

Appendix E – Mitigation Measures

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Table 2-1. Standard Mitigation Measures

Standard mitigation measures are part of the Project description; they are applied to all alternatives considered in the impact assessment.				
Mitigation Measure		Mitigation Application Phase		
		Engineering, Design, and Location	Construction	Operations
1	Prior to construction, a detailed POD will be developed to further describe Project features, selective mitigation, and procedures. At a minimum, the POD will address Project design, construction and operation considerations, biological considerations (including noxious weed management), cultural resources, paleontological considerations, hazardous materials management, and reclamation considerations.	●	●	●
2	All vehicle movement outside the right-of-way would typically be restricted to designated access, contractor acquired access, or public roads.	●	●	●
3	The boundary of construction activities would typically be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate survey or construction activity limits.		●	
4	The alignment of any new access roads or overland route would follow the designated area's landform contours where possible, provided that such alignment does not additionally impact resource values. This would minimize ground disturbance and/or reduce scarring (visual contrast).	●	●	
5	In construction areas where grading is not required, vegetation would be left in place wherever possible, and original contour would be maintained to avoid excessive root damage and allow for regrowth. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission lines, as determined by the appropriate land-managing agency.	●	●	
6	To limit new disturbance, existing access roads in the Project area would be used to the extent practicable, provided that doing so does not additionally impact resource values.	●	●	●
7	Construction holes left open overnight would be appropriately fenced or covered to prevent damage to wildlife or livestock.		●	
8	In construction areas (e.g., marshalling yards, structure sites, spur roads from existing access roads) where grading is required, surface restoration would be implemented as required by the landowner or BLM Authorized Officer. The method of restoration would normally consist of returning disturbed areas back to their natural contour, reseeding (where required), cross		●	

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	drains installed for erosion control, placing water bars in the road, and filling ditches.			
9	Watering facilities (e.g., tanks, developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities to their pre-disturbed condition, as required by the landowner or land management agency. Temporary watering facilities would be provided for wildlife and livestock until permanent repair or replacement is complete.		●	
10	Nonspecular conductors would be used, where specified by the BLM Authorized Officer, to reduce visual impacts.	●	●	
11	“Dulled” metal or self-weathering finish structures would be used to reduce visual impacts, if specified by the BLM Authorized Officer.	●	●	
12	Structures and/or groundwire would be marked with high-visibility devices where required by government agencies (e.g., Federal Aviation Administration [FAA]).	●	●	●
13	On agricultural land, right-of-way would be aligned, in so far as practicable, to reduce the impact to farm operations and agricultural production.	●		
14	Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural and ecological resources. The training program outlined in the HPTP would be implemented. To assist in this effort, the construction CIC or a resource specialist would address: (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources and the purpose and necessity of protecting them.	●	●	
15	Cultural resources would continue to be considered during post-EIS phases of Project implementation, in accordance with a PA executed for the Project. This would involve efforts such as intensive surveys, documentary and archival research, and/or visual modeling to inventory and evaluate potential impacts to historic properties within the areas of potential effect, as identified in the PA (direct and indirect). This would also require preparation and approval of a cultural resource inventory report, and the preparation and implementation of an approved HPTP to avoid, minimize, or mitigate adverse effects, as appropriate to each historic property.	●	●	●

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16	Project Owners would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line would be evaluated on a regular basis so that damaged insulators or other line materials that could cause interference are repaired or replaced.			●
17	Project Owners would apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing right-of-way, to the mutual satisfaction of the parties involved.	●	●	●
18	Roads would be built as near as possible at right angles to the streams and washes. Culverts or temporary bridges would be installed where necessary. All construction and operations activities shall be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks.	●	●	●
19	To the extent practicable, structures would be sited with a minimum distance of 200 feet from stream banks.	●		
20	All requirements of those entities having jurisdiction over air quality matters would be adhered to, any necessary dust control plans would be developed, and permits for construction activities would be obtained. Open burning of construction trash would not be allowed unless permitted by appropriate authorities.		●	
21	Fences and gates would be repaired or replaced to their original, undisturbed condition, as required by the landowner or the BLM Authorized Officer if they are damaged or destroyed by construction activities. New temporary and/or permanent gates would be installed only with the permission of the landowner or the BLM. Temporary gates not required for post-construction access control (see SE 6) would be removed following construction completion, and the area restored in accordance with the POD (see ST 1).		●	●
22	Transmission line materials would be designed and tested to minimize corona. Bundle configuration and larger diameter conductors would be used to limit the audible noise, radio interference, and television interference due to corona. Tension would be maintained on all insulator assemblies to ensure positive contact between insulators, avoiding sparking. Caution would be exercised during construction and operations to avoid scratching or nicking the conductor surface, which may provide points	●	●	●

