

BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF PUBLIC SERVICE)
COMPANY OF NEW MEXICO'S APPLICATION)
FOR APPROVAL OF A 345 KV TRANSMISSION)
LINE AND ASSOCIATED FACILITIES PURSUANT)
TO THE PUBLIC UTILITY ACT,)
)
PUBLIC SERVICE COMPANY OF NEW MEXICO,)
)
Applicant.)
_____)

Case No. 18-00__UT

DIRECT TESTIMONY

OF

ERIC JOHNSON

August 10, 2018

NMPRC CASE NO. 18-00__-UT
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WITNESS FOR
PUBLIC SERVICE COMPANY OF NEW MEXICO

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1 **I. INTRODUCTION AND SUMMARY OF TESTIMONY**

2 **Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.**

3 **A.** My name is Eric Johnson. I am a Senior Environmental Project Manager with Marron
4 and Associates, an NV5 Company (“Marron”). My business address is 7511 4th Street
5 NW, Albuquerque, New Mexico, 87107.

6
7 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.**

8 **A.** My education and professional qualifications are provided in PNM Exhibit EJ-1. I
9 received a Bachelor of Science degree in Range Ecology from Colorado State
10 University in 1980, and I received a Masters of Planning and Community Development
11 from the University of Colorado at Denver in 1984. I am a member of the American
12 Institute of Certified Planners (“AICP”) and a Certified Hazardous Materials Manager
13 (“CHMM”).

14
15 **Q. PLEASE DESCRIBE YOUR RESPONSIBILITIES AS A SENIOR
16 ENVIRONMENTAL PROJECT MANAGER FOR MARRON.**

17 **A.** I manage environmental assessments for infrastructure projects. My responsibilities
18 include collecting environmental data, preparing environmental impact reports,
19 coordinating with governmental agencies, and obtaining public input. I have more than
20 30 years of professional environmental experience, including 23 years as an
21 environmental consultant. I specialize in the preparation of environmental assessment
22 documents, most of which are prepared under the National Environmental Policy Act

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1 (“NEPA”) guidelines. I have prepared environmental assessments for a variety of
2 infrastructure projects, including electric transmission lines, roadways, water pipelines,
3 and wastewater facilities. I have worked on more than 100 permits that were approved
4 by regulatory agencies such as the Texas Public Utility Commission, Federal Highway
5 Administration, Bureau of Indian Affairs, Bureau of Land Management, and Bureau of
6 Reclamation. Examples of my project experience are included in my resume in Exhibit
7 EJ-1. Each of the projects described in my resume was approved by the appropriate
8 governmental agencies and successfully built. The environmental assessments I have
9 prepared addressed a variety of environmental resources and issues including geology,
10 soils, surface water, groundwater, wetlands, vegetation, wildlife, threatened and
11 endangered species, air quality, noise, cultural resources, land use, recreation, protected
12 areas, socioeconomics, environmental justice, and hazardous materials.

13

14 **Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

15 **A.** My testimony supports PNM’s Application for New Mexico Public Regulation
16 Commission (“Commission”) approvals related to PNM’s proposed 345 kV
17 transmission line in Santa Fe and Sandoval counties (“BB2 Project”). As Senior
18 Environmental Project Manager for Marron, I was lead author of Marron’s
19 Economic Assessment Report (“EAR”) for the BB2 Project, which analyzed the
20 important environmental values that may be impacted by the BB2 Project.
21 Specifically, I: 1) sponsor the EAR, which is attached to my testimony as PNM
22 Exhibit EJ-2.; 2) explain the EAR study process and findings concerning the
23 selection of, and modifications to, the route for the BB2 Project; and 3) based on

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1 the findings and conclusions described in the EAR, demonstrate that the location
2 of the BB2 Project will not unduly impair important environmental values and
3 that PNM's request for location approval of the BB2 Project satisfies the
4 environmental requirements of Section 62-9-3 of the Public Utility Act and
5 Subsections 10(E) and (H) of 17.9.592 NMAC ("Rule 592"). PNM witnesses
6 Douglas Campbell and Jeff Mechenbier address PNM's compliance with the
7 remaining portions of Rule 592 in their direct testimonies

8
9 **II. ENVIRONMENTAL ANALYSIS REPORT FOR THE BB2 PROJECT**

10 ***A. The EAR Study***

11 **Q. WHAT LEGAL STANDARDS DID MARRON FOLLOW IN CREATING**
12 **THE EAR?**

13 **A.** Marron complied with Rule 592.10(E) and Section 62-9-3(M). Because the BB2
14 Project will not cross any federal lands, Rule 592.10(C) and (D) are inapplicable;
15 PNM was not required to prepare an environmental impact statement pursuant to
16 NEPA. Marron prepared the EAR pursuant to Rule 592.10(E), which requires a
17 report comparable to an environmental impact statement be submitted with an
18 application for location approval. The EAR is comparable because the EAR has a
19 format similar to NEPA environmental assessment documents prepared by federal
20 agencies such as the Bureau of Land Management, Federal Highway
21 Administration, and U.S. Forest Service.

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1 As required by Rule 592.10(E), the EAR is in the format prescribed in 40 CFR
2 1502.10.

3

4 **Q. WHAT ENVIRONMENTAL IMPACTS DID MARRON CONSIDER IN**
5 **THE EAR?**

6 **A.** Marron considered all of the important environmental values identified in Rule
7 592.10(H): preservation of air and water quality, land uses, soils, flora and fauna,
8 and water, mineral, socioeconomic, cultural, historic, religious, visual, geologic
9 and geographic resources. Marron also specifically considered the factors listed
10 in Section 62-9-3(M) that the Commission has not incorporated into Rule 592:
11 existing plans of the state, local government and private entities for other
12 developments at or in the vicinity of the proposed location, noise emission levels
13 and interference with communication signals, the proposed availability of the
14 location to the public for recreational purposes, consistent with safety
15 considerations and regulations, and existing scenic areas or archaeological sites at
16 or in the vicinity of the proposed location. For each of these important
17 environmental values and factors, Marron evaluated the nature of the current
18 environment, focusing on existing conditions, and determined whether the BB2
19 Project would have any adverse impacts on each value. Marron proposes
20 measures in the EAR to minimize or avoid environmental impacts where
21 appropriate. Section 5.0 of the EAR describes these mitigation measures,
22 including transmission line reclamation, noxious weed species, restoration success
23 criteria and post-construction monitoring, restoration of temporary disturbance

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1 areas, erosion control, standard mitigation measures/best management practices,
2 cultural resources, public safety, and standards safety measures. PNM witness
3 Douglas Campbell addresses PNM's application of mitigation measures in his
4 direct testimony.

5

6 **Q. WHAT PROCESS DID MARRON USE TO PREPARE THE EAR?**

7 **A.** The process of preparing the EAR had essentially four steps: i) creating a purpose
8 and need statement, ii) collecting data on the affected environment, iii) evaluating
9 the alternative environmental impacts that would be expected if the BB2 Project
10 were not constructed, and iv) developing mitigation measures. The purpose and
11 need statement was based on the Plan of Development. The purpose of the BB2
12 Project is to provide additional electric transmission capacity for a new wind
13 development in Torrance County. The project is needed provide the requested
14 capacity on PNM's transmission system to serve this wind farm development.

15

16 Marron conducted field surveys to collect cultural resource, biological resource,
17 waterway, and wetland data. The cultural resource investigations included a
18 review of known cultural resource sites including archaeological sites and historic
19 properties. Archaeologists conducted a walking survey of the entire BB2 Project
20 area. Cultural resources sites were recorded and mapped. For biological resources,
21 biologists conducted a walking survey of the entire BB2 Project area. Observed
22 plant and animal species were recorded. Signs of animal activity, such as tracks
23 and nests, were also recorded. Protocol surveys were conducted for the gray vireo,

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1 southwestern willow flycatcher, and yellow-billed cuckoo. The biologists also
2 identified and delineated wetland areas based on the presence of wetland indicator
3 plants species, hydric soils, and wetlands hydrology. Environmental data was
4 obtained from on-line and literature sources. Data was collected on landforms,
5 geology, soils, surface and groundwater, wetlands vegetation, wildlife, cultural
6 resources, climate and air quality, visual resources, communities and land use,
7 development plans, socioeconomics and environmental justice, recreation, noise,
8 electromagnetic fields, and hazardous materials. The environmental data was used
9 to prepare the affected environment sections of the EAR. Environmental impacts
10 were evaluated based on the proposed action and affected environment.
11 Opportunities to mitigate environmental impacts were identified, such as moving
12 a structure location to avoid a cultural resource site. PNM's application of
13 mitigation measures is described in the testimony of PNM witness Douglas
14 Campbell.

15
16 ***B. Marron's Findings Regarding Impact to Important Environmental Values***

17 **Q. PLEASE BRIEFLY DISCUSS MARRON'S FINDINGS AND**
18 **CONCLUSIONS REGARDING THE ENVIRONMENTAL IMPACTS OF**
19 **THE BB2 PROJECT?**

20 **A.** Marron found and concluded that the selected route of the BB2 Project will not
21 have a significant impact on the human environment and will not unduly impair
22 any important environmental values (see Section 4.16 of the EAR). Each resource

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1 was evaluated individually for impacts. Implementation of the BB2 Project would
2 involve the commitment of natural, physical, human, and fiscal resources.
3 Undeveloped lands within the proposed BB2 Project corridor would be committed
4 to use as utility easement for the foreseeable future. This would preclude
5 incompatible uses, such as construction of buildings or tall structures within the
6 easement, but would not prevent use as rangeland, which is currently the most
7 common of area land uses.

8
9 Fossil fuels, labor, and materials committed to the construction would be largely
10 irretrievable, although some materials could be recycled. The labor and natural
11 resources necessary to fabricate construction materials would be irretrievable.

12
13 Vegetation clearing needed to comply with PNM's standards would regrow if the
14 line were removed, but would be maintained so long as the line remains. Soils
15 within the easement would be disturbed only as needed for structure placement.
16 Soils would be affected along the route, but would remain largely undamaged (see
17 Section 4.17 of the EAR). Specific measures are prescribed for transmission line
18 restoration including defining a zone for tree cutting, salvaging topsoil, restoring
19 areas and drainages to original contours, reseeded using the existing seedbank
20 and seeding specifications approved by landowners, and re-spreading cleared
21 vegetation to increase soil moisture and provide a catchment for wind dispersed
22 seeds (see Section 5.1 of the EAR).

23

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1 **Q. DESCRIBE MARRON’S REVIEW OF THE COMMUNITY VALUES.**

2 **A.** Marron evaluated whether the BB2 Project would significantly and negatively
3 alter the use, enjoyment, or intrinsic value attached to an important area or
4 resource crossed by the proposed transmission line. The review focused on the
5 impacts to existing land uses along the proposed route, including impacts on: 1)
6 residential structures; 2) agricultural lands (both crop and grazing lands); 3)
7 transportation, aviation, utility, and electronic communication facilities, and 4)
8 socioeconomic impacts.

9
10 **Q. WHAT SPECIFIC COMMUNITY VALUES DID MARRON CONSIDER?**

11 **A.** Marron looked at if the project would alter or prevent current land use, affect area
12 residences or communities, result in measurable socioeconomic changes to the
13 effected counties, affect population growth, cause migration to the area, cause
14 environmental justice impacts, disproportionately impact low income or minority
15 populations, or create jobs (see Sections 4.11 and 4.12 of the EAR).

16
17 **Q. PLEASE SUMMARIZE THE FINDINGS REGARDING THE POTENTIAL
18 IMPACTS OF THE PROPOSED PROJECT ON COMMUNITY VALUES.**

19 **A.** Marron found that the location of the BB2 Project will have minimal impact on
20 community values in the area because the project will be adjacent to the existing
21 BB line and structures will be located to minimize impacts to sensitive resources.
22 Marron does not expect the BB2 Project will alter land use or prevent current land
23 uses because any impacted land uses are already occurring directly adjacent to an

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1 existing powerline easement. Most lands would continue to be used as rangeland
2 for livestock grazing. There would be no effect on residences or area
3 communities, such as Golden and Stanley, which are the closest communities to
4 the BB2 Project, based on line location and proximity to the line. Construction of
5 the BB2 Project would not result in measurable socioeconomic changes in
6 Sandoval or Santa Fe Counties and would not affect population growth. There
7 would be no migration to the area. No environmental justice impacts are
8 anticipated. There would be no disproportionate impacts on low income or
9 minority populations (see Sections 4.10 and 4.11 of the EAR).

10
11 **Q. WILL ANY JOBS BE CREATED BY THE BB2 PROJECT?**

12 **A.** Temporary construction jobs would be created. Approximately 60 to 150 people
13 would work on the BB2 Project at various times, split between the transmission
14 line and switching station. Fewer construction workers would be working at the
15 beginning and end of the project.

16
17 **Q. ARE ANY PARKS AND RECREATION AREAS LOCATED NEAR THE
18 PROPOSED PROJECT?**

19 **A.** No. There are no hiking trails, bike routes, picnic areas, camping areas, wildlife
20 refuges, or public lands with recreational opportunities within 0.5 miles of the
21 BB2 Project area. State lands in the BB2 Project area are not used for recreation
22 purposes. No other public lands, such as National Parks, National Forests, Bureau
23 of Land Management lands, State Parks, or county parks and recreation areas, are

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1 located within or adjacent to the BB2 Project area. For this reason, no parks or
2 recreation areas would be impacted by the proposed BB2 Project. (see Section
3 4.12 of the EAR).

4

5 **Q. WHAT IS THE VISUAL CONTEXT OF THE PROPOSED PROJECT?**

6 **A.** Regarding visual impacts, it is worth noting, again, that the existing BB Line is
7 already adjacent to where the BB2 Project will be installed. The BB2 Project area
8 occurs in a rural part of Sandoval and Santa Fe County. The visual context of the
9 proposed new line consists of the flat, open range lands of the Estancia Valley in
10 the eastern half and rolling hills and varied terrain with the dense pinyon/juniper
11 vegetation cover associated with the Ortiz and San Pedro Mountains in the
12 western half of the BB2 Project area.

13

14 **Q. FROM WHERE WOULD THE PROJECT BE MOST FREQUENTLY**
15 **VIEWED?**

16 **A.** The project would be most visible from where it crosses three highways: New
17 Mexico Highway 14 (“NM 14”), New Mexico Highway 41 (“NM 41”), and U.S.
18 Highway 285 (“US 285”). NM 14 is designated the Turquoise Trail Scenic
19 Byway from Santa Fe to Tijeras. The powerline crossing is located
20 approximately 1.5 miles north of Golden near the western extent of the Santa Fe
21 County portion of the BB2 Project area. Views are directed north and south at
22 this location on the highway both northbound and southbound. The NM 41
23 crossing is located approximately 4.3 miles north of Stanley, New Mexico. This

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1 highway connects I-40 with Santa Fe. US 285 is located at the eastern terminus of
2 the BB2 Project area. The existing Clines Corners Switching Station is located
3 approximately a quarter mile west of the highway and does not obstruct the view.

4
5 **Q. HOW WOULD THE PROJECT AFFECT VIEWS FROM THESE THREE**
6 **HIGHWAYS?**

7 **A.** Where it crosses NM 14, the proposed BB2 Line location is immediately adjacent
8 to an existing utility corridor in an already modified landscape. The landscape has
9 a strong capacity to screen and absorb new elements because of the uneven
10 topography and presence of small trees in many areas. The BB2 Line would have
11 a minimal effect on the view from NM 14 and would not affect the visual setting
12 of the NM 14 Turquoise Trail Scenic Byway because the new line would parallel
13 the existing transmission line with structure-for-structure placement. Visibility of
14 the BB2 structures from NM 14 northbound and southbound would be generally
15 limited to brief foreground views for a short distance, and the line would not
16 interrupt views of distant mountains because of the short duration when the line is
17 in sight.

18
19 Grasslands with open character at the NM 41 crossing provide limited visual
20 absorption capacity with few, sparse interrupting features; however, greater
21 viewing distance from the corridor crossing reduce its apparent scale and small
22 rises in topography coupled with longer distant views help with screening. Views

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1 include the presence of existing transmission structures and minor surface
2 disturbances.

3

4 The view of the BB2 Line from US 285 would be seen in a lower position in the
5 landscape with minimal skylining. Greater viewing distance from the corridor
6 crossing reduces its apparent scale and small rises in topography coupled with the
7 with longer distant views help with screening. Views include the presence of
8 existing transmission structures and minor surface disturbances (see Section 4.9
9 of the EAR).

10

11 **Q. DOES THE PROPOSED PROJECT ADVERSELY IMPACT ANY VISUAL**
12 **RESOURCES?**

13 **A.** The proposed BB2 Project would not adversely impact visual resources. The new
14 line would be located next to the existing line, which has modified the landscape.
15 Lighter galvanized color on structures would lessen visual impacts. Vegetation
16 disturbance would be limited to the BB2 Project corridor and access roads. The
17 proposed design elements of structure-for-structure placement and reduction of
18 color contrast by the use of lighter, dulled galvanized structures would result in
19 acceptable levels of visual alteration. The selected color and design of the
20 structures was based on a preference expressed in public comment, as addressed
21 in the Direct Testimony of Douglas Campbell. Measures that could be
22 implemented to further reduce alteration of existing visual character of the
23 vicinity are avoidance of side slopes and ridges, where possible; use of non-

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1 specular conductors to reduce line contrasts from reflectivity; and reduce
2 vegetation clearing as much as possible to retain the visual absorption, reduce
3 visible ground disturbance, and reduce color and line contrasts. PNM has
4 incorporated the EAR and will further refine this project in accordance with the
5 EAR and its policies during the construction process. PNM will implement the
6 mitigation measures described in the EAR (see Section 4.9 of the EAR).

7

8 **Q. DESCRIBE MARRON'S REVIEW OF ECOLOGICAL AND**
9 **BIOLOGICAL RESOURCES?**

10 **A.** Marron obtained data and information on ecological resources within the study
11 area from a variety of sources, including geographic information system analysis,
12 field pedestrian surveys, on-line sources, and a literature review. Vegetation
13 communities, wetlands, and wildlife species were inventoried. Marron recorded
14 nest sites and identified the potential for impacts to protected species. Marron also
15 conducted calling surveys for the gray vireo, a state threatened species, and
16 southwestern willow flycatcher and yellow-billed cuckoo, federal endangered
17 species. The plan for mitigating impact on the birds is detailed in the EAR (see
18 Section 5.6 of the EAR).

19

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1 **Q. WHAT VEGETATION TYPES ARE PRESENT IN THE BB2 PROJECT**
2 **AREA?**

3 **A.** The BB2 Project area supports four major natural vegetation types: Coniferous
4 Woodland, Juniper Savanna, Plains-Mesa Grassland, and Arroyo Riparian. The
5 most abundant is Plains-Mesa Grassland, which covers approximately 22 miles of
6 the corridor. Plains-Mesa Grassland is dominated by grass species such as blue
7 grama in association with galleta, buffalograss, and wheatgrasses. Arroyo
8 Riparian is the least common vegetation type.

9
10 **Q. WHAT LEVEL OF VEGETATION IMPACTS DOES MARRON**
11 **ANTICIPATE?**

12 **A.** Most of the proposed BB2 Project corridor supports intact, and in many areas,
13 undisturbed vegetation. All construction vehicle movement outside the ROW
14 normally will be restricted to predesignated access, contractor-acquired access, or
15 public roads. In construction areas where recontouring is not required, vegetation
16 will be left in place wherever possible, and the original contour will be maintained
17 to avoid excessive root damage and allow for resprouting. Vegetation that is not
18 consistent with line safety and operation will be removed. Approximately 176
19 acres of temporary vegetation impacts and 48 acres of permanent vegetation
20 impacts will occur. Temporary impacts include the structure areas, construction
21 staging areas, wire-pulling sites, wire-tensioning sites, wire-splicing sites, and
22 construction yards. Permanent impacts include pole foundations, H-frame
23 foundations, access roads, and the Diamond Tail Switching Station.

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1 **Q. HOW WILL DISTURBED VEGETATION BE RESTORED?**

2 A. Specific measures have been identified for transmission line restoration including
3 defining a zone for tree cutting, salvaging topsoil, restoring areas and drainages to
4 original contours, reseeding using the existing seedbank and seeding
5 specifications approved by landowners, and re-spreading cleared vegetation to
6 increase soil moisture and provide a catchment for wind dispersed seeds. Seeding
7 specification will be determined in consultation with the landowner for those
8 areas that will be reseeded. Only approved seed mixes will be used. Reclamation
9 success will be evaluated by comparing project-affected sites with preconstruction
10 conditions and/or adjacent areas in terms of final grading and removal of any
11 introduced berms, recontouring to approximate preconstruction contours, removal
12 of noxious weed species, and relief of all compacted soils.

13

14 **Q. WHAT WILDLIFE SPECIES DID MARRON IDENTIFY IN THE BB2**
15 **PROJECT AREA?**

16 A. Overall, wildlife is not abundant in the BB2 Project area. A total of 67 vertebrate
17 animal species were observed during the biological survey, including 49 bird
18 species, 16 mammal species, and two reptile species. No amphibians were
19 observed. The low diversity is likely due to poor habitat quality and limited water
20 sources. Nevertheless, common species, such as ravens, kangaroo rats, pocket
21 gophers and pronghorn antelope, were observed regularly. Within the grassland
22 habitats birds were especially scarce. Species most commonly observed included
23 horned lark, American crow, and common raven. Other species, such as western

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1 meadowlark and curve-billed thrasher, were scattered and uncommon throughout
2 the grassland areas. In the Coniferous Woodland and Savanna vegetation
3 communities, the most common species were house finch, dark-eyed junco, and
4 northern flicker. Bewick's wren, mountain chickadee, and mountain bluebird
5 were also locally common in some areas (see EAR Section 4.6).

6
7 In addition, at least six species of birds of prey occurred in the BB2 Project area,
8 including American kestrel, red-tailed hawk, Cooper's hawk, peregrine falcon,
9 ferruginous hawk, and Swainson's hawk. An active red-tailed hawk nest was
10 observed adjacent to the BB2 Project area. There are no burrowing owls within
11 the BB2 Project area, possibly due to the low number of prairie dog burrows.

12

13 **Q. WHAT IS THE RISK OF RAPTOR ELECTROCUTION AND BIRD**
14 **COLLISIONS IF THE BB2 PROJECT IS CONSTRUCTED?**

15 **A.** The risk of raptor electrocutions is low. Energized equipment will be separated to
16 reduce the risk of raptor electrocution. Raptor wingspans are insufficient to make
17 contact between two conductors. Collision risks would be low to moderate. There
18 are no regular flight paths in the BB2 Project area, such as between a foraging
19 area and pond. Occasional bird collisions may occur during periods of poor
20 visibility, like dust storms and foggy conditions.

21

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1 **Q. ARE BIRDS NESTING WITHIN AND NEAR THE BB2 PROJECT AREA?**

2 **A.** During the 2018 biological field surveys, 132 migratory bird nests were
3 discovered within or adjacent to the BB2 Project area. Of those, 110 (83.3
4 percent) of the nests were stick nests on the existing BB Line structures. Over 90
5 percent of these nests occurred in grassland areas. In aggregate, the Coniferous
6 Woodland and Juniper Savanna communities accounted for approximately 55
7 percent of the total vegetative cover, but these combined communities accounted
8 for only 6.8 percent of the nests found (and most of these were twig nests in
9 adjacent trees). There appeared to be a clear preference at least for the larger bird
10 species to use the transmission line structures in the grasslands as opposed to the
11 woodland areas.

