits the take of a species listed as endangered. Take is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

MBTA = Migratory Bird Treaty Act. The MBTA protects nests, eggs, and parts of migratory birds.

NEP = Nonessential Experimental Population

T = Threatened. The ESA specifically prohibits the take of a species listed as threatened. Take is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

BS = BLM Sensitive. A species proven to be imperiled in at least part of its range and documented or considered likely to occur on BLM lands.

SGCN: Tier 1a, 1b, or c = Species of Greatest Conservation Need. An AGFD status listing defined as wildlife of conservation priority—described nationally as Wildlife of Greatest Conservation Need, with a tiered listing regarding the species level of vulnerability and the AGFD's priority level for management where "a" is the highest vulnerability ranking.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Allen's (Mexican) big-eared bat (*Idionycteris phyllotis*)	BS	Coniferous woodlands of Mexico north to Arizona and New Mexico from 1,320 to 9,800 feet, as well as arid, non-forested habitats. Day roosts may include rock shelters, caves, trees and mines. Their main food source is small moths gleaned from surfaces or in flight.	Unlikely to occur. The project area lacks foraging habitat and rocky outcrops for roosting. In addition, the project area is not located within the current geographic range of this species. The nearest recorded location of the Allen's lappet-browed bat is approximately 90 miles northeast of the project area in the Sierra Ancha Mountains (AGFD 2012).	No impact.
American kestrel (*Falco sparverius*)	R MBTA	Found over a wide range of habitats in North America and nests in cavities. Frequent use of Sonoran Desertscrub where saguaros and legume trees are present.	Unlikely to occur. Although the project area does contain a few saguaros and trees, the lack of suitable cavities would likely preclude this species from using the project area. The nearest recorded location of the American kestrel is approximately 12 miles north of the project area (AGFD 2012).	No impact.
American Peregrine falcon (*Falco peregrinus*)	BS BCC MBTA SGCN: Tier 1b	Inhabits areas where sufficient prey is found near cliffs. Optimum habitat is generally considered to be steep, sheer cliffs overlooking woodlands, riparian areas, or other habitats that support avian prey species in abundance. Also found breeding in less optimal habitat, either small, broken cliffs in ponderosa pine forest or large, sheer cliffs in very xeric areas. Presence of an open expanse is critical. Birds use areas from around 400 feet amsl along the lower Colorado River to 9,000 feet amsl along the Mogollon Rim.	Unlikely to occur. The project area lacks cliffs that would provide foraging perches for this species. The nearest recorded location of the Peregrine falcon is approximately 31 miles northeast of the project area near Camelback Mountain (AGFD 2012).	No impact.
Arizona myotis (*Myotis occultus*)	BS	This medium-sized, long-footed Myotis species is found at higher elevations usually near water sources in Apache,Coconino, Cochise, Gila, Greenlee, Mohave, Navajo, and Yavapai Counties; however, a few individuals have been recorded in the Mohave Desert near the Colorado River. This species prefers tree cavities and crevices as roosting sites.	Unlikely to occur. The project area is not within this species general range as it is located within lower elevational desert habitats and lacks the presence of water. The nearest recorded location of the Arizona myotis is a historic record (pre-1986), which is approximately 83 miles northeast of the project area near the Black Hills, while the nearest recent (2003) recorded location is approximately 102 miles northeast of the project area in the White Hills area (AGFD 2012).	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Bald eagle (*Haliaeetus leucocephalus* [desert population])	T MBTA BGEPA SGCN: Tier 1a	Nesting sites are usually isolated, located high in trees or on cliffs that are close to water. A small, resident population of approximately 40 pairs nests along the Salt, Verde, Gila, Bill Williams, Agua Fria, San Pedro, and San Francisco rivers and along Tonto and Canyon creeks. At least 200 to 300 winter each year throughout Arizona, with the greatest numbers found along the Mogollon Rim east through the White Mountains.	Unlikely to occur. The project area and vicinity do not contain water sources or perching structures suitable for this species. The nearest recorded breeding location of the bald eagle to the project area is approximately 14 miles north-northeast of the project area along the Salt River (AGFD 2012).	No impact.
Black-chinned sparrow (*Spizella atrogularis)*	BCC MBTA	Found in Arizona at mid-level elevations, preferring chaparral habitat. Also use pinyon-juniper habitats and oak woodlands. Nests usually in shrubs near dry washes.	Unlikely to occur. The project area is below the typical elevational range of this species and lacks suitable woodland or chaparral habitat. The nearest recorded location of the black-chinned sparrow is approximately 60 miles north of the project area (AGFD 2012).	No impact.
Black vulture (*Coragyps atratus*)	R MBTA	Found in a wide variety of habitats throughout its expansive range, but in Arizona, mostly found in Sonoran Desertscrub where numerous saguaros and large trees are present. Nests in secluded rocky outcrops or caves.	Unlikely to occur. Suitable rocky outcrop or cave nesting habitat is not present. The nearest recorded location of the black vulture is approximately 81 miles southwest of the project area in the Organ Pipe National Monument (AGFD 2012).	No impact.
Bell's vireo (*Vireo bellii*)	BCC MBTA	Bell's vireo inhabits lowland riparian areas with willows, mesquite, and seepwillows. The vireo prefers nesting in areas with dense, low, shrubby vegetation near riparian areas. This species can be found in central, southeastern, and southwestern Arizona, mostly along the Colorado River corridor and winter south of the U.S.-Mexico border.	May occur. Marginally suitable nesting habitat is located near the xeroriparian washes within the project area, especially along Waterman Wash; however, in Arizona, this species prefers to nest in riparian areas rather than xeroriparian habitats.	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to Bell's vireo nesting habitat.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*)	BS BCC MBTA SGCN: Tier 1a	Has occurred in streamside cottonwoods and willows and adjacent mesquite bosques, usually with saguaros on nearby slopes in Arizona. Less often, it has been found along dry washes where large mesquite, paloverde, ironwood, and saguaro thrive. Found at elevations between 1,300 and 4,000 feet.	Unlikely to occur. Streamside cottonwoods, willows, and mesquite bosques are not present in the project area. Although the project area is located near one large wash (Waterman Wash) with large mesquites and paloverdes, the project area is not within the current geographic range of this species. The nearest historical (1971) recorded location of the cactus ferruginous pygmy-owl is approximately 46 miles northeast of the project area along the Verde River, whereas the nearest recent (1999 and 2001, respectively) recorded location are approximately 67 miles southeast of the project area near Durham Hills and 67 miles southwest of the project area near Gunsight Hills (AGFD 2012).	No impact.
California leaf-nosed bat (*Macrotus californicus*)	BS SGCN: Tier 1b	Mostly found in Sonoran Desertscrub. Primarily roost in mines, caves, and rock shelters. Nocturnal roosts include a variety of human-made structures, rock shelters, and mines between elevations of 160 and 3,980 feet.	May occur. Foraging and dispersal habitat suitable for this species is present within the project area. The nearest recorded location of the California leaf-nosed bat is approximately 11 miles northeast of the project area in the Estrella Mountains and the nearest recorded roost location is approximately 19 miles northwest of the project area in the White Tank Mountains (AGFD 2012).	The project would remove forging habitat for this species; thus, the project would result in a site-specific, minor, and long-term impact to California leaf-nosed bat foraging habitat.
California black rail (*Laterallus jamaicensis coturniculus*)	BS MBTA SGCN: Tier 1b	In Arizona, this species only occurs in near water bodies in extreme southwestern Arizona and is normally non-migratory. Nesting habitat includes grasses within marshy areas.	Unlikely to occur. No marsh-like nesting habitat is present within the project area. The nearest recorded location of the California black rail is approximately 112 miles northwest of the project area along the Bill Williams River (AGFD 2012).	No impact.
Cave myotis (*Myotis velifer*)	BS	Desertscrub vegetation with colonial roosts in caves, tunnels, and mine shafts and under bridges in the south half of Arizona and south to Mexico at elevations between 300 and 5,000 feet. It is estimated that this species can have a home range of up to 900 square miles.	May occur. Foraging and dispersal habitat suitable for this species is present within the project area. The nearest recorded location of the cave myotis is a roost site, which is approximately 22 miles southwest of the project area in the Sand Tank Mountains (AGFD 2012).	The project would forging habitat for this species; thus, the project would result in a site-specific, minor, and long-term impact to cave myotis foraging habitat.
Chestnut-collared longspur (*Calcarius ornatus*)	BCC MBTA	Breeds in northern North America in short-grass plains and prairies. Winters in open cultivated fields (All about Birds [AAB] 2009).	Unlikely to occur. Arizona provides only wintering habitat and not nesting habitat. The nearest recorded location of the chestnut-collared longspur is approximately 145 miles southeast of the project area (AGFD 2012).	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Common barn owl (*Tyto alba*)	R MBTA	Found in a variety of open habitats where suitable nesting and roosting site occur. Roost in structures, bridges, large trees, cavities, caves, and cutbanks.	Unlikely to occur. Although the project area does contain a few saguaros and trees, the lack of suitable cavities would likely preclude this species from using the project area. The nearest recorded location of the common barn owl is approximately 49 miles north of the project area (AGFD 2012).	No impact.