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	for corona to occur.			
23	During operation of the transmission lines, the right-of-way would be maintained free of nonbiodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the landowner or management agency.		●	●
24	In consultation with appropriate land-management agencies, specific mitigation measures for paleontological resources would be developed and implemented to mitigate any identified adverse impacts. These measures would include: preparation of a PRMP; paleontological surveys; personnel education; monitoring ground disturbance for fossils; curation of fossils; and deposition of fossils in a paleontological repository.	●	●	
25	Preconstruction surveys for species listed under the ESA or specified by the appropriate land management agency as sensitive or of concern would be conducted in areas of known occurrence or suitable habitat. Timing of the surveys would be determined by species, coordinated with agency wildlife biologists, and completed prior to construction. Monitoring of construction activities would be required in some areas to ensure that effects to these species are avoided during construction. If Bald Eagle or Golden Eagle nests are identified during preconstruction surveys, seasonal restrictions on construction within a specified buffer would be implemented in coordination with the USFWS and/or species survey protocols, as appropriate, and comply with the BGEPA. Preconstruction nesting-season surveys for migratory birds, and surveys for Burrowing Owls in suitable habitat, would be conducted as needed to comply with the MBTA.	●	●	●
26	Preconstruction native plant inventories and surveys for noxious weed species as stipulated by the appropriate land-administering agency would also be conducted once transmission line centerline, access roads, and tower sites have been located.	●	●	
27	Surveys for bat roosts would be conducted within ¼ mile of the Project right-of-way in areas that potentially contain caves, karst features, or mines. Occupied bat roosts would be avoided.	●	●	
28	Paniculate agave plants (<i>Agave palmeri</i> , <i>A. parryi</i> , and <i>A. chrysantha</i>) and saguaro cacti (<i>Carnegiea gigantea</i>) within the known range of the Lesser Long-nosed Bat or	●	●	

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	Cactus Ferruginous Pygmy-owl would be avoided or salvaged for replanting within the right-of-way or suitable adjacent habitat. Only agaves not possessing flower stalks would be salvaged, and only saguaros of transplantable size (15 feet or less in height) would be salvaged.			
29	Electrical facility design would be in accordance with “Suggested Practices for Raptor Protection on Power Lines” (Avian Power Line Interaction Committee [APLIC] 2012).	●		
HPTP – Historic Properties Treatment Plan PRMP – Paleontological Resources Monitoring Plan				

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Table 2-11. SunZia Selective Mitigation Measures