12
13 **Q. HOW WILL PNM MINIMIZE IMPACTS TO NESTING BIRDS?**

14 **A.** The trees within the woodland and savanna communities within the 100-foot wide
15 clear zones under the transmission line would be removed. Although this removal
16 would occur in a relatively narrow band in relation to the overall habitat areas, it
17 would result in a permanent loss of habitat for the species that rely on this habitat
18 type. Tree clearing would occur outside the migratory bird nesting season (March
19 15 to September 15) or a preconstruction migratory bird survey would be
20 conducted.

21

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1 **Q. WHAT THREATENED AND ENDANGERED SPECIES WERE**
2 **OBSERVED IN THE BB2 PROJECT AREA?**

3 **A.** The state threatened gray vireo and state threatened peregrine falcon were
4 observed. The gray vireos were observed on the Diamond Tail Ranch in the
5 western part of the BB2 project area. The peregrine falcon was initially perching
6 on the top of the BB34 structure and later moved to the northern end of the
7 Arroyo Coyote Wetland.

8
9 **Q. HOW WILL THE PROJECT AFFECT THE GRAY VIREO?**

10 **A.** A few perching trees may be lost, but abundant trees are available to gray vireos
11 on adjoining lands.

12
13 **Q. WHAT MEASURES WILL BE TAKEN TO MINIMIZE IMPACTS TO**
14 **THE GRAY VIREO?**

15 **A.** PNM will coordinate with the New Mexico Department of Game and Fish and
16 develop plans to implement measures to reduce impacts in gray vireo occupied
17 habitat. Tree cutting will occur outside the migratory bird nesting season (March
18 15 to September 15) or a preconstruction gray bird survey would be conducted. A
19 few trees will be left in key locations along the project area to provide gray vireo
20 sentinel trees.

21

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1 **Q. HOW WILL THE PROJECT AFFECT THE PEREGRINE FALCON?**

2 **A.** The project will not affect the peregrine falcon. No suitable nesting habitat is
3 present within or near the project area. The only likely nesting habitat for this
4 species is a section of cliffs about 1.1 miles east of structure east of the project
5 area. Foraging habitat will remain available.

6

7 **Q. ARE THERE ANY OTHER POTENTIAL IMPACTS TO THREATENED
8 OR ENDANGERD SPECIES?**

9 **A.** No other-listed endangered or threatened species were observed in the BB2
10 Project area, however, potential southwestern willow flycatcher and yellow-billed
11 cuckoo habitat occurs in the BB2 Project area. The southwestern willow
12 flycatcher is a federal and state endangered species that occurs in riparian shrub
13 habitat with a cottonwood or box elder tree overstory. The yellow-billed cuckoo is
14 a federal threatened species that occurs in riparian woodland habitat with
15 cottonwoods and willows. Within the BB2 Project area, southwestern willow
16 flycatcher potential migration habitat and yellow-billed cuckoo potential habitat
17 are present in an area of riparian trees and shrubs at Arroyo Coyote (see Figures
18 A5, A14, and A15; Appendix A of the EAR). No southwestern willow flycatchers
19 or yellow-billed cuckoos were observed during 2018 protocol surveys.

20

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1 **Q. HOW WILL PNM VERIFY THAT THE SOUTHWESTERN WILLOW**
2 **FLYCATCHER AND YELLOW-BILLED CUCKOO HABITAT IS**
3 **UNOCCUPIED?**

4 **A.** PNM will conduct southwestern willow flycatcher and yellow-billed cuckoo
5 protocol surveys in 2019 to confirm the absence of this species. If either of these
6 species is located in potential habitat, PNM will coordinate with the U.S. Fish and
7 Wildlife Service to develop measures, such as occupied habitat avoidance by
8 construction activities, to ensure that the found species is not affected by the
9 project.

10

11 **Q. ARE FURTHER ECOLOGICAL RESOURCE STUDIES NECESSARY?**

12 **A.** No, the ecological resources were adequately addressed and documented
13 consistent with the NEPA regulations at 40 CFR 1500-1508.

14

15 **Q. WHAT WERE MARRON'S FINDINGS REGARDING**
16 **PHYSIOGRAPHY, GEOLOGY, AND SOIL RESOURCES**
17 **POTENTIALLY IMPACTED BY THE LOCATION OF THE PROPOSED**
18 **PROJECT?**

19 **A.** As to the physiography and geology, Marron did not identify any geological
20 hazards. As a result, construction will not have significant adverse effects on these
21 resources. Further, while soil erosion, compaction, and sedimentation are
22 potential impacts primarily during the construction phase of the BB2 Project,
23 these impacts will be minimized by the use of erosion and sediment control best

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1 management practices until sites are established. Disturbed areas will be restored
2 as closely as practical to the original preconstruction topographic contours;
3 existing seed bank in the first inches of soil will be used to the extent possible to
4 revegetate disturbed areas; and cut wood vegetation will be chipped, where
5 practical, to cover bare soils, to improve stability for soils and protect the
6 seedbank.

7
8 **Q. WHAT WERE MARRON'S FINDINGS REGARDING WATER**
9 **RESOURCES IMPACTED BY THE LOCATION OF THE PROPOSED**
10 **PROJECT?**

11 **A.** The BB2 Project will not cross any permanent surface waters, and Marron does
12 not expect that any construction activities will significantly impede the seasonal
13 flow of water within the watersheds. The construction, operation, and
14 maintenance of the proposed line is also not anticipated to adversely affect
15 groundwater resources, and PNM will take necessary and available precautions,
16 such as not draining hazardous materials onto the ground or into streams or
17 drainage areas (see Section 5.6 of the EAR), to avoid and minimize the effects of
18 any accidental spills, which will be addressed in accordance with state and federal
19 regulations.

20

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1 **Q. DESCRIBE MARRON’S REVIEW OF THE CULTURAL RESOURCES**
2 **POTENTIALLY IMPACTED BY THE PROJECT.**

3 **A.** In 2018, Marron completed a 100 percent ground survey of the BB2 Project area
4 and prepared cultural resource reports. In Sandoval County, 19 newly recorded
5 historic sites, 10 previously recorded historic sites, and three segments of the
6 same historic railroad grade were found. In addition, six previously recorded sites
7 were not found within the BB2 Project limits. In Santa Fe County, six newly
8 recorded sites, 10 previously recorded sites, three previously recorded sites that
9 were not found, segment of the New Mexico Central Railroad grade, and 58
10 isolated occurrences were recorded. 21 of the cultural resource sites were
11 determined to be eligible to the National Register of Historic Properties
12 (“NRHP”). Without avoidance, site treatment, consisting of excavation and
13 documentation of site features, is recommended at 15 of the sites. As many sites
14 as possible will be avoided by sensitive structure placement.

15

16 **Q. DID MARRON MAKE ANY OTHER FINDINGS REGARDING**
17 **ENVIRONMENTAL RESOURCES POTENTIALLY IMPACTED BY THE**
18 **LOCATION OF THE PROPOSED PROJECT?**

19 **A.** Yes. The trees within the woodland and savanna communities within the 100-
20 foot wide clear zones under the transmission line would be removed. Although
21 this removal would occur in a relatively narrow band in relation to the overall
22 habitat areas, it would result in a permanent loss of habitat for the species that rely

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1 on this habitat type. Tree clearing would occur outside the migratory bird nesting
2 season.

3

4 **III. SUMMARY OF PNM'S COMPLIANCE WITH THE**
5 **ENVIRONMENTAL REQUIREMENTS OF RULE 592 AND SECTION**
6 **62-9-3**

7 **Q. WILL THE BB2 PROJECT UNDULY IMPAIR IMPORTANT**
8 **ENVIRONMENTAL VALUES?**

9 **A.** No. Marron analyzed the factors and important environmental values identified in
10 Section 62-9-3(M) and Rule 592.10(H), respectively, in the EAR and, as
11 described above and in the EAR, determined that no undue impacts would result
12 from the location of the BB2 Project. As such, the BB2 Project satisfies the
13 requirements for location approval under 62-6-3 and Rule 592(E) and (H).

14

15 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

16 **A.** Yes.

GCG#524906



Eric Johnson, AICP, CHMM
Senior Environmental Project Manager

Years of Experience

Over 25 years of Professional Experience. Employed with Marron and Associates – NV5 since November 2000

Education

M.P.C.D., Planning and Community Development, University of Colorado, 1984

B.S., Range Ecology, Colorado State University, 1980

Affiliations

Alliance of Hazardous Materials Professionals (AHMP), Vice President-Elect

American Institute of Certified Planners (AICP) - 42448

American Planning Association

Institute of Hazardous Materials Management, Certified Hazardous Materials Manager (CHMM) – 11632

New Mexico Society of Hazardous Materials Managers/AHMP Roadrunner Chapter, Past President

Society of Environmental Toxicology and Chemistry

Responsibilities

Mr. Johnson is a Senior Environmental Project Manager and Public Involvement Specialist with over 25 years of experience with projects that adhere to the National Environmental Policy Act (NEPA). He routinely prepares categorical exclusions and environmental assessments for infrastructure, transportation, and utilities projects. Mr. Johnson specializes in socioeconomic analysis including environmental justice, demographics, employment trends, income levels, visual resources, and economic indicators. He is also experienced in collecting baseline data and evaluating environmental impacts on communities, land use, hazardous materials, and cumulative impacts. He also assesses properties for impacts from hazardous materials and documents the findings in a Phase I Environmental Site Assessment or Initial Site Assessment documents. Mr. Johnson has conducted a variety of public involvement and community participation activities. He has prepared public involvement plans, which described strategies and methods to achieve public involvement. He organizes public meeting and stakeholder events, identifies community participants, and develops stakeholder lists. Mr. Johnson has organized and facilitated work with stakeholder groups. Often stakeholder groups are organized around similar interests such as neighborhoods, economic development, or local government. Mr. Johnson prepares materials for public involvement including PowerPoint presentations, handouts, comment forms, and meeting notices. He is also fluent in Spanish and can translate handouts and present meetings in Spanish.

Project Experience Table

Eric Johnson has worked on numerous projects. Examples are provided in the following table.

	Project Permitted	Location	Description
1	Picuris Solar Generation Facility Project, Pueblo of Picuris and Bureau of Indian Affairs	Pueblo of Picuris, New Mexico	Environmental project manager on solar generating project. Prepared NEPA environmental assessment. Bureau of Indian Affairs issued a Finding of No Significant Impact (FONSI)
2	Williams 69-kV Tap, North Plains Electric Cooperative and Public Utility Commission of Texas	Hansford County, Texas	Environmental assessment writer for a transmission line. Project consisted of a 2-mile 69-kV transmission line and substation. Certificate of Convenience and Necessity (CCN) obtained from Public Utility Commission of Texas.
3	Waka 115-kV Tap, North	Ochiltree County,	Environmental assessment writer for a transmission line. Project

	Plains Electric Cooperative and Public Utility Commission of Texas	Texas	consisted of a 4-mile 115-kV transmission line and substation. Certificate of Convenience and Necessity (CCN) obtained from Public Utility Commission of Texas.
4	Peralta Waterline Project, New Mexico Environment Department and Environmental Protection Agency	Peralta, New Mexico	Environmental project manager on water system improvement project. Prepared environmental information document and conducted public hearing. The Environmental Protection Agency issued a FONSI.
5	McKinley Canyon Sediment Basin Project, City of Alamogordo and US Forest Service	Alamogordo, New Mexico	Environmental project manager on flood control project. Prepared decision memo/NEPA categorical exclusion. The Sacramento Ranger District, Lincoln National Forest approved the project.
6	I-25 Paseo del Norte Interchange Project, New Mexico Department of Transportation and Federal Highway Administration	Albuquerque, New Mexico	Environmental project manager on interstate highway project. Collected environmental data, analyzed environmental impacts, organized two public meetings, and prepared a NEPA categorical exclusion and supporting environmental documentation to Federal Highway Administration and New Mexico Department of Transportation standards.
7	Carlsbad Project, New Mexico Interstate Stream Commission and US Bureau of Reclamation	Lower Pecos River Basin, Santa Rosa to Carlsbad, New Mexico	Co-project manager on this NEPA EIS project in southeastern New Mexico. Oversaw the preparation for an EIS that established a flow regime for the Pecos River from Santa Rosa to Carlsbad. Key issues included endangered fish, hydrology, and irrigated agriculture. The Bureau of Reclamation issued a Record of Decision that authorized the project.
8	Camino Real Landfill Permit, New Mexico Environment Department	Sunland Park, New Mexico	Provide peer review services for environment and socioeconomic for a landfill permit. Prepared socioeconomic and environmental justice analysis. Provided expert testimony on behalf of New Mexico Environment Department.
9	US 64 Farmington to Bloomfield Improvement Project, New Mexico Department of Transportation and Federal Highway Administration	Bloomfield, Farmington, and San Juan County, New Mexico	Environmental project manager on multi-phase transportation project. Project involved lane additions and intersection improvements on US 64. Prepared NEPA environmental assessment and environmental assessment re-evaluations for project phases. Conducted several public meetings. Federal Highway Administration issued a FONSI.
10	Hopi Arsenic Mitigation Project, Hopi Tribe and Indian Health Service	Hopi Reservation, Arizona	Environmental project manager on water system improvement project. New wells and pipelines were proposed to reduce arsenic levels in Hopi water system. Conducted three public meetings and prepared NEPA environmental assessment. Indian Health Service issued a FONSI.
11	US 491 Roadway Improvements Project, New Mexico Department of Transportation and Federal Highway Administration	McKinley and San Juan Counties, New Mexico	Environmental project manager on roadway improvement project that proposed to convert 75 miles of US 491 between Tohatchi and Shiprock from a 2-lane highway to a 4-lane divided highway. Prepared NEPA environmental assessment and conducted several public meetings. Federal Highway Administration issued a FONSI.
12	Sandia Pueblo Housing, Sandia Pueblo and US Department of Housing and Urban Development	Sandia Pueblo, New Mexico	Environmental project manager on housing development project. New single-family housing units were proposed. Prepare environmental assessment. US Department of Housing and Urban Development issued a FONSI.
13	Griggs-Walnut Plume Superfund Site, City of Las Cruces and New Mexico Environment Department	Las Cruces, New Mexico	Environmental project manager for NEPA process on a hazardous materials site remediation project. Prepared environmental assessment, and a FONSI was issued.
14	Lead and Coal Avenue	Albuquerque, New	Environmental project manager on a street and landscape

	Improvements, City of Albuquerque and New Mexico Department of Transportation	Mexico	improvement project. Prepared a categorical exclusion and Initial Site Assessment for hazardous materials.
15	NM 68 Pilar Project, New Mexico Department of Transportation, Federal Highway Administration, and Bureau of Land Management	Rio Arriba County, New Mexico	Environmental project manager on rockfall stabilization project along NM 68 in Rio Grande Gorge. Conducted visual resource analysis using Bureau of Land Management Visual Resource Management system. Prepared EA that received FONSI from the Federal Highway Administration and Bureau of Land Management.
16	Land Exchange for Union Pacific Straus Intermodal Facility, Bureau of Land Management	Chaves and Doña Ana County, New Mexico	Environmental specialist on land exchange project. Oversaw environmental assessment preparation and prepared a Phase I Environmental Site Assessment. The Bureau of Land Management issued a FONSI.
17	I-40 Exit 102 Project, Acoma Pueblo, New Mexico Department of Transportation, and Federal Highway Administration	Acoma Pueblo, Cibola County, New Mexico	Environmental project manager on interstate interchange reconstruction project. Facilitated a series of public and stakeholder meetings. Prepared environmental assessment. Federal Highway Administration issued a FONSI.
18	NM 58 Roadway Improvement Project, New Mexico Department of Transportation and Federal Highway Administration	Colfax County, New Mexico	Environmental project manager on roadway and drainage improvement project at Ponil Creek. Prepared environmental assessment and facilitated public meetings. Federal Highway Administration issued a FONSI.
19	I-25 Missouri Bridge Art, New Mexico Department of Transportation	Las Cruces, New Mexico	Managed bridge art selection process for I-25 bridge over Missouri Avenue. Manage artist selection criteria, advisory committee, and artist selection.
20	NM 344 Curve Reconstruction, New Mexico Department of Transportation and Bureau of Land Management	Santa Fe County	Prepared visual resource analysis for reconstruction of a curve on NM 344 in the San Pedro Mountains. The Bureau of Land Management's Visual Resource Management system was used.
21	Santa Rosa Property Phase I Environmental Site Assessment, New Mexico Facilities Management Division	Santa Rosa, New Mexico	Environmental specialist on Phase I Environmental Site Assessment project. Evaluated a property for proximity to known hazardous materials sites.
22	Deming Property Purchases, Deming Public Schools	Deming, New Mexico	Environmental specialist on Phase I Environmental Site Assessment projects. Evaluated three properties for proximity to known hazardous materials sites.
23	Pick-Martin Property Acquisition, Acoma Pueblo	Acoma Pueblo, New Mexico	Environmental specialist on Phase I Environmental Site Assessment project. Evaluated ranch for proximity to known hazardous materials sites.
24	Carnuel Water System Improvement Project, Albuquerque Bernalillo County Water Utility Authority	Bernalillo County, New Mexico	Environmental project manager on water system improvement project. Prepared environmental information document and conducted public meeting and public hearing. The Environmental Protection Agency issued a FONSI.

PNM BB2 Transmission Line Environmental Analysis Report

August 2018

Prepared For:
PNM



N | V | 5



ENVIRONMENTAL ANALYSIS REPORT

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Appendix A - Maps

Appendix B - Supporting Information

1.0 Introduction

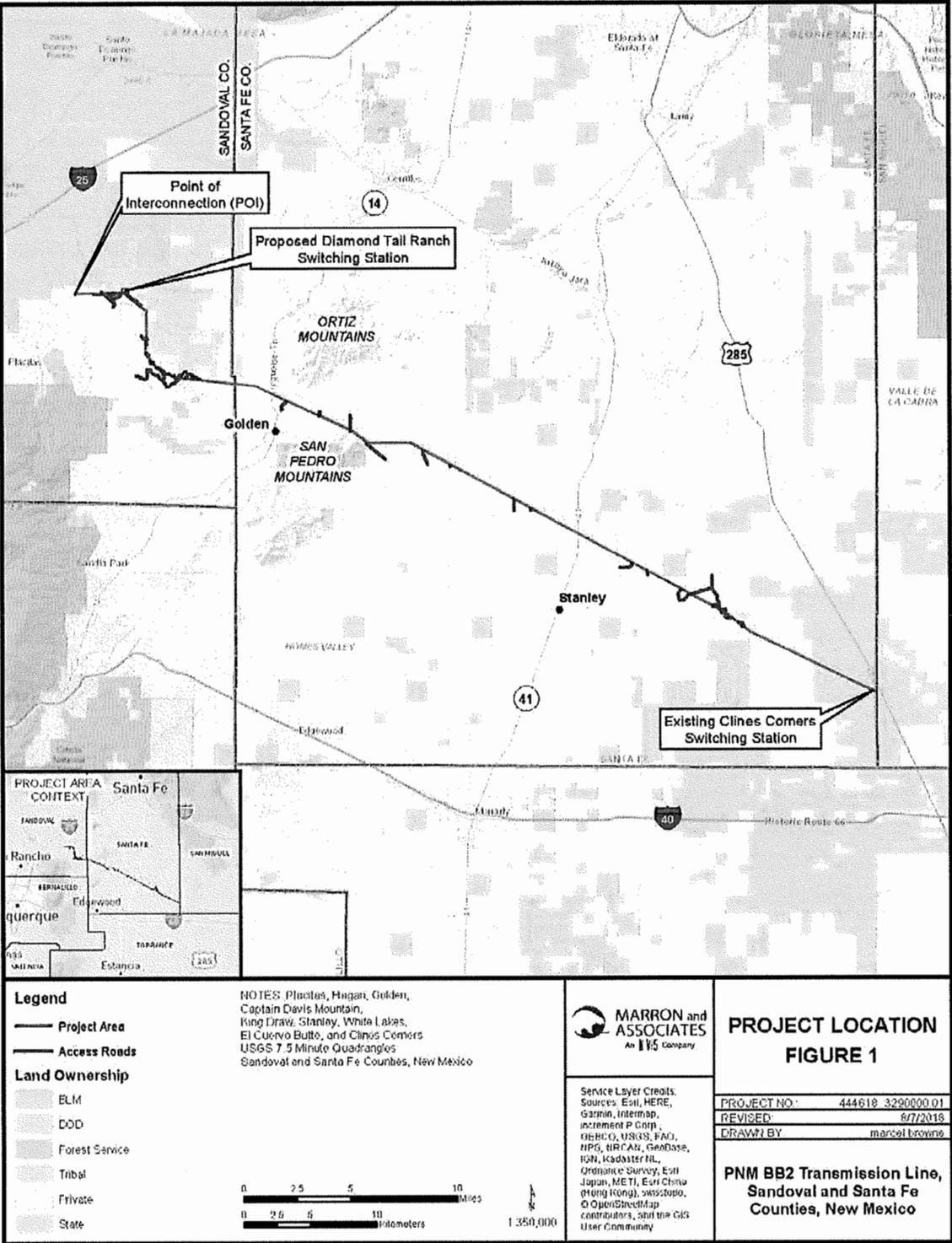
The Public Service Company of New Mexico (PNM) proposes to build a new 345 kilovolt (kV) single-circuit transmission line project and associated facilities in Sandoval and Santa Fe counties, New Mexico. This transmission project is referred to interchangeably as the “Proposed Project” or the “BB2 Project”. The BB2 Project will expand PNM’s existing transmission capacity and parallel the existing transmission facilities into New Mexico’s eastern plains so that new wind farms can deliver renewable energy to PNM and can access regional energy markets. The Proposed Project can be broken down into four segments:

1. Expansion of the Clines Corners 345kV Switching Station;
2. Construction of 42 miles of Single-Circuit 345kV Transmission Line;
3. Construction of the new 345kV Diamond Tail Switching Station; and
4. Construction of 3 miles of Double-Circuit 345kV Transmission Line.

The project will start east of Algodones and Interstate 25 (I-25) in Sandoval County at the Point of Interconnection (POI) and terminate near Clines Corners approximately 6 miles north of Interstate 40 (I-40) and west of US 285 in Santa Fe County (see Figure 1). The line is planned within an existing transmission line corridor immediately adjacent to the existing BB 345kV transmission line (BB Line).

The project would be constructed within an approximate 150-foot wide easement. The width of the easement may vary depending on site conditions. PNM is negotiating easement agreements with the landowners.

This Environmental Analysis Report (EAR) describes the purpose and need, alternatives considered, affected environment, and environmental impacts expected to be associated with the project. Mitigation measures are proposed to avoid and minimize project impacts. The EAR has been prepared to support PNM’s application requesting a Certificate of Public Convenience and Necessity (CCN) before the New Mexico Public Regulation Commission (PRC).



2.0 Purpose and Need

2.1 Project History

The purpose of the BB2 Project is to provide additional transmission capacity for wind energy development in Torrance County, New Mexico.