Cooper's hawk (*Accipiter cooperii*)	R MBTA	Found mainly in low- to mid-elevation riparian woodlands where large trees are present. Also occur in urban areas. Nest in large trees.	Unlikely to occur. The project area does not contain large trees for nesting.	No impact.
Costa's hummingbird (*Calypte costae*)	BCC MBTA	Nest mainly in Mohave and Sonoran desertscrub habitats where cacti and trees are present near foraging resources.	May occur. Desertscrub nesting habitat is present; however, foraging resources, including flowering plants, are minimal within the project area. The nearest recorded location of the Costa's hummingbird is approximately 15 miles north of the project area (AGFD 2012).	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to Costa's hummingbird nesting habitat.
Crissal thrasher (*Toxostoma crissale*)	BCC MBTA	Found most frequently heavily vegetated drainages near open areas. Nests in densely vegetated trees and large shrubs.	May occur. Waterman Wash and its tributaries, such as West Prong, in and near the project area provide suitable nesting habitat for this species. The nearest recorded location of the Crissal thrasher is approximately 15 miles north of the project area (AGFD 2012).	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to Crissal thrasher nesting habitat.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Crested caracara (*Polyborus plancus*)	R MBTA SGCN: Tier 1b	Found in a wide variety of habitats throughout is large range. In Arizona, Sonoran Desertscrub with abundant saguaros and trees are preferred. Nests mainly in multi-armed saguaros.	May occur. Although the project area does not contain numerous multi-armed saguaros and large trees, this species could use the xeroriparian habitat where higher densities of trees are present. The nearest recorded breeding location of the Crested caracara is approximately 43 miles southeast of the project area in the Sawtooth Mountains (AGFD 2012)..	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to crested caracara nesting habitat.
Desert bighorn sheep (*Ovis canadensis mexacana*)	G SGCN: Tier 1b	Small populations are found in the nearby mountain ranges, including the Sierra Estrella Mountains and the Maricopa Mountains. This subspecies ranges from Nevada and California to west Texas and south into Mexico. Prefer rocky terrain of mountains within elevational ranges of 2,500 to 8,000 feet amsl.	May occur. Although the project area does not contain rugged mountain habitat, it is possible that this species could pass through the project area during movement events between suitable habitat areas in the nearby mountain ranges. The nearest known populations of desert bighorn sheep are in the Sierra Estrella Mountains, approximately 10 miles north of the project area, in the Maricopa Mountains (northern range), approximately 10 miles southwest, and the Buckeye Hills, approximately 10 miles to northwest of the project area. Populations of bighorn sheep in these mountain ranges have seen drastic declines in recent years. The 2009 survey data estimates the population in the Estrella and Maricopa Mountains to be approximately 16 and 24 individuals, respectively; whereas a partial survey in 2012 of the BLM portion of the Estrella Mountains estimates the population in the BLM portion of the Estrella Mountains to be approximately 17 individuals and due to 2010 translocations in the Buckeye Hills population of sheep in the Buckeye Hills is estimated to be approximately 10-20 individuals (D. Warnecke, AGFD 2013).	The project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to desert bighorn sheep movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to desert bighorn sheep movement patterns for the 4- and 6-lane roadway of all alternatives.
Desert purple martin (*Progne subis hesperia*)	BS MBTA SGCN: Tier 1c	This species is a summer resident in Sonoran Desertscrub where saguaro cavities are available for nesting.	Unlikely to occur. Although the project area does contain a few saguaros, the lack of suitable cavities would likely preclude this species from using the project area.	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Desert sucker (*Catostomus clarki*)	BS SGCN: Tier 1b	Found in rapids and flowing pools of streams and rivers primarily over bottoms of gravel-rubble with sandy silt in the interstices. Adults live in pools, moving at night to swift riffles and runs to feed. Young inhabit riffles throughout the day, feeding on midge larvae. Found at elevations between 480 and 8,840 feet.	Unlikely to occur. There are no permanent rapids or flowing rivers in the project area. The nearest recorded location of the desert sucker is approximately 44 miles northeast of the project area in the Salt River (AGFD 2012).	No impact.
Elf owl (*Micrathene whitneyi*)	BCC MBTA	Found in Sonoran Desertscrub where saguaros and trees with cavities are present.	Unlikely to occur. Although the project area does contain a few saguaros and trees, the lack of suitable cavities would likely preclude this species from using the project area. The nearest recorded location of the elf owl is approximately 53 miles north of the project area (AGFD 2012).	No impact.
Ferruginous hawk (*Buteo regalis*)	BS R MBTA SGCN: Tier 1b	In Arizona, mostly found in open grassland or sagebrush habitat and occasionally use agricultural fields for foraging. Nests are usually located in juniper trees.	Unlikely to occur. Although agricultural fields are present near the project area, this species is normally found nesting in the higher elevations of Arizona. The nearest recorded location of the ferruginous hawk is approximately 112 miles northwest of the project area along Burrow Creek (AGFD 2012).	No impact.
Gambel's quail (*Callipepla gambelii*)	G MBTA	Found in river valleys and brushy washes in all three southwestern deserts. Nest normally on the ground under shrubs or cacti.	May occur. This species is likely to use the xeroriparian habitat along Waterman Wash and its tributaries, including West Prong. The nearest recorded location of the Gambel's quail is approximately 12 miles north of the project area (AGFD 2012). Populations in the region are estimated to be in good condition (D. Warnecke, AGFD 2013).	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to Gambel's quail nesting habitat.
Gilded flicker (*Colaptes chrysoides*)	BS BCC MBTA	Widespread throughout Sonoran Desertscrub habitat where numerous saguaros and trees with cavities are present for nesting.	Unlikely to occur. Although the project area does contain a few saguaros and trees, the lack of suitable cavities would likely preclude this species from using the project area. The nearest recorded location of the gilded flicker is approximately 15 miles north of the project area (AGFD 2012).	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Golden eagle (*Aquila chrysatos*)	BS R MBTA BGEPA	Found in a variety of habitats in Arizona, ranging from desertscrub to pine forests where tall cliffs or canyons for foraging perches and nesting are present.	May occur. Although the project area does contain desertscrub, no cliffs or canyons are present in the project area. However, there are areas with slopes greater than 50 degrees within 10 miles of the project area (Sierra Estrella, Maricopa, and Seven Mile mountains) where this species could nest. Thus, the project area would be within their foraging range and potential forage in the project area. The nearest recorded location of the golden eagle is approximately 52 miles north of the project area in the Wickenburg Mountains (AGFD 2012).	The project would remove forging habitat for this species; thus, the project would result in a site-specific, minor, and long-term impact to golden eagle foraging habitat.
Gray vireo (*Vireo vicinior*)	BCC MBTA	In Arizona, normally found in open areas containing juniper and slopes. Sometimes use upland areas of Sonoran Desertscrub for wintering. Nests in the higher elevations of Arizona in oak, juniper, and hackberry species.	Unlikely to occur. No suitable habitat for this species is present in the project area or vicinity. The nearest recorded location of the gray vireo is approximately 70 miles northeast of the project area (AGFD 2012).	No impact.
Great-horned owl (*Bubo virginianus*)	R MBTA	Found in a variety of open habitats where suitable nesting and roosting site occur. Utilize the nests of other birds in structures, bridges, large trees, cavities, caves, saguaros, and cutbanks.	May occur. The dense xeroriparian vegetation along Waterman Wash and West Prong may provide suitable nesting habitat for this species. The nearest recorded location of the great-horned owl is approximately 12 miles north of the project area (AGFD 2012).	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to great-horned owl nesting habitat.
Greater western mastiff bat (*Eumops perotis californicus*)	BS SGCN: Tier 1b	Lower and upper Sonoran Desertscrub near cliffs. Prefer rugged, rocky canyons with abundant crevices at elevations from 240 to 8,475 feet. Prefer crowding into tight crevices 1 foot or more deep × 2 inches or more wide. Colonies prefer deeper crevices, to 10 or more feet.	Unlikely to occur. Although foraging and roosting habitat do potentially exist in the project area, there are no rugged, rocky canyons in the project area, The nearest historical (pre-1986) recorded location of the greater western mastiff bat is approximately 31 miles north of the project area near Lake Pleasant, whereas the nearest recent (2001) recorded location is approximately 66 miles northeast of the project area near Queen Creek (AGFD 2012).	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Great Plains narrow-mouthed toad (*Gastrophryne olivacea*)	BS SGCN: Tier 1b	Within Arizona, the Great Plains narrow-mouthed toad is found in the vicinity of Santa Cruz County and Pima County, to near Casa Grande in Pinal County. Habitat for this species in Arizona consists of Madrean evergreen woodland, semi-desert grassland, and Sonoran Desertscrub communities near riparian areas at elevations ranging from sea level to around 4,100 feet amsl. Populations in Arizona are at the extreme northwestern edge of the species range, and distribution is limited throughout its range.	May occur. Sonoran Desertscrub habitat is present in the project area. The most likely area that this species would use is Waterman Wash and West Prong when water is present. The nearest recorded location of the Great Plains narrow-mouthed toad is approximately 9 miles southeast of the project area in the Vekol Valley (AGFD 2012).	The project would remove habitat for the Great Plains narrow-mouthed toad, which would result in a site-specific, minor, long-term impact. In addition, the project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to Great Plains narrow-mouthed toad movement patterns for the 2-lane roadway of all alternatives, and a, local, major, and long-term impact to Great Plains narrow-mouthed toad movement patterns for the 4- and 6-lane roadway of all alternatives.