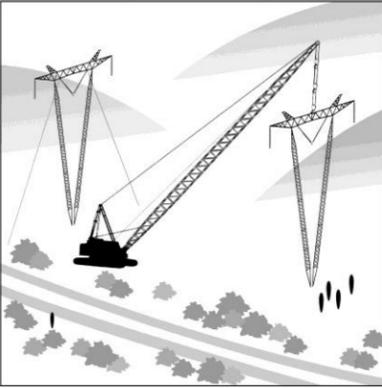
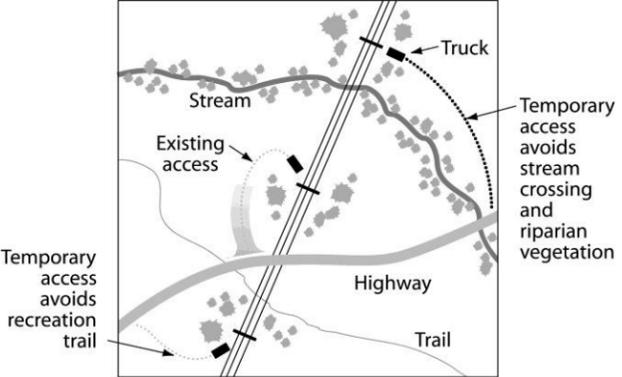
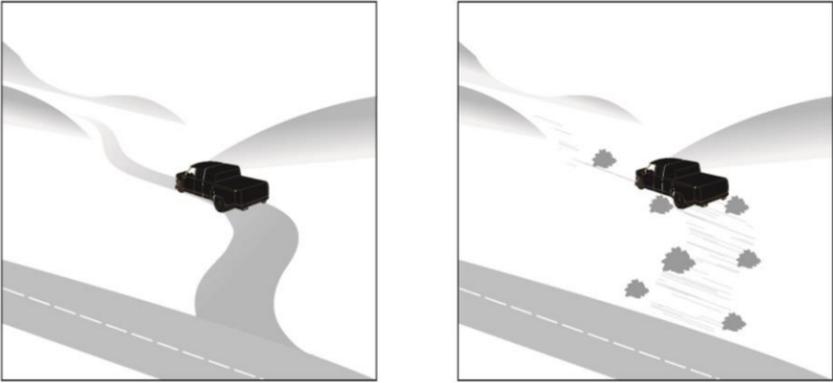
Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
		Engineering, Design, and Location	Construction	Operations	Water Resources		Earth Resources		Biological Resources		Land Use	Visual Resources	Cultural Resources
					Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species			
<p>1. No widening or upgrading of existing access roads would be undertaken in the area of construction and operations, except for repairs necessary to make roads passable, where soils and vegetation are very sensitive to disturbance, or where existing archaeological sites are present.</p>		●	●	●	●	●			●	●	●	●	
<p>2. There would be no blading of new access roads in select areas of construction and operations. Existing crossings would be utilized at perennial streams, designated recreational trails, and irrigation channels. Off-road or cross-country access routes would be used for construction and maintenance in select areas. This would minimize ground disturbance impacts. These access routes must be flagged with an easily seen marker, and the route must be approved in advance of use by the BLM Authorized Officer or landowner.</p>		●	●		●	●		●	●	●	●		
<p>3. Overland access (i.e., drive-and-crush or cut-and-clear) would be used to the greatest extent possible in areas where no grading would be needed to access work areas. Drive-and-crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed, but not cropped. Soil is compacted, but no surface soil is removed. Cut-and-clear is considered as brushing off (removal) of all vegetation to improve or provide suitable access for equipment. All vegetation is removed using above-ground cutting methods that leave the root crown intact.</p>		●	●	●	●	●		●	●	●	●		

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8. In designated areas, structures would be placed so as to avoid, and/or to allow conductors to span sensitive features such as riparian areas, water courses, roads, trails, bat roosts, and cultural sites within limits of standard tower design. This would minimize the amount of sensitive features disturbed and/or reduce visual contrast.	<p>Cropland (spanned) Route realignment avoids structures Cultural site (spanned) River and riparian area (spanned) Construction with mitigation</p>	●			●	●	●		●	●	●	●	●	●	<p>Flexibility in the placement of structures allows for sensitive features to be avoided. Realigning the structures along a route or realigning the route can result in avoiding or minimizing direct impacts to resources, such as cultural and biological, as well as land uses such as agriculture, parks, preservation, hazardous substance remediation, and recreation areas.</p>
9. Standard tower design would be modified to correspond with spacing of existing transmission line structures where feasible, and within limits of standard tower design. The typical span would be modified to correspond with existing structures, but not necessarily at every location. This would reduce visual contrast and/or potential operational conflicts.	<p>Plan view without mitigation Plan view with mitigation</p>	●							●		●	●	●	<p>Matching tower spacing with existing parallel lines reduces the visual space occupied by the structures and minimizes the amount of contrast between the man-made structures and the landscape.</p>	
10. At highway, canyon, and trail crossings, structures are to be placed at the maximum distance practicable from the crossing to reduce visual impacts.	<p>Canyon Trees Highway Towers placed maximum distance from canyon and highway crossings</p>	●									●	●	●	<p>Placing structures at a maximum distance from major or sensitive crossings (i.e., roads and trails) would reduce visual impacts and potential safety hazards (i.e., vehicle collision with tower).</p>	