A wind farm developer, Avangrid Renewables, LLC (Avangrid Renewables), has executed Transmission Service Agreements (TSAs) with PNM totaling 362 megawatts (MW). These TSAs require that the Proposed Project be constructed in order to provide transmission service. PNM is required by the Federal Energy Regulatory Commission (FERC) to develop the requested capacity on its transmission system to serve this wind farm developer.

The Proposed Project is the most cost effective alternative to provide the requested transmission service by the required date and minimizes environmental impacts over other technically feasible alternatives.

2.2 Project History

PNM developed the BB2 Project in response to a need to provide additional transmission capacity. During 2018, PNM prepared a Plan of Development (POD) for the BB2 Project including construction, operation, and maintenance of the proposed 345kV transmission line. PNM also conducted biological and cultural resource field studies to identify wildlife species, vegetation types, archaeological sites, and historic properties within the BB2 Project area.

2.3 Existing Electric Facilities

The existing BB Line is a single-circuit 345kV transmission line with guyed-delta galvanized steel lattice structures that was constructed in the mid-1980's and spans the length of the BB2 Project area. The transmission line has already allocated a total of 1,000 MW of long-term transmission service and is at capacity (fully subscribed).

3.0 Alternatives

3.1 Alternatives Considered but Eliminated from Further Consideration

Other route alternatives were considered but eliminated due to cost and feasibility. A new route would require constructing a transmission line in a new transmission corridor in undeveloped areas. This would not only result in a higher construction and maintenance cost, but also have greater visual and right-of-way (ROW) impacts than a line constructed in an existing transmission corridor adjacent to the existing BB Line. Another route would be longer than the existing BB Line. More materials would be needed, and the level of land disturbance would be greater. For these reasons, it was determined that other routes were less preferred and were eliminated from further consideration.

3.2 No-Build Alternative

Under the No Build Alternative, a second BB Line would not be constructed. There would be no additional land disturbance along the existing BB Line, which would remain in its current condition. BB Line maintenance activities would occur, but this would not involve any land disturbance except for maintenance vehicles traveling along patrol 2-tracks and access roads. Another transmission line would be needed to serve the Avangrid Renewables wind farm. New routes would need to be considered along other transmission lines or across available land.

3.3 Proposed Action Alternative

PNM is proposing construction of the BB2 Project and associated facilities. The BB2 Project would include approximately 3 miles of double-circuit 345kV transmission line, the development of a new switching station called Diamond Tail Switching Station, 42 miles of a new single-circuit 345kV transmission line, and expansion within the existing Clines Corners Switching Station. The project would start east of Algodones and I-25 in Sandoval County at the POI and terminate near Clines Corners approximately 6 miles north of I-40 and west of US 285 in Santa Fe County (see Figures 1 and A5 through A8, Appendix A). The line is planned within an existing transmission line corridor immediately adjacent to the existing BB Line. The following alternative description is summarized from the POD (PNM 2018a).

Project Components

The BB2 Project consists of the following elements:

1. Construction of a new double circuit 345kV transmission line from the POI at the BA 345kV Switching Station east to a new 345kV switching station - This line component would be located adjacent to the existing BB Line and expands an existing utility corridor. This section of line is approximately 3 miles in length.
2. Development of a new 345kV switching station located on the Diamond Tail Ranch between the POI and NM Highway 14 (NM 14) -This switching station is needed to tie together the existing BB Line and the new circuits that would be built. The design of the switching station is such that circuits can be managed remotely, readily disconnected in an emergency, or taken out of service for routine maintenance. The new station site, to be located generally east of I-25 and west of NM 14, would encompass approximately 23 acres within a 40-acre parcel.
3. Construction of a new, approximately 42-mile-long single-circuit 345kV transmission line to the new switching station west from the PNM Clines Corners 345kV switching station - This line component represents most of the line construction. The new single-circuit line would be

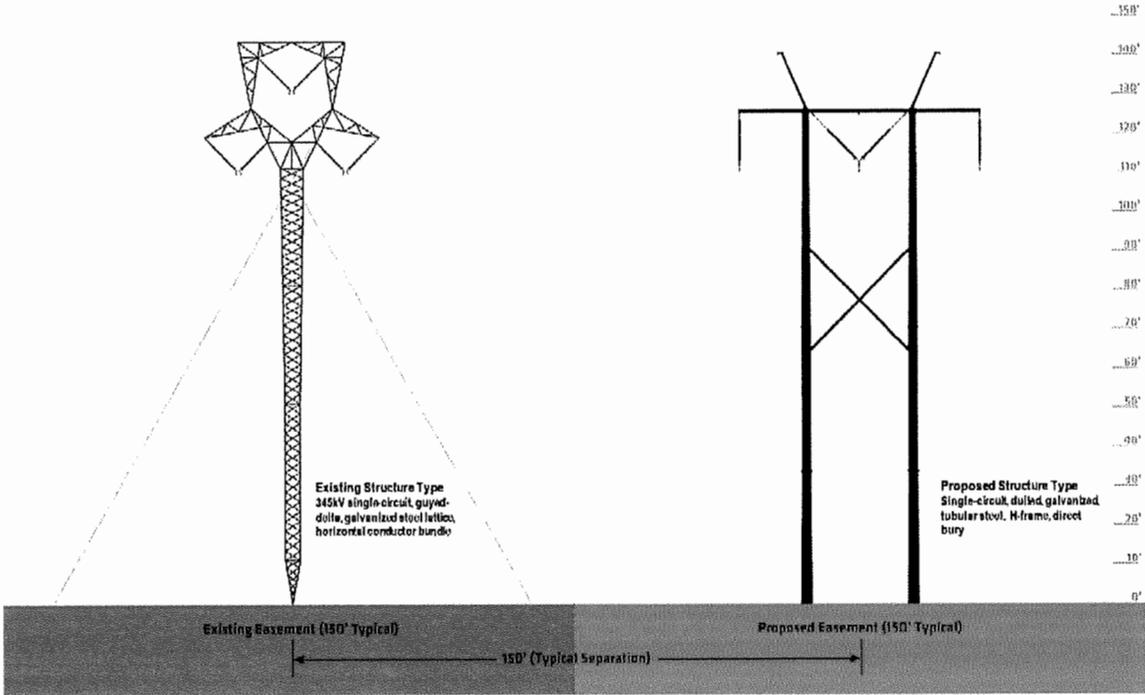
located adjacent to the existing BB Line and expands an existing utility corridor (see Figure 2). As with the BB Line, the BB2 Project would be located on lands presently used for ranching and dispersed rural residential use. The new transmission line will allow both uses to continue. Structures would be spaced out approximately 1,200 to 1,500 feet from each other. In rugged terrain, structures may be spaced up to 1,900 or 2,000 feet. To the extent practicable, new BB2 Project structures would align with existing BB Line structures and with similar height as the BB Line. The transmission structures would be 120 feet to 150 feet in height. A few longer spans with taller structures may be needed in certain locations due to terrain or other conditions.

4. Expansion of the existing Clines Corners 345kV Switching Station - The expansion is needed to accommodate the new single-circuit 345kV line connecting to the west. Expansion would occur within the footprint of the existing switching station, which is located on New Mexico state land. The Clines Corners Switching Station is located along US 285 about 6 miles north of I-40.

Right-of-Way (ROW) and Temporary Construction Permit and Access Needs

The BB2 Project would generally parallel the existing BB Line with approximately 150 feet of separation between the two lines. Placing a new transmission line within an existing corridor adjacent to an existing transmission line requires adequate clearances and separation for reliability, access, maintenance and to meet the requirements of the National Electric Safety Code (NESC). A new 150-foot-wide easement is needed to meet the required safety clearances. The transmission line and switching station would operate year-round, 24 hours a day.

The existing 345kV BB Line's structure type is a single-circuit, guyed-delta galvanized steel lattice, as shown in Figure 2. The main structure style for the BB2 Project will be steel monopoles for the double-circuit line from the POI to the Diamond Tail Switching Station and H- frame dulled (grey) galvanized structures for the single-circuit line from Diamond Tail Switching Station to Clines Corners Switching Station. These structures are shown in Figures 3 and 4.



Typical Structure & Easement Profiles



Figure 2. ROW Configuration

The BB2 Project area is located on lands in Santa Fe and Sandoval counties belonging primarily to various private land owners. State land managed by the New Mexico State Land Office (NMSLO) occurs along a few miles of the eastern end of the BB2 Project area in Santa Fe County.

The final BB2 structure locations would be determined by PNM by combining the information from the environmental and engineering investigations to identify a transmission alignment that seeks to avoid major environmental sensitivities and traverse areas of low environmental impact. Where no environmental concerns exist, the final placement would be based on engineering factors such as terrain, slopes, and access.

Facility Design Factors

The major components of the project include switching stations and transmission line facilities. Typical design characteristics of the BB2 Project are listed in Table 1. More detail on project design is contained in the following sections. Final design characteristics would be determined in the detailed final design phase of the project.

The design, construction, operation, and maintenance of the project would meet or exceed the requirements of the NESC, US Department of Labor, Occupational Safety and Health Standards (OSHA), and PNM’s requirements for safety and protection of landowners and their property.

Table 1. BB2 Project - Typical Design Characteristics

FEATURE	DESCRIPTION
Transmission Line Facilities	
Line Length and Type of Structure	1) West of New Station: approximately 3 miles 345kV double-circuit transmission loop with dulled galvanized tubular monopole steel structures. 2) East of New Station: approximately 42 miles 345kV single-circuit H-Frame dulled-galvanized structures.
Typical structure height	120 to 150 feet in height or, with longer spans, taller structures may be required
Typical span lengths	1,200 to 1,500 feet from each other. In rugged terrain, structures may be spaced up to 1,900 or 2,000 feet
Number of structures per mile	5 to 6
ROW width	150 feet
Access	US highway, state roads and local road network; 5 to 7 miles of new patrol 2-tracks; overland travel; and the use of approximately 15 to 25 miles of existing access patrol 2-tracks, 10 of which will require redevelopment.
Nominal Voltage	345kV AC line-to-line
Capacity	Line is rated at 1000 MW with transfer capacity limited to 362 MW
Circuit configuration	15 monopole double-circuit and 160 single-circuit with three phases per structure, two subconductors per phase
Conductor	Bundled 795 MCM ACSR Drake
Ground Wires	OPGW – 2 fiber optic ground wires for system operations
Design ground clearance of conductor	Minimum 30 feet; greater clearance highways and any cultivated areas as conditions dictate.
Pole foundations depth/diameter	Circular cast-in-place concrete with diameters of 2.5 to 5 feet and depths of 6 to 20 feet – may also be direct embedded.
H-Frame foundation depth /diameter/direct bury	Each typical tangent H-frame steel structure would be installed by direct embedding the poles typically 10 to 15 feet deep and backfilling.
Single Monopole Double-circuit	Each typical double-circuit steel monopole structure would be installed on cast-in place concrete pier foundations. The structure would then be placed on the piers.
Land Temporarily Disturbed	
Structure work area	50 x 100 feet per structure (approximately 180 structures with additional 20- by 40-foot permanent structure area)
Wire-pulling sites	150 x 300 feet (on each side of the site) per 2 to 3 miles, up to 150 x 750 feet depending on structure height.
Wire-tensioning sites	150 x 300 feet per 2 to 3 miles, up to 150 x 750 feet depending on structure height.
Wire-splicing sites	100 x 100 feet per 2 miles
Construction yard	Up to four at 5 to 10 acres each
Switching Station	
Clines Corners Switching Station (existing)	Within existing footprint, expand facility to accommodate new single-circuit 345kV line.
Diamond Tail Switching Station	New, 23-acre 345kV station to tie existing BB and new circuits within a 40-acre parcel.
Communication Facilities	
Systems	Microwave and fiber optic
Functions	Communications for fault detection, line protection, supervisory control and data acquisition (SCADA) and two-way voice communication
Key: AC=alternating current; KV=kilovolt; MW=megawatts; MCM (kcmil)=thousand circular mil; ACSR-aluminum conductor steel reinforced	

PNM | BB2

Switching Stations

Diamond Tail Switching Station

The new 345kV switching station would be located between the POI and NM 14. The new Diamond Tail Switching Station is needed to tie together the existing BB Line and the new circuits that would be built as part of this project. The design of the switching station is such that circuits can be managed remotely, readily disconnected in an emergency, or taken out of service for routine maintenance.

Clines Corners Switching Station

The existing Clines Corners 345kV Switching Station would be expanded. The expansion is needed to accommodate the new single-circuit 345kV line connecting to the west. Expansion would occur within the footprint of the existing switching station. Clines Corners Switching Station is located along US 285 about 6 miles north of I-40.

Transmission Facilities

The new transmission structures are planned to be placed adjacent to the existing BB Line structures in most places. The proposed transmission line components consist of a new 345kV transmission loop and a new single circuit 345kV transmission line.

Loop

A new 345kV transmission loop would be constructed from the POI in Sandoval County east to a new 345 kV switching station. This component with double-circuit design would be located adjacent to the existing BB Line and expands an existing utility corridor. This line section is approximately 3 miles in length.

Single Circuit

A new single-circuit 345kV transmission line would be constructed from the PNM Clines Corners 345kV Switching Station west to the new Diamond Tail Switching Station. This line component represents most of the line construction, approximately 42 miles in length. The new single-circuit line would be located adjacent to the existing BB Line and expands an existing utility corridor. As with the BB Line, the project would be located on lands presently used for ranching and dispersed rural residential use. The new transmission line would allow both uses to continue. The new construction would require an easement typically 150-foot-wide (easement requirements along this new connector line may vary, depending on site conditions). PNM is negotiating with private landowners to obtain this easement.

Structures and Foundations

The project would be built using approximately 175 structures. All structures would be designed to meet NESC requirements. Illustrations of 345kV structures that would be used for this project are provided in Figures 3 and 4. Two structure types would be used for the project:

- Single-circuit H-frame dulled, galvanized tubular steel structure (gray color) (42 miles);
- Double-circuit or galvanized tubular steel structure for a loop on the western edge of the BB2 Project area (3 miles).

Structure heights would range from 120 feet to 150 feet varying with terrain and associated span lengths. Some structures may be taller depending on span lengths in rough terrain. Span lengths would typically be spaced out approximately 1,000 to 1,500 feet from each other, resulting in about four to six structures per mile of line. Some span lengths in rough terrain would be closer to 1,900 or 2,000 feet.

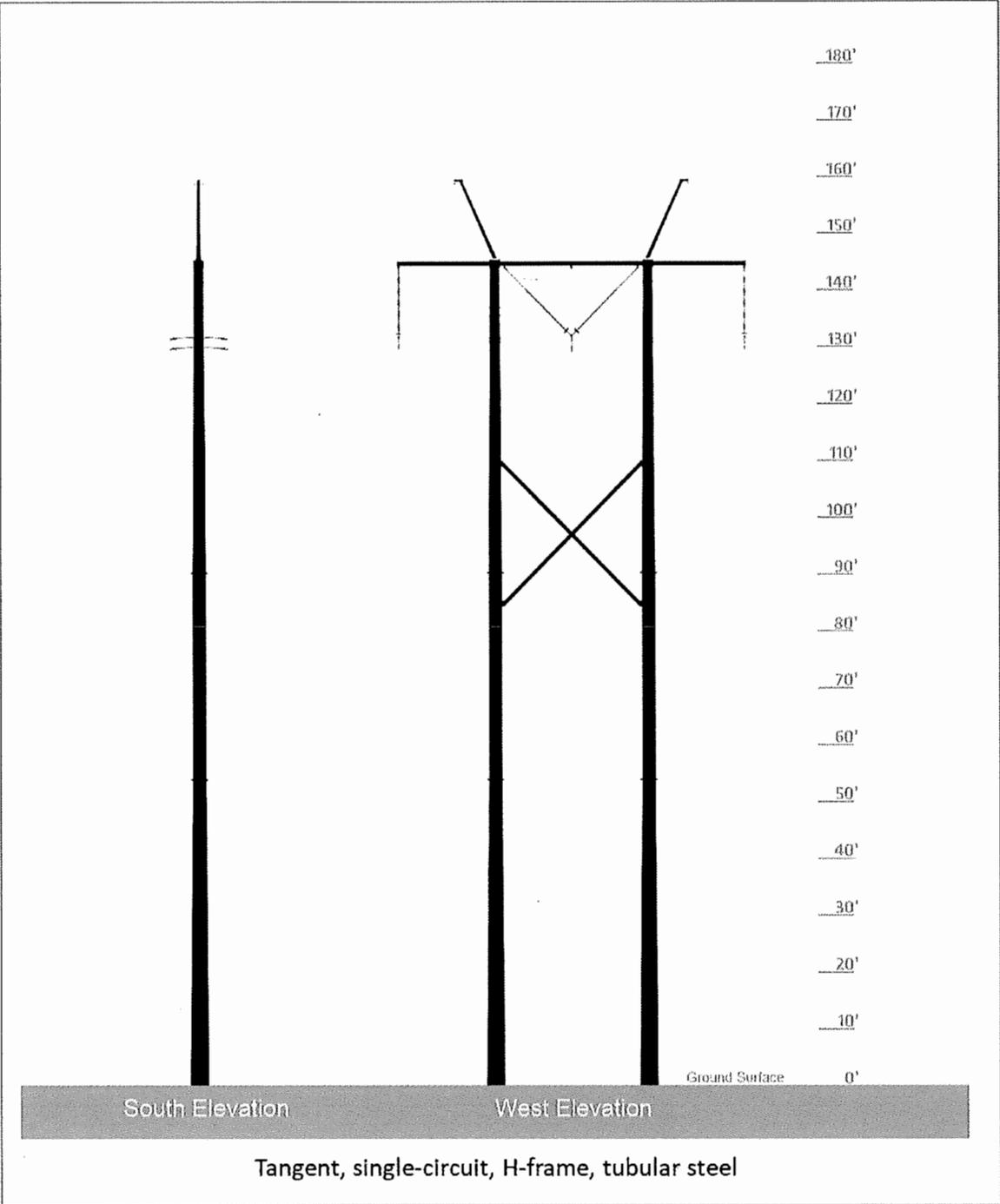


Figure 3 Single-Circuit H-Frame Structure

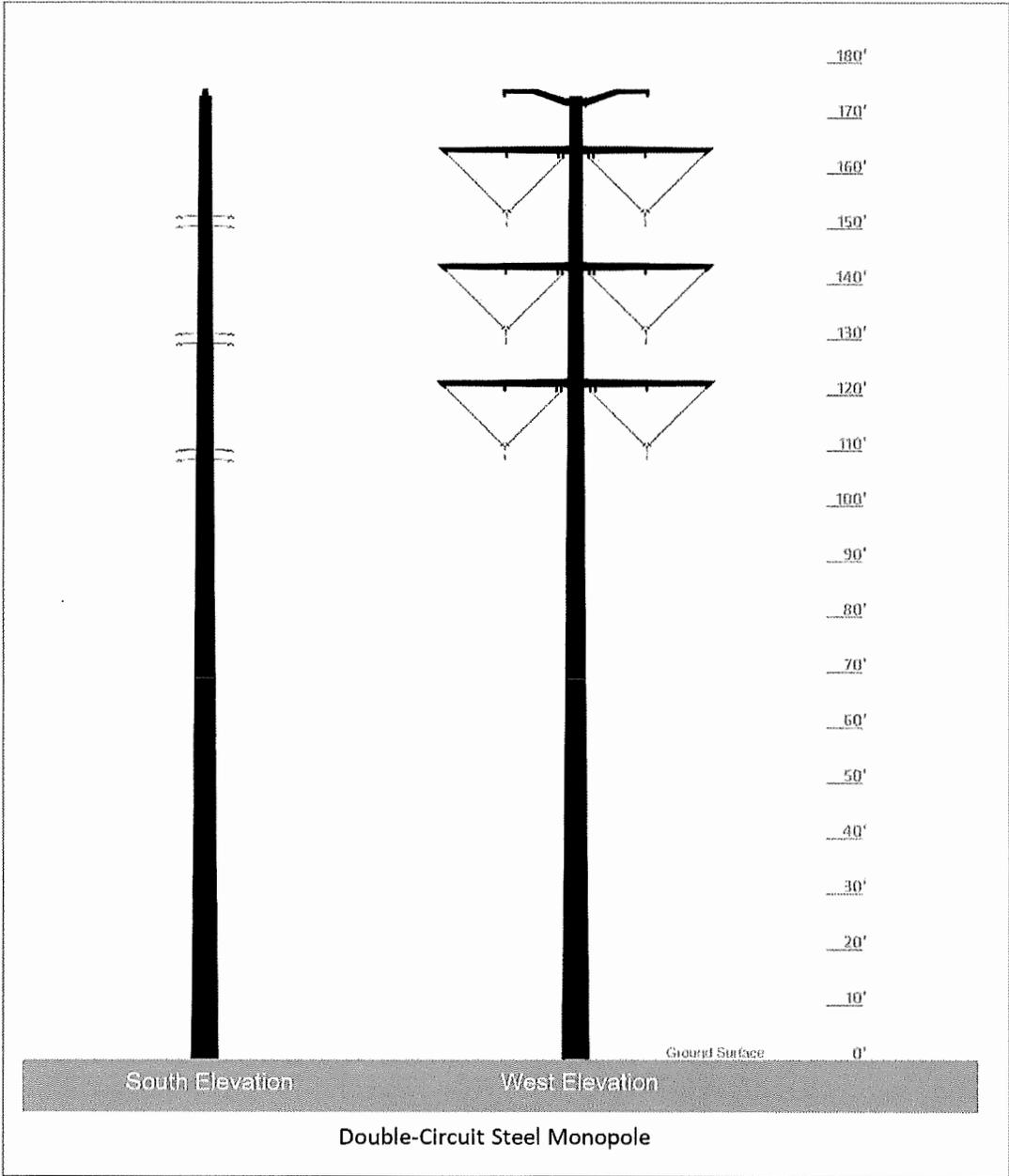


Figure 4. Double-Circuit Tubular Steel Structure

PNM | BB2

Depending on soil and loads, the foundations would be installed either on drilled pier foundations or direct embedment. Each structure location would be evaluated individually during final engineering to determine the exact foundation dimensions.

Each typical tangent H-frame steel structure would be installed by direct embedding the poles typically 15 to 30 feet deep and backfilling. Trees would be cleared to provide a 100-foot wide clear zone along the corridor to comply with North American Electric Reliability Corporation (NERC) and PNM vegetation management standards.

Each typical double-circuit steel monopole structure would be installed on cast-in-place concrete pier foundations. The structure would then be placed on the piers.

Structure Sites

Each structure site area would be approximately 20 by 40 feet. The locations of structure sites would be shown on the final engineering design and POD. Temporary construction staging areas would be adjacent to each structure site and within the ROW. They would be approximately 50-foot wide (up to 100 feet) by 100-foot long. Final structure locations would be determined by topography, best engineering practices, and environmental and land use considerations.

Wire Pull/Tensioning Sites and Wire Splicing Sites

The pull/tensioning sites are temporary-use areas where equipment is set up for pulling the conductors and shield wires. Construction equipment would be set up at both sides of a pull site at approximately a 3:1 ratio or greater from the structure(s). On average, these sites would be approximately 150-footwide by 300-foot long (or longer). The size would depend on the manufacturer's recommendations and the height of the poles. No ground disturbance is required for this activity.