Harris' hawk (*Parabuteo unicinctus*)	R MBTA	Found in a wide variety of habitats throughout its large range. In Arizona, Sonoran Desertscrub with abundant large, many-armed saguaros and trees is preferred for nesting.	Unlikely to occur. The project area lacks numerous large, multi-armed saguaros and large trees. The nearest recorded non-historical breeding locations of the Harris' hawk include three locations, which are approximately 22 miles southwest of the project area in the Sand Tank Mountains (AGFD 2012).	No impact.
Hydrobiid spring snails (*Pyrgulopsis* spp.)	BS SGCN	This group of aquatic spring snail species is restricted to permanent water sources, especially springs, throughout Arizona.	Unlikely to occur. Suitable aquatic habitat is not present in the project area. The nearest recorded location of a hydrobiid spring snail (brown Springsnail, *Pyrgulopsis sola*) is approximately 90 miles north of the project area in the vicinity of the Black Hills (AGFD 2012).	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Javelina (collared peccary) (*Pecari tajacu*)	G	Geographic range includes the Chihuahuan and Sonoran deserts of southwestern Texas, New Mexico and Arizona, southward through Central America to northern Argentina. In Arizona, occur in saguaro deserts, where they prefer mesquite habitats with an abundance of prickly pear cacti. They also occur in semi-desert canyons, cliffs, and watering holes near cacti, chaparral, and oak.	Known to occur. Sonoran Desertscrub habitat is present in the project area. Furthermore, sign of this species has been documented within the project area. The nearest recorded location of the javelina is approximately 50 miles north of the project area (AGFD 2012). Populations in the region are estimated to be low (D. Warnecke, AGFD 2013).	The project would remove habitat for javelina, which would result in a site-specific, minor, long-term impact. In addition, the project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to javelina movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to javelina movement patterns for the 4- and 6-lane roadway of all alternatives.
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	E SGCN: Tier 1a	See Table G-1.	See Table G-1.	No impact.
LeConte's thrasher (*Toxostoma lecontei*)	BS MBTA SGCN: Tier 1b	Found in sparsely vegetated Sonoran Desertscrub and uses thorn shrubs and trees for nesting.	May occur. Suitable nesting habitat, i.e., desertscrub, for this species is present throughout the project area.	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to LeConte's thrasher nesting habitat.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Long-eared owl (*Asio otis*)	R MBTA	Most often found in areas where groves and woodlands are present near open areas where prey is abundant but also know to inhabit deserts. Utilize the nests of other birds in structures, bridges, large trees, cavities, caves, saguaros, and cutbanks.	May occur. The dense xeroriparian vegetation along Waterman Wash or West Prong may provide suitable nesting habitat for this species. The nearest breeding season recorded location of the long-eared owl is approximately 47 miles southwest of the project area on the Barry M. Goldwater Air Force Range (AGFD 2012).	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to long-eared owl nesting habitat.
Lucy's warbler (*Vermivora luciae*)	BCC MBTA	Found most abundantly along riparian areas of desert washes where mesquite trees are abundant. Nest in trees or cavities in densely vegetated areas.	May occur. Waterman Wash and its tributaries, such as West Prong, in and adjacent to the project area provide suitable nesting habitat for this species. The nearest recorded location of the Lucy's warbler is approximately 15 miles northwest of the project area (AGFD 2012).	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to Lucy's warbler nesting habitat.
Long-fin dace (*Agosia chrysogaster*)	BS SGCN: Tier 1b	Wide-ranging, from intermittent hot low-desert streams to clear, cool brooks at higher elevations. Tend to occupy relatively small or medium-sized streams with sandy or gravelly bottoms, eddies, pools near overhanging banks, or other cover. Usually in water less than 0.6 foot deep with moderate velocities of around 1.1 feet per second. Rarely abundant in large streams or above 5,000 feet amsl. Generally found in water less than 75°F but are tolerant of high temperatures and low dissolved oxygen. During low water, they may take refuge in moist detritus and algal mats. Found at elevations generally less than 4,900 feet amsl, but have been recorded ranging to 6,700 feet amsl.	Unlikely to occur. There are no suitable aquatic habitats in the project area. The nearest recorded location of the longfin dace is approximately 44 miles north of the project area (AGFD 2009).	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Lowland burrowing treefrog (*Pternohyla fodiens*)	BS SGCN: Tier 1b	Associated with xeric environments, where it lives in burrows in low, open mesquite grasslands. Usually associated with major washes and arroyos that help form the large mesquite bosques it seems to prefer at elevations from 1,930 to 2,480 feet amsl in Arizona.	May occur. Sonoran Desertscrub habitat is present in the project area. The most likely area that this species would use would be Waterman Wash and West Prong when water is present. The nearest recorded location of the lowland burrowing treefrog are approximately 15 to 25 miles southeast of the project area in the Vekol Valley (AGFD 2012; Enderson and Bezy 2005).	The project would remove habitat for the lowland burrowing treefrog, which would result in a site-specific, minor, long-term impact. In addition, the project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to lowland burrowing treefrog movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to lowland burrowing treefrog movement patterns for the 4- and 6-lane roadway of all alternatives.
Lowland leopard frog (*Lithobates yavapaiensis*)	BS SGCN: Tier 1b	This species is generally restricted to permanent waters below elevations of 3,000 feet. It is found in small to medium streams, and occurs in small springs, stock ponds, and occasionally in large rivers. Populations typically occur in aquatic systems with surrounding desert scrub, semidesert grassland, or evergreen woodland.	Unlikely to occur. There are no suitable aquatic habitats in the project area; they could disperse through the project area during the summer monsoon period. Impacts could occur during construction and/or by vehicular traffic to any individuals potentially passing through the area. The nearest recorded location of the lowland leopard frog is approximately 18 miles west-northwest of the project area near Powers Butte (AGFD 2012).	No impact.
Merlin (*Falco columbarius*)	R MBTA	Found in northern forests and prairies and sometimes urban areas. Winters in open woodland, grasslands, open cultivated fields, marshes, estuaries, and seacoasts; uncommon winter migrant of Arizona (AAB 2009).	Unlikely to occur. Arizona provides only wintering habitat and not nesting habitat. The nearest recorded location of the merlin is approximately 12 miles north of the project area (AGFD 2012).	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Mourning dove (*Zenaida macroura*)	G MBTA	Found in a variety of vegetation communities throughout Arizona and nests in large assortment of habitats.	May occur. The project area contains habitat suitable for this species. The nearest recorded location of the mourning dove is approximately 12 miles north of the project area (AGFD 2012). Populations in the region are estimated to be in good condition (D. Warnecke, AGFD 2013).	The project would remove nesting habitat for this species. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to mourning dove nesting habitat.
Mountain lion (*Puma concolor*)	G	Geographically found throughout the U.S. and prefers vegetated ridges, rocky cliffs, and ledges and other solid covers in inland areas in the southwestern deserts and mountain range country.	May occur. Although the project area does not contain rugged mountain habitat, it is possible that this species could pass through the project area during movement events between suitable habitat areas in the nearby mountain ranges. The nearest known populations of mountain lion are in the Sierra Estrella Mountains, approximately 10 miles north of the project area, and in the Maricopa Mountains, approximately 10 miles south of the project area. Populations in GMU 39E are estimated to be at approximately 2-5 individuals (D. Warnecke, AGFD 2013).	The project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to mountain lion movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to mountain lion movement patterns for the 4- and 6-lane roadway of all alternatives.
Mule deer (*Odocoileus hemionus*)	G	Geographically found throughout the entire western United States.	May occur. Although the project area does not contain rugged mountain habitat, it is possible that this species could pass through the project area during movement events between suitable habitat areas in the nearby mountain ranges. The nearest known populations of mule deer are in the Sierra Estrella Mountains, approximately 10 miles north of the project area, and in the Maricopa Mountains, approximately 10 miles south of the project area. Populations in GMU 39E are currently considered stable and estimated to be less than 200 individuals since desert populations of mule deer typically occur at 0.5 deer per square mile (D. Warnecke, AGFD 2013).The nearest recorded location of the mule deer is approximately 52 miles north of the project area (AGFD 2012).	The project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to mule deer movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to mule deer movement patterns for the 4- and 6-lane roadway of all alternatives.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Northern harrier (*Circus cyaneus*)	R MBTA SGCN: Tier 1c	This species is a statewide winter migrant in Arizona and is an occasional ground nester in northern Arizona. Usually found in grasslands, agricultural fields, and marshes.	Unlikely to occur. The project area is not within its normal breeding range. The nearest recorded breeding location of the northern harrier is approximately 160 miles northeast of the project area near Apache Butte (AGFD 2012).	No impact.