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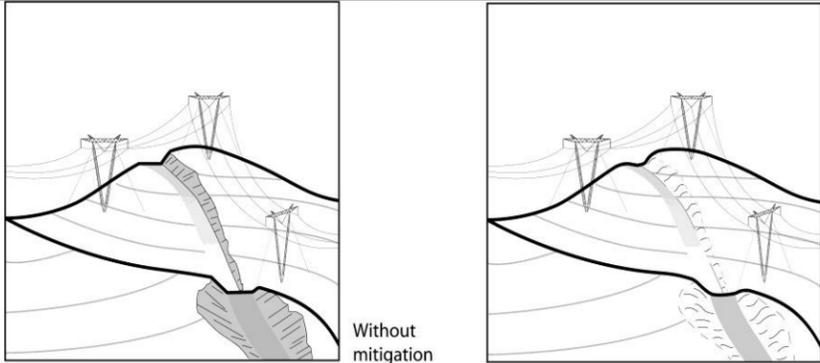
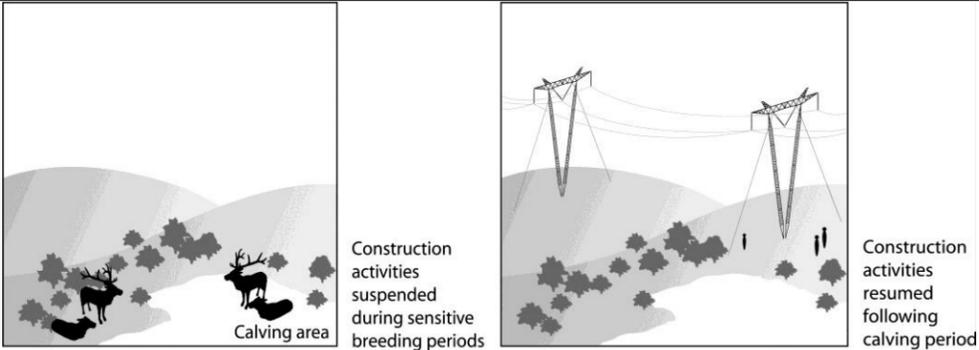
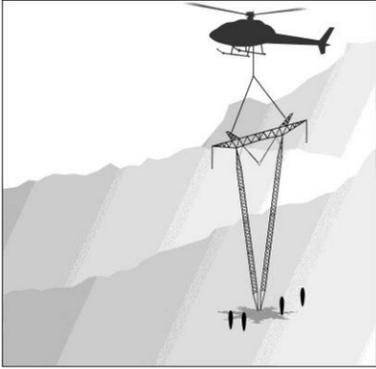
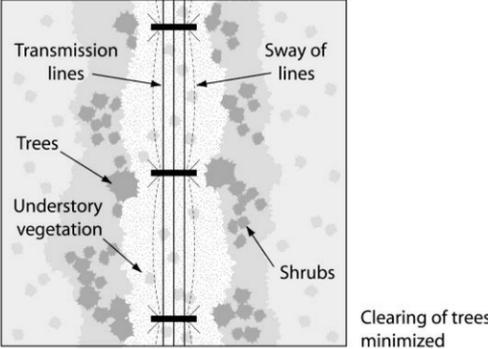
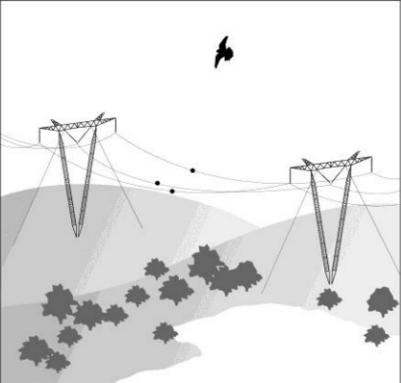
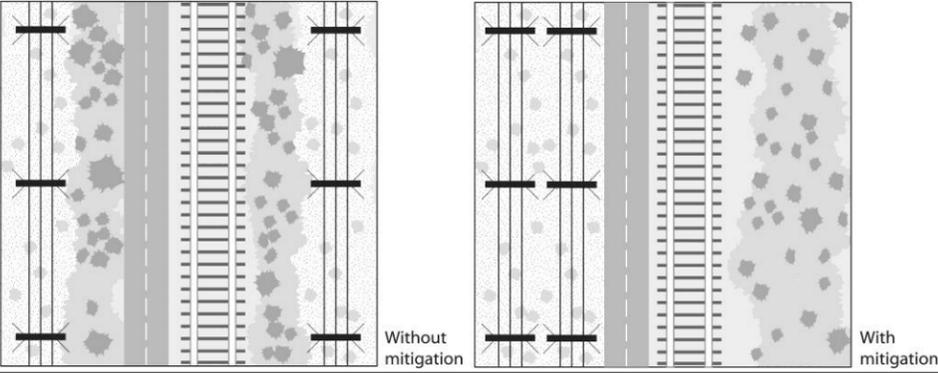
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<p>11. To reduce visual contrast, mineral or asphalt emulsions (e.g., Permeon™ or approved equivalent) would be applied in rocky areas where newly exposed rock color would create strong landscape contrasts.</p>		●	●									●	●
<p>The implementation of mineral or asphalt emulsions (e.g., Permeon™ or approved equivalent) would reduce the visual contrast between exposed ground and the surrounding environment. The application of this mitigation would be determined in the field, during or after construction, by the CIC and Authorized Officers.</p>													
<p>12. With the exception of emergency repair situations, right-of-way construction, restoration, maintenance, and termination activities in designated areas would be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed threatened and endangered, or other sensitive animal species. Sensitive periods, species affected, and areas of concern would be approved in advance of construction or operations by the BLM Authorized Officer.</p>			●	●					●				
<p>Restricting construction activities or maintenance during breeding or nesting periods eliminates potential disturbance of wildlife during these critical periods of their life cycles.</p>													
<p>13. Helicopter placement of structures may be used to reduce ground disturbance (e.g., to minimize soil erosion, vegetation loss, and visual impacts) caused by permanent access road construction.</p>			●				●	●	●	●	●	●	●
<p>Using helicopters to place structures in steep terrain or otherwise sensitive areas reduces land use and natural resource impacts that would otherwise result from ground-disturbing activities. The decrease of ground disturbance would reduce the loss of vegetation, soil erosion, potential damage to cultural resources, and visual impacts.</p>													