A pilot or sock line of nylon or flexible steel would be threaded through the stringing sheaves from one structure to another. A larger, higher-strength, flexible-steel pulling line would be threaded through the sheaves by the pilot line and used to pull the conductor into position. Some contractors use the sock line as a pulling line. Not all the BB2 ROW is suitable for this method of wire pulling. In those instances, helicopters could be used.

Grounding

Ground rods would be installed next to the structure foundations and would be bonded to the structure. H-frame and steel-pole structures would typically have two grounds installed per structure. After the ground rods have been installed, the grounding would be tested to determine the resistance to ground. If the measurements indicate a high resistance, counterpoise may need to be installed, which typically consists of trenching in-ground wire to a depth of 12 inches in non-cultivated land with a ground rod driven at the end.

Optical Grounding Wire

Reliable and secure system communications for controlling and monitoring the transmission line is important to maintain the operational integrity of the project and the overall interconnected system. Primary communications for relaying and controlling the system would be provided via optical grounded wire (OPGW), which would be installed on the transmission line. Each transmission

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structure would have two lightning-protection shield wires installed on the peaks of each structure. The glass fibers inside the OPGW shield wires would facilitate data transfer between facilities along the fiber path. The data transferred are required for controlling and monitoring the system.

Staging Areas

Staging areas and equipment storage areas would be needed for storing materials, construction equipment, and vehicles (see Figure 5). Staging areas/construction material storage areas needed for the project would be located on private land or state land. There would be about four staging areas located along the BB2 Project area. Each area would be 5 to 10 acres in size or larger.

Access

Construction of the transmission line would require vehicle, truck, and crane access to each new structure site for construction crews, materials, and equipment. Similarly, construction of other project facilities (e.g., staging areas and station sites) would require vehicle access. To the extent practical, existing roadways would be used. Access to the BB2 Project area would be along existing state and local road networks; 5 to 7 miles of new patrol 2-tracks; overland travel; and the use of approximately 15 to 25 miles of existing access patrol 2-tracks with approximately 10 miles requiring redevelopment.

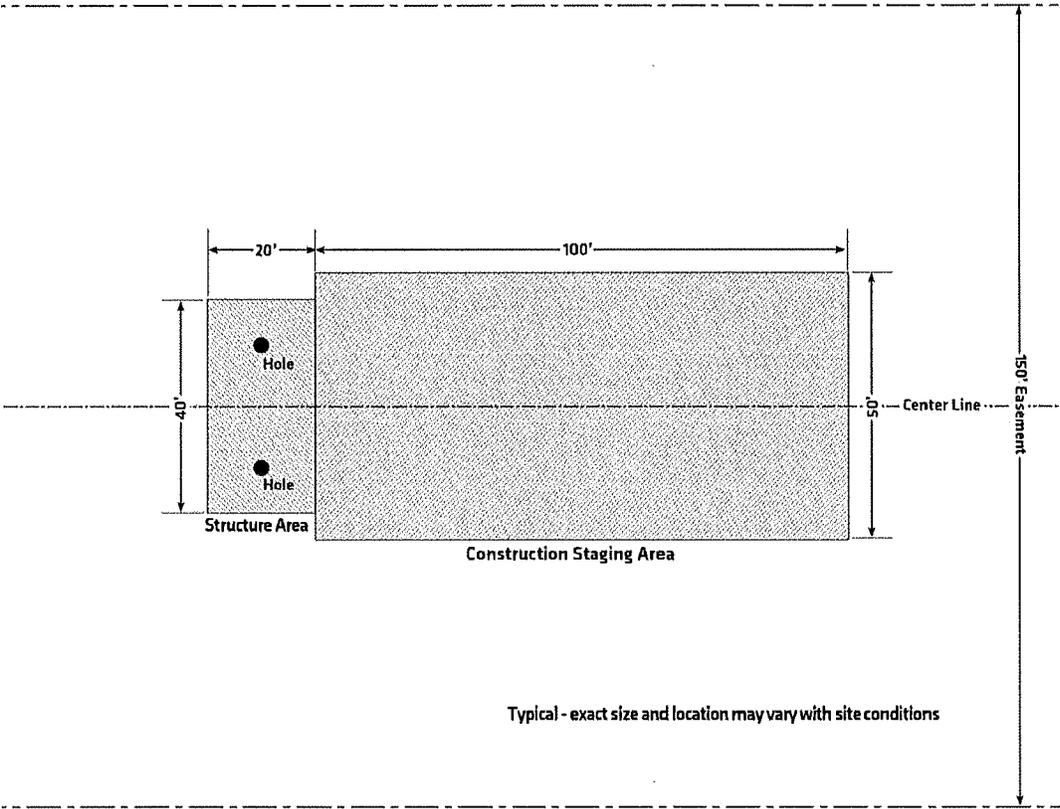


Figure 5. Structure and Staging Areas

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Induced Current Mitigation

Buried water and gas pipelines that are crossed with overhead electrical transmission lines are subject to the influence of electromagnetic fields that may result in safety concerns for people or mobile equipment making contact with the pipeline, including pipeline personnel, as well as long-term corrosion damage to the pipeline and to any existing corrosion-protection equipment. Determining proper mitigation for placing the BB2 Project that may cross over pipelines would be addressed and coordinating with each utility that may be crossed would be conducted and crossing permits would be obtained from these entities as needed. In addition, all existing fences, metal gates, pipelines, and other features that cross or are within the transmission line ROW would be grounded to prevent electrical nuisance shock.

Construction, Staging and Access

Construction would generally include surveying the centerline; accessing development; clearing portions of the ROW and structure sites; installing foundations; assembling and erecting structures; installing conductors, overhead shield wires, and grounding systems; and cleaning up and performing site reclamation.

The workforce and types of equipment would vary during construction. Approximately 15 to 25 miles of existing patrol 2-tracks would be used to access the line during construction. Construction would be progressive and proceed generally in a linear fashion, though multiple crews may be working simultaneously. The total number of personnel would average to between 40 and 70 (generally 50). Multiple work crews may be working on the transmission line at certain times.

Most equipment used by PNM and contractors would be highway legal. Overweight, height-limited, and oversized vehicles would be permitted.

Funding

As currently proposed, the transmission rates paid by the developer would pay for the BB2 Project improvements over time. The cost of this project would be neutral or beneficial to PNM customers.

4.0 Affected Environment and Impacts

4.1 Landforms and Geology

Affected Environment

The BB2 Project area is in the Rio Grande Physiographic Province (Williams 1986). The westernmost portion of the corridor is the lowest portion of BB2 Project area at an elevation of 5,750 feet. A low mountain pass between the San Pedro and Ortiz mountains is the highest point in the BB2 Project area at an elevation of 7,030 feet. The BB2 Project area then slopes downward to the east. The eastern terminus has an elevation of 6,970 feet. On average, representative slopes range from approximately 0 to 45 percent in the BB2 Project area and immediate vicinity.

The western end of the BB2 Project area is complex and is composed of a wide range of geologic formations from the Permian to the Pleistocene. Surface geology at the west end of the BB2 Project area is a mixture of clastic, medium-grained mixed-clastic, shale, and sandstone (see Figures A1 and A2, Appendix A). The BB2 Project area then passes through a large area of alluvium, which is the predominant surface geology along the corridor. The east end of the BB2 Project area is medium-grained mixed-clastic (Green and Jones 1997).

Paleontological resources may be present in the BB2 Project area. In the Bureau of Land Management's Ball Ranch Special Management Area, paleontological resources are present including petrified wood, bivalve marine shells, and Eocene mammal bones (Bureau of Land Management 1985). The Ball Ranch Special Management Area is located approximately 2 miles north of the BB2 Project area. Similar geologic formations containing fossils may be present in the BB2 Project area.

Geologic resources are not being extracted in the BB2 Project area. No mining is occurring.

Environmental Impacts

Transmission structure foundation construction would require excavation through geologic material. Each typical double-circuit steel monopole structure would be installed on cast-in place concrete pier foundations. The structure would then be placed on the piers. Each typical tangent H-frame steel structure would be installed by direct embedding the poles typically 10 to 15 feet deep. In poor geologic conditions, concrete backfilling may be required. Geologic surface disturbance would occur at structure areas and construction staging areas. Geotechnical studies will be conducted to ensure that structure design is appropriate to the underlying geologic material. Excavation may occur in geologic strata containing fossils. Geotechnical studies will characterize the geology where structures would be placed.

4.2 Soils

Affected Environment

A variety of soil types occur in the BB2 Project area due to varied terrain, geologic material, vegetation, and climate conditions. Four soil orders are present in the BB2 Project area (see Figures A3 and A4, Appendix A). Entisols are in the western part and a few isolated areas in the eastern part of the BB2 Project area. Aridisols are the commonest soil and are mostly in the middle and eastern parts of the BB2 Project area. Alfisols and Mollisols occur in wetter conditions. Alfisols occur near the San Pedro and Ortiz mountains. Mollisols are in scattered locations in the middle and eastern parts of the project area (Natural Resources Conservation Service 2018).

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BB2 Project area lands are used for livestock grazing. No crop cultivation is occurring. No prime farmland or farmland of statewide importance has been identified by the Natural Resources Conservation Service within the BB2 Project area. No conversion of important farmland would occur.

Environmental Impacts

As currently proposed, the project would consist of approximately 45 miles of utility corridor within a 150-foot wide easement and a switching station. The estimated temporary soil disturbance area from transmission line installation and access road development would be 176 acres, and the permanent disturbance area would be 48 acres. Temporary impacts include structure area, construction staging areas, wire-pulling sites, wire-tensioning sites, wire-splicing sites, and construction yards. Permanent impacts include the 20 feet by 40 feet structure pad, which includes the pole foundations and H-frame foundations, some construction work areas, and access roads. The temporary and permanent disturbance area for the construction of the Diamond Tail Switching Station would be approximately 23 acres within a 40-acre parcel. Temporarily disturbed areas will be restored. Reclamation procedures are described in Section 5.0 of this Environmental Analysis Report and in the POD.

4.3 Surface and Ground Water

Affected Environment

No perennial waterways cross the BB2 Project area. Forty-nine ephemeral or intermittent arroyo crossings occur in the BB2 Project area. Most are unnamed. Named arroyos include Cañon Tejon, Arroyo Coyote, Arroyo Uña de Gato, Lucas Canyon, Arroyo Tuerto, Kamradt Draw, Big Draw, Kinsell Draw, Armijo Draw, and tributaries to Armijo Draw and are shown in Figures A5 through A8, Appendix A. The BB2 Project area crosses some arroyos in several locations.

The Federal Emergency Management Agency (FEMA 2018) has identified Zone A, flood hazard areas without base flood elevations in association with arroyos and draws that cross or approach the BB2 Project area. The BB2 Project area passes through these areas.

In general, the depth to groundwater in the BB2 Project area is expected to exceed 100 feet below the ground surface. In most areas, the depth would be deeper. No wells are located in the BB2 Project area.

Analysis of Impacts

No dredge or fill of waterways is proposed. As feasible, structures would be placed to avoid waterways and any associated wetlands. Arroyos in the BB2 Project area would be crossed via existing access routes for construction access. For most access, no blading of new roads or improvement of existing roads (installation of surfacing) is proposed. No impacts to downstream receiving waters are expected due to construction. If it is determined that fill would be placed in a jurisdictional Water of the US, permit coverage would be obtained as necessary from the US Army Corps of Engineers (USACE).

No loss of floodplain function would occur. No change in flood hazard zones or alteration of base flood elevations would occur.

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4.4 Wetlands

Affected Environment

Wetlands are present at a few locations at the western end of the BB2 Project Area (see Figures A5 and A8, Appendix 9). Several drainages located near the western terminus of the of the BB2 Project area exhibited evidence of the presence of groundwater, such as salt crust on the soil or wetland plant species. Some of these areas had seeps discharging enough groundwater to have flowing surface water and wetlands. Many larger arroyos have high steep banks above the channel. Several of these drainages were fed by persistent groundwater (Knight and Hathcock 2018).

The Cañon Tejon Seep Wetland is located under the existing BB Line between structures BB30 and BB31 (see Figures A5, A9, and A10, Appendix A) and consists of two wetland areas, but function as one wetland because of their proximity to one another and their assumed shared groundwater hydrology. The upper portion of the wetland saturates part of Access Road 14 south of the existing BB Line. The second portion of the wetland is located downslope and approximately 340 feet east-northeast of BB30 along the bottom of small drainage that discharges into the Cañon Tejon Drainage.

Arroyo Coyote had flowing water present within the BB2 Project area throughout the early spring (see Figures A5, A9, and A11). Access Roads 9, 10, and 12 cross Arroyo Coyote. Surface water was present approximately 1,800 feet both upstream and downstream of the BB2 Project area. Since this large drainage is subject to intense summer flows during the monsoon season, wetland vegetation is scoured from the sandy channel bottom. The Arroyo Coyote crosses perpendicular through the BB2 Project area and is a large intermittent drainage with perennial reaches fed by groundwater flows. The existing BB Line structures are located above the ordinary high-water mark (OHWM) of the drainage.

A large amount of groundwater is surfacing under the existing BB Line at the junction of Arroyo Coyote and Cañon Tejon (see Figure A5, Appendix A). This groundwater and surface water support an extensive area of salt cedar intermixed with Siberian elm, Russian olives, and scattered cottonwood trees. It provides high-quality bird habitat that lines the waterway just south of the BB2 Project area and expands into an area of approximately 13 acres in size north of the BB2 Project area. This bird habitat provides potential habitat for southwestern willow flycatcher and yellow-billed cuckoo. If clearing of woody vegetation is required in this area, approximately 0.65 acres of perennial wetland habitat may be removed.

Analysis of Impacts

Construction activities would occur outside the wetland boundaries within most of the BB2 Project area. No structures would be installed in wetlands. Access Road 4 is within the Cañon Tejon Seep Wetland. The wetland is on a steep slope of a ridge, and Access Road 4 cuts through the bottom of this wetland (see Figure A9). This area would be protected by using wetland mats that vehicles could drive over. The BB2 Project structures associated with Arroyo Coyote are located outside the floodplain of the waterway, and new structure construction would have no impact to the Arroyo Coyote Wetland. However, three access roads in this area (Roads 9, 10, and 12) cross the waterway in areas where surface water and wetland vegetation is present. Regular use of these roads has left a clear zone along the road bed through the wetland vegetation. This area would be protected by using wetland mats that vehicles could drive over. The mats would be removed after construction in those areas is completed.

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4.5 Vegetation

Affected Environment

The BB2 Project area occurs within the Arizona/New Mexico Plateau, Southwestern Tablelands, and Arizona and New Mexico Mountains ecoregions. The western BB2 Project area extent begins at the eastern edge of the Albuquerque Basin sub-ecoregion, and the BB2 Project area passes through the Pinyon/Juniper Woodlands and Savannas, Conifer Woodlands, and Savannas sub-ecoregions, and terminates at the eastern project extent in the Central New Mexico Plains sub-ecoregion (Griffith et al., 2006).

The BB2 Project area supports four major natural vegetation types including Coniferous Woodland, Juniper Savanna, Plains-Mesa Grassland, and Arroyo Riparian (Dick-Peddie 1993). The most abundant is Plains-Mesa Grassland, which covers approximately 22 miles of the corridor. Arroyo Riparian is the least common. A map of the vegetation communities for the BB2 Project area was prepared (Knight and Hathcock 2018; see Figures A12 and A13, Appendix A).

Plains-Mesa grassland covers the eastern plains of New Mexico and can be found on tops of mesas throughout the state. Blue grama is one of the most common grasses found in Plains-Mesa Grasslands and can often be found with other grass species such as galleta, buffalo grass, species of wheatgrass, shrubby vegetation such as winterfat, and cane cholla. This vegetation type covers the most area in the project area, occurring in large continuous sections east of the pass between the Ortiz and San Pedro mountains from BB104 to BB156 and also from BB170 to the eastern terminus of the BB2 Project area at BB197. One small section occurs between areas of Juniper Savanna east of NM 14 from BB62 to BB67.

Juniper savanna vegetation covers large portions of New Mexico at the transition zone between woodlands and grasslands and scrub zones. A thinning tree density and an overall increase in grasses characterize this zone. The dominant tree is one-seed juniper. The main grass species found include blue grama, galleta, and three-awn species. Other common species include snakeweed, winterfat, cane cholla, and club cholla. Juniper savanna occurs in small patches near the western terminus of the BB2 Project area including from BB33 to BB38, BB42 to BB43, and BB61 to BB62. There are two larger continuous patches on the eastern and western edges of the pass between the Ortiz and San Pedro mountains where juniper savanna occurs between BB67 and BB70 on the western edge and between BB101 and BB104 on the eastern edge. Finally, Juniper Savanna is found interspersed with pinyon-juniper woodland in the mesa area near the eastern terminus between BB155 and BB158.

Due to the variability of the terrain, the composition of Coniferous Woodland within the BB2 Project area varies considerably. The pinyon-juniper portion of the Coniferous Woodland in the western portion of the BB2 Project area is dominated by scattered pinyon with the bulk of the trees present in the community consisting of denser stands of one-seed juniper. The dominant shrubs and herbaceous species within this community include snakeweed, four-winged saltbush, rabbit brush, and Indian rice grass. Within the proposed BB2 Project area, pinyon-juniper woodland occurred in three main areas. The most diffuse pinyon-juniper woodland (intermixed with juniper woodland, savanna, and patches of grasses) occurs near the western end of the BB2 Project area from BB30 to BB61. The largest section of pinyon-juniper woodland is approximately 6 miles long and occurs in the pass between the Ortiz and San Pedro mountains between BB72 and BB101. The last section of pinyon-juniper woodland occurs along a stretch of small mesas and drainages approximately 7 miles west of the eastern terminus of the project from BB158 to BB170. In this area, the pinyon-juniper is interspersed with sections of Juniper Savanna. The

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BB2 Project would cut a 100-foot wide area of Coniferous Woodland and Juniper Savanna vegetation which would comply with NERC and PNM vegetation management standards.

Juniper woodland occurs only on the western half of the BB2 Project area west of NM 14. It occurs in small patches from BB31 to BB61, where it is located between sections of pinyon-juniper and Juniper Savanna. It then occurs sporadically between BB72 and BB101. The overall tree density in these areas is above what would normally be considered savanna, and grasses were scarce. This community is most common in the western portion of the BB2 Project area where combinations of topographically broken country and complex geology create numerous microhabitats and consequently highly variable vegetation distribution.

Arroyo Riparian vegetation occurs in the drainages. First order drainages within the BB2 Project area are generally less well-defined and often scoured with little riparian vegetation present. However, the larger second order drainages often have clearly defined vegetation bands lining their banks forming an Arroyo Riparian plant community. At higher elevations in the Coniferous Woodland in the eastern half of the BB2 Project area, the larger drainages are lined with densities of Apache plume, mountain mahogany, and California brickbush. The drainage bottoms supported patches of side-oats grama, blue grama, galleta, and sporadic snakeweed. The drainages near the western terminus and the lowest elevations in the BB2 Project area that spill into Tonque Arroyo are often edged with scattered salt cedar, rabbit brush, and occasionally four-wing saltbush. Herbaceous species occasionally found in the riparian fringe or channel bottoms of these larger drainages include common sunflower, alkali sacaton, summer cypress, and cocklebur. Since Arroyo Coyote is subject to intense summer flows during the monsoon season, wetland vegetation is scoured from the sandy channel bottom. However, wetland vegetation is present along the lower slopes with wetland species such as salt cedar, coyote willow, spike rush, watercress, and blue water speedwell. Alkali seeps were present at several locations within the eroded hills upslope from the Cañon Tejon Drainage. These areas are heavily encrusted with salt and are dominated by salt grass, alkali sacaton, sea arrowgrass, and scattered mountain rush.

The New Mexico Department of Agriculture (NMDA) designates invasive weeds as noxious and targeted these species as needing control or eradication pursuant to the *Noxious Weed Management Act of 1998*. Noxious weeds are divided into three divisions: Class A, Class B, and Class C. There are no Class A or B species present within the BB2 Project area; however, four species of Class C weeds are present including Siberian elm, Russian olive, tree-of-heaven, and salt cedar. Siberian elm, Russian olive, and salt cedar grow along Arroyo Coyote and scattered in small pockets along Arroyo Uña de Gato, Cañon Tejon, and Arroyo Cuchillo. Tree-of-heaven is found at only one location along the access road off Puerticito Road.

Analysis of Impacts

Most of the proposed BB2 Project area supports intact, and in many areas, undisturbed vegetation. Approximately 176 acres of temporary vegetation impacts and 48 acres of permanent vegetation impacts would occur. Temporary impacts include the structure areas, construction staging areas, wire-pulling sites, wire-tensioning sites, wire-splicing sites, and construction yards. Permanent impacts include pole foundations, H-frame foundations, access roads, and the Diamond Tail Switching Station. In addition, approximately 345 acres of Coniferous Woodland and Juniper Savanna trees would be removed to comply with NERC and PNM vegetation management standards. This would impact principally the Coniferous Woodland habitats where tree densities in some areas in the pass between the Ortiz and San Pedro mountains can reach 100 per acre. Native vegetation is expected to recover in temporary disturbance areas. Reclamation procedures are described in Section 5.0 of this EAR.

Generally, no management actions are required for the Class C species. The majority of the Class C weeds that are present grow in wetter sites. The BB2 Project structures would span these areas, and there should be no direct contact with these populations aside from use of existing access roads.

4.6 Wildlife

Affected Environment

Overall, wildlife was not abundant in the BB2 Project area. A total of 67 vertebrate animal species were observed during the biological survey including 49 bird species, 16 mammal species, and two reptile species. No amphibians were observed. The low diversity present was likely due to poor habitat quality and limited water sources. Nevertheless, common species, such as ravens, kangaroo rats, pocket gophers and pronghorn antelope, were observed regularly. Within the grassland habitats birds were especially scarce. Species most commonly observed included horned lark, American crow, and common raven. Other species such as western meadowlark and curve-billed thrasher were scattered and uncommon throughout the grassland areas. In the Coniferous Woodland and Savanna communities, the most common species were house finch, dark-eyed junco, and northern flicker. Bewick's wren, mountain chickadee, and mountain bluebird were also locally common in some areas (Knight and Hathcock 2018).

Migratory Birds

During 2018 biological field surveys, 132 migratory bird nests were discovered within or adjacent to the BB2 Project area. Of those, 110 (83.3 percent) of the nests were stick nests on the existing BB Line structures. Over 90 percent of these nests occurred in grassland areas. In aggregate, the Coniferous Woodland and Juniper Savanna communities accounted for approximately 55 percent of the total vegetative cover, but these combined communities accounted for only 6.8 percent of the nests found (and most of these were twig nests in adjacent trees). There appeared to be a clear preference, at least for the larger bird species, to use the transmission line structures in the grasslands as opposed to the woodland areas.

Birds of Prey

At least six species of birds of prey occurred in the BB2 Project area and included American kestrel, red-tailed hawk, Cooper's hawk, peregrine falcon, ferruginous hawk, and Swainson's hawk. An active red-tailed hawk nest was observed adjacent to the BB2 Project area. There are no burrowing owls within the BB2 Project area, possibly due to the low number of prairie dog burrows.