Northern goshawk (*Accipiter gentilis*)	BS MBTA SGCN: Tier 1b	This hawk favors cool forests of tall pine, fir, and spruce, including adjacent conifer-dominated forests. This species usually nests in trees.	Unlikely to occur. Suitable tree nesting habitat is not present in the project area. The nearest recorded breeding location of the Northern goshawk is approximately 65 miles north of the project area in the Bradshaw Mountains (AGFD 2012).	No impact.
Pinyon jay (*Gymnorhinus cyanocephalus*)	BS	Found as a year around resident in pinyon pine forests and pinyn-junioer woodlands of Arizona and feeds exclusively on pinyon seeds. This species is a tree nester in pine, oak, or juniper trees.	Unlikely to occur. Suitable tree nesting habitat is not present in the project area. The nearest recorded location of the pinyon jay is approximately 15 miles northwest of the project area (AGFD 2012).	No impact.
Prairie falcon (*Falco mexicanus*)	BCC R MBTA	Found mainly in grasslands and deserts in Arizona. Favor cliff perches and open areas for foraging. Nest in rocky ledges, cliffs, and crevices.	Unlikely to occur. The project area lacks nesting sites utilized by this species. The nearest recorded location of the prairie falcon is approximately 12 miles north of the project area (AGFD 2012).	No impact.
Red-tailed hawk (*Buteo jamaicensis*)	R MBTA	Found in almost all vegetation communities of Arizona wherever open areas for foraging and suitable nesting and perching sites are available. Nest in large trees, cliffs, saguaros, and artificial structures.	Known to occur. Although this species was observed in the project area during field reconnaissance, it is unlikely to use the project area for nesting because of the lack of multi-armed saguaros and large trees within the project area. The nearest recorded location of the red-tailed hawk is approximately 12 miles north of the project area (AGFD 2012).	No impact.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E BCC MBTA SGCN: Tier 1a	See Table G-1.	See Table G-1.	No impact.
Sonoran Desert tortoise (*Gopherus agassizii* [Sonoran population])	C BS SGCN: Tier 1b	See Table G-1.	See Table G-1.	See Table G-1.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Sonora mud turtle (*Kinosternon sonoriense sonoriense*)	BS	Found in springs, creeks, ponds, streams, and waterholes with at least an intermittent water source. In Arizona, this species' range includes the Gila River drainage of central and southeast Arizona; Quitobaquito Spring in Pima County; Laguna Dam area in Yuma county; and Big Sandy-Burro River drainages in Yavapai County.	Unlikely to occur. There are no suitable aquatic habitats in the project area.	No impact.
Sonora sucker (*Catostomus insignis*)	BS SGCN: Tier 1b	The Sonora sucker is found in a variety of habitats from warm water rivers to trout streams.	Unlikely to occur. There are no suitable aquatic habitats in the project area. The nearest recorded location of the Sonora sucker is approximately 29 miles north-northeast of the project area in a canal (AGFD 2012).	No impact.
Sonoran pronghorn (*Antilocapra americana sonoriensis*)	E SGCN: Tier 1a	See Table G-1.	See Table G-1.	No impact.
Sonoran green toad (*Bufo retiformis*)	BS	Found in south-central Arizona. Inhabit rain pools, wash bottoms, and areas near water in semi-arid mesquite-grassland, creosotebush desert, and upland saguaro-paloverde desert scrub at elevations in Arizona from 500 to 3,225 feet amsl.	May occur. Creosotebush desert habitat is present in the project area providing suitable habitat for this species. The most likely area that this species would use would be near Waterman Wash and West Prong, especially when water is present. The nearest recorded location of the Sonoran green toad is approximately 2.4 miles west-southwest of the project area near the Mobile Valley (AGFD 2012). In addition, there is another recorded location approximately 3.8 miles east of the project area in the Vekol Valley (AGFD 2012).	The project would remove habitat for the Sonoran green toad, which would result in a site-specific, minor, long-term impact. In addition, the project would increase the difficulty of dispersal movements for this species through the addition of a roadway with traffic hazards and noise; thus, the project would result in a local, moderate, and long-term impact to Sonoran green toad movement patterns for the 2-lane roadway of all alternatives, and a local, major, and long-term impact to Sonoran green toad movement patterns for the 4- and 6-lane roadway of all alternatives.
Succineid snails (*Succineidae* spp.)	BS SGCN	This group of terrestrial ambersnail species is restricted to humid or moist areas near water sources throughout Arizona.	Unlikely to occur. Suitable moist or humid habitats near water sources are not present in the project area.	No impact.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Spotted bat (*Euderma maculatum*)	BS SGCN: Tier 1b	Dry, rough desertscrub, less common in ponderosa pine forest. Found from low desert in southwestern Arizona to high desert and riparian habitats in northwestern Arizona and Utah and conifer forests in northern Arizona. Might prefer to roost singly in crevices and cracks in cliff faces and cliffs. Water sources are characteristic of localities in which it occurs. Specimen localities in Arizona range between 110 and 8,670 feet amsl.	Unlikely to occur. Although this species inhabits many vegetation associations, some of which are present in the project area, there are no nearby occurrences for this species and no water sources present. The nearest historical (1940) recorded location of the spotted bat is approximately 85 miles west of the project area in the Mohawk Valley, whereas the nearest non-historical recorded location is approximately 139 miles north of the project area (AGFD 2012).	No impact.
Swainson's hawk (*Buteo swainsoni*)	R MBTA	Found in open grasslands and croplands near riparian vegetation. Nests tall shrubs or trees in northern Arizona.	Unlikely to occur. The project area is now within the nesting range and does not contain suitable nesting habitat for this species. The nearest recorded breeding location of the Swainson's hawk is approximately 24 miles north of the project area in the White Tank Mountains (AGFD 2012).	No impact.
Townsend's big-eared bat (*Corynorhinus* [=*Plecotus*] *townsendii*)	BS	In Arizona, summer day roosts include caves and mines in areas of desertscrub, oak woodland, oak-pine woodland, pinyon-juniper woodland, and coniferous forest; most records are from above 3,000 feet amsl. These bats roost in caves, lava tubes, and abandoned mines. Shelters in which the bats have been found range from the low, arid desert, to the fir zone in upper elevations. In winter, the bats hibernate in cold caves and mines in the upland and mountains from the Grand Canyon to the southeastern part of Arizona. The bat feeds near forested areas, gleaning insects off plant leaves or in flight.	May occur. Suitable foraging Sonoran Desertscrub habitat is present within the project area; however, suitable roosting sites are not present. The nearest recorded roost location of the Townsend's big-eared bat is approximately 45 miles northeast of the project area in the McDowell Mountains (AGFD 2012).	The project would remove forging habitat for this species; thus, the project would result in a site-specific, minor, and long-term impact to Townsend's big-eared bat foraging habitat.
Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*)	C BS SGCN: Tier 1b	See Table G-1.	See Table G-1.	See Table G-1.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Western burrowing owl (*Athene cunicularia hypugea*)	BS BCC MBTA SGCN: Tier 1c	Grasslands, pastures, coastal dunes, desertscrub, edges of agricultural fields, and other human areas where there is sufficient friable soil for a nesting burrow between 650 and 6,140 feet amsl.	May occur. The project area does contain the flat, open spaces considered to be suitable habitat for this species, and there are burrows and friable soil in the project area. The nearest recorded location of the western burrowing owl is less than 1 mile north of the project area, and another is approximately 4 miles northwest of the project area in the Rainbow Valley (AGFD 2012).	The project would remove nesting habitat depending on the phase and alternative. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to Western burrowing owl nesting habitat.
White-tailed deer (*Odocoileus virginianus cousei*)	G	Geographically found throughout North America from southern Canada through Central America. In desert areas, they can occur in most habitats within 10 miles of a water source.	Unlikely to occur. Although historically present within the region, this species has not been recorded recently in or near the project area. The nearest known populations of white-tailed deer are in the Sand Tank Mountains, approximately 15 miles south of the project area in GMU 40A. Populations have not been surveyed in many years within GMU 39E (D. Warnecke, AGFD 2013).The nearest recorded location of the white-tailed deer is approximately 71 miles north of the project area (AGFD 2012).	No impact.
Western screech owl (*Otus kennicottii*)	R MBTA	Found mostly in woodland areas, but also occupy upland areas of Sonoran Desertscrub. Nests in cavities, especially those of flickers.	Unlikely to occur. Although the project area does contain a few saguaros and trees, the lack of suitable cavities would likely preclude this species from using the project area. The nearest recorded location of the Western screech owl is approximately 49 miles north of the project area (AGFD 2012).	No impact.
White-winged dove (*Zenaida asiatica*)	G MBTA	Nest and inhabit a variety of vegetation communities throughout Arizona as a summer resident.	May occur. The project area contains nesting habitat suitable for this species. Populations in the region are estimated to be in good condition (D. Warnecke, AGFD 2013). The nearest recorded location of the white-winged dove is approximately 129 miles north of the project area (AGFD 2012).	The project would remove nesting habitat depending on the phase and alternative. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to white-winged dove nesting habitat.

Table G-2. Bureau of Land Management Priority Wildlife Species Potentially Occurring in the Lower Sonoran Field Office and SDNM Planning Area (Continued)

Unless otherwise noted, range or habitat information is from the following sources: HDMS (2009); *Arizona Rare Plant Field Guide* (ARPC n.d. [2002]); and Corman and Wise-Gervais (2005).

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Project Area	Impact Determination
Yellow-billed cuckoo (*Coccyzus americanus*)	C BCC MBTA SGCN: Tier 1a	See Table G-1.	See Table G-1.	No impact.
Yellow warbler (*Dendroica petechia*)	BCC MBTA	Found in riparian areas with moist areas and deciduous trees. Known to nest in xeroriparian and riparian areas of Arizona.	May occur. The Waterman Wash, West Prong, and their tributaries within the project area contain suitable nesting habitat for this species. The nearest recorded location of the Yellow warbler is approximately 13 miles north of the project area (AGFD 2012).	The project would remove nesting habitat depending on the phase and alternative. In addition, any individuals nesting within or adjacent to the project area prior to construction could incur decreased breeding success through noise and nesting habitat removal; thus, the project would result in a site-specific, minor, and long-term impact to yellow warbler nesting habitat.
Yuma clapper rail (*Rallus longirostris yumanensis*)	E MBTA SGCN: Tier 1a	See Table G-1.	See Table G-1.	No impact.

* Status Definitions:

BCC = Birds of Conservation Concern. Species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973 (USFWS 2008).

BGEPA = Bald and Golden Eagle Protection Act. The BGEPA protects against take, including nests, eggs, and any part of bald and golden eagles.

BP = BLM Priority. Animal and plant species listed in the LSFO and SDNM RMP as inhabiting the Planning Area.

C = Candidate. Candidate species are those for which USFWS has sufficient information on biological vulnerability and threats to support proposals to list as endangered or threatened under the ESA. However, proposed rules have not yet been issued because they are precluded by other listing activity that is a higher priority. This listing category has no legal protection.

E = Species listed as endangered under the ESA.

G = Game Species as managed by AGFD and BLM.

HS = Highly Safeguarded. Plant species as protected by the ADA's ANPL.

MBTA = Migratory bird species protected by the MBTA.

R = Raptor Species as protected under the MBTA.

BS = BLM Sensitive. A species proven to be imperiled in at least part of its range and documented or considered likely to occur on BLM lands.

SR = Salvage Restricted. Plant species as protected by the ADA's ANPL.

SGCN: Tier 1a, 1b, or c = Species of Greatest Conservation Need. An AGFD status listing defined as wildlife of conservation priority—described nationally as Wildlife of Greatest Conservation Need, with a tiered listing regarding the species level of vulnerability and the AGFD's priority level for management where "a" is the highest vulnerability ranking.

Appendix H

SVPP CUMULATIVE ACTIONS

SVPP CUMULATIVE IMPACTS (CHAPTER 4)

CEQ regulations implementing NEPA define *cumulative impacts* as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions (RFA) regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

BLM's NEPA Handbook states that the purpose of the cumulative effects analysis is to ensure that the decision makers consider the full range of the consequences of the Proposed Action, alternatives to the Proposed Action, and No Action Alternative (BLM 2008a). Assessing the cumulative effects of the actions begins early in the NEPA process, during the identification of issues.

See each resource's individual section in Chapter 4 for a description of the resource cumulative effects analysis area and rationale for that selection. In addition to the geographic scope of the analysis, a time frame for the analysis must also be established. For this cumulative effects analysis, the temporal scope is the life of the BLM ROW grant for construction and operation of the two-lane Sonoran Valley Parkway, which is 30 years.

LIST OF PROJECTS

The following are a list of actions to consider when analyzing the incremental impact of the SVPP when added to other past, present, and reasonably foreseeable actions in Chapter 4.

Past/Present Actions

- Historic trails (Mormon Battalion Trail/Butterfield Overland Stage Route and the Juan Bautista de Anza NHT corridor); south end of the project area;
- Agricultural activities (particularly on ASLD lands in the study area);
- Recreational use (OHV, hiking, hunting) in area;
- Butterfield Station Landfill, south end of project area;
- SR 238, south end of project area;
- EPNG pipeline and associated access road, parallel to Komatke Road;
- Transwestern Gas pipeline and associated access road, parallel to Komatke Road;
- El Paso Transmission Line (Salt River Project 500 kV) and associated access road, parallel to Komatke Road;
- Arizona Desert Wilderness Act of 1990;
- SDNM, parallel to Komatke Road
- Roads in the SDNM that are currently closed, parallel to Komatke Road;
- MAG Hidden Valley Transportation Framework Study, BLM linear ROW;
- City of Goodyear annexation of BLM lands;
- FCDMC's Rainbow Valley plan of the Metro Phoenix Area Drainage Master Plan (ADMP);

- Sonoran Solar Energy Project (4 miles west of the north end of the action alternatives);
- PM_{10} nonattainment for Maricopa County, entire project area; and
- Buckeye Parks, Trails and Open Space Master Plan, north area of project area.

Future Actions

- Future residential development in the study area (i.e., southern Goodyear, Mobile area, city of Maricopa, etc.);
- Loop 303 alignment; TBD (conceptual alignment only); studies began in 2009;
- Interstate 11 (Hassayampa Freeway); TBD (conceptual alignment only); planning began in 2012;
- Potential for roads in the SDNM to reopen;
- Marisol Solar Park;
- Sonoran Desert Protection Proposal (wildlife corridor protection/conservation); and
- BLM Programmatic Weed Environmental Assessment; Waterman Wash.

GUIDANCE

BLM's NEPA Handbook states that the purpose of the cumulative effects analysis is to ensure that the decision makers consider the full range of the consequences of the Proposed Action, alternatives to the Proposed Actions, and No Action Alternative (BLM 2008).

Assessing the cumulative effects of the actions begins early in the NEPA process, during the identification of issues. During the scoping process for the SVPP EIS, the public and agency personnel identified issues relating to cumulative effects for consideration and analysis in the EIS. These are listed by resource below, for consideration in the analysis:

Transportation/Access: Commenter indicated that the primary purpose of the roadway would be to provide transportation to and from the newly annexed portions of the city of Goodyear that currently have limited access. Preliminary issues related to transportation will include roadway alignments, existing and future traffic demands, and cumulative impacts to surrounding communities and public lands.

Wildlife/Connectivity: Consider the cumulative impact to wildlife habitat, in particular habitat connectivity, of adding another linear facility that may further fragment wildlife habitat.

Appendix I

VISUAL CONTRAST RATING SHEETS

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of field work)	**February 2013**
District	**Phoenix**
Resource Area	**Lower Sonoran**
Activity (program)	**ROW**

SECTION A. PROJECT INFORMATION

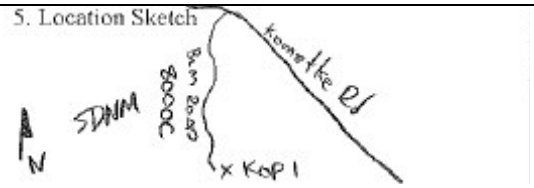
1. Project Name
Sonoran Valley Parkway Project EIS

2. Key Observation Point
SDNM/North Maricopa Mountains Wilderness

3. VRM Class
VRM I, II

4. Location
UTM – 12 S 0361798
3669284

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Rocky outcroppings; flat foreground	Ranges from soft to coarse and spotty (not consistently homogenous throughout)	Fencing spaced, equidistant around perimeter of grazing lands
LINE	Horizontal, linear, some flowing curves	Patchy, mottled. Higher density and defined lines along washes.	Horizontal, very infrequent
COLOR	Earthtones ranging in rust, browns, and tans,	Seasonal variations of bright greens to rust, tans and browns	Rust colored
TEX-TURE	Coarse, irregular	Patchy, clusters of coarse vegetation	Linear; low profile poles

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Linear, at-grade to 15-feet above grade corridor through landscape	Complete removal within portion of ROW that is paved or disturbed.	Linear; paved; road corridor
LINE	Linear; with curves;	Bare (no vegetation) band through landscape	Linear, flat, non-reflective asphalt surface
COLOR	Paved surface/grey/black;	Exposed soil (on shoulder – or unpaved portion).	Asphalt (black; grey) ribbon through landscape
TEX-TURE	Smooth, curvilinear band through landscape	Bare, flat	Smooth, linear

SECTION D. CONTRAST RATING ___ SHORT TERM _X_ LONG TERM

1. **DEGREE OF CONTRAST**

ELEMENT	FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form		X					X			X		
Line		X				X				X		
Color			X				X				X	
Texture			X			X					X	

2. Does project design meet visual resource management objectives? _x_ Yes __ No (Explain on reverse side)

3. Additional mitigating measures recommended?
__x Yes __ No (Explain on reverse side)

Evaluators Name(s) Date

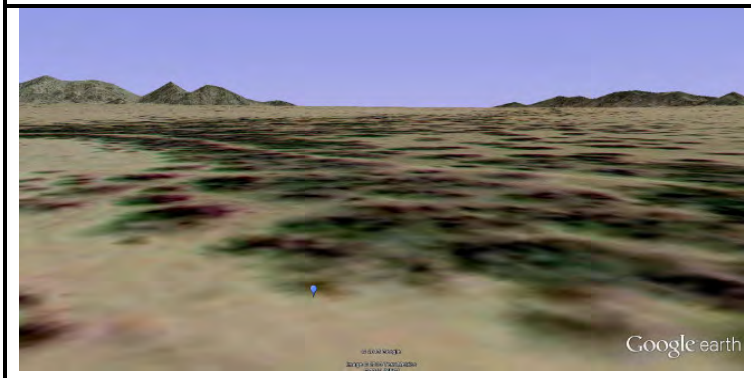
Ryan Rausch, Pamela Cecere
SWCA Environmental Consultants

August 2009; February 2013

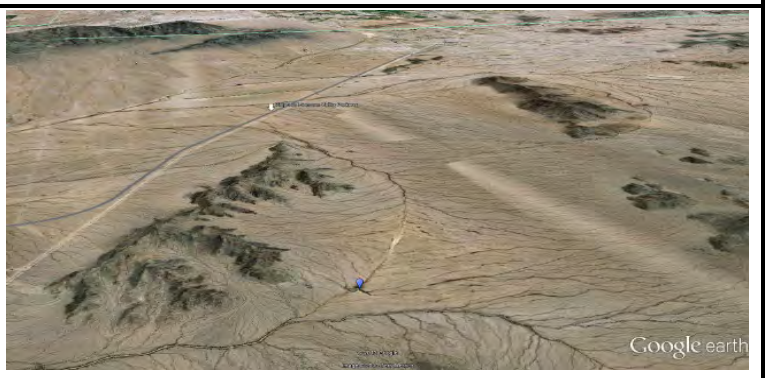
SECTION D. (Continued)

Project design meets VRM objectives for the lands upon which it is located (designed by LS RMP as VRM Class IV). Introduction of parkway would be evident from this KOP

Inclusion of BLM Best Management Practices for minimizing impacts to visual resources in keeping with VRM designations should be employed. Design of the roadway should include using BLM color palate for built features such as reflective surfaces of signage, and guardrails. Revegetation plan should also be included in the decision and be in keeping with both BLM and Arizona Parkway standards, and the design of the parkway.



SDNM KOP 1 from a typical observer height oriented to southeast toward the proposed parkway reveals that the road corridor would blend into the landscape at distances of beyond 4 miles (or within the SDNM)



This bird's eye view of KOP 1 from within the SDNM with views to the southeast reveal topographic obstruction blocking a large swath of potential views of the parkway from within the SDNM.

Typical views from within the SDNM reveal flat, vegetated foreground, with rocky outcroppings in the middleground. Vegetation color and density is somewhat dependent upon season and precipitation levels. Some human-made structures such as cattle fencing are evident within the landscape.

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Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of field work) **February 2013**
District **Phoenix**
Resource Area **Lower Sonoran**
Activity (program) **ROW**

SECTION A. PROJECT INFORMATION

1. Project Name
Sonoran Valley Parkway Project EIS

2. Key Observation Point
House/Residence KOP 2

3. VRM Class
VRM IV/Private

4. Location
UTM - **12 S 0370406**
3676618

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, open distant views of rocky outcroppings	Flat, patchy, mottled. Disturbed from natural state.	Lines associated with former and active agriculture, and rural residential
LINE	Edges of roads and agricultural fields are evident	Very patchy, irregular and discordant	Angular
COLOR	Exceedingly earthy and browns associated with exposed soil. No water present.	Seasonal color variation; agricultural fields are deep greens and homogenous, while natural vegetation is irregular and varied shades of greens, rusts, and browns.	Very distinguishable whites, browns, greys, and blacks associated with a variety rural residential development (e.g., homes, roads, overhead powerlines, two-tracks, etc).
TEX-TURE	Rough, irregular, random.	Homogenous within agricultural areas; otherwise extremely patchy and irregular.	Low density residential, with large swaths of open space between built features.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Band of roadway within a relatively undeveloped, and sporadic landscape.	Removal of vegetation would be evident with introduction of road feature.	Linear, band traversing the landscape.
LINE	Relatively straight, linear band within landscape	Bold and noticeable removal of vegetation where road band would be located.	Linear, continuous band through open landscape where similar features do not exist.
COLOR	Paved surface/grey/black	Exposed soil (on shoulder – or unpaved portion)	Asphalt (black; grey) ribbon through landscape
TEX-TURE	Smooth, curvilinear band through landscape	Bare, flat	Smooth, linear

SECTION D. CONTRAST RATING ___ SHORT TERM _X_ LONG TERM

1. **DEGREE OF CONTRAST**

2. Does project design meet visual resource management objectives? _x_ Yes __ No (Explain on reverse side)

3. Additional mitigating measures recommended? _x_ Yes __ No (Explain on reverse side)

ELEMENT	FEATURES: LAND/WATER BODY (1)				VE GETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form			X				X				X	
Line			X				X			X		
Color			X				X				X	
Texture			X				X				X	

Evaluators Name(s) Date

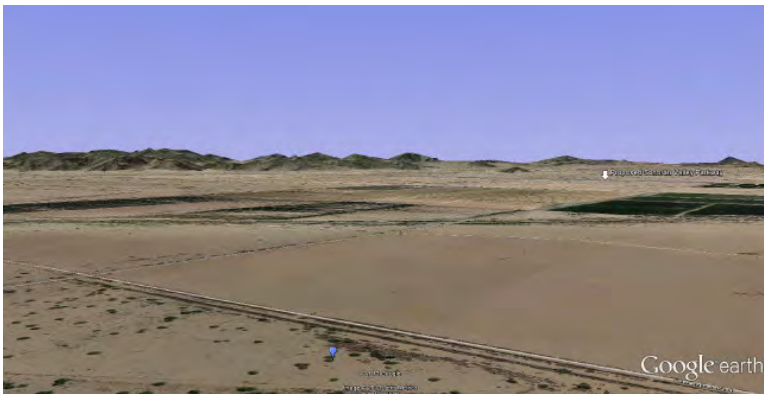
Ryan Rausch, Pamela Cecere
SWCA Environmental Consultants

August 2009; February 2013

SECTION D. (Continued)

Project design meets VRM objectives for the lands upon which it is located (designed by LS RMP as VRM Class IV). Introduction of parkway would be evident from this KOP

Inclusion of BLM Best Management Practices for minimizing impacts to visual resources in keeping with VRM designations should be employed. Design of the roadway should include using BLM color palate for built features such as reflective surfaces of signage, and guardrails. Revegetation plan should also be included in the decision and be in keeping with both BLM and Arizona Parkway standards, and the design of the parkway.



This bird's eye view from KOP 2 (or a typical residence) indicates a long-distance, and partial views of the proposed parkway due to both natural and human-made obstructions. This view ranges from 2.5 (from Alternative C) to 4.5 miles (Alternative A) away.

Typical views from KOP 2 include a combination of vacant, disturbed lands, and active agricultural fields with background views of moderate to high relief rocky outcrops. Foreground and middleground views are largely flat, with widely varying color contrasts due to the presence (or absence) of vegetation.

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Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of field work) **February 2013**
District **Phoenix**
Resource Area **Lower Sonoran**
Activity (program) **ROW**

SECTION A. PROJECT INFORMATION

1. Project Name
Sonoran Valley Parkway Project EIS

2. Key Observation Point
Sierra Estrella Wilderness, Quartz Peak KOP 3

3. VRM Class
VRM III, IV/Private

4. Location
UTM – 12 S 0385388
3677296

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, open, panoramic views of desert valley landscape; with distant sporadic views of rocky outcroppings	Flat, patchy, mottled, and appearing somewhat homogenous, or regular at long-distance views	Some lines associated with active agriculture and existing rural residential development is evident.
LINE	Edges of existing roads, agricultural field and some rocky outcroppings. Also, horizon line is very evident from superior views atop mountains.	Seasonal density variation is evident (due predominantly to rainfall). Lines of denser vegetation is evident along washes.	Existing roads and linear corridors such as utility lines are most evident as bands within the landscape, other structures are peppered throughout the landscape randomly.
COLOR	Earthtones dominate and range from greens, to tans and browns.	Seasonal color variation due to precipitation and density of vegetation is evident and ranges from deep greens to browns and tans.	Bands of roads with faded greys and blacks (asphalt paved) and unpaved roads with lines of browns and desert soil color are most evident.
TEX-TURE	Somewhat irregular, with harmony in texture occurring at distances beyond 5 miles.	Somewhat patchy and irregular becoming more fine and soft at long distances.	Irregular and less evident at long distances.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Band of roadway (within background distance zone) as a linear development within a relatively undeveloped, open landscape.	Removal of vegetation becomes quite evident with superior views of parkway.	Linear band traversing the landscape, with nearly a complete view of the parkway.
LINE	Relatively straight, linear band within the landscape	Noticeable where vegetation is removed and replaced with paved roadway.	Linear, continuous band through open landscape, where no similar features exist.
COLOR	Paved surface/grey/black	Exposed soil/pavement, within natural landscape. Removal of vegetation is evident.	Asphalt (black/grey) ribbon through landscape.
TEX-TURE	Smooth, curvilinear, ribbon/band through landscape.	Bare, flat.	Smooth, linear.

SECTION D. CONTRAST RATING ___ SHORT TERM _X_ LONG TERM

1. **DEGREE OF CONTRAST**

2. Does project design meet visual resource management objectives? _x__ Yes __ No (Explain on reverse side)

3. Additional mitigating measures recommended? _x__ Yes __ No (Explain on reverse side)

ELEME	FEATURES: LAND/WATER BODY (1)				VE GETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form			X				X				X	
Line		X				X					X	
Color			X				X				X	

Evaluators Name(s) Date

Ryan Rausch, Pamela Cecere
SWCA Environmental Consultants

August 2009; February 2013

	Texture			x				x				x		

SECTION D. (Continued)

Project design meets VRM objectives for the lands upon which it is located (designed by LS RMP as VRM Class IV). Introduction of parkway would be evident from this KOP

Inclusion of BLM Best Management Practices for minimizing impacts to visual resources in keeping with VRM designations should be employed. Design of the roadway should include using BLM color palate for built features such as reflective surfaces of signage, and guardrails. Revegetation plan should also be included in the decision and be in keeping with both BLM and Arizona Parkway standards, and the design of the parkway.

This view from atop the Sierra Estrella mountains reveals a superior (or looking down upon) vista. Due to the relatively flat nature of the landscape from this viewpoint, views of the proposed parkway would be nearly complete (e.g., the entire length of the road being visible) with a range of 6 to 10 miles away.

From KOP 3, panoramic vistas of the Rainbow Valley are evident. The proposed parkway would be in the background distance zones but due to lack of topography, and other obstructions, the parkway itself would be evident. In addition, the movement of cars would also make the linear roadway band more obvious to viewers.

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Form 8400-4
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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of field work) **February 2013**

District **Phoenix**

Resource Area **Lower Sonoran**

Activity (program) **ROW**

SECTION A. PROJECT INFORMATION

1. Project Name
Sonoran Valley Parkway Project EIS

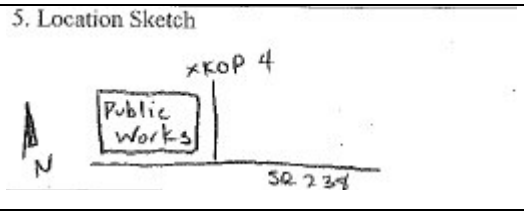
2. Key Observation Point
Town of Mobile KOP 4

3. VRM Class
VRM IV; Private

4. Location

UTM – 12 S 0381330
3658061

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Diverse landforms, mountainous in background, flat and open within foreground and middleground; no water features	Dense along washes, sporatic or non-existent within foreground, middleground	Rural development, including roads (paved and unpaved), power lines, landfill, and community facilities.
LINE	Naturally occurring lines are rare to non-existent	Dense along washes, and an evident band of high desert foliage within the middleground.	Human-made bands from roads, and transmission lines are readily apparent throughout
COLOR	Earthtones ranging from rust to browns, and light tans of exposed desert soil.	Minimal variation in color, as low-lying vegetation is relatively consistent with some color variation occurring seasonally.	Colors associated with rural residential development, including exposed soil/tans of unpaved roads dominate the foreground.
TEX-TURE	Coarse, somewhat irregular, unharmonious due to development	Very dichotomized due to varied levels of development and disturbance to natural vegetation.	Ranges from large, high mounds (landfill), to rural residential and community development to flat open expanses.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Linear, slightly elevated band within all distance zones	Complete removal of vegetation within area of ROW that is disturbed.	Linear, paved, road corridor evident within all distance zones
LINE	Linear, mostly straight	Bare, sporadic	Linear, flat, paved, within rural residential/existing development.
COLOR	Paved, non-reflective flat, black/grey surface	Exposed soil, sporadic vegetation	Asphalt (black, grey) ribbon through landscape.
TEX-TURE	Smooth, curvilinear band	Bare, flat	Smooth, linear.

SECTION D. CONTRAST RATING ___ SHORT TERM _X_ LONG TERM

1. **DEGREE OF CONTRAST**

2. Does project design meet visual resource management objectives? _x_ Yes __ No (Explain on reverse side)

3. Additional mitigating measures recommended? _x_ Yes __ No (Explain on reverse side)

ELEMENT	FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form		X					X		X			
Line	X						X		X			
Color			X				X		X			
Texture			X				X		X			

Evaluators Name(s) Date

Ryan Rausch, Pamela Cecere
SWCA Environmental Consultants

August 2009; February 2013

SECTION D. (Continued)

Project design meets VRM objectives for the lands upon which it is located (designed by LS RMP as VRM Class IV). Introduction of parkway would be evident from this KOP

Inclusion of BLM Best Management Practices for minimizing impacts to visual resources in keeping with VRM designations should be employed. Design of the roadway should include using BLM color palate for built features such as reflective surfaces of signage, and guardrails. Revegetation plan should also be included in the decision and be in keeping with both BLM and Arizona Parkway standards, and the design of the parkway.

This bird's eye view from KOP 4 within the Town of Mobile reveals views to the northwest of the entire length of the proposed parkway (Alternative A is shown here, also Sub-Alternatives G and F would be very evident from this viewpoint.

Views from the town of Mobile due west reveal direct, but partially obstructed views of the parkway.

A variety of mountain heights are located within the background distance zones (beyond where the proposed parkway would be located). The proposed parkway would be evident within foreground, middleground, and background distance zones as its termination point is located less than .5 miles from the Town of Mobile.

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Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of field work) **February 2013**

District **Phoenix**

Resource Area **Lower Sonoran**

Activity (program) **ROW**

SECTION A. PROJECT INFORMATION

1. Project Name
Sonoran Valley Parkway Project EIS

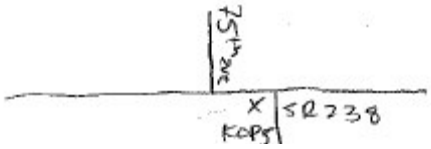
2. Key Observation Point
De Anza Trail KOP 5

3. VRM Class
VRM IV; Private

4. Location

UTM – 12 S 0384307
3658974

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Diverse landforms, mountains evident in the background, flat and open landscape within the foreground and middleground. No evidence of water features.	Sporadic and extremely patchy vegetation in foreground and middlground.	Some rural development, such as existing roads and power lines are evident in middleground and background.
LINE	Naturally occurring lines associated with mountainous backdrop that forms the horizon line is most evident. Otherwise, landscape is flat and open	Dense along washes, evidence of high desert foliage is apparent within middleground.	Lack of human-made structures largely characterizes the area, however, some roads and power lines form lines within the landscape.
COLOR	Landscape is dominated by earthtones ranging from browns, to greens, and exposed desert soil hues, with grey/dark backdrop created by mountains.	Minimal variation in color, as low-lying vegetation is relatively consistent, with some color variation occurring as vegetative densities increase.	Landscape is dominated by browns and tans, some rural residential development includes industrial hues of black and grey associated with roads and powerlines.
TEX-TURE	Coarse, somewhat irregular, unharmonious	Varying density of vegetation creates a texturized, rough, unharmonious pattern in the landscape.	Largely associated with linear development (e.g., roads, power lines), and point development (e.g., residences, and buildings).

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Linear, slightly elevated band within the middle and background distance zones.	Removal of vegetation from development of proposed parkway would largely be shielded by existing vegetation.	Linear, paved, road corridor evident within the middle and background distance zones.
LINE	Linear, straight, open, and panoramic, when viewed from this KOP	Varied, ranging from bare to sporadic and a dense band of high desert foliage.	Linear, flat, paved asphalt within middleground
COLOR	Paved, non-reflective flat, black/grey surface	Sporadic vegetation, mostly not evident from this distance	Asphalt (black, grey) ribbon through landscape.
TEX-TURE	Smooth, curvilinear band	Variable, mostly clustered and rough patches	Smooth/Linear

SECTION D. CONTRAST RATING ___ SHORT TERM _X_ LONG TERM

1. **DEGREE OF CONTRAST**

2. Does project design meet visual resource management objectives? _x_ Yes __ No (Explain on reverse side)

3. Additional mitigating measures recommended? _x_ Yes __ No (Explain on reverse side)

	FEATURES											
	LAND/WATER BODY (1)				VE GETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENT Form			X				X				X	
ELEMENT Line		X					X			X		
ELEMENT Color			X				X				X	
ELEMENT Texture		X					X				X	

Evaluators Name(s) Date

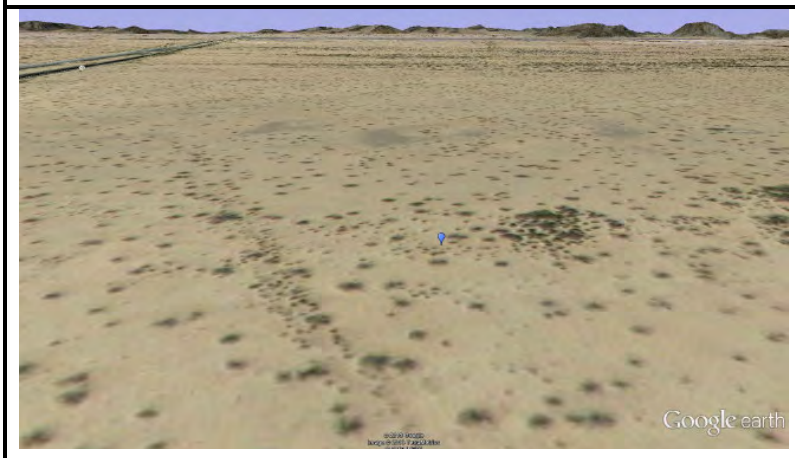
Ryan Rausch, Pamela Cecere
SWCA Environmental Consultants

August 2009; February 2013

SECTION D. (Continued)

Project design meets VRM objectives for the lands upon which it is located (designed by LS RMP as VRM Class IV). Introduction of parkway would be evident from this KOP

Inclusion of BLM Best Management Practices for minimizing impacts to visual resources in keeping with VRM designations should be employed. Design of the roadway should include using BLM color palate for built features such as reflective surfaces of signage, and guardrails. Revegetation plan should also be included in the decision and be in keeping with both BLM and Arizona Parkway standards, and the design of the parkway.



From the de Anza Trail, with viewers oriented due west, would experience open expanses of flat desert landscape, with the proposed parkway being between 1.7 (Sub-Alternative F) and 2.3 (Alternative A) and 3.0 (Sub-Alternative G) miles away. Topography is largely flat (only varies about 10 feet in within about a 3 mile radius of the trail, however, vegetative obstruction is evident and would shield direct, unadulterated views of the proposed parkway.

Views from the de Anza trail of the proposed parkway would be largely unobstructed aside from vegetation and the flat nature of the roadway itself as it blends into the landscape at distances beyond the middleground. Viewers on the de Anza trail would likely be seeking a remote, desert experience devoid of human-made development, however, development associated with a rural residential community is currently evident.

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