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<p>14. To minimize disturbance to riparian vegetation and woodlands, and to reduce visual contrast, clearing of trees in and adjacent to the right-of-way would be minimized to the extent practicable to satisfy conductor-clearance requirements (National Electric Safety Council [NESC] and up to 10 years of timber growth). Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate.</p>			●					●		●				<p>Selectively removing vegetation (i.e., trees) within and along the edges of the right-of-way reduces disruption of habitat, minimizes removal of timber resources, and reduces the visual contrast between the right-of-way and the surrounding environment. Furthermore, “feathering” the edges of the right-of-way instead of cutting trees and vegetation in a straight line results in a more gradual modification to the environment.</p>
<p>15. To minimize bird collisions, bird diverters would be installed and maintained on groundwires, transmission lines, and/or guywires in areas of heavy bird use (i.e., Rio Grande and other riparian corridors). Groundwires would be replaced with one-inch diameter Fiber optic groundwires (OPGW) to increase visibility where practicable and appropriate.</p>			●	●					●					<p>Conductor, groundwire or guywire markings on segments of the transmission lines that cross through, or are adjacent to, heavy bird migration corridors and/or habitat would minimize the risk of avian collision.</p>
<p>16. To reduce ground disturbance and visual contrast, the separation between the transmission lines and existing utilities, roads, or railroads would be minimized to the extent practicable.</p>		●							●		●			<p>Consolidating the transmission lines with existing facilities such as roads, railroads, or other utilities (e.g., transmission lines, distribution lines, pipelines, etc.) would typically minimize ground disturbance, habitat fragmentation, and visual contrast. Furthermore, locating the transmission lines within designated utility corridors (where established) minimizes potential land use conflicts and other resource impacts.</p>

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