Protected Species

No federally-listed endangered or threatened species were observed in the BB2 Project area, but potential southwestern willow flycatcher and yellow-billed cuckoo habitat occurs in the BB2 Project area. The southwestern willow flycatcher is a federal and state endangered species that occurs in riparian shrub habitat with a cottonwood or box elder tree over story. The yellow-billed cuckoo is a federal threatened species that occurs in riparian woodland habitat with cottonwoods and willows. Within the BB2 Project area, southwestern willow flycatcher potential migration habitat and yellow-billed cuckoo potential habitat are present in an area of riparian trees and shrubs at Arroyo Coyote (see Figures A5, A14, and A15; Appendix A). No southwestern willow flycatchers or yellow-billed cuckoos were observed during 2018 protocol surveys.

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Two state threatened species were observed in the BB2 Project area during 2018 field surveys. They were gray vireo and peregrine falcon. Several gray vireos were detected in nesting territories during territorial calling surveys (see Figure A5, Appendix A). A peregrine falcon was observed in the BB2 Project area, but appeared to be hunting, not nesting. No other federal or state threatened species were observed (Knight and Hathcock 2018).

The gray vireo is listed as threatened in New Mexico. It is found throughout much of the western United States and northern Mexico. It is usually found breeding from southern California to western Oklahoma, and southward to northern Baja California, southern Arizona, southern New Mexico, western Texas, and northern Coahuila, Mexico. In New Mexico, gray vireos summer west of the eastern plains, from the San Juan Valley, Santa Fe area, and southward to the southern New Mexico border (NMDGF-BISON 2018). In New Mexico, gray vireo (an insectivore) is only found during the months of April through September when insects are most abundant. It generally nests from May through August. Gray vireos are found in Coniferous Woodland including lower pinyon-juniper woodland into upper Juniper Savanna. The gray vireo is known to nest in Sandoval and Santa Fe counties. Gray vireo appears to be somewhat intolerant of human presence and activity, and they tend to leave the area when development moves into occupied habitat. Although gray vireos were observed in the BB2 Project area, no gray vireo nests were observed in the BB2 Project area.

Peregrine falcons are listed as threatened in New Mexico. This species breeds in mountainous areas and occurs essentially statewide, except during winter. During summer, peregrine falcons nest on tall, steep, rocky cliffs associated with forest or woodland close to water. Peregrines take virtually all their prey on the wing, typically after a stoop or dive from above. Prey consists almost entirely of birds ranging in size from swallows to ducks and large shorebirds. A solitary peregrine falcon was observed within and adjacent to the BB2 Project. The falcon was initially perching on the top of the BB34 structure and later moved to the northern end of the Arroyo Coyote Wetland. There was no suitable nesting habitat for peregrine falcon within or near the BB2 Project area. The only likely nesting habitat for this species is a section of cliffs about 1.1 miles east of structure BB44.

Intermittent and permanent water sources support some riparian woodland vegetation that provides suitable migration habitat for the federally listed southwestern willow flycatcher and western yellow-billed cuckoo. Protocol surveys were conducted during 2018 to determine whether either of these species would be affected by the proposed project. These species were not found in the BB2 Project area.

Environmental Impacts

There would be 176 acres of temporary habitat removal, and 48 acres of permanent habitat removal. Temporary disturbance areas would be restored using measures described in Section 5.0 of this report.

The trees within the woodland and savanna communities within the 100-foot wide clear zones under the transmission line would be removed. Although this removal would occur in a relatively narrow band in relation to the overall habitat areas, it would result in a permanent loss of habitat for the species that rely on this habitat type. To lessen the impact to habitat, tree clearing would occur outside the migratory bird nesting season (March 15 to September 15) to the extent practical or a preconstruction migratory bird survey would be conducted.

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The risk of raptor electrocutions is low. A 60-inch separation of conductors reduces the risk of raptor electrocution (avian protection). Raptor wingspans are insufficient to make contact between two conductors. Collision risks would be low to moderate. There are no regular flight paths in the BB2 Project area, such as between a foraging area and pond. Occasional bird collisions may occur during periods of poor visibility, such as dust storms and foggy conditions.

For the southwestern willow flycatcher, the BB2 Project may affect southwestern willow flycatcher potential migration habitat at Arroyo Coyote. No southwestern willow flycatchers were observed during 2018. PNM will conduct southwestern willow flycatcher protocol surveys in 2019 to confirm the absence of this species.

For the yellow-billed cuckoo, the BB2 Project may affect yellow-billed cuckoo potential habitat at Arroyo Coyote. No cuckoos were observed during 2018. PNM will conduct yellow-billed cuckoo protocol surveys in 2019 to confirm the absence of this species.

Regarding impacts to the gray vireo, PNM will coordinate with the New Mexico Department of Game and Fish and develop plans to implement measures to reduce impacts in gray vireo occupied habitat. Approximately 345 acres of woody habitat (trees) would be removed, and of that, 172 acres of gray vireo habitat would be removed. To lessen the impact to habitat, tree clearing would occur outside the migratory bird nesting season (March 15 to September 15) to the extent practical or a preconstruction gray vireo survey would be conducted. A few trees will be left in key locations along the BB2 Project area to provide gray vireo sentinel trees. PNM activities comply with the gray vireo recovery plan. Specifically, PNM will support Strategy 8 under Issue 4: "Encourage surveys for the gray vireo before and monitoring after habitat treatments." (New Mexico Department of Game and Fish 2007)

4.7 Cultural Resources

Affected Environment

The BB2 Project area ranges from the pinyon/juniper woodland of the foothills of the San Pedro Mountains to the Estancia Basin. This area is fairly rich in cultural resources that range from the Paleoindian to Historic homesteading. Cultural periods in the area include Paleoindian, Archaic, Ancestral Pueblo, Plains 'nomads', and Historic Euroamerican/Anglo. Within the later period, cultural resources can be related to railroad, mining, homesteading, and ranching. In 2018, a 100 percent ground survey of the BB2 Project area was completed, and cultural resource reports were prepared and submitted to the SHPO. In Sandoval County, 19 newly recorded, 10 previously recorded, three segments of the Rio Grande Eastern railroad grade, and 32 isolated occurrences were found. In addition, six previously recorded sites were not found within the project limits (Goar, Kerr, and Kirwan 2018). In Santa Fe County, six newly recorded sites, 10 previously recorded sites, three previously recorded sites that were not found, segment of the New Mexico Central Railroad grade, and 58 isolated occurrences were recorded (Goar and Kerr 2018).

Environmental Impacts

In Sandoval County, 17 cultural resource sites are eligible to the National Register of Historic Properties (NRHP). Site mitigation within the BB2 Project area is recommended for the following sites:

- Site LA 190497, Ancestral Pueblo artifact scatter

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- Site LA 190503, Anglo/Euroamerican artifact scatter
- Site LA 190520, Ancestral Pueblo artifact scatter
- Site LA 190522, Ancestral Pueblo artifact scatter
- Site LA 190593, Ancestral Pueblo artifact scatter
- Site LA 191149, Anglo/Euroamerican artifact scatter
- Site LA 411, Ancestral Pueblo artifact scatter
- Site LA 55741, artifact scatter of unknown affiliation
- Site LA 55743, Anglo/Euroamerican artifact scatter
- Site LA 55745, Ancestral Pueblo artifact scatter
- Site 55747, Town of Coyote, Anglo/Euroamerican
- Site 55760, Ancestral Pueblo artifact scatter

Site LA 190504 is a feature of unknown affiliation, and no maintenance of access road within the site is recommended. HCPI 44966 consists of Rio Grande Eastern Railroad segments, and archival research is recommended. Site LA 55717 is an Ancestral Pueblo artifact scatter, and Site LA 55749 is a Paleoindian and Ancestral Pueblo artifact scatter. Site LA 190491 is an Anglo/Euroamerican artifact scatter. No further treatment is recommended for these three sites (Goar, Kerr, and Kirwan, 2018).

In Santa Fe County, four cultural resource sites are eligible to the NRHP. Site 190494 is an Anglo/Euroamerican artifact scatter, and no further treatment within the BB2 Project area is recommended. Site LA 55687 is a Paleoindian artifact scatter, and Site LA 77436 is an Archaic artifact scatter. Site mitigation within the BB2 Project area is recommended for these two sites. Site LA 171612 is the Old Albuquerque to Galisteo Road. It is recommended to flag the site to avoid it and have a monitor present during construction activities. No grading of the site would occur, but vehicle traffic is allowable (Goar and Kerr 2018).

4.8 Climate and Air Quality

Affected Environment

The climate in the BB2 Project area is semi-arid. Annual precipitation ranges from approximately 8.0 inches in Bernalillo, 12.0 inches in Stanley, to approximately 17.6 inches in Clines Corners. The average annual maximum temperature is 72.1 degrees Fahrenheit (°F) at 1 mile north-northeast of Bernalillo, 65.8°F at Stanley, and 63.7°F at Clines Corners. The average annual minimum temperature is 37.1°F at 1 mile north-northeast of Bernalillo, 33.6°F at Stanley, and 35.3°F at Clines Corners.

The Clean Air Act of 1970, as amended, established National Ambient Air Quality Standards (NAAQS) for six air pollutants: ozone, airborne particulates, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. The NAAQS were established to protect the public from exposure to dangerous levels of these pollutants. States that failed to attain the NAAQS were required to submit a State Implementation Plan (SIP) to address the problem. New Mexico has submitted a SIP to address non-attainment and has subsequently prepared necessary revisions as required by the USEPA.

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The entirety of the BB2 Project area occurs in attainment areas under the Clean Air Act (NMED 2018h). Sandoval and Santa Fe Counties are classified as in attainment for criteria pollutants. No major emissions sources are near the BB2 Project area.

Global climate change is recognized as a concern. World temperature averages have been increasing for more than a century. The recognized cause is greenhouse gas emissions (National Academy of Sciences 2017; US Global Change Research Program 2017).

Environmental Impacts

During construction, minor dust impacts would occur. Dust would be minimized since disturbed land areas are dispersed. Restoration measures described in Section 5.0 of this report would be implemented to re-establish vegetation cover.

The proposed action offers an opportunity to reduce greenhouse gas emissions. The construction of the transmission line would facilitate the transmission of renewable electrical energy from a wind energy source. Use of wind energy would allow for reduced fossil fuel energy use and lower greenhouse gas emissions.

4.9 Visual Resources

Affected Environment

The BB2 Project area occurs in a rural part of Sandoval and Santa Fe County. The visual context of the proposed new line consists of the flat, open range lands of the Estancia Valley in the eastern half of the BB2 Project area and rolling hills and varied terrain with the dense pinyon/juniper vegetation cover associated with the Ortiz and San Pedro mountains in the western half of the BB2 Project area. The existing BB Line is already present within this context.

Key observation points (those locations where the new line would be most visible to viewers, and where most views would occur) consist primarily of those locations where the proposed line would cross three existing highways:

- NM 14, which is designated the Turquoise Trail Scenic Byway from Santa Fe to approximately Tijeras. The powerline crossing is located approximately 1.5 miles north of Golden near the western extent of the Santa Fe County portion of the BB2 Project area. Views are directed north and south at this location on the highway both northbound and southbound. This highway connects I-40 with Santa Fe.
- NM 41 crossing is located approximately 4.3 miles north of Stanley. This highway connects I-40 with Santa Fe.
- US 285 is located at the eastern terminus of the BB2 Project area. The existing Clines Corners Switching Station is located approximately a quarter mile west of the highway and does not dominate the view.

Visual Contrast and Dominance

Visual contrast refers to the actual differences in size, shape, and color between an introduced component and existing landscape components. Distance, angle of view, duration of view, lighting and nature of the backdrop are variables that can influence visual contrast. The visual dominance of structures is the degree to which the structures contrast with or dominate its setting or other components of the setting.

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Visual Absorption

Visual absorption is the ability of topography and vegetation pattern to screen or integrate visual elements (or both). Topography and vegetation can screen introduced elements into the landscape.

Environmental Impacts

NM-14 Turquoise Trail

The proposed BB2 Line location is immediately adjacent to an existing utility corridor in an already modified landscape. The landscape has a strong capacity to screen and absorb new elements. The BB2 Line would have a minimal effect on the view from NM-14 and would not affect the visual setting of the NM-14 Turquoise Trail Scenic Byway because the new line would parallel the existing transmission line with structure-for-structure placement. Visibility of the BB2 structures from NM-14 northbound and southbound would be generally limited to brief foreground views for a short distance, and the line would not interrupt views of distant mountains because of the short duration when the line is in sight. Reflectivity of conductors in certain lighting conditions may be lowered by the use of a non-specular conductor. Locating the line in contrasting dark to light pinyon/juniper vegetation and ground patterns provides considerable topographic screening, which reduces scale and line contrasts. The BB2 Line would use the existing BB Line access, which would reduce contrast on slopes and exposed soils.

NM-41

Grasslands with open character at the NM-41 crossing provide limited visual absorption capacity with few, sparse interrupting features; however, greater viewing distance from the corridor crossing reduce its apparent scale, and small rises in topography coupled with longer distant views help with screening. Views include the presence of existing transmission structures and minor surface disturbances. Reductions in contrast could come from structure color and structure-for-structure placement. Reflectivity of conductor in certain lighting conditions may be lowered by the use of a non-specular conductor.

US-285

The view of the BB2 Line from US-285 would be seen in a lower position in the landscape with minimal sky lining. Greater viewing distance from the corridor crossing reduces its apparent scale and small rises in topography coupled with the with longer distant views help with screening. Views include the presence of existing transmission structures and minor surface disturbances. Reductions in contrast could come from lighter structure color and structure-for-structure placement. Reflectivity of conductor in certain lighting conditions may be lowered by the use of a non-specular conductor.

The BB2 Line location is routed along existing landscape modifications in an existing utility corridor. The proposed design elements of structure-for-structure placement and reduction of color contrast by the use of lighter galvanized color on structures would result in acceptable levels of visual alteration.

Measures that could be implemented to further reduce alteration of existing visual character of the vicinity are avoidance of side slopes and ridges, where possible; use of non-specular conductors to reduce line contrasts from reflectivity; and limit vegetation removal (trees) to what is required for safety purposes as possible to retain the visual absorption capability, reduce visible ground disturbance, and reduce color and line contrasts.

4.10 Communities and Land Use

Affected Environment

The BB2 Project area and vicinity in Sandoval and Santa Fe counties is a rural area with no established communities adjacent to the BB2 Project area. Nearby land is rangeland with livestock grazing as the main economic use. Dispersed residences are present, and PNM estimates that between 50 and 70 dwellings occur near the BB2 Project area. No urban areas are present. Nearby communities include Golden approximately 1.5 miles south of the BB2 Project area, Cedar Grove approximately 6 miles south of the BB2 Project area, and Stanley approximately 4.3 miles south of the BB2 Project area (see Figure 1).

No public or non-profit facilities are identified within the BB2 Project area, and none are evident on aerial imagery or topographic mapping within the vicinity. There is no apparent industrial use of the BB2 Project area or vicinity. Since little public land is present and access is limited, there is little likelihood that recreation is important in the BB2 Project area or vicinity. Within Sandoval and Santa Fe Counties, public lands such as National Forests provide recreation and ecotourism opportunities. These lands do not occur near the BB2 Project area. There are no known private ecotourism or recreation operations within or adjacent to the BB2 Project area.

Environmental Impacts

The BB2 Project would not alter current land uses, since it would occur directly adjacent to an existing powerline easement. Most lands would continue to be used as rangeland for livestock grazing. There would be no effect on residences or area communities, such as Golden and Stanley.

PNM coordinated with Santa Fe County on meeting permitting requirements. An Environmental Information Report was submitted to and accepted by the county (PNM 2018b). The BB2 Project is compatible with policies and strategies contained in the 2015 Santa Fe County Sustainable Growth Management Plan. The BB2 Project is located in an area where the plan identifies future land use as agriculture and ranching. The BB2 Project would not affect ranching use. The BB2 Project aligns with plan Policy 24.4: "Research potential to create solar and wind electrical transmission grid related to renewable energy infrastructure," and Strategy 24.4.1: "Identify a mechanism for solar and wind farm electrical transmission line connection to the existing grid system." (Santa Fe County 2015).

PNM coordinated with Sandoval County on meeting permitting requirements. The BB2 Project area is located in the Southeast Corner planning region according to the Sandoval County Comprehensive Plan (Sandoval County 2013). The plan does not contain specific land use proposals for the BB2 Project area. The Placitas Area Plan is not affected by the BB2 Project (Sandoval County 2009).

The BB2 Project would not affect the San Pedro community located south of the project area. Goals described in the San Pedro Neighborhood Community Plan (Community Members of San Pedro 2001) would not be affected by the project.

PNM coordinated with the Edgewood Soil and Water Conservation District. The BB2 project would support objectives of the Edgewood Soil and Water Conservation District Land Use Plan (Edgewood Soil and Water Conservation District 2015) by reducing visual impacts by locating the BB2 Project next to the existing BB Line; minimizing watershed impacts by limiting soil, vegetation, and arroyo disturbance; and

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ensuring that transmission line construction and maintenance does not interfere with ranching operations.

The BB2 Project would be compatible with many of the policies found within the Coronado Soil and Water Conservation District Land Use Policy Plan (Coronado Soil and Water Conservation District 2017). The BB2 Project would be located within an existing utility corridor that would lessen visual resource impacts by placement of structures adjacent to another transmission line; continue to allow for traditional uses like agriculture / grazing; and through pre-project planning efforts, avoid impacts to wildlife and water resources (e.g., arroyos and wetlands) to the extent possible. Soil erosion and sedimentation, and water quality are of particular importance to the District, so prior to start of construction, a Stormwater Pollution Prevention Plan (SWPPP) would be in place and best management practices (BMPs) would be utilized during construction to limit dust and stormwater runoff. Disturbed areas affected during construction would be stabilized through the strategic use of BMPs, such as the reuse of topsoil, where possible, for revegetation, or the use of erosion control blankets on erodible slopes. After construction, the transmission line would be properly maintained to minimize additional disturbance and repair areas that may need BMP repair or replacement.

4.11 Socioeconomics and Environmental Justice

Affected Environment

The BB2 Project area is located within southeastern Sandoval and southern Santa Fe Counties. Based on the 2016 Census Bureau estimates, Sandoval County's population was 138,117, and Santa Fe County's population was 147,320 (see Table 1). The population is older than the state average (37.2 years) with a median age of 39.4 years in Sandoval County and 45.0 years in Santa Fe County. The Hispanic/Latino population is the state's largest minority group representing 47.8 percent of New Mexico's population. Hispanic/Latino is also the largest minority group near the BB2 Project area representing 37.3 percent of Sandoval County's population and 51.1 percent of Santa Fe County's population.

Two Census tracts provide local socioeconomic data for areas near the BB2 Project area. Census Tract 111 includes areas in southeastern Sandoval County. Census Tract 111 has an older population with a median age of 57.6 years of age and 27.7 percent over 64 years. Census Tract 103.10 includes areas in southern Santa Fe County. Census Tract 103.10 also has an older population with a median age of 51.8 years and 24.4 percent over 64 years. Census Tract 111's population is 19.7 percent Hispanic/Latino, and Census Tract's 103.10 population is 30.4 percent Hispanic/Latino.

Counties and census tracts near the BB2 Project area have mostly higher incomes and lower poverty rates than the state median family income of \$55,900 and state family poverty rate of 15.9 percent (see Table 2). Sandoval County's median family income is \$68,713 with a family poverty rate of 10 percent. Santa Fe County's median family income is slightly lower at \$66,202 with a family poverty rate of 10.9 percent. Median family incomes range from \$95,521 in Census Tract 111 to \$54,563 in Census Tract 103.10. Family poverty rates range from 4.2 percent in Census Tract 111 to 7.8 percent in Census Tract 103.10. Based on these statistics and their minority representation, these census tracts do not contain communities of concern for environmental justice evaluation.

Table 2 Socioeconomic Characteristics of Areas Near BB2 Project Area

Characteristics	New Mexico	Sandoval County	Santa Fe County	Census Tract 111	Census Tract 103.10
Location Description	Statewide	Countywide	Countywide	Southeastern Sandoval County	Southern Santa Fe County
Population:					
- Total Population	2,082,669	138,117	147,320	6,568	1,268
- Median Age – years	37.2	39.4	45.0	57.6	51.8
- Percent Under 18	24.1%	24.7%	19.5%	13.9%	17.2%
- Percent Over 64	15.3%	15.0%	19.8%	27.7%	24.4%
Race Status:					
- White	73.5%	70.0%	83.4%	72.4%	95.0%
- Black/African American	2.0%	2.1%	0.8%	0.3%	0.0%
- Native American	9.3%	12.4%	3.4%	16.5%	2.1%
- Asian	1.4%	1.4%	1.2%	0.8%	0.0%
- Hawaiian/Pacific Islander	0.1%	0.1%	0.1%	0.0%	0.0%
- Some other race	10.5%	9.8%	8.6%	6.5%	0.5%
- Two or more races	3.3%	4.2%	2.6%	3.6%	2.4%
Hispanic/Latino	47.8%	37.3%	51.1%	19.7%	30.4%
Income and Poverty:					
- Median Family Income	\$55,900	\$68,713	\$66,202	\$95,521	\$54,563
- Family Poverty Rate	15.9%	10.0%	10.9%	4.2%	7.8%
- Per Capita Income	\$24,459	\$27,060	\$34,176	\$40,560	\$29,931
- Per Capita Poverty Rate	20.9%	14.4%	15.6%	9.1%	11.0%
Unemployment Rate, January 2018	5.8%	5.7%	4.8%	--	--

Sources: .US Census Bureau (2018), New Mexico Department of Workforce Solutions (2018)

Undeveloped private lands in Sandoval and Santa Fe Counties are used mainly as rangeland for livestock production. The Census of Agriculture shows 1,029 farms in Sandoval County with a median size of 13 acres, and 715 farms in Santa Fe County with a median size of 11 acres (National Agricultural Statistics Service 2018). Lands near the BB2 Project area are used for livestock grazing.

Both Sandoval and Santa Fe counties are strongly influenced by urban activities. The county unemployment rates are lower than the state unemployment rate (5.8 percent) at 5.7 percent in Sandoval County and 4.8 percent in Santa Fe County (New Mexico Department of Workforce Solutions 2018).

Environmental Impacts

The proposed action would not result in measurable socioeconomic changes in Sandoval or Santa Fe counties. Construction of the project would not affect population growth. There would be no migration to the area. Minority populations would not be affected. Temporary construction jobs would be created. Approximately 30 to 70 people would work on the project. Fewer construction workers would be working at the beginning or end of the project during construction ramp-up and finalization of cleanup and restoration. There would not be any permanent jobs created associated with the BB2 Project, but the project would facilitate several permanent positions at the wind farm interconnecting to the BB2 Project. The BB2 Project would generate additional tax revenue for Sandoval and Santa Fe counties. Local businesses would experience an increase in revenues from the purchase of services and products. No

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environmental justice impacts are anticipated. There would be no disproportionate impacts on low income or minority populations.

4.12 Recreation

Affected Environment

No established recreation sites are within or adjacent to the BB2 Project area. There are no hiking trails, bike routes, picnic areas, camping area, wildlife refuges, or public lands with recreational opportunities near the BB2 Project area. State lands in the BB2 Project area are not used for recreation purposes.

Environmental Impacts

There would be no impacts on existing recreation facilities. The proposed action would not affect recreation activities in other parts of Sandoval and Santa Fe Counties.

4.13 Noise

Affected Environment

No noise receptors, such as houses or schools, are located within 200 feet of the BB2 Project area. The nearest house is 500 feet from the BB2 Line. The transmission line noise is only audible to individuals who are within 200 feet of the BB Line.

Since the BB2 Project area is in an undeveloped area, there are few noise sources except for those found in rural areas. The existing BB Line produces noise levels below 40 decibels within 50 feet of the line. This is primarily crackling noise produced by electric current flowing through the lines. The noise is caused by the energy discharge that occurs when the electrical field strength on the conductor surface is greater than the "breakdown strength" (the field intensity necessary to start a flow of electric current) of the air around the conductor. The noise is also associated with radio noise, light glow near the conductor, and corona loss. Humidity, air density, wind, and water from rain, drizzle, and fog affect the noise. Water increases conductivity in air and increases the noise. Airborne contaminants can also increase the noise. Weathering of the conductor tends to reduce the noise (Dent no date).

Corona noise is the commonest transmission line noise consisting of a crackling or hissing sound. It is caused by the breakdown of air into charged particles from the electrical field at the conductor surfaces. Corona noise is at 40 to 50 decibels in dry conditions and can increase to 50 to 60 decibels in wet conditions. For comparison, 50 decibels is the average ambient home noise, and 60 decibels is conversation noise at 3 feet. Other noise can also be produced. Insulator noise is produced by dirty, cracked, or nicked insulators. Aeolian noise is produced by wind blowing through the conductors and structures (Aspen Environmental Group no date).

Environmental Impacts

Additional low-level noise would be produced by the BB2 Line. Adjacent to the transmission line, noise levels would range from 40 to 60 decibels; however, decibel levels diminish rapidly the further away from a line the receptor is. The transmission line noise would only be audible to individuals who are within 200 feet of the BB2 Line. There are no receptors within this distance.

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4.14 Hazardous Materials

Affected Environment

US Environmental Protection Agency (USEPA) and New Mexico Environment Department (NMED) databases were reviewed for hazardous materials sites within or near the BB2 Project area. No Superfund, USEPA clean up, or brownfield sites are located within 1 mile of the BB2 Project area (USEPA 2018a through 2018c). No hazardous waste generators are present (USEPA 2018d). No state cleanup, Voluntary Remediation Program, landfills, or leaking petroleum storage tank sites are located within 1 mile of the BB2 Project area (NMED 2018a through 2018g). No registered petroleum tanks are within or adjacent to the BB2 Project area (NMED 2018d). Mining activities have occurred in the Ortiz Mountains north of the BB2 Project area and San Pedro Mountains south of the BB2 Project area (Julyan 2006). Mines may be associated with soil and groundwater contamination. Based on the US Geological Survey maps and field surveys of the BB2 Project area, no mining activities are known to have occurred in the BB2 Project area.

Environmental Impacts

Construction of the BB2 Line would not affect any known hazardous substance sites. During construction, hazardous materials management practices will be used to keep hazardous materials in appropriate containers and prevent releases or spills. After construction, no hazardous materials will be stored along the transmission line.

4.15 Electromagnetic Fields

Affected Environment

Electromagnetic fields (EMF) are electric and magnetic fields of energy that surround any electrical device that is turned on. Electromagnetic radiation consists of waves of electric and magnetic energy moving together through space. Electric fields are produced by electric charges and magnetic fields are produced by the flow of current through wires or electrical devices. EMFs are found near power lines and other electronic devices and equipment. Power lines emit non-ionizing radiation, which is generally considered harmless. Other common sources of non-ionizing radiation include cell phones and wireless networks.

Numerous studies have been conducted to explore the possible human health effects of EMF. The largest US study to date was led by the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health and the Department of Energy (DOE), with input from many public and private agencies. This effort, known as the Electric and Magnetic Fields Research and Public Information Dissemination (EMFRAPID) Program (US Department of Health and Human Services 1999), was a six-year project with the goal of providing scientific evidence to determine whether exposure to power-frequency EMF involved a potential risk to human health. In conclusion of the project, the NIEHS reported to the US Congress that the overall scientific evidence for human health risk from EMF exposure is weak and based on a slight epidemiological association between childhood leukemia and exposure to power-frequency EMF. This epidemiological association has been reported in other studies but has not been reproduced in laboratory studies with animals and cells. Additional information is available in booklets prepared by the NIEHS (EMF: Electric and Magnetic Fields Associated with the Use of Electric Power) and the Federal Communications Commission Office of Engineering & Technology (Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields).

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There are no federal standards limiting occupational or residential exposure to 60-Hertz (Hz) EMF. For power lines, the maximum field strength for the electric field values occurs within a relatively small area immediately adjacent to the conductors, where they are in closest proximity to the ground below. Exposure to EMF lessens with distance and time, and this applies to power transmission lines.

Environmental Impacts

The BB2 Line would emit non-ionizing radiation, which is generally considered harmless. There would be no anticipated health effects from EMF. PNM's e-field results are well below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guideline for Occupational Exposure (8.33kV/m) within the ROW and General Public Exposure (4.16kV/m) past the edge of the R/W. All magnetic fields are well below the ICNIRP guideline for General Public Exposure (833 mGauss).

4.16 Applicable Regulatory Compliance

PNM is required to comply with general and industry specific standards and safety regulations identified by the following entities:

- Federal Energy Regulation Commission (limited jurisdiction)
- National Electric Safety Code
- New Mexico Public Regulation Commission
- New Mexico North American Electric Reliability Corporation
- Western Electricity Coordinating Council
- Occupational Safety and Health Administration
- New Mexico Occupation Health and Safety Bureau
- State of New Mexico Fire Safety Standards

The project is not expected to result in a significant impact to public health or safety.

4.17 Cumulative Impacts/Commitment of Resources

Cumulative Impacts

Cumulative impacts are the combined effect of past, current, and reasonably foreseeable future actions within the vicinity to which development of the proposed BB2 Project may add incremental impacts. The combination of all the typical land use practices across the BB2 Project area landscape has the potential to impact natural and cultural resources and slightly alter visual character. However, the likelihood of these impacts occurring is minimized through compliance with state and federal regulations and implementation of standard avoidance/mitigation measures. In general, most natural resources are expected to sustain some level of cumulative impacts over time.

Projects that have occurred or are occurring in the vicinity include: state/federal highway and county roadway construction/maintenance and improvement; stock tank or other water source development; mining; ranching activities such as well drilling, fence construction, grazing, home/structure construction; and the installation of the existing BB Line.

Projects likely to occur within the BB2 Project area and vicinity in the foreseeable future include: state/federal highway and county roadway maintenance and improvement; stock tank or other water source development; utility access maintenance; construction or improvement of homes or small

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commercial structures; and fence line maintenance. Impacts expected of these types projects generally consist of relatively minor losses of vegetation and soil disturbance.

Commitment of Resources

Implementation of the BB2 Project would involve the commitment of natural, physical, human, and fiscal resources. Undeveloped lands within the proposed BB2 Project area would be committed to use as utility easement for the foreseeable future. This would preclude incompatible uses, such as construction of buildings or tall structures within the BB2 Project area, but would not prevent use as rangeland, which is currently the most common of area land uses.

Fossil fuels, labor, and construction materials committed to the construction would be largely irretrievable, although some materials could be recycled. The labor and natural resources necessary to fabricate construction materials would be irretrievable.

Vegetation clearing needed to comply with management standards would regrow if the line were removed but would be maintained so long as the line remains. Soils within the BB2 Project area would be disturbed only as needed for structure placement. Soils would be affected along the route but would remain largely undamaged.

5.0 Mitigation Measures

5.1 Transmission Line Reclamation

The following prescriptions will be implemented after final construction activities have been completed:

- Woody vegetation (trees) will be cut within a 100-foot-wide zone (50 feet on either side of the Project centerline) per NERC and PNM vegetation management standards (see Figure 6). Where practical, wood will be chipped and spread over the ground surface to control erosion, stabilize soil, and protect the natural seedbank. To the maximum extent possible, non-woody vegetation will not be removed, but only crushed unless grading is necessary.

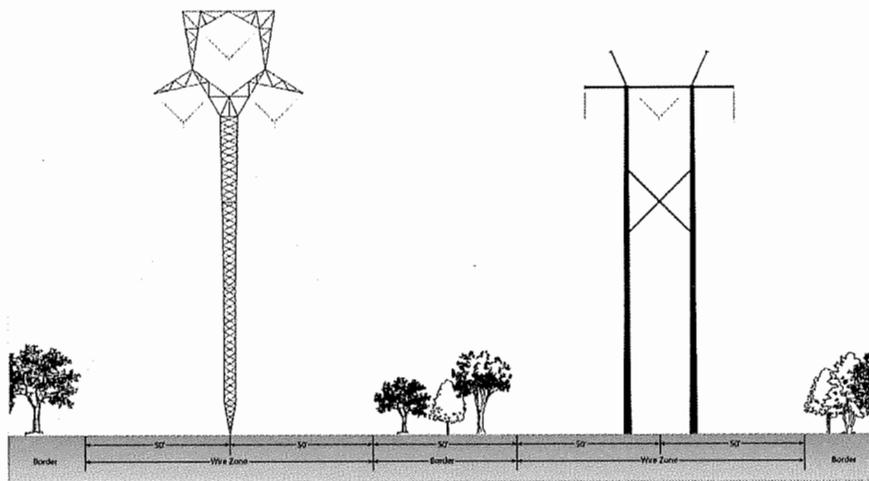


Figure 6. Profile of Vegetation in the BB2 Project Area

- If soil is to be excavated or graded in areas of temporary disturbance, topsoil will be salvaged and redistributed prior to reclamation to the extent practical.
- Subsurface soils, if excavated, will be used as initial fill for disturbed sites. Following this, salvaged topsoil will be spread on the disturbed area and raked with a narrow-toothed spike or similar equipment to create imprinting or micro-catchment depressions for water retention and seed collection. Unless deemed to be otherwise beneficial, no mulch will be applied to eliminate any barriers to seed deposition from wind dispersal and possible introduction of alien and noxious plant species.
- Following construction, disturbed areas will be restored as closely as practical to the original preconstruction topographic contours, unless otherwise agreed to by the landowners.
- Where hydrologic features and/or banks are disturbed, the original surface channel hydrologic features will be re-contoured to approximate preconstruction contours and bank slope margins will be backfilled. If needed, Section 404 permit coverage would be obtained.
- The existing seed bank in the first several inches of soil will be used to the extent possible to revegetate a disturbed site. Supplemental seeding will only be used where necessary.
- Where necessary (e.g., unstable soils, steep slopes), erosion control measures, including contouring, will be used to prevent erosion and sedimentation until vegetation becomes established.

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- If vegetation has been cleared from a construction area, it will be re-spread within the reclaimed area to increase soil moisture and provide a catchment for wind dispersed seeds.
- Seeding specification will be determined in consultation with the landowner for those areas that will be reseeded. Only approved seed mixes will be used.
- Temporary construction sites, material storage yards, will be restored to their original use after construction and cleanup will be achieved.
- Trash will be removed and disposal of refuse and trash will be achieved through daily maintenance and trash removal.

5.2 Noxious Weed Species

The control of noxious weed species can be achieved through proper revegetation using appropriate management practices during transmission line construction as well as reclamation of the disturbed areas. The following measures associated with limiting the impact of noxious weed species are provided:

- Construction supervisors and managers will be educated on weed identification and the importance of controlling and preventing the spread of noxious weed species infestations.
- Disturbed construction areas will be reclaimed as soon as possible after construction in the area is completed.
- Before beginning reclamation activities, previously identified noxious weed infestations will be controlled through acceptable mechanical (e.g., topsoil excavation and removal), cultural, and/or herbicide applications.
- Clearing and grading equipment will have the tires, axles, frame, running boards, under carriages, and soil holding areas washed and cleaned to prevent noxious weed species transport to unaffected areas.

5.3 Erosion Control

The effectiveness of erosion control measures will be evaluated by noting particular site conditions, including soil movement and downslope sedimentation, surface vegetative detritus (litter) movement, flow pattern development, rills and gullies, wind-scour depressions, and plant root system exposure. If the conditions listed are present, it will be assumed that project-related erosion is occurring, and options for remedial measures will be evaluated and implemented as needed.

5.4 Standard Mitigation Measures/Best Management Practices

- Construction vehicle movement outside the BB2 Project area will be restricted to predesignated access, contractor-acquired access, or public roads.
- In construction areas where recontouring is not required, vegetation will be left in place wherever possible, and original contour will be maintained to avoid excessive root damage and allow for re-sprouting. Woody vegetation that is not consistent with line safety and operation will be removed.
- Prior to construction, the PNM and the construction contractor will instruct all personnel on the protection of cultural, ecological, and other natural resources including: (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources; and (c) the purpose and necessity of protecting them.

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- Hazardous material shall not be drained onto the ground or into streams or drainage areas. Totally enclosed containment will be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
- In newly disturbed temporary work areas, the soil will be salvaged to the extent practical and will be distributed and contoured evenly over the surface of the disturbed area after construction completion. The soil surface will be left rough to help reduce potential wind erosion.
- To lessen the impact to habitat, tree clearing would occur outside the migratory bird nesting season (March 15 to September 15) to the extent practical; however, dates may vary depending upon the species and current environmental conditions.
- As needed, effects to federally listed threatened or endangered species with occupied habitat will be assessed and consultation with the US Fish and Wildlife Service implemented. Effects to state listed threatened or endangered species with occupied habitat will be assessed and consultation with the New Mexico Department of Game and Fish implemented. Measures to minimize impacts to listed species would be developed. For the southwestern willow flycatcher, PNM will conduct southwestern willow flycatcher protocol surveys in 2019 to confirm the absence of this species. For the yellow-billed cuckoo, PNM will conduct yellow-billed cuckoo protocol surveys in 2019 to confirm the absence of this species.
- In designated areas, sensitive plants and/or habitat will be flagged and a structure will be adjusted to allow spanning of these features, where feasible, within the limits of standard structure design.
- PNM will locate structures, access, and disturbance areas to avoid known archaeological sites. Sites located close to construction areas will be fenced off.

5.5 Cultural Resources

In Sandoval County, 17 cultural resource site mitigation within the BB2 Project area is recommended for the following sites: LA 190497, LA 190503, LA 190520, LA 190522, LA 190593, LA 191149, LA 411, LA 55741, LA 55743, Site LA 55745, Site 55747, and Site 55760. No maintenance of the access road within Site LA 190504 is recommended. Archival research is recommended for HCPI 44966.

In Santa Fe County, site mitigation within the BB2 Project area is recommended for sites LA 55687 and LA 77436. Site LA 171612 will be flagged and avoided with a monitor present during construction activities. No grading of the site will occur, but vehicle traffic is allowable.

In the event that archeological deposits, including lithic, ceramics, or human remains, are uncovered, PNM contractors would be instructed to stop all work immediately near the discovery and take reasonable measures to avoid or minimize harm to the findings. All archeological findings would be secured and access to the sensitive area restricted. If unmarked graves or human remains are present on private or state land, compliance with the Native American Graves Protection and Repatriation Act, as applicable, and the New Mexico Cultural Properties Act would be required. PNM would immediately notify the Office of the Medical Investigator (OMI) and the State Historic Preservation Officer (SHPO). The OMI would terminate the discovery of any non-medicolegal human remains to the SHPO.

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5.6 Public Safety

Safety is a primary concern in the design and operation of transmission line and related facilities. The line would be protected with power circuit breakers and related line relay protection equipment. Lightning protection would be provided by overhead ground wires along the line. Existing fences, metal gates, pipelines, and other features that cross or are within the BB2 Project area would be grounded as necessary to prevent electrical nuisance shock.

5.7 Standard Safety Measures

The BB2 Project area would be periodically patrolled to inspect its condition and identify problem areas so that maintenance crews may be scheduled to correct any problems. Ground and aerial inspections will be performed on average once per year, or as needed to detect facilities needing repair or replacement.

Petroleum products such as gasoline, diesel fuel, lubricants, and cleaning solvents present temporarily within the work areas during construction would be contained and handled in compliance with federal and state regulations and industry standards by contractors.

Hazardous materials would be properly stored to prevent spills. In the event of a hazardous materials spill, notification and clean-up will be undertaken by the construction contractor in compliance with all applicable federal, state, and local regulations. All hazardous construction waste, used petroleum products, and other potentially hazardous materials would be removed to an authorized treatment/disposal facility.

For public protection during wire installation, guard structures may be erected adjacent to roads, existing power-lines, and other obstacles. Guard structures typically consist of H-framed wood poles placed on either side of an obstacle. These structures would prevent ground wire, conductor, or equipment from falling on an obstacle, and would be removed following the completion of conductor installation. Guard structures may not be required for small access roads or other areas where suitable safety measures such as barriers, flagmen, or other traffic controls could be used.

Contractors would provide health and safety plans, as well as traffic control and construction management plans, as necessary, to meet PNM standards and fulfill local, state, and federal requirements applicable to the industry.

6.0 List of Preparers

The individuals identified in Table 3 contributed to the preparation of this document.

Table 3. Preparers

Name	Title	Organization
Eric Johnson	Senior Environmental Project Manager	Marron/NV5
Heather Parmeter	Environmental Project Manager/Water Resources Lead	Marron/NV5
Toni Goar	Cultural Resources Program Manager	Marron/NV5
Paul Knight	Senior Biologist	Marron/NV5
Douglas Campbell	Project Manager	PNM
Nancy Nething	Environmental Specialist	PNM

7.0 Agency Coordination

The agencies identified in Table 4 were contacted or available website data accessed to provide information presented in this document.

Table 4. Agency Coordination

Agency	Contact	Information Provided
Santa Fe County	Various individuals	Permit review
Sandoval County	Various individuals	Permit review
New Mexico State Land Office	Various individuals	Lands request
New Mexico Historic Preservation Division	SHPO	Site data and project review
USEPA	Website	Hazardous materials site data
NMED	Website	Hazardous materials site data
Natural Resources Conservation Service	Website	Soils data
US Fish and Wildlife Service	Website	Threatened and endangered species data
New Mexico Department of Game and Fish	Website	Threatened and endangered species data
US Army Corps of Engineers	Albuquerque District, Regulatory	Preconstruction Notification for Section 404 Nationwide Permit
New Mexico Department of Game and Fish	Website	Threatened and endangered species data

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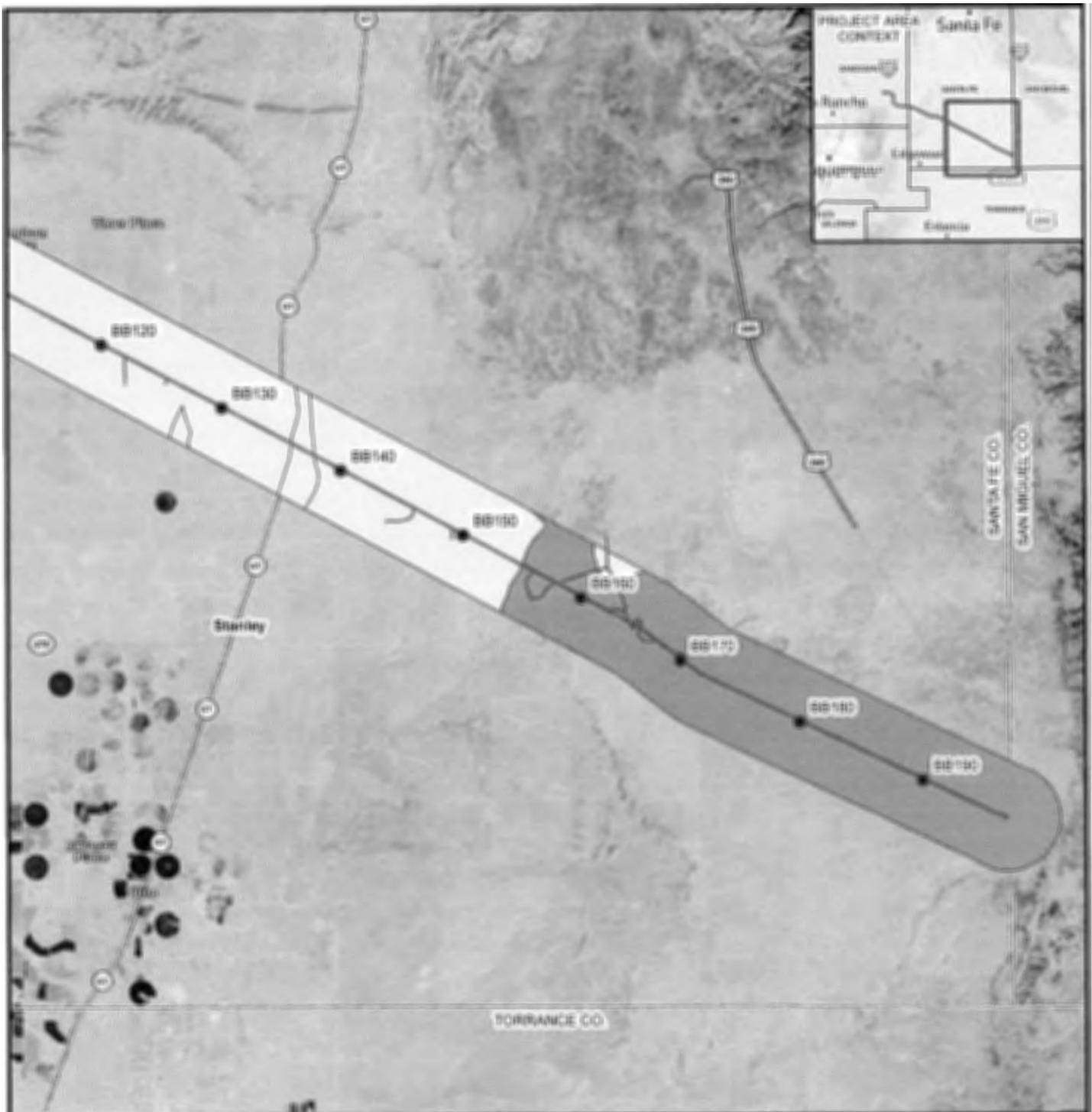
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Appendix A
Maps



<p>Legend</p> <p>Geology</p> <ul style="list-style-type: none"> alluvium clastic fine-grained mixed clastic limestone medium-grained mixed clastic plutonic rock (granitic) sandstone sedimentary rock shale 	<ul style="list-style-type: none"> BB Line Transmission Structure Project Area County <p>NOTES: Pecos, Hagen, Gidley, Capitan-Corte Mountain, Kings Draw, UICIS 7.5 Minute Quadrangles, Sandoval and Santa Fe Counties, New Mexico</p> <div style="text-align: center;"> <p>0 1.25 2.5 5 Miles 0 1.25 2.5 5 Kilometers 1:250,000</p> </div>	<p>MARRON and ASSOCIATES A BEI Service</p>	<p>GEOLOGY FIGURE A1</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">PROJECT NO.</td> <td style="padding: 2px;">66876-300000-01</td> </tr> <tr> <td style="padding: 2px;">REVISED</td> <td style="padding: 2px;">7/2016</td> </tr> <tr> <td style="padding: 2px;">DRAFT BY</td> <td style="padding: 2px;">JBB/rls</td> </tr> </table>	PROJECT NO.	66876-300000-01	REVISED	7/2016	DRAFT BY	JBB/rls
PROJECT NO.	66876-300000-01								
REVISED	7/2016								
DRAFT BY	JBB/rls								
<p>Source Layer: Green, G.N., and Jones, G.E., 1987, The Digital Geologic Map of New Mexico, U.S. Geological Survey</p>		<p>PNM BB2 Transmission Line, Sandoval and Santa Fe Counties, New Mexico</p>							



Legend

- BB Line Transmission Structure
- Project Area
- County
- Geology**
- alluvium
- medium-grained mixed clastic

NOTES: King Draw, Starkey, White Lake, El Corno Butte, and Citrus Center
USGS 7.5 Minute Quadrangle Santa Fe County, New Mexico



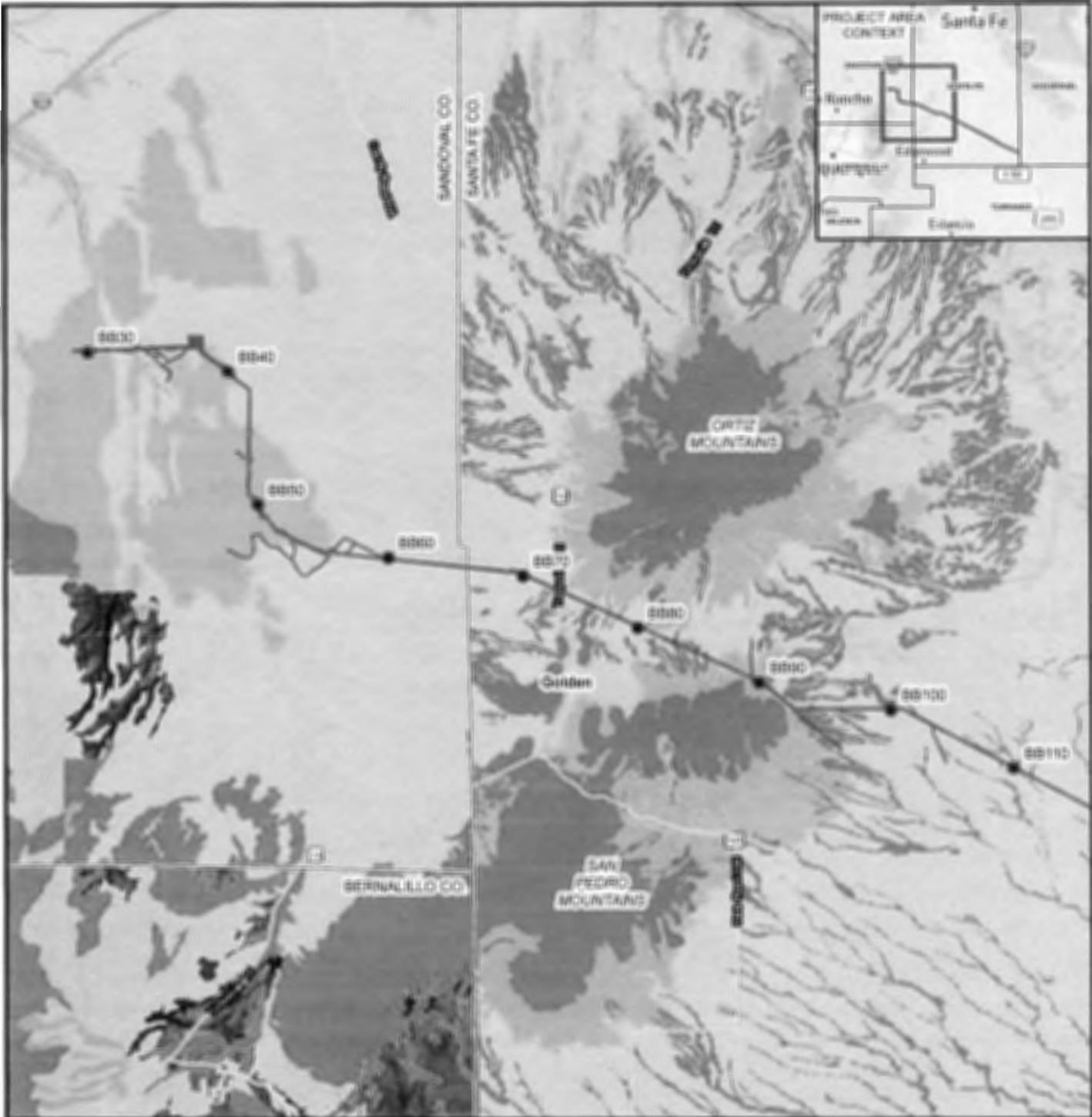
**GEOLOGY
FIGURE A2**

PROJECT NO.:	44476-000000-01
REVISION:	7/11/2014
DRAWN BY:	alshale

Source Layer: Green, G.N., and Jones, G.E., 1997, The Digital Geologic Map of New Mexico, U.S. Geological Survey

**PNM BB2 Transmission Line,
Sandoval and Santa Fe
Counties, New Mexico**





Legend

- BB Line Transmission Structure
- Project Area
- County

Soil Survey Geographic

Dominant Order

- Alfids
- Alfisols
- Entisols
- Mollisols

NOTES: Flowler, Hager, Gutter, Captain Cook Mountain, King Crow USGS 7.5 Minute Quadrangles Sandoval and Santa Fe Counties, New Mexico



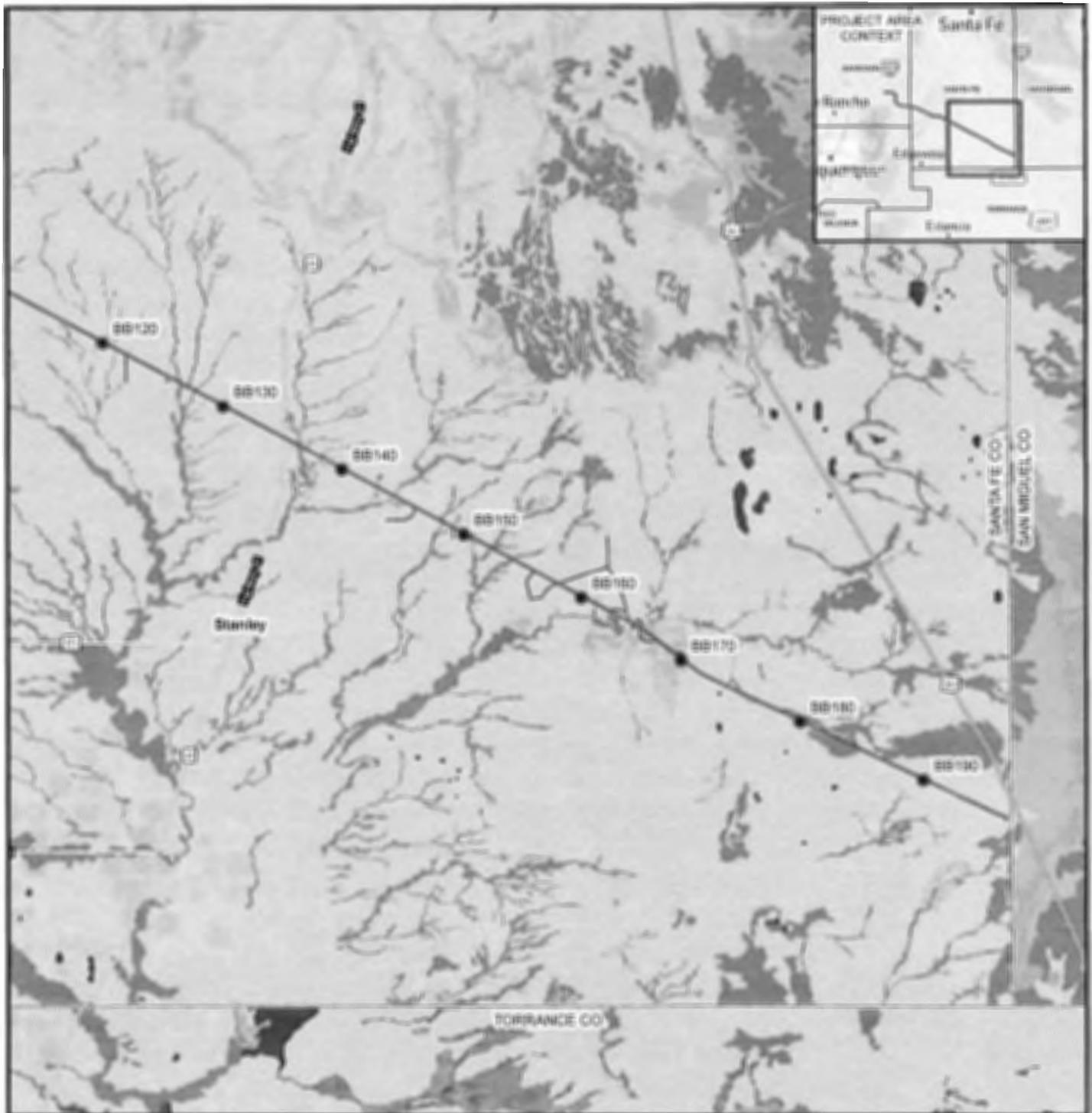
**SOILS
 FIGURE A3**

PROJECT NO.:	BB210-20080101
REVISED:	01/20/08
DRAWN BY:	000000

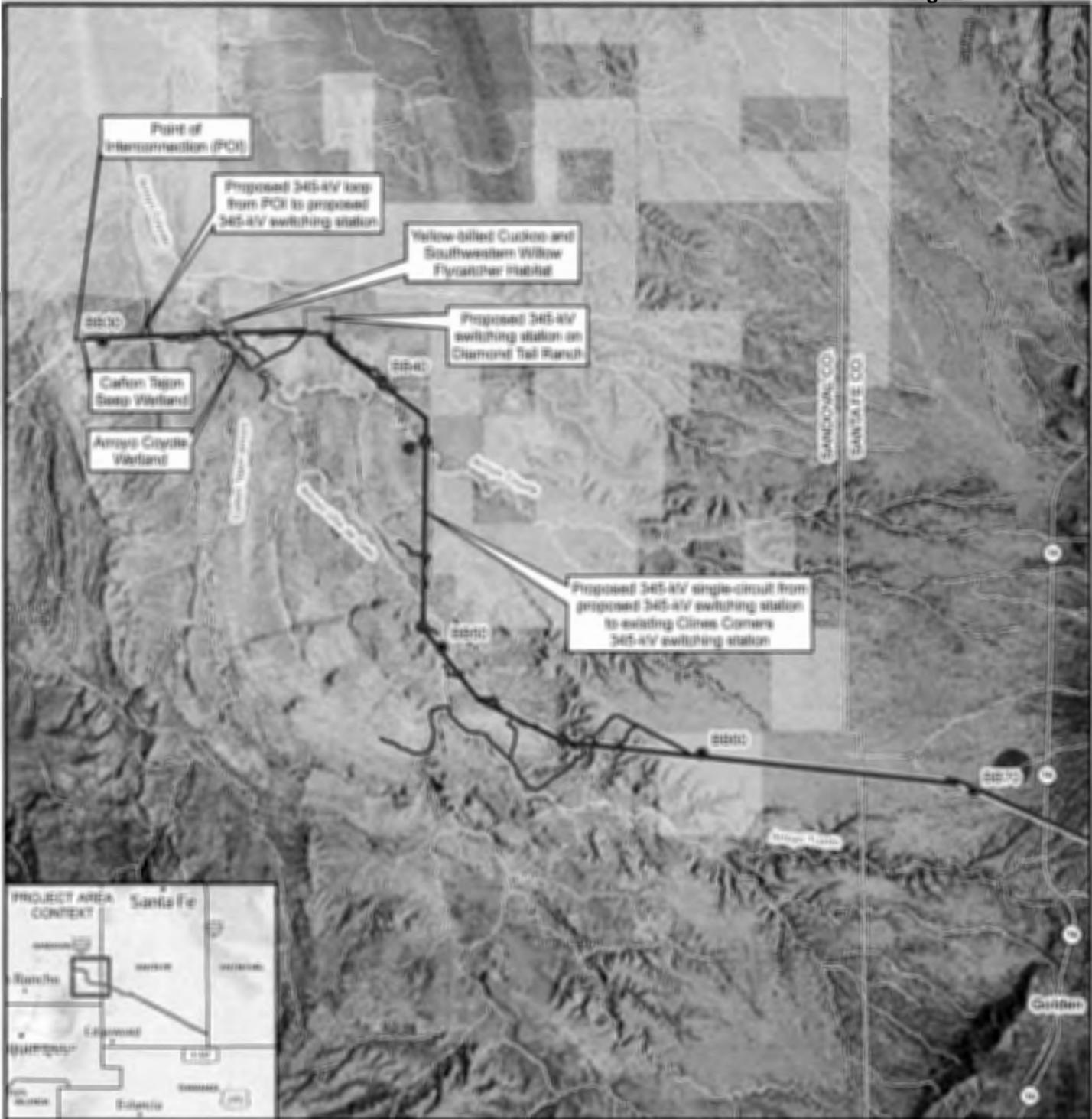
Source: USGS National Resources Conservation Service



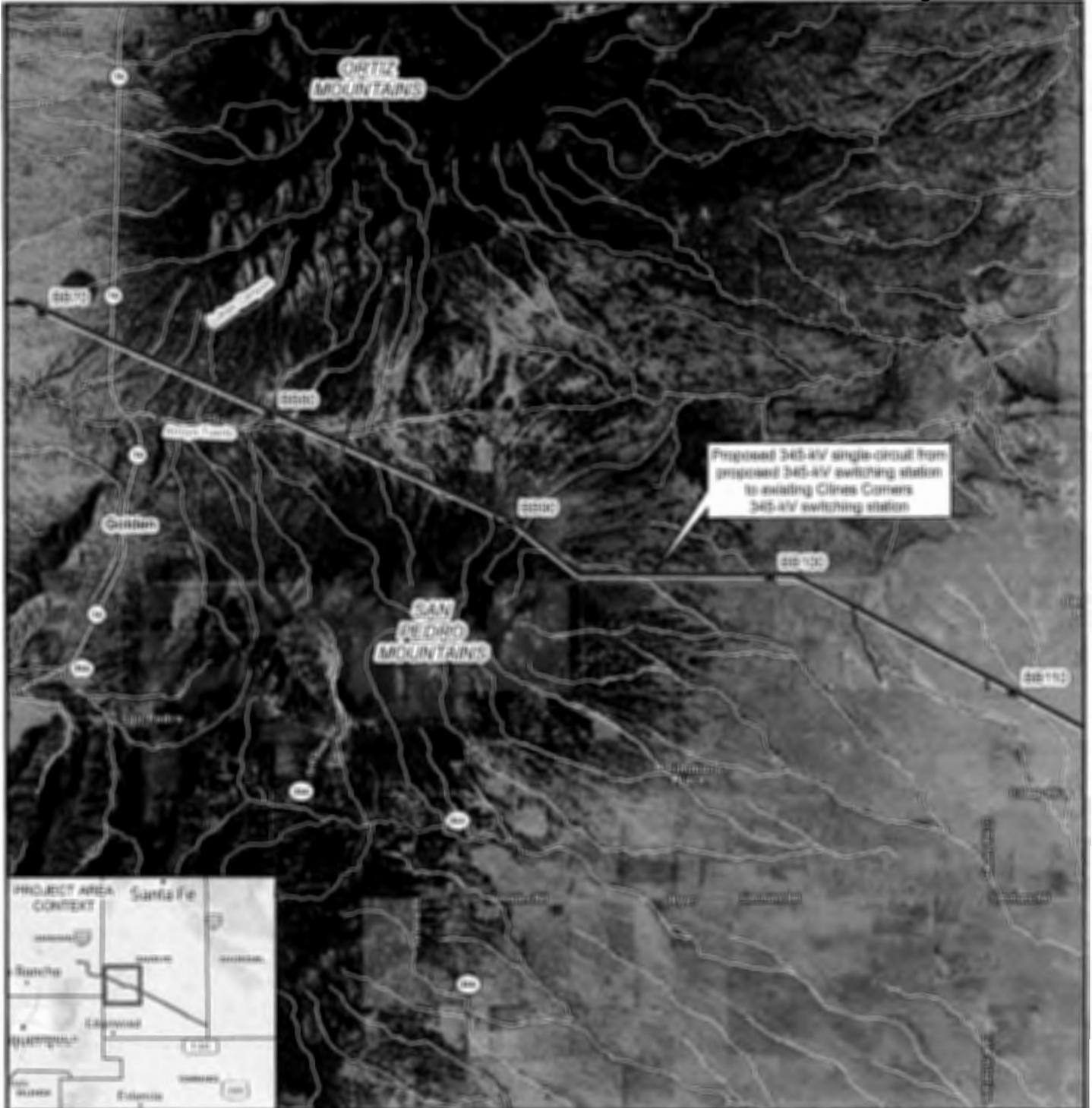
**PNM BB2 Transmission Line,
 Sandoval and Santa Fe
 Counties, New Mexico**



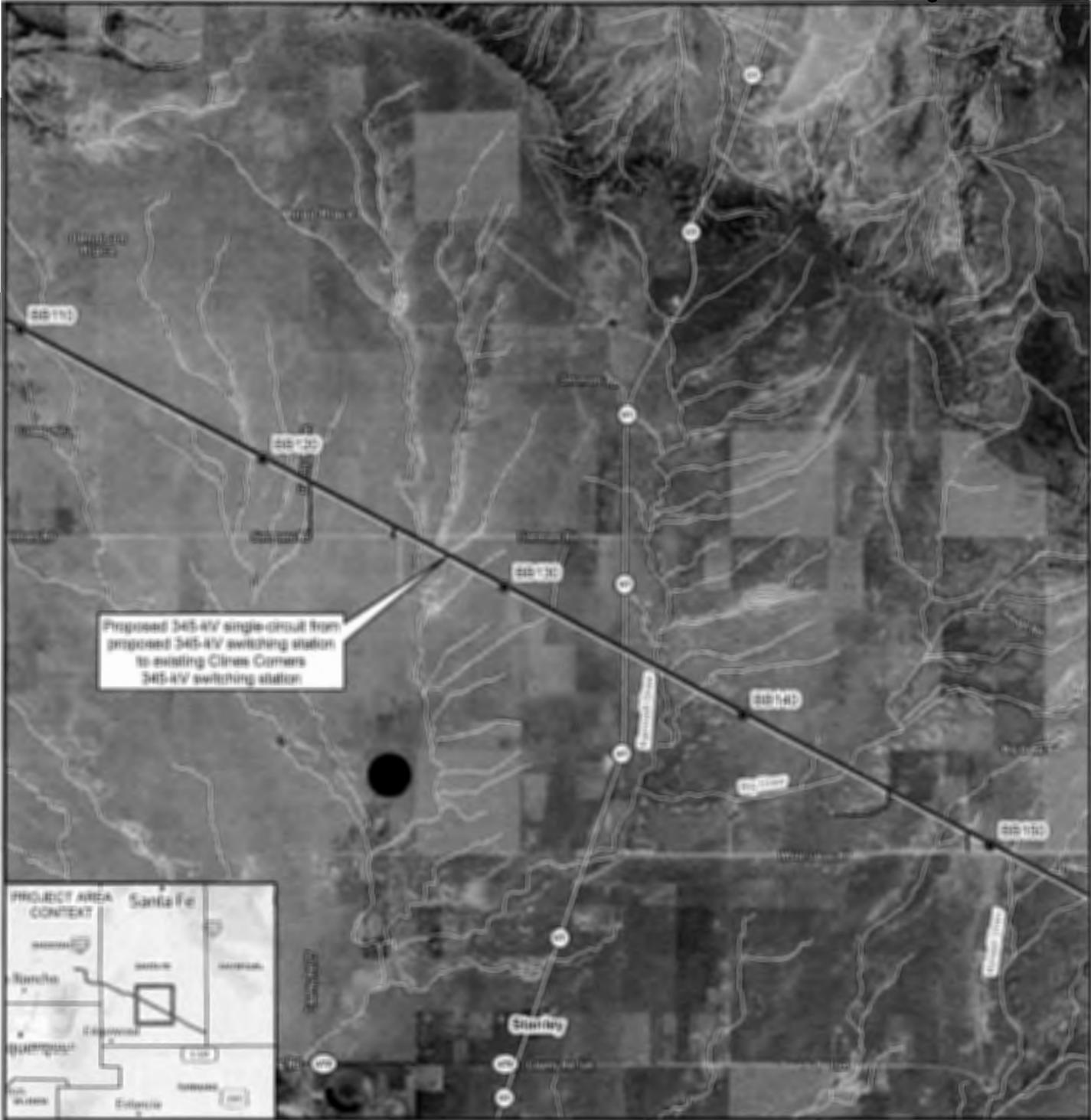
<p>Legend</p> <ul style="list-style-type: none"> ● BB Line Transmission Structure ■ Project Area □ County <p>Soil Survey Geographic</p> <p>Dominant Order</p> <ul style="list-style-type: none"> ■ Alfisols ■ Aridisols ■ Entisols ■ Inceptisols ■ Mollisols ■ Vertisols 	<p>NOTES: King Draw, Starley, White Lakes, El Corno Butte, and Glass Corners USGS 7.5 Minute Quadrange Santa Fe County, New Mexico</p>	 <p>MARRON and ASSOCIATES INCORPORATED</p>	<p>SOILS FIGURE A4</p>						
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PROJECT NO.	66808 300000-01								
REVISION	1/2010								
DATE	04/2010								



<p>Legend</p> <ul style="list-style-type: none"> ● BB Line Transmission Structure ▭ Project Area — Existing BB Line — Proposed BB Line — Access Roads — Waterway ▭ Wetland ▭ Bird (flycatcher and cuckoo) habitat ● Grey Vireo Occupied Habitat 	<p>▭ County</p> <p>Land Ownership</p> <ul style="list-style-type: none"> ▭ BLM ▭ Tribal ▭ Private ▭ State 	<p>NOTES: Pecos, Hager, Goshute, USGS 7.5 White Quadrangle Sandoval and Santa Fe Counties, New Mexico</p>	<p>MARRION and ASSOCIATES a BWS company</p> <p>Service Layer Credits:</p>	<p>BIO RESOURCES FIGURE A5</p> <table border="1"> <tr> <td>PROJECT NO:</td> <td>ARR-18-00000-10</td> </tr> <tr> <td>REVISION:</td> <td>Final</td> </tr> <tr> <td>DATE:</td> <td>11/15/18</td> </tr> </table> <p>PNM BB2 Transmission Line, Sandoval and Santa Fe Counties, New Mexico</p>	PROJECT NO:	ARR-18-00000-10	REVISION:	Final	DATE:	11/15/18
PROJECT NO:	ARR-18-00000-10									
REVISION:	Final									
DATE:	11/15/18									



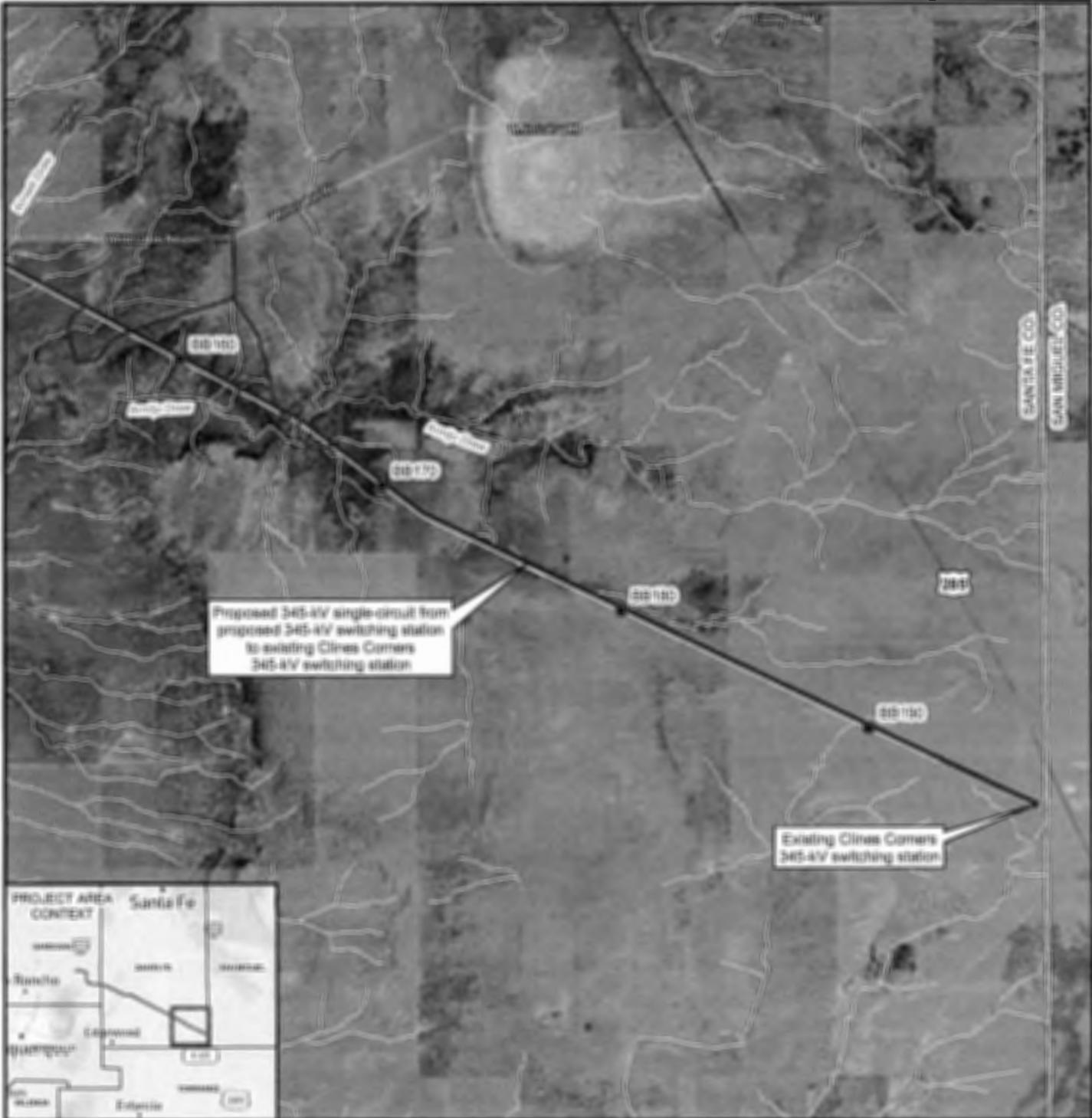
<p>Legend</p> <ul style="list-style-type: none"> BB Line Transmission Structure Project Area Existing BB Line Proposed BB2 Line Access Roads Waterway 	<p>Land Ownership</p> <ul style="list-style-type: none"> BLM Private State 	<p>NOTES: Garden, Capitan, Davis Mountain, King Draw USGS 7.5 Minute Quadrangles Santa Fe County, New Mexico</p>	<p> MARRION and ASSOCIATES An EITC Company</p>	<p style="text-align: center;">BIO RESOURCES FIGURE A6</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">PROJECT NO.</td> <td>44878-00000-01</td> </tr> <tr> <td>REVISED</td> <td>7/20/18</td> </tr> <tr> <td>CREATED BY</td> <td>ash/afg</td> </tr> </table> <p style="text-align: center;">PNM BB2 Transmission Line, Sandoval and Santa Fe Counties, New Mexico</p>	PROJECT NO.	44878-00000-01	REVISED	7/20/18	CREATED BY	ash/afg
PROJECT NO.	44878-00000-01									
REVISED	7/20/18									
CREATED BY	ash/afg									



Proposed 345-kV single-circuit from proposed 345-kV switching station to existing Clinch Corners 345-kV switching station



<p>Legend</p> <ul style="list-style-type: none"> ● BB Line Transmission Structure □ Project Area — Existing BB Line — Proposed BB2 Line — Access Roads — Waterway 	<p>Land Ownership</p> <ul style="list-style-type: none"> ■ BLM □ Private ■ State <p>NOTES: King Draw, Stanley UDDS 7.5 Minute Quadrangles Santa Fe County, New Mexico</p>	 <p>MARRON and ASSOCIATES An EES Company</p>	<p>BIO RESOURCES FIGURE A7</p> <table border="1"> <tr> <td>PROJECT NO.</td> <td>448018_000001-01</td> </tr> <tr> <td>PROJECT</td> <td>TRANSMISSION</td> </tr> <tr> <td>DATE</td> <td>08/20/14</td> </tr> </table>	PROJECT NO.	448018_000001-01	PROJECT	TRANSMISSION	DATE	08/20/14
PROJECT NO.	448018_000001-01								
PROJECT	TRANSMISSION								
DATE	08/20/14								
<p>Scale: 0 0.5 1 2 Miles 0 0.5 1 2 Kilometers 1:100,000</p>		<p>Service Layer Credits:</p> <p>PNM BB2 Transmission Line, Sandoval and Santa Fe Counties, New Mexico</p>							



Proposed 345-4V single-circuit from proposed 345-4V switching station to existing Clines Corners 345-4V switching station

Existing Clines Corners 345-4V switching station



<p>Legend</p> <ul style="list-style-type: none"> ● BB Line Transmission Structure ▭ Project Area — Existing BB Line — Proposed BB2 Line — Access Roads — Waterway 	<p>County</p> <p>Land Ownership</p> <ul style="list-style-type: none"> ▭ BLM ▭ Private ▭ State <p>NOTES: Stanley, White Lakes, El Cuervo Butte, Clines Corners USGS 7.5 Minute Quadrangles Santa Fe County, New Mexico</p>	<p>MARRION and ASSOCIATES a B2B company</p> <p>Service Layer Credits:</p>	<p>BIO RESOURCES FIGURE A8</p> <table border="1"> <tr> <td>PROJECT NO.</td> <td>66618</td> <td>REVISION</td> <td></td> </tr> <tr> <td>REVISED</td> <td></td> <td>TRACED</td> <td></td> </tr> <tr> <td>DRAWN BY</td> <td></td> <td>DATE</td> <td></td> </tr> </table>	PROJECT NO.	66618	REVISION		REVISED		TRACED		DRAWN BY		DATE	
PROJECT NO.	66618		REVISION												
REVISED		TRACED													
DRAWN BY		DATE													
<p>Scale: 0 0.5 1 2 Miles 0 0.5 1 2 Kilometers 1:100,000</p>		<p>PNM BB2 Transmission Line, Sandoval and Santa Fe Counties, New Mexico</p>													



NOTES: Planets, Inset
USGS 7.5 Minute Quadrangles
Santa Fe County, New Mexico



**Wetland Overview
FIGURE A9**

PROJECT NO.: 44418-00000-01
REVISED: 8/12/18
DRAWN BY: [illegible]

Source Layer Credits:

**PNM BB2 Transmission Line,
Sandoval County, New Mexico**



1
20,000



Legend

-  Project Area
-  Wetland

NOTES: Photos, Hager
USGS 7.5 Minute Quadrangles
Santa Fe County, New Mexico



**Canon Tejon
Wetland
FIGURE A10**

PROJECT NO.	66618-30000-00
REVISION	01/2018
DATE	01/2018

Service Layer Credits

**PNM BB2 Transmission Line,
Sandoval County, New Mexico**



1:5,000



Legend

-  Project Area
-  Wetland
-  Road ID

NOTES: Photos, Hagen
USGS 7.5 Minute Quadrangles
Santa Fe County, New Mexico



**Arroyo Coyote
Wetland
FIGURE A11**

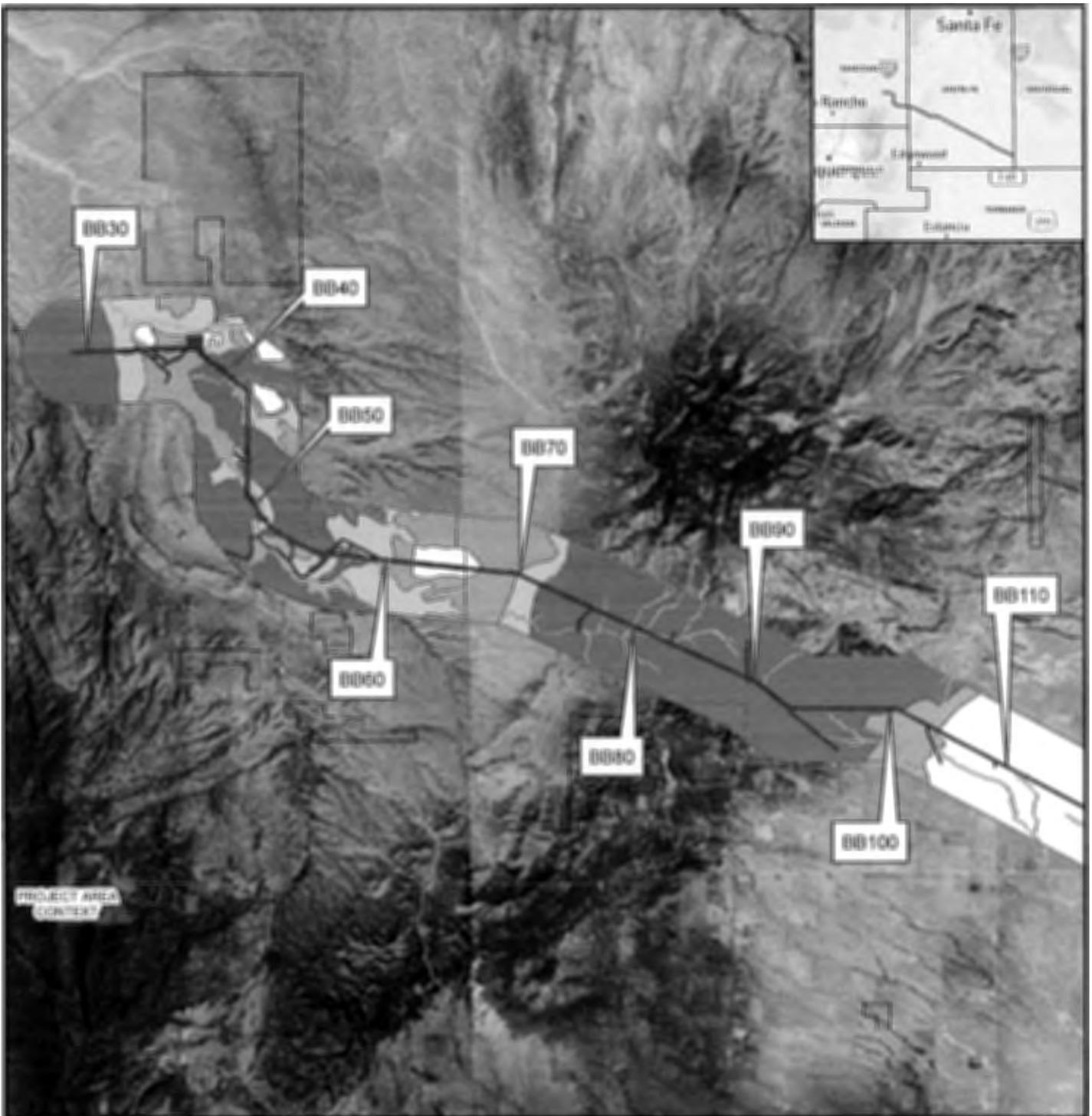
PROJECT NO.:	44414-00000101
REVISED:	6/3/2014
DRAWN BY:	Shallcross

Service Layer Credits:

**PNM BB2 Transmission Line,
Sandoval County, New Mexico**



1
6
1:5,000



Legend

- Project Area
- Arroyo Riparian
- Juniper Savanna
- Juniper Woodland
- Pinyon-Juniper Woodland
- Coniferous Forest
- Plains-Mesa Grassland

NOTES: Pallas, Hagen, Golden, Captain Davis Mountain, King Draw UTM 7.5 Minute Quadrangles Santa Fe County, New Mexico



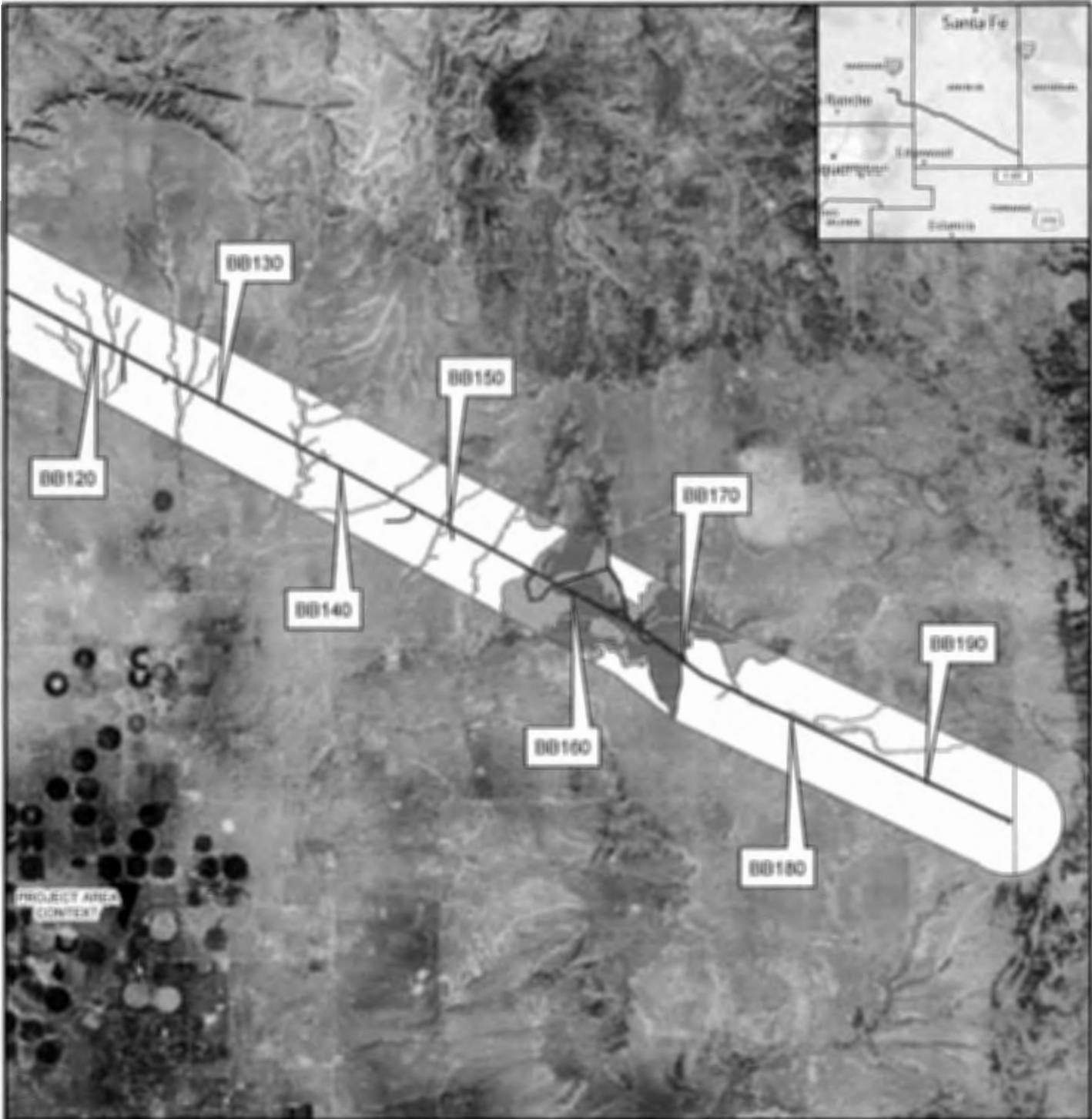
Service Layer Credits:
Source: Esri,
DigitalGlobe, GeoEye,
Earthstar
Geographics,



**Vegetation
FIGURE A12**

PROJECT NO.:	44444
REVISED:	4/1/2014
CREATED BY:	gallwood

**PNM 882 Transmission Line,
Sandoval County, New Mexico
Santa Fe County, New Mexico**



Legend

- Project Area
- Arroyo Riparian
- Juniper Savanna
- Juniper Woodland
- Piñon-Juniper Woodland
- Plains-Mesa Grassland

NOTES: King Draw, Binky, White Lakes, El Cervo Suite, Caves Corral, USGS 7.5 Minute Quadrangles, Santa Fe County, New Mexico



**Vegetation
 FIGURE A13**

PROJECT NO.:	BB2018-000000-01
PROVIDED BY:	BB2018
DATE:	08/20/2018

Source Layer Credits:
 Source: Esri,
 DigitalGlobe, GeoEye,
 Earthstar
 Geographic

**PNM BB2 Transmission Line,
 Sandoval County, New Mexico
 Santa Fe County, New Mexico**





NOTES: Aerial Image
 USGS 7.5 Minute Quadrangle
 Santa Fe County, New Mexico



**Southwestern Willow
 Flycatcher Potential
 Habitat
 FIGURE A14**

PROJECT NO.	BBB18-000001-01
REVISED	6/9/2018
CREATED BY	lballou

Legend

- Project Area
- SWFL Potential Nesting Habitat
- SWFL Potential Migration Habitat
- Road ID



Source Layer Credits:

**PNM BB2 Transmission Line,
 Sandoval County, New Mexico**



Legend

-  Project Area
-  Yellow-billed Cuckoo Potential Habitat
-  Peregrine Falcon Sightings
-  Road ID

NOTES: Planets, Pagan
USGS 7.5 Minute Quadrangles
Santa Fe County, New Mexico



**Listed Species Potential
Habitat and Sightings
FIGURE A15**

PROJECT NO.	40012E-2009001-01
REVISED	6/16/2016
DRAWN BY	Shelley

Service Layer Credits:

**PNM BB2 Transmission Line,
Sandoval County, New Mexico**



Appendix B
Supporting Information

Transmission Line Noise Fact Sheet

Three types of noise are often associated with transmission lines once operational, including noise from the transmission lines and towers, noise from activities for routine inspection and maintenance of the new facilities, and noise from new substation facilities. The noise generated by routine maintenance is generally negligible, while the noise generated by a substation may affect the area immediately adjacent to the substation. Transmission line noise, which includes **corona, insulator, and Aeolian noise**, can be generated throughout the transmission line route and is therefore more likely to affect sensitive receptors than the other two noise types.

Types of Transmission Line Noise

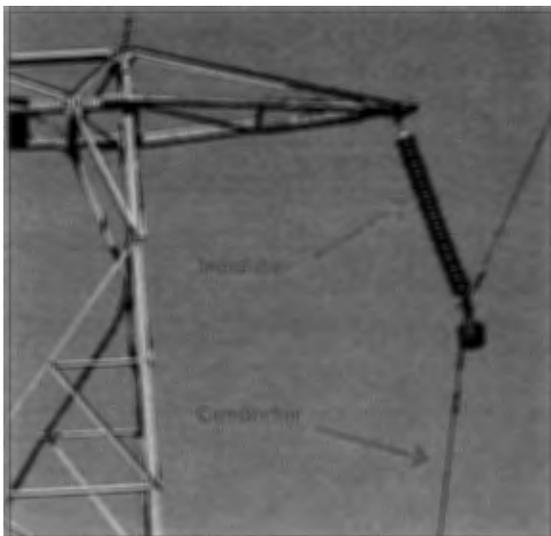
Corona noise is the most common noise associated with transmission lines and is heard as a crackling or hissing sound. Corona is the breakdown of air into charged particles caused by the electrical field at the surface of conductors. This type of noise varies with both weather and voltage of the line, and most often occurs in conditions of heavy rain and high humidity (typically >80%). An electric field surrounds power lines and causes implosion of ionized water droplets in the air, which produces the sound.

During relatively dry conditions, corona noise typically results in continuous noise levels of 40 to 50 dBA in close proximity to the transmission line, such as at the edge of the right-of-way. In many locations, this noise level is similar to ambient noise conditions in the environment. During wet or high humidity conditions, corona noise levels typically increase. Depending on conditions, wet weather corona noise levels could increase to 50 to 60 dBA and could even increase to over 60 dBA under some conditions. Corona noise levels are not consistent from location to location because conductor surface defects, damage, dust, and other inconsistencies can influence the corona effect.

For comparison purposes, noise levels for other common sounds are presented in the table to the right.



Common Sounds and Their Associated Noise Levels	
Source	Level
Normal breathing	10 dBA
Rustling leaves	20 dBA
Whisper	20-30 dBA
Ambient noise in an average home	50 dBA
Normal conversation at 3 feet	60-65 dBA
Vacuum cleaner	60-82 dBA
Freeway traffic at 165 feet	70 dBA
Garbage disposal at 3 feet	80 dBA
Rock concert	90-115 dBA
Jet flyover at 1,000 feet	110 dBA
Apollo liftoff	188 dBA



Top of lattice steel tower illustrating insulator and conductor.

Insulator noise is similar to corona noise but it is not dependent on weather. It is caused by dirty, nicked, or cracked insulators, and is mainly a problem with older ceramic or glass insulators. New polymer insulators minimize this type of noise.

Aeolian noise is caused by wind blowing through the conductors and/or structures. This type of noise is usually infrequent and depends on wind velocity and direction. Wind must blow steadily and perpendicular to the lines to set up an Aeolian vibration, which can produce resonance if the frequency of the vibration matches the natural frequency of the line. Dampeners can be attached to the lines to minimize Aeolian noise.

BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF PUBLIC SERVICE)
COMPANY OF NEW MEXICO'S APPLICATION)
FOR APPROVAL OF A 345 KV TRANSMISSION)
LINE AND ASSOCIATED FACILITIES PURSUANT) Case No. 18-00 ____ -UT
TO THE PUBLIC UTILITY ACT,)
)
PUBLIC SERVICE COMPANY OF NEW MEXICO,)
)
Applicant.)
_____)

AFFIDAVIT

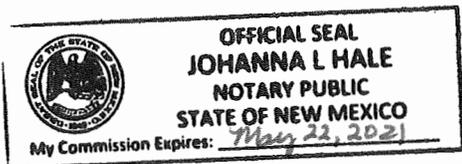
STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

ERIC JOHNSON, Senior Environmental Project Manager with Marron and Associates, upon being duly sworn according to law, under oath, deposes and states: I have read the forgoing **Direct Testimony of Eric Johnson** and it is true and accurate based on my own personal knowledge and belief.

SIGNED this 23rd day of July, 2018.

Eric Johnson
ERIC JOHNSON

SUBSCRIBED AND SWORN to before me this 23rd day of July, 2018.



Johanna L Hale
NOTARY PUBLIC IN AND FOR
THE STATE OF NEW MEXICO

My Commission Expires:
