NEW APPLICATION

ORIGINAL

Application

for

L-00000D-19-0196-00183

Certificate of Environmental Compatibility

WILDCAT AND CYCLONE 230kV TRANSMISSION LINE PROJECT

Prepared for:
State of Arizona
Power Plant and Transmission Line Siting Committee

Submitted by:
Arizona Public Service Company

August 2019
Case No. 183

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INTRODUCTION

Pursuant to A.R.S. § 40-360, *et seq.*, Arizona Public Service Company (APS or Applicant) is seeking a Certificate of Environmental Compatibility (CEC) granting authority to construct the Wildcat and Cyclone 230 kilovolt (kV) Transmission Line Project.

PROJECT OVERVIEW

The Wildcat and Cyclone transmission line project will consist of new single-circuit 230kV transmission lines between the existing APS Palm Valley to Rudd 230kV transmission line and the TS15 Substation and TS18 Substation (Project). The Project is anticipated to be constructed with steel double-circuit capable monopole and H-frame structures. Final design cannot be completed until a route is finalized. Additional structure types may be needed depending upon specific route and site conditions.

The 230kV infrastructure is needed to serve two separate but adjacent APS-customer data center projects referred to as the Wildcat Data Center and the Cyclone Data Center. The Project is designed to deliver power to the customer projects' substations, located northwest of the intersection of West Broadway Road and South Litchfield Road in Goodyear, from the nearby existing APS Palm Valley to Rudd 230kV transmission line located approximately 0.30 to 0.35 miles to the south of the Wildcat Data Center and Cyclone Data Center sites.

The Project will serve two separate customers with differing development schedules, and depending on the selected line route alternative, the Project could be constructed at the same time or in two separate phases to meet the in-service needs of each customer. The anticipated in-service date for the Project is 2021. The Project is encompassed in APS's Ten-Year Plan and Ten-Year Plan Supplemental filed with the Arizona Corporation Commission (Commission) on January 31, 2019 (TS15), and June 12, 2019 (TS18), respectively.

For the initial development phase, the Wildcat Data Center and Cyclone Data Center will be temporarily provided electricity via 69kV infrastructure. The 69kV components of the TS15 Substation (Wildcat Data Center Site) are currently under construction, and construction of 69kV components of the TS18 Substation (Cyclone Data Center Site) is anticipated to begin in late 2019. Full build-out of the data centers will require 230kV electrical infrastructure, as described in detail below.

PURPOSE AND NEED

The greater Phoenix region has emerged as one of the top markets in the western U.S. for attracting high-tech companies, including data centers. With these companies comes a need for electrical infrastructure to serve the increased electrical demand. APS has identified the need for new 230kV infrastructure to serve the two separate but adjacent data center businesses.

Data centers require a large amount of electrical power demand in a small geographical footprint. The Wildcat Data Center and Cyclone Data Center are anticipated to require at full buildout 270 megawatts (MW) and 350MW of electrical power, respectively. To put this into perspective, the 2019 peak demand expected for customers within the City of Goodyear is 467MW; with the addition of these two data centers, this peak demand will increase by 233%. This increase will occur in a geographical footprint of less than three quarters of a square mile.

Due to the high demand required by the data centers, the customers must be served by 230kV sources. To ensure high reliability of the 230kV interconnected system, the existing Palm Valley to Rudd 230kV line must be cut in and out to the new data center substations (TS15 and TS18). The Preferred Route and two alternative routes (Figures 1 through 3) meet the customers' requirement that no single contingency (such as the loss of a single pole) would result in the inability to serve load. In addition to ensuring continuity of load for any single contingency, the Preferred Route and two alternative routes (Figures 1 through 3) ensure a high level of reliability to the West Valley and the Bulk Electric System.

ENVIRONMENTAL AND PUBLIC SITING PROCESS

APS and its consultant, Environmental Planning Group, LLC (EPG), developed a public planning and outreach process to identify environmentally compatible routes for the Project. APS implemented the process over an approximate 6-month timeframe. This planning process began with APS and EPG identifying and examining the area surrounding the Wildcat and Cyclone Data Centers' sites to identify possible routes for the Project. This process included identifying opportunities to co-locate the transmission lines along existing transmission lines, distribution lines, or roadways, and to avoid environmentally sensitive areas and minimize impacts to land owners. Based on the review of opportunities and constraints, APS and EPG identified preliminary segments or links (see Figure 4) that were then developed into route alternatives for the Project. Prior to creating the route alternatives, some preliminary links were eliminated from further consideration based on input received from the City of Goodyear, the City of Avondale, and members of the public. These links were located east of South Litchfield Road along West Broadway Road (Link 12), and north of West Broadway Road on South Litchfield Road (Link 11) – these locations included existing residences and/or planned residential development. In addition, some preliminary links were modified and/or added to account for detailed design. EPG then completed environmental secondary data and field inventories for lands within 2 miles of the route alternatives (Study Area) and examined in greater detail the overall level of impact the Project's route alternatives would have on the various environmental resources. This research included field visits and reviews of relevant documents and data, as well as the completion of environmental impact analyses.

APS and EPG instituted multiple public participation activities including a public open house meeting, jurisdictional meetings, agency briefings, landowner contacts, a newsletter mailing, newspaper advertisements, a telephone information line, and a website. Through these activities, APS requested and received public and agency feedback on the proposed preliminary route links and how those links may impact certain locations. APS also gathered information regarding constraints associated with engineering feasibility, right-of-way availability, and associated costs. Using this information, APS and EPG examined the overall compatibility of the routes, incorporated the feedback from the public, and developed the Preferred Route and two alternative routes (Figures 1 through 3) to be carried forward for the Arizona Power Plant and Transmission Line Siting Committee (Siting Committee) and Commission consideration in this application.

This approach allows for consideration of a broad range of reasonable alternative transmission line locations at the beginning of the process but focuses on specific details and construction feasibility prior to APS identifying final alternative transmission line routes.

CONCLUSION

This application includes the environmental evaluation and documentation relevant to the Project as specified by Arizona Administrative Code Rule R14-3-219. The CEC requested in this application balances, in the broad public interest, the need for an adequate, economical, and reliable supply of electric power, with the desire to minimize impacts on the environment and ecology. The Project will result in minimal

adverse impacts on factors to be considered by the Siting Committee, including: existing land use plans, fish, wildlife, and plant life, areas unique because of biological wealth, scenic areas, historic sites and structures and archaeological sites, and the total environment of the area. APS is committed to avoiding and minimizing environmental impacts and believes the Project's Preferred Route and alternative routes are environmentally compatible. As such, APS respectfully requests that the Siting Committee grant, and the Commission approve, the requested CEC for the Project.

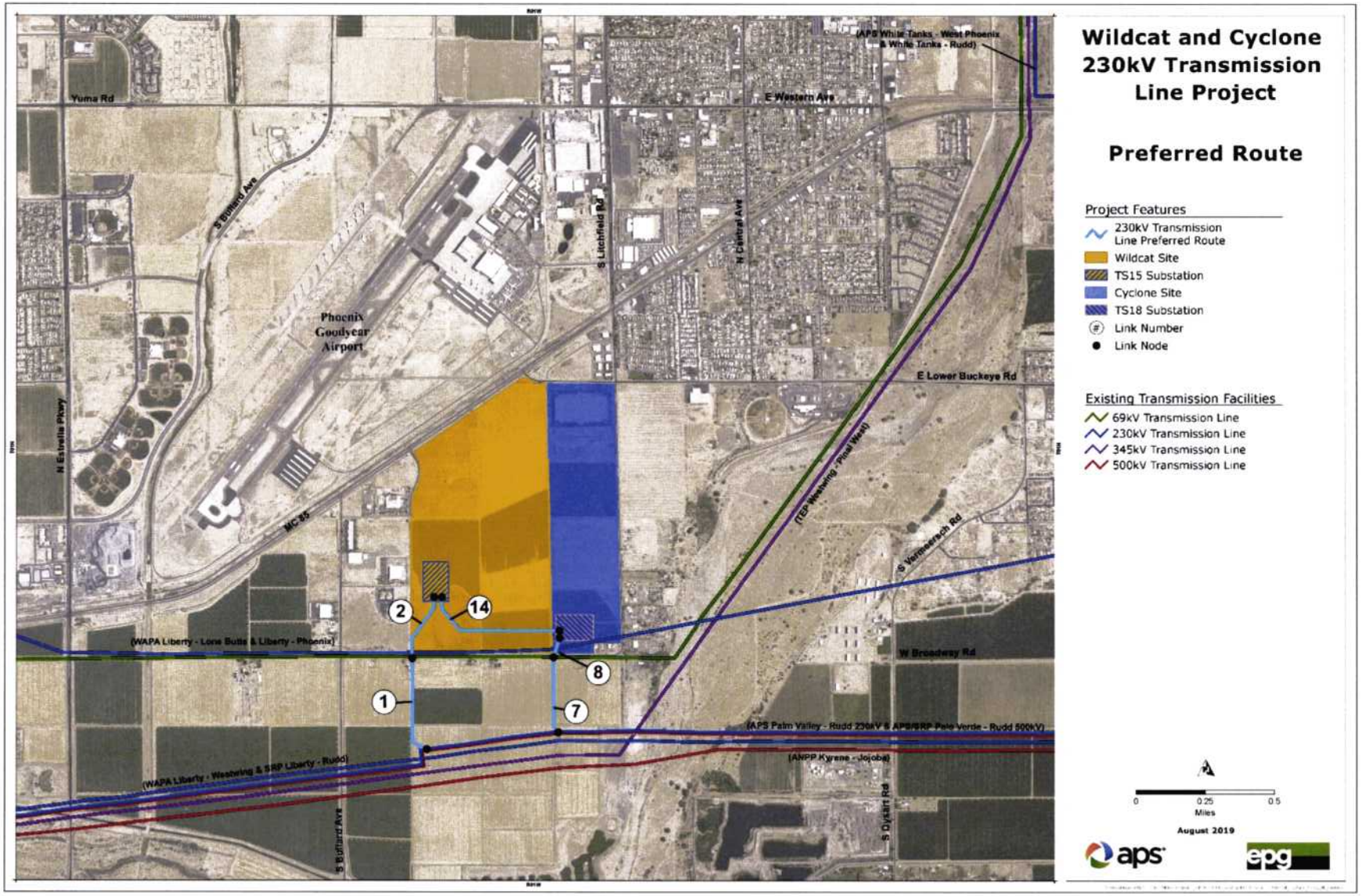

Figure 1. Preferred Route

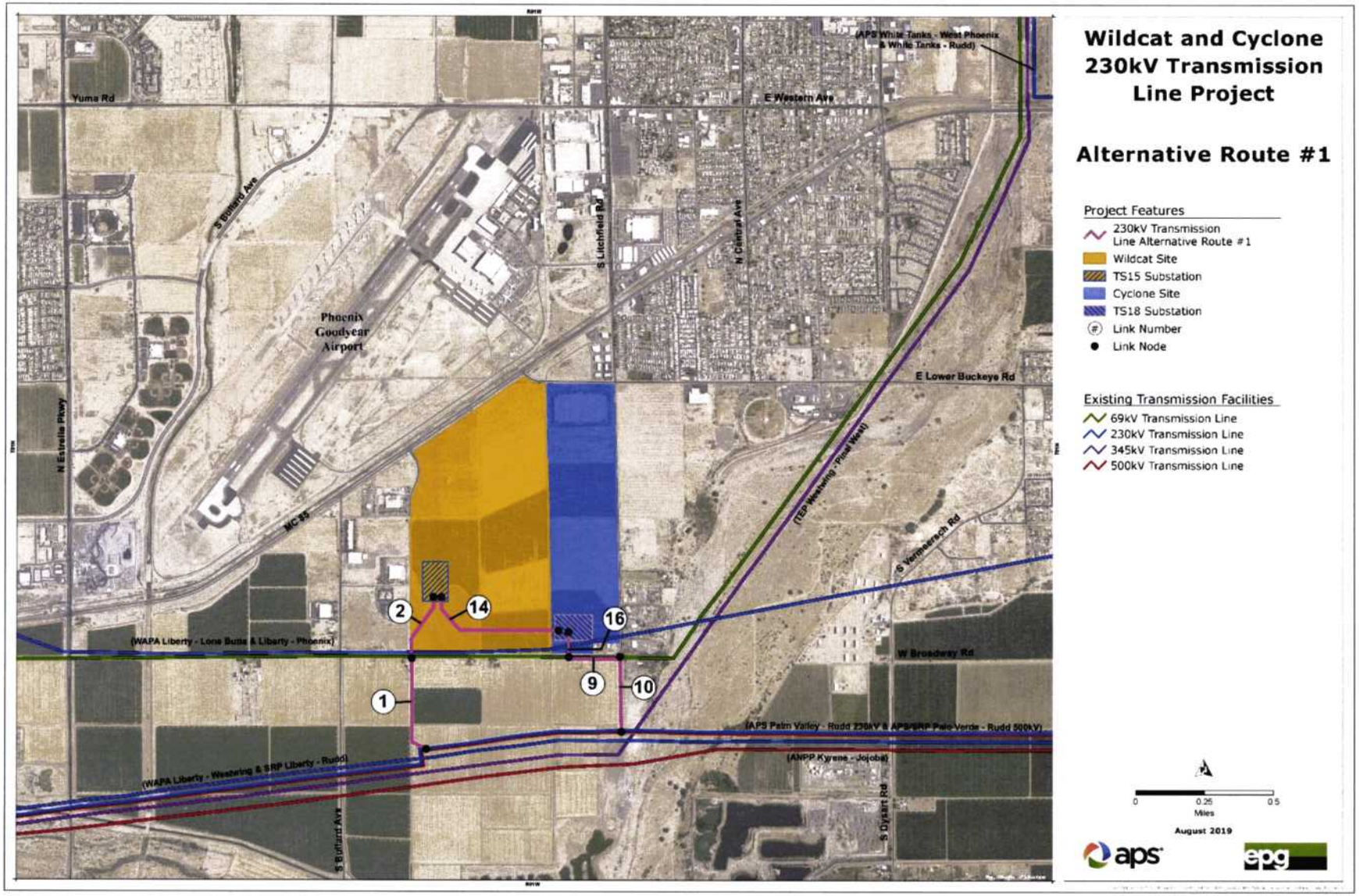

Figure 2. Alternative Route #1

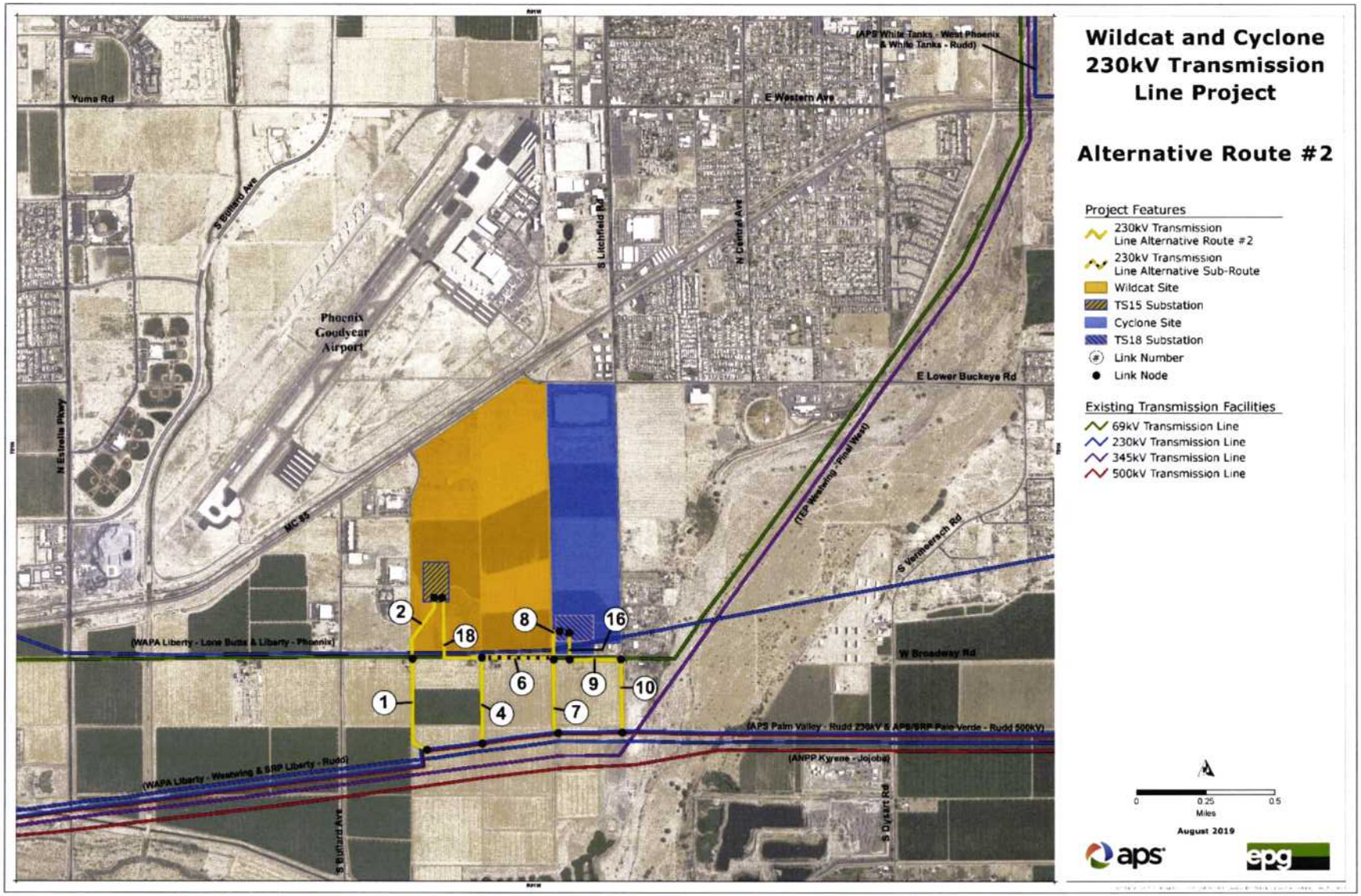

Figure 3. Alternative Route #2

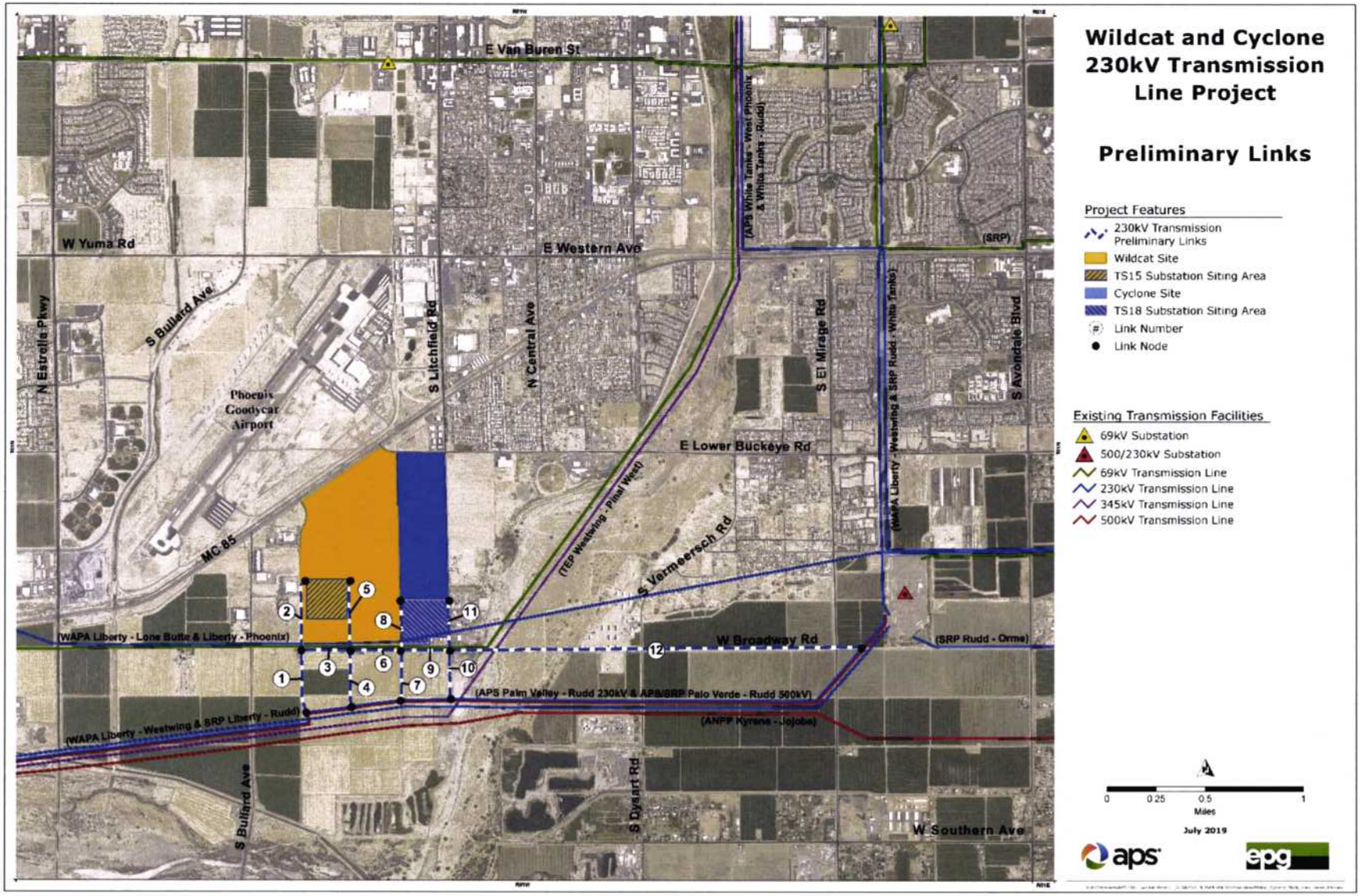

Figure 4. Preliminary Links

APPLICATION FOR CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

1. **Name and address of Applicant:**
   Arizona Public Service Company
   PO Box 53933
   Phoenix, Arizona 85072-3933

2. **Name, address and telephone number of a representative of an applicant who has access to technical knowledge and background information concerning the application in question and who will be available to answer questions or furnish additional information.**
   D. Brad Larsen, P.E.
   Senior Siting Consultant
   Transmission and Facility Siting
   Arizona Public Service Company
   PO Box 53933, MS 3293
   Phoenix, Arizona 85072-3933
   (602) 493-4338

3. **Date on which Applicant filed a ten-year plan in compliance with A.R.S. § 40-360.02, in which the facilities for which this application is made were described.**
   The Project is included in APS's Ten-Year Plan and Ten-Year Plan Supplemental Filing that were filed with the Commission on January 31, 2019 (TS15), and June 12, 2019 (TS18), respectively.

4. **Description of the proposed facility, including:**
   a. **Description of the electrical generating plant:**

      There are no electrical generating plants included in the Project.

   b. **Description of the proposed transmission line:**

      i. **Nominal voltage for which the line is designed; description of the proposed structures and switchyards or substations associated therewith; and purpose for constructing said transmission line.**

         (1) **Nominal voltage:**

            The nominal voltage for the Project's transmission lines is 230kV.

         (2) **Description of proposed structures:**

            The transmission lines are anticipated to be constructed using steel monopole and H-frame structures. The structures would be approximately 130 to 190 feet in height. The average span length between structures will range between approximately 500 and 1,200 feet apart depending on final design. The structures will have a dulled gray or weatherized finish, and conductors will have a non-specular finish in order to reduce visibility. Variations may be required to achieve site-specific mitigation objectives or meet site-specific engineering requirements.

Conceptual drawings showing the typical structures that may be used are provided in Exhibit G.

(3) Description of proposed switchyards and substations:

The transmission lines that will serve the Project will terminate at the TS15 and TS18 230kV substations. The TS15 230kV substation is 0.20 miles north of West Broadway Road and 0.30 miles east of South Bullard Avenue and is located on the customer's property. The TS18 230kV substation is 0.05 miles north of West Broadway Road and 0.10 miles west of South Litchfield Road and is located on the customer's property.

Both the TS15 and TS18 Substations will contain typical substation equipment including dead-end structures, buss work, switches, transformers, breakers, communication equipment, and a control structure.

Conceptual layouts of the substations described above are provided in Exhibit G.

(4) Purpose for constructing said transmission line:

The purpose of the Project is to deliver electrical power to two separate, but adjacent data center projects.

ii. Description of geographical points between which the transmission line will run, the straight-line distance between such points and the length of the transmission line for each alternative route for which application is made.

(1) Description of geographical points between which the transmission line will run:

The TS15 and TS18 Substations will be located within each data center owner's private property. The TS15 Substation will be located within portions of parcels 500-07-983, 500-07-106, and 500-07-107 in the NE quarter of the SW quarter of Section 21 of Township 1 North, Range 1 West, Gila & Salt River Baseline & Meridian (G&SRB&M). The TS18 Substation will be located within parcel 500-07-037G in the SE quarter of the SE quarter of Section 21 of Township 1 North, Range 1 West, G&SRB&M. The Project will connect the TS15 and TS18 Substations to the existing Palm Valley to Rudd 230kV transmission line located approximately 0.38 to 0.55 miles to the south of the TS15 and TS18 Substations. The Project's points of connection to the Palm Valley to Rudd 230kV transmission line will be determined based on the selected route, within one or more of parcels 500-80-012, 500-80-014A, and 500-80-001A, all within the South half of the North half of Section 28 of Township 1 North, Range 1 West, G&SRB&M.

(2) Straight-line distance between such points:

The straight-line distance between the TS15 Substation to the point of interconnection at the Palm Valley to Rudd 230kV transmission line is 0.55 miles due south.

The straight-line distance between the TS18 Substation to the point of interconnection at the Palm Valley to Rudd 230kV transmission line is 0.38 miles due south.

(3) Length of the transmission line for each alternative route:

Transmission Line Alternative	Total Length of Transmission Line
Preferred Route	1.45 miles
Alternative Route #1	1.65 miles
Alternative Route #2	2.22 miles
Alternative Route #2 with Sub-Route	1.89 miles

iii. Nominal width of right-of-way required, nominal length of spans, maximum height of supporting structures and minimum height of conductor above ground.

(1) Nominal width of right-of-way required:

The right-of-way will be up to 120 feet wide within a requested corridor 500 feet in width. The location of the alignment for the right-of-way within this corridor will be determined according to site-specific design, and environmental factors.

(2) Nominal length of spans:

The typical span length between structures will be approximately 500 to 1,200 feet, with variations made to achieve site-specific mitigation objectives or meet site-specific engineering requirements.

(3) Maximum height of structures above ground:

The height of the supporting structures will not exceed 190 feet above ground.

(4) Minimum height of conductor above ground:

The minimum height of the conductor above existing grade will be 24 feet above ground.

iv. To the extent available, the estimated costs of proposed transmission line and route, stated separately. (If application contains alternative routes, furnish an estimate for each route and a brief description of the reasons for any variations in such estimates.)

Transmission Line Alternative	Total Length of Transmission Line (miles)	Right-of-Way Costs ($ millions)	Construction Costs ($ millions)	Total Right-of Way and Construction Costs ($ millions)
Preferred Route	1.45	1.47	2.65	4.12
Alternative Route #1	1.65	1.62	3.01	4.63
Alternative Route #2	2.22	2.37	4.10	6.47
Alternative Route #2 with Sub-Route	1.89	1.88	3.50	5.38

v. Description of proposed route and switchyard locations. (If application contains alternative routes, list routes in order of applicant's preference with a summary of reasons for such order of preference and any changes such alternative routes would require in the plans reflected in (i) through (iv) hereof.)

Preferred Route

The Preferred Route will originate at a point on the Palm Valley to Rudd 230kV Transmission Line 0.30 miles east of South Bullard Avenue and 0.35 miles south of West Broadway Road. From that point, the Preferred Route will proceed north 0.55 miles, crossing above the existing APS 69kV subtransmission line, West Broadway Road, and the existing Western Area Power Administration (WAPA) Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and then connect to the TS15 Substation. From a location within the TS15 Substation 0.20 miles north of West Broadway Road, the Preferred Route will extend southeast approximately 0.15 miles, and then travel east 0.35 miles where it will connect into the western side of the TS18 Substation. From a location within the TS18 Substation 0.06 miles north of West Broadway Road, the Preferred Route will extend south 0.38 miles, crossing above the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line, West Broadway Road, and the existing APS 69kV subtransmission line and then connect with the Palm Valley to Rudd 230kV Transmission Line at a point 0.28 miles south of West Broadway Road and 0.25 miles west of the alignment of South Litchfield Road.

The Preferred Route crosses the Wildcat and Cyclone Data Center parcels as well as two private landowners and would result in a high visual impact to one residence on West Broadway Road—the least amount of visual impact for any alternative. As compared to other route alternatives, the Preferred Route:

- minimizes the number of private landowners directly affected by the Project;
- avoids residential land use impacts;
- limits land use impacts to private agricultural land;
- limits crossings of existing transmission and subtransmission lines;
- will be compliant with Federal Aviation Administration (FAA) requirements associated with the Phoenix Goodyear Airport; and
- is the most direct route – thereby reducing costs and environmental impacts.

Alternative Route #1

Alternative Route #1 will originate at a point on the Palm Valley to Rudd 230kV Transmission Line 0.30 miles east of South Bullard Avenue and 0.35 miles south of West Broadway Road. From that point Alternative Route #1 will proceed north 0.55 miles, crossing above the existing APS 69kV subtransmission line, West Broadway Road, and the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and then connect to the TS15 Substation. From a location within the TS15 Substation 0.20 miles north of West Broadway Road, Alternative Route #1 will extend southeast approximately 0.15 miles, and then travel east 0.35 miles where it will connect into the western side of the TS18 Substation. From a location within the TS18 Substation 0.06 miles north of West Broadway Road and 0.19 miles west of South Litchfield Road, Alternative Route #1 will extend south 0.10 miles, crossing above the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and West Broadway Road, and would then travel east along the south side of West Broadway Road – co-located with the existing APS 69kV subtransmission line for 0.19 miles. Alternative Route #1 would then travel south along the alignment of South

Litchfield Road for 0.27 miles, where it would then connect with the Palm Valley to Rudd 230kV Transmission Line.

Alternative Route #1 crosses the Wildcat and Cyclone Data Center parcels as well as two private landowners and would result in a slightly greater amount of low visual impacts to scenery, and a slightly greater amount of low visual impacts to South Litchfield Road residences as compared to the Preferred Route. Alternative Route #1:

- minimizes the number of private landowners directly affected by the Project;
- avoids residential land use impacts;
- limits crossings of existing transmission and subtransmission lines;
- will be compliant with FAA requirements associated with the Phoenix Goodyear Airport; and
- as compared to the Preferred Route is designed to further reduce land use impacts to the private agricultural land south of the Wildcat Data Center and Cyclone Data Center sites by moving the easternmost alignment to the eastern edge of the private landowner's property boundary.

However, Alternative Route #1 is approximately 0.20 miles longer than the Preferred Route and would require a rebuild of a portion of the existing APS 69kV subtransmission line – both factors that would increase the cost of Alternative Route #1 as compared to the Proposed Route.

Alternative Route #2

Alternative Route #2 includes two separate circuits, one to serve the TS15 Substation and another to serve the TS18 Substation. The first circuit of Alternative Route #2, serving the TS15 Substation, will originate at a point on the Palm Valley to Rudd 230kV Transmission Line 0.30 miles east of South Bullard Avenue and 0.35 miles south of West Broadway Road. From that point, Alternative Route #1 will proceed north 0.55 miles, crossing above the existing APS 69kV subtransmission line, West Broadway Road, and the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and then connect to the TS15 Substation. From a location within the TS15 Substation 0.20 miles north of West Broadway Road, Alternative Route #2 will extend south 0.21 miles, crossing above the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and West Broadway Road, and would then travel east along the south side of West Broadway Road – collocated with the existing APS 69kV subtransmission line for 0.14 miles. Alternative Route #2 will then extend south 0.31 miles and connect with the Palm Valley to Rudd 230kV Transmission Line at a point 0.50 miles east of South Bullard Avenue. This would complete the circuit to the TS15 Substation.

A second, separate circuit of Alternative Route #2, serving the TS18 Substation, will originate at a point on the Palm Valley to Rudd 230kV Transmission Line 0.25 miles west of the alignment of South Litchfield Road and 0.28 miles south of West Broadway Road. From that point, Alternative Route #2 will extend north 0.38 miles, crossing above the existing APS 69kV subtransmission line, West Broadway Road, and the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line, and follow the property boundary between the Wildcat Data Center and Cyclone Data Center sites, where it would then connect into the western side of the TS18 Substation. From a location within the TS18 Substation 0.09 miles north of West Broadway Road and 0.19 miles west of South Litchfield Road, Alternative Route #2 will extend south 0.10 miles, crossing above the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and West Broadway

Road, and would then travel east along the south side of West Broadway Road – collocated with the existing APS 69kV subtransmission line for 0.19 miles. Alternative Route #2 would then travel south along the alignment of South Litchfield Road for 0.27 miles where it would then connect with the Palm Valley to Rudd 230kV Transmission Line.

Alternative Route #2 crosses the Wildcat and Cyclone Data Center parcels as well as up to four additional private landowners. Alternative Route #2 would result in:

- a slightly greater amount of low visual impacts to scenery;
- a slightly greater amount of low visual impacts to residences on Bullard Avenue and South Litchfield Road;
- a slightly greater amount of moderate visual impacts to a residence on, and the travel route along, West Broadway Road; and
- additional high visual impacts to two other residences on West Broadway Road.

Alternative Route #2 is designed to provide separate circuits for each customer project, and will be compliant with FAA requirements associated with the Phoenix Goodyear Airport; however, as compared to the Preferred Route and Alternative Route #1, it does result in increased crossings of existing transmission and subtransmission lines, increased land use impacts to one residence located on the south side of West Broadway Road, and increased land use impacts to the private agricultural land south of the Wildcat Data Center and Cyclone Data Center sites.

Alternative Route #2 with Sub-Route

Alternative Route #2 with Sub-Route will originate at a point on the Palm Valley to Rudd 230kV Transmission Line 0.30 miles east of South Bullard Avenue and 0.35 miles south of West Broadway Road. From that point Alternative Route #2 with Sub-Route will proceed north 0.55 miles, crossing above the existing APS 69kV subtransmission line, West Broadway Road, and the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and then connect to the TS15 Substation. From a location within the TS15 Substation 0.20 miles north of West Broadway Road, Alternative Route #2 with Sub-Route will extend south 0.21 miles, crossing above the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and West Broadway Road, and would then travel east along the south side of West Broadway Road – collocated with the existing APS 69kV subtransmission line for 0.40 miles. Alternative Route #2 with Sub-Route will then extend north 0.10 miles, crossing West Broadway Road and the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and connecting into the TS18 Substation. From a location within the TS18 Substation 0.09 miles north of West Broadway Road and 0.19 miles west of South Litchfield Road, Alternative Route #2 with Sub-Route will extend south 0.10 miles, crossing above the existing WAPA Liberty to Lone Butte and Liberty to Phoenix double-circuit 230kV transmission line and West Broadway Road, and would then travel east along the south side of West Broadway Road – collocated with the existing APS 69kV subtransmission line for 0.19 miles. Alternative Route #2 with Sub-Route would then travel south along the alignment of South Litchfield Road for 0.27 miles where it would then connect with the Palm Valley to Rudd 230kV Transmission Line.

Alternative Route #2 with Sub-Route crosses the Wildcat and Cyclone Data Center parcels as well as up to four additional private landowners. It would result in a lesser amount of moderate impacts to the West Broadway Road travel route and would reduce high to moderate impacts associated with two West Broadway Road residences as compared to Alternative Route #2.

Alternative Route #2 with Sub-Route will be compliant with FAA requirements associated with the Phoenix Goodyear Airport; however, it does result in increased crossings of existing transmission lines as compared to the Preferred Route and Alternative Route #1. In addition, as compared to the Preferred Route and Alternative Routes #1 and #2, it results in increased land use impacts to two residences located on the south side of West Broadway Road.

vi. For each alternative route for which application is made, list the ownership percentages of land traversed by the entire route (federal, state, Indian, private, etc.).

All Project alternatives are located on privately owned land, except for the portions of each alternative located within the right-of-way of West Broadway Road, which is owned by the City of Goodyear.

Transmission Line Alternative	Total Length of Transmission Line (miles)	Percentage of Alternative located on Goodyear-owned Land (West Broadway Road)	Percentage of Alternative located on Data Centers' Privately-owned Land	Percentage of Alternative located on other Privately-owned Land
Preferred Route	1.45	2%	54%	44%
Alternative Route #1	1.65	2%	50%	48%
Alternative Route #2	2.22	3%	27%	70%
Alternative Route #2 with Sub-Route	1.89	4%	32%	64%

5. List the areas of jurisdiction [as defined in A.R.S. § 40-360(1)] affected by each alternative site or route and designate those proposed sites or routes, if any, which are contrary to the zoning ordinances or master plans of any of such areas of jurisdiction.

All Project alternatives are located within the jurisdiction of the City of Goodyear, and no Project alternatives are contrary to the zoning ordinances or master plans of this jurisdiction.

Project alternatives cross areas zoned in the City of Goodyear Zoning Code as *Agricultural*, *Industrial* (I-1, I-2), or *Planned Area Development* (associated with the Wildcat Data Center and Cyclone Data Center projects). The City of Goodyear Zoning Code indicates that public utility facilities are an allowable use within all of these zoning prescriptions, but notes that within the areas zoned *Agricultural* a Use Permit is required; however, Chapter 9 Article 9-9 of the zoning code indicates that "an electric line used for the bulk transmission of electricity between generating or receiving points and major substations or delivery points having a rating of over 12,000 volts…may be installed without such a permit."

All Project alternatives cross areas identified in the City of Goodyear General Plan as a planned *Industrial* land use, which "provides areas for more intensive business and employment uses which have a greater impact on surrounding land uses."

All Project alternatives are consistent with the requirements of City of Goodyear's jurisdiction.

6. **Description of environmental studies Applicant has performed or caused to be performed in connection with this application or intends to perform or cause to be performed in such connection, including the contemplated date of completion.**

   The Applicant has evaluated available secondary and field data related to biological resources, visual resources, cultural resources, recreational resources, land use, noise levels, and communications signals in order to assess the potential impacts that may result from the construction, operation, and maintenance of the Project. These evaluations are included in Exhibits B, C, D, E, F, H, and I to this Application.

ARIZONA PUBLIC SERVICE COMPANY

By: _____
D. Brad Larsen, APS Senior Siting Consultant

I HEREBY CERTIFY that on this ___ day of August 2019, I have delivered to the Arizona Corporation Commission twenty-five (25) copies of this application for Certificates of Environmental Compatibility.

EXHIBIT A: LOCATION MAP AND LAND USE MAPS

In accordance with Arizona Administrative Code Rules of Practice and Procedure R14-3-219, the applicant provides the following location maps and land use information:

Where commercially available, a topographic map, 1:250,000 scale, showing any proposed transmission line route of more than 50 miles in length and the adjacent area. For routes less than 50 miles in length, use a scale of 1:62,500.

*Where commercially available,** a topographic map, 1:62,500 scale, of each proposed transmission line route of more than 50 miles in length showing that portion of the route within two miles of any subdivided area. The general land use plan within the area shall be shown on a 1:62,500 map required for Exhibit A-3, and for the map required by this Exhibit A-4, which shall also show the areas of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of on an overlay.*

***If a topographic map is not commercially available, a map of similar scale, which reflects prominent or important physical features of the area in the vicinity of the proposed site or route, shall be substituted.*

LAND USE OVERVIEW

The following exhibits are required by the Arizona Corporation Commission's *Rules of Practice and Procedure* R14-3-219 to support the land use studies conducted for this application:

- Exhibit A-1 illustrates the Study Area, as well as the land ownership for areas within 2 miles, which is also referred to as the Study Area.
- Exhibit A-2 illustrates the Study Area, as well as the surface jurisdiction surrounding the Study Area.
- Exhibit A-3 illustrates existing land use within the Study Area.
- Exhibit A-4 illustrates planned land use for areas within the Study Area.

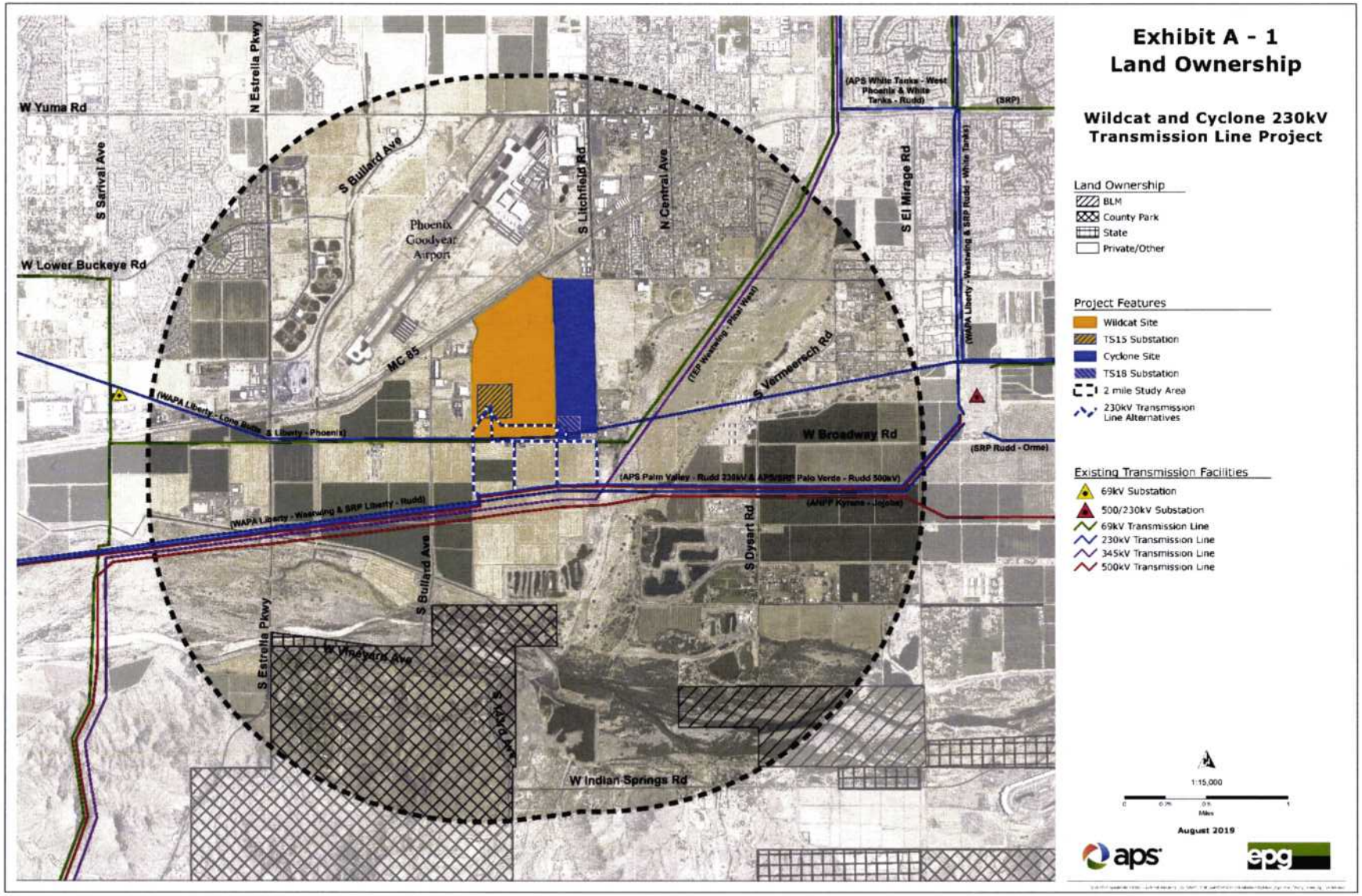

Exhibit A-1. Land Ownership for Areas within 2 miles of the Study Area

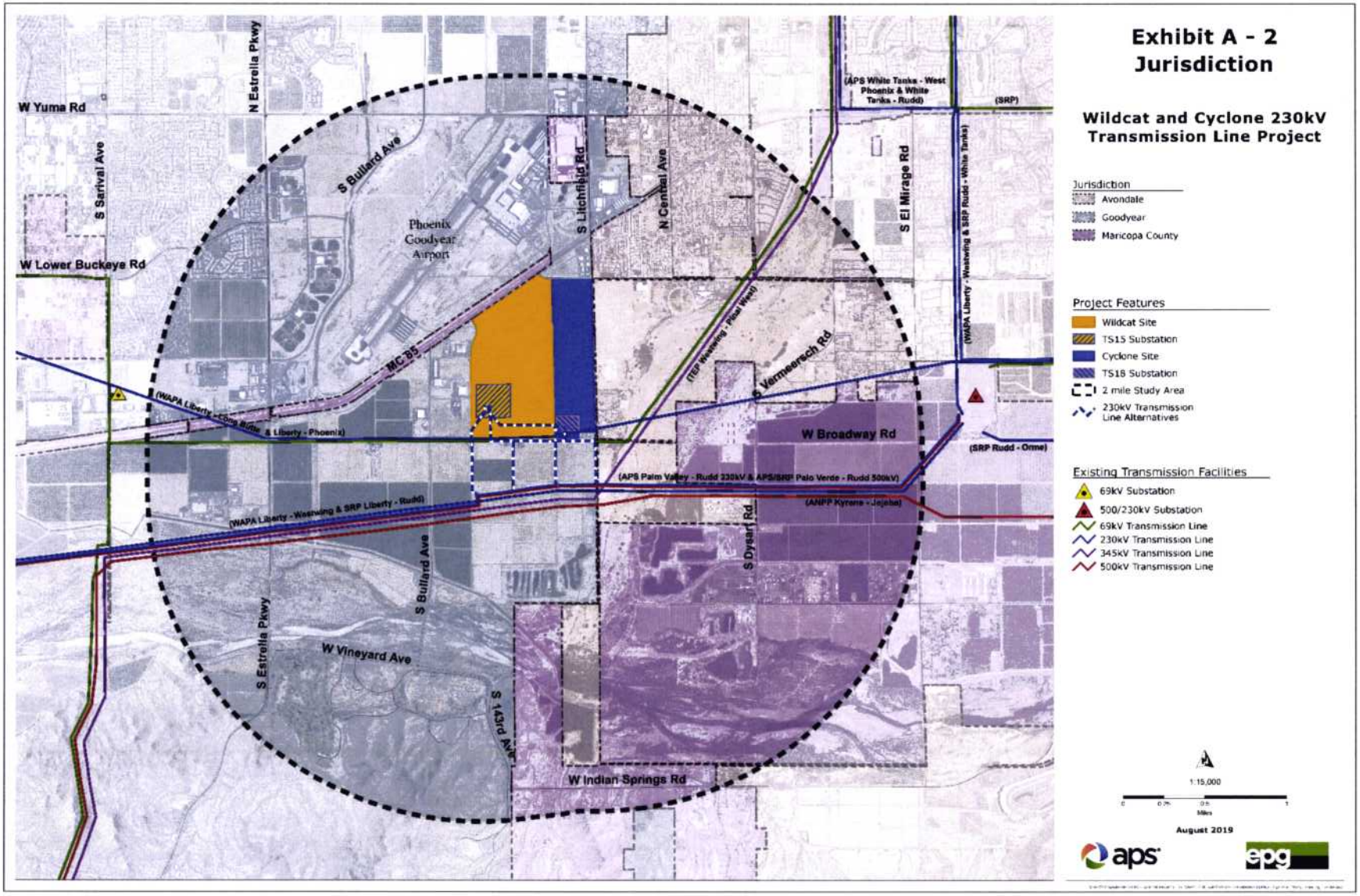

Exhibit A-2. Surface Jurisdiction Surrounding the Study Area

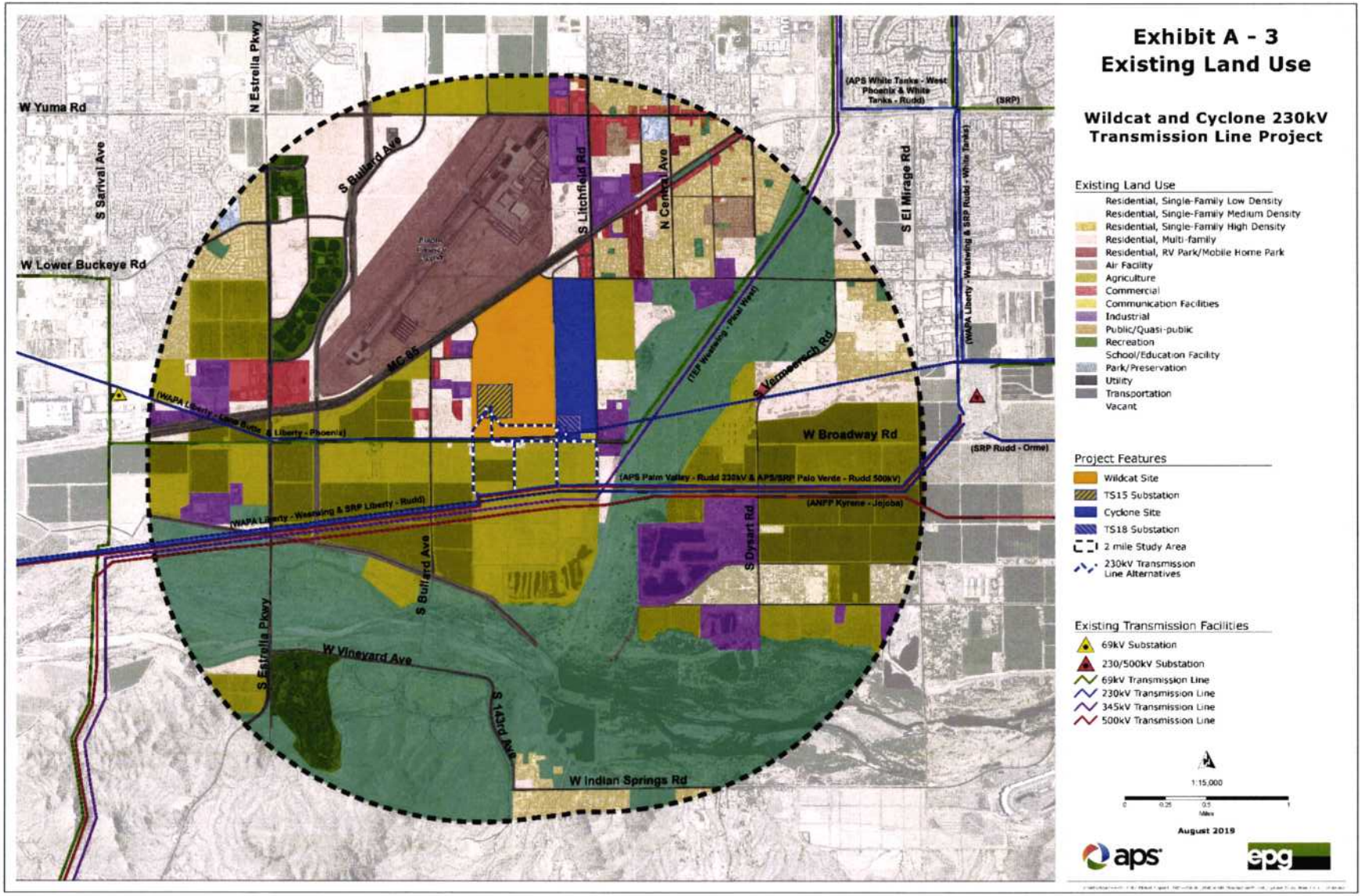

Exhibit A-3. Existing Land Use within the Study Area

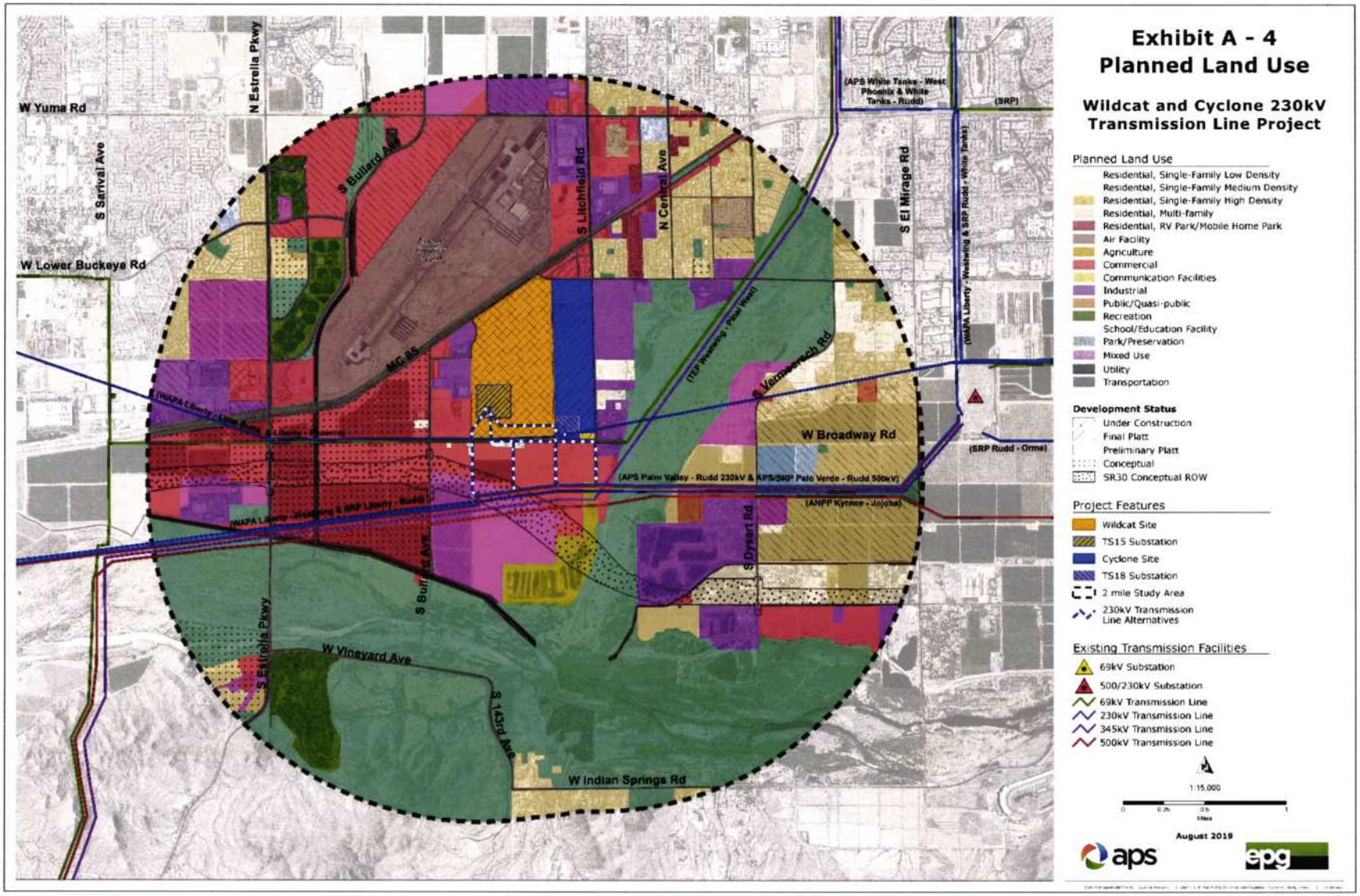

Exhibit A-4. Planned Land Use for Areas within the Study Area

EXHIBIT B: ENVIRONMENTAL REPORTS

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

> *Attach any environmental studies which applicant has made or obtained in connection with the proposed site(s) or route(s). If an environmental report has been prepared for any federal agency or if a federal agency has prepared an environmental statement pursuant to Section 102 of the National Environmental Policy Act, a copy shall be included as a part of this exhibit.*

INTRODUCTION

EPG conducted the environmental analysis for the Project between February and July 2019, and included an evaluation of land use, biological, visual, cultural, and recreation resources within the Study Area. The Study Area for the inventory of environmental resources was defined as a 2-mile buffer around the route alternatives. Below is a detailed inventory of the existing and future land uses, and potential impacts to those uses associated with the Preferred Route and two alternative routes. The biological, visual, recreation, and cultural resource studies are discussed in detail in the subsequent exhibits C, D, E, and F.

LAND USE

Inventory

A land use inventory was completed in order to identify and map existing and future land uses within the Study Area. Existing and future land use data were compiled from various sources including the City of Goodyear and City of Avondale general plans, Maricopa County Comprehensive Plan, as well as various other city and county planning documents. These data were compiled for the Study Area and displayed over aerial imagery for a preliminary mapping inventory of land use resources. Field investigations were conducted in March and June 2019 and included photo documentation and geospatial data collection to verify and refine the preliminary land use inventory mapping. In addition, governmental agencies within the Study Area were contacted for information regarding development plans and known planned projects. This information was then compiled to complete the inventory of existing and future land uses (see Exhibit A). The following is a summary of the results.

The primary planning documents that prescribe land uses in the Study Area are listed below:

- Goodyear 2025 - City of Goodyear General Plan, adopted 2014
- Avondale General Plan 2030, adopted 2012
- Vision 2030, Maricopa County Comprehensive Plan, adopted 2016
- Phoenix Goodyear Airport Master Plan 2018 Update

Jurisdiction and Land Ownership

The Study Area primarily includes lands under the jurisdiction of the City of Goodyear, Maricopa County, and the City of Avondale. Lands located in the western and southern portions of the Study Area are under the jurisdiction/ownership of the Bureau of Land Management (BLM) and Arizona State Land Department (ASLD).

The Wildcat and Cyclone Data Center sites are located on privately owned property, under the jurisdiction of the City of Goodyear. The eastern edge of the Cyclone Data Center site is adjacent to the City of Avondale and the northwestern edge of the Wildcat Data Center site is adjacent to a county highway (MC 85), which is under the jurisdiction of and maintained by Maricopa County. Transmission line alternative routes are primarily located on privately owned land located within the City of Goodyear.

Existing Land Use

Existing land uses within the Study Area are mapped on Exhibit A-3, and include an airport facility, industrial, agriculture, residential, commercial, recreation, open space, transportation, education, public/quasi-public, and vacant land. Overall, the Study Area can be described as a semi-developed suburban area that includes existing utility infrastructure, an airport, mixed commercial and industrial facilities, and scattered agricultural and residential uses. Land uses in the immediate vicinity of the Project sites include six individual transmission line alignments to the south that range in voltages of 69, 230, 345, and 500kV, other electrical utility facilities such as the nearby Rudd 230/500kV Substation, mixed commercial and industrial land uses, as well as the Buckeye Canal and associated laterals; agricultural operations; and residences. These existing land uses identified within the Study Area, and displayed in Exhibit A-3, are described below.

Air Facility – The Phoenix Goodyear Airport is a prominent land use and defining feature located in the northwest portion of the Study Area. The airport does not operate commercial passenger flights but does operate over 120,000 flights annually (Phoenix Goodyear 2019). The facility operates under the jurisdiction of the City of Phoenix and FAA and does have operational boundaries that extend into the surrounding airspace, which limit building/structure heights in the vicinity of the airport.

Agriculture – Agriculture is a prominent land use for a large portion of the land within the Study Area. Numerous flood irrigated farming operations are located within the Study Area. A dairy operation is located within the eastern portion of the Study Area.

Commercial – Various commercial land uses are found within the Study Area, and are primarily found along MC85, South Litchfield Road, Yuma Road, and Western Avenue. Commercial land uses located in the Study Area include small office complexes, gas stations, grocery stores, auto shops, restaurants, and other businesses.

Education – There are six schools within the Study Area, including five elementary schools and one high school. These schools are generally located north and east of the Project sites, with one being to the northwest. The nearest school is more than 1.50 miles away from the Project.

Industrial – Industrial land uses within the Study Area include water treatment facilities, metal and concrete manufacturing facilities, storage facilities, shipping centers, and various industrial activities associated with the Phoenix Goodyear Airport. In addition, numerous electrical industrial/utility facilities such as 69, 230, 345, and 500kV electrical transmission lines, and electrical distribution lines are located throughout the Study Area and are described further below under "Utilities".

Open Space – The Study Area is bisected by two rivers: the Agua Fria and the Gila. The Agua Fria River is dammed at Lake Pleasant upstream and is ephemeral or intermittent within the Study Area. The Gila River has perennial flow within the Study Area. These riverine areas constitute relatively large swaths of land that divide the developed areas from east to west. There are associated open space recreational opportunities/activities in these areas.

Public/Quasi-Public – Public/quasi-public land uses within the Study Area include City of Goodyear government facilities such as fire stations, police stations, the City of Avondale Water Resources Department, community centers, post offices, other government buildings, and churches that are scattered throughout the Study Area.

Recreation – A number of recreation land uses are located within the Study Area, including the Estrella Mountain Regional Park, the Tres Rios Golf Course, various neighborhood parks scattered throughout the residential developments in the area, a dog park, and multiple commercial recreation operations including the Goodyear BMX Raceway, the Goodyear Ballpark, the Cleveland Indians Spring Training Facility, and the Cincinnati Reds Spring Training Facility. In addition, the Study Area intersects a small portion of the ISM Raceway property to the southeast. Regional, city, and local trails are also located within the Study Area. Detailed information on recreational uses in the Study Area can be found in Exhibit F.

Residential – Residential land uses are scattered throughout the Study Area, including residences immediately east and south of the Data Center sites. Low density rural residential developments are common within the Study Area including some affiliated with agricultural operations. Medium density residential land uses are the most prevalent residential use within the Study Area and concentrated in the north and northwestern portion of the Study Area. Multiple small high density residential and multi-family developments are scattered within the Study Area, primarily north of the Project site near the airport and the commercial activities within the City of Goodyear. There are four RV/mobile home parks within the Study Area near the Phoenix Goodyear Airport.

Transportation – Transportation facilities within the Study Area include a mix of local, county, and private roadways. Primary roadways within proximity to the Project are MC85, Buckeye Road, West Broadway Road, and South Litchfield Road. The Union Pacific Railroad operates a railroad that runs generally east-west across the Study Area along the MC85/Buckeye Road alignment. No bus stations are present in the Study Area, but many bus stops are present along major roadways. In addition to these facilities is the Phoenix Goodyear Airport, which is discussed above.

The Study Area is adjacent to the State Route (SR) 303 Loop (L) existing and planned alignment, and the proposed conceptual alignment for the SR30 connection to SR303L extends through the southern portion of the Study Area. SR 30 is discussed in further detail in the Future Land Use section below.

Utilities - Utilities within the Study Area include multiple high voltage transmission lines, various distribution lines, communications facilities, flood control facilities, and canals. Immediately south, and within approximately 0.35 miles of the Data Center sites are six individual high voltage transmission alignments that generally run east-west and vary in voltage from 69, 230, 345, to 500kV. These transmission lines are identified in Table B-1.

Table B-1.
Transmission Lines in Immediate Vicinity of the Project

Owner	Name	Voltage	Circuits
ANPP	Kyrene to Jojoba	500kV	Single
APS/SRP	APS Palm Valley to Rudd 230kV and APS/SRP Palo Verde to Rudd	230/500kV	Double
APS	Sarival to White Tanks	69kV	Single
TEP	Westwing to Pinal West	345kV	Single
WAPA	Liberty to Lone Butte and Liberty to Phoenix	230kV	Double
WAPA/SRP	Liberty to Westwing and SRP Liberty to Rudd	230kV	Double

Adjacent to the southeast corner of the Cyclone Data Center site is a private communications facility. The Buckeye Canal runs generally east-west across the Study Area and follows the Gila River approximately 1 mile south of the Project. There are also various flood control facilities located throughout the Study Area.

Multiple pipelines are within the Study Area including one refined petroleum product pipeline operated by Santa Fe Pacific Partners, LP that bisects the area east to west and follows the railroad and MC85 alignment. Two natural gas pipelines are located within the Study Area, generally traveling east to west, following Western Ave and running through the Phoenix Goodyear Airport. Additionally, a water pipeline serving the Palo Verde Generating Station is located within the southern portion of the Study Area. Other smaller pipelines, electrical distribution lines, and telephone lines, as well as numerous smaller irrigation canals and laterals, extend throughout the Study Area.

Vacant – Numerous large tracts of privately owned vacant undeveloped land are located within the Study Area.

Future Land Use

Planned land uses within the Study Area are mapped on Exhibit A-4 and can be generally characterized as existing agricultural or vacant land that is zoned or planned to be developed. The Study Area includes lands under the jurisdiction of the City of Goodyear, the City of Avondale, and Maricopa County and the planned land uses within their jurisdictions are documented through each jurisdiction's General or Comprehensive Plan.

The planned land uses in the Study Area consist mainly of commercial developments, commercial business parks, mixed-use developments, industrial, residential developments, open space, parks, schools, and further infill development within the Phoenix Goodyear Airport property. The region is rapidly developing, and a variety of the planned land uses are at various stages of the development process – from conceptual developments, those that have been preliminarily or final platted, to some currently under construction. All Project alternatives cross areas identified in the City of Goodyear General Plan as a planned *Industrial* land use, which "provides areas for more intensive business and employment uses which have a greater impact on surrounding land uses."

The Wildcat Data Center site is currently under construction. The northern portion of the Cyclone Data Center site contains an existing warehouse building that will be redeveloped for data center use, while the remainder of the site is final platted, with construction expected to start in late 2019. It is for these planned land uses that the Project is needed.

There is a residential development approximately 2.50 miles to the east of the Project, portions of which are under construction and portions of which are preliminarily platted.

The Arizona Department of Transportation (ADOT) has recently released a Draft Environmental Assessment for the SR30, SR303L to SR202L project. Construction of the SR30 project is scheduled to begin construction in 2025 (ADOT 2019). The current SR30 conceptual alignment bisects the Study Area from east to west, just north of the Gila River and from approximately 0.25 to 1 mile south of the Wildcat and Cyclone Data Center sites. In the area south of the Wildcat Data Center site and Cyclone Data Center site, this SR30 conceptual alignment is located primarily on privately owned land. The current proposed alignment of this highway intersects with existing high voltage transmission line corridor to which the proposed Cyclone Data Center and Wildcat Data Center would connect and would likely require utility relocations. Portions of the Preferred Route and alternatives are also intersected by this planned land use. APS has coordinated directly with the ADOT SR30 project management team to minimize any potential conflicts with the Project and proposed future SR30 alignments. As the Project is needed to be in service by 2021, and the SR30 project is not scheduled to begin construction until 2025, additional coordination between APS and ADOT will need to occur to coordinate design considerations for ADOT's SR30 project.

Impact Assessment Methods

Land use impacts may be defined primarily as restrictions on a land use, such as limitations on allowed uses within the right-of-way that would result from the construction or operation of the Project. Typically, restrictions on a land use would result from right-of-way or easement acquisition across a property.

All route alternatives are proposed to be placed on private lands and would have aerial crossing of roads under county or city jurisdiction. APS has requested 300-foot-wide corridors for the placement of an up to 120-foot-wide right-of-way within the corridor.

In order to assess Project impacts to land use, impact levels were assigned based on the sensitivity of each land use category crossed by Project alternatives to the introduction of a new transmission line right-of-way or easement. Examples of impact levels include (1) acquisition of new right-of-way and pole placement across private residential property, resulting in high impact; (2) acquisition of new right-of-way and pole placement across agricultural operations, resulting in moderate impact; and (3) acquisition of right-of-way and pole placement across properties with industrial/utility land uses, resulting in low impact. In locations where pole placement would occur within existing utility right-of-way and the proposed transmission structures would be co-located with existing transmission or sub-transmission structures, impact levels would be lessened.

Results

In order to minimize land use impacts, the Project routes were sited to follow existing linear features, such as existing distribution or transmission lines, roadways, canal laterals, existing rights of way, or on the edge of properties where feasible. The use of single-pole structures would minimize potential effects to land uses where structure footprints could directly interfere with land use activities such as in agricultural lands.

Additionally, APS is coordinating with the Phoenix Goodyear Airport and the FAA regarding compliance with airspace restrictions related to the Phoenix Goodyear Airport. APS requested a preliminary Project review from FAA as part of a "Civilian Hypothetical 14 CFR Part 77 Report", which indicated that Project structures would not exceed height restrictions related to the Phoenix Goodyear Airport's horizontal surface elevation limit. Further, APS will follow the FAA Obstruction Evaluation/Airport Airspace Analysis process and will file a Notice of Proposed Construction or Alteration with the FAA for the selected Project alternative, once determined.

Preferred Route

The Preferred Route is composed of links 1, 2, 7, 8, and 14, and entails approximately 1.45 miles of new 230kV transmission infrastructure.

The parcels crossed by the Preferred Route include APNs: 500-80-012, 500-80-015A, 500-80-014A, 500-80-001A, 500-07-983, and 500-07-037G.

The Preferred Route would result in 0.63 miles of moderate impacts to existing agricultural land uses along link numbers 1 and 7. The 0.82 miles of the remaining links (2, 8, and 14) cross the Wildcat and Cyclone Data Center properties, where the land is currently or soon to be under development for industrial use, and would result in low impacts across these areas of industrial development.

The Preferred Route link numbers 1 and 7 would cross areas with planned commercial and industrial land uses, though no specific proposed commercial or industrial developments within this area have been

identified. The Preferred Route would result in minimal impacts to the future commercial and industrial land uses. However, link 1 would intersect the proposed SR30 highway project alignment and would require further coordination between APS and ADOT to minimize possible future relocations associated with this planned transportation project.

Alternative Route #1

Alternative Route #1 is composed of links 1, 2, 9, 10, 14, and 16, and includes approximately 1.65 miles of new 230kv transmission infrastructure.

The parcels crossed by Alternative Route #1 include APNs: 500-80-012, 500-80-015A, 500-80-014A, 500-80-001A, 500-07-983, and 500-07-037G.

Alternative Route #1 would result in 0.62 miles of moderate impacts to existing agricultural land uses along link numbers 1 and 10. Link 9, which is located adjacent to West Broadway Road. and would be co-located with the existing 69kV infrastructure, would result in approximately 0.19 miles of low impacts to existing agricultural land use. The 0.84 miles of remaining links (2, 14, and 16) cross the Wildcat and Cyclone Data Center properties, where the land is currently or soon to be under development for industrial use and would result in low impacts across these areas of industrial development.

Alternative Route #1 link numbers 1 and 10 would cross areas with planned commercial and industrial land uses, though no specific proposed commercial or industrial developments within this area have been identified. Alternative Route #1 would result in minimal impacts to the future commercial and industrial land uses. However, link 1 would intersect the proposed SR30 highway project alignment and would require further coordination between APS and ADOT to minimize possible future relocations associated with this planned transportation project.

Alternative Route #2

Alternative Route #2 is composed of links 1, 2, 4, 7, 8, 9, 10, 16, and 18, and includes approximately 2.22 miles of new 230kV transmission infrastructure.

The parcels crossed by Alternative Route #2 include APNs: 500-80-012, 500-80-015A, 500-80-014A, 500-80-001A, 500-07-983, and 500-07-037G.

Alternative Route #2 would result in 1.17 miles of moderate impacts to existing agricultural land uses along link numbers 1, 4, 7, and 10. Approximately 0.04 miles of link 7 would result in a high impact to one residence. Link 9, which is located adjacent to West Broadway Road and would be co-located with the existing 69kV infrastructure, would result in approximately 0.19 miles of low impacts to existing agricultural land use. Approximately 0.14 miles of link 18 is also located adjacent to West Broadway Road and would be co-located with the existing 69kV infrastructure, however in this location it crosses one residence and would thus result in approximately 0.14 miles of moderate impacts to this existing residential land use. The 0.63 miles of remaining links (2, 8, 16, and a portion of 18) cross the Wildcat and Cyclone Data Center properties, where the land is currently or soon to be under development for industrial use and would result in low impacts across these areas of industrial development.

Alternative Route #2 link numbers 1, 4, 7, and 10 would cross areas with planned commercial and industrial land uses, though no specific proposed commercial or industrial developments within this area have been identified. Alternative Route #2 would result in minimal impacts to the future commercial and industrial land uses. However, links 1 and 4 would intersect the proposed SR30 highway project alignment and would

require further coordination between APS and ADOT to minimize possible future relocations associated with this planned transportation project.

Alternative Route #2 with Sub-Route

Alternative Route #2 with Sub-Route is composed of links 1, 2, 6, 8, 9, 10, 16, and 18, and includes approximately 1.89 miles of new 230kV transmission infrastructure.

The parcels crossed by Alternative Route #2 include APNs: 500-80-012, 500-80-015A, 500-80-014A, 500-80-014C, 500-80-014D, 500-80-001A, 500-07-983, and 500-07-037G.

Alternative Route #2 with Sub-Route would result in 0.62 miles of moderate impacts to existing agricultural land uses along link numbers 1 and 10. Links 6, 9, and a portion of link 18 are located adjacent to West Broadway Road and would be co-located with the existing 69kV infrastructure. Link 9, and a portion of link 6 would also be co-located with the existing 69kV infrastructure and would result in approximately 0.19 miles of low impacts to existing agricultural land use; while the remaining portion of link 6 and the portion of link 18 along West Broadway Road would cross two residences and thus result in approximately 0.35 miles of moderate impacts to this existing residential land use. The 0.63 miles of remaining links (2, 8, 16, and a portion of 18) cross the Wildcat and Cyclone Data Center properties, where the land is currently or soon to be under development for industrial use and would result in low impacts across these areas of industrial development.

Alternative Route #2 with Sub-Route link numbers 1 and 10 would cross areas with planned commercial and industrial land uses, though no specific proposed commercial or industrial developments within this area have been identified. Alternative Route #2 with Sub-Route would result in minimal impacts to the future commercial and industrial land uses. However, link 1 would intersect the proposed SR30 highway project alignment and would require further coordination between APS and ADOT to minimize possible future relocations associated with this planned transportation project.

Conclusions

The Preferred Route is the shortest of all alternatives, minimizing overall land use impacts. The Preferred Route limits crossings of existing transmission and subtransmission lines, avoids residential land use impacts, and maximizes the placement of Project facilities on the Wildcat and Cyclone Data Center parcels, as opposed to other privately owned land.

REFERENCES

City of Avondale. 2012. Avondale General Plan 2030: General Plan Update. Accessed July 1, 2019. Available at: https://www.avondaleaz.gov/home/showdocument?id=1493.

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Maricopa County. 2016. Maricopa County Vision 2030 Comprehensive Plan. Accessed July 1, 2019, Available at: https://www.maricopa.gov/DocumentCenter/View/6756/Comprehensive-Plan-Vision-2030-Plan-PDF.

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EXHIBIT C: SPECIAL-STATUS SPECIES AND SPECIES OF CONCERN

As stated in Arizona Corporation Commission Rules of Practice and Procedure R-14-3-219:

> *Describe any areas in the vicinity of the proposed site or route which are unique because of biological wealth or because they are habitats for rare and endangered species. Describe the biological wealth or species involved and state effects, if any, the proposed facilities will have thereon.*

INTRODUCTION

Exhibit C addresses species protected by federal or state laws and policies because of their conservation status. Exhibit C also addresses whether any areas protected for conservation purposes (i.e., areas of biological wealth) are present in or near the vicinity of the Project. The Project vicinity, or Study Area, is generally defined as all areas within a 2-mile buffer of the Project alternatives identified in this application, including the data center sites. The Project area is where all ground disturbance associated with the Project would occur. However, some databases used to review existing data in the region do not return results based strictly on a 2-mile buffer. Exhibit C addresses the complete results of those database queries and discusses whether identified species or protected areas may be present or affected by the Project.

Laws and Policies

Laws and policies protecting rare species on private lands in Arizona include the following:

The U.S. Fish and Wildlife Service (USFWS) administers the Endangered Species Act of 1973 (ESA), as amended. The ESA protects species listed as threatened or endangered from "take" (generally, directly or indirectly harming or disturbing listed species). Prior to being listed as threatened or endangered, a proposed listing rule is issued. When agency priorities take precedence over certain listing actions, species may also be designated as candidates, to be evaluated and potentially listed when no longer precluded by higher-priority actions. The ESA also allows for the designation of critical habitat (areas essential to the survival and recovery of listed species), although designation of critical habitat is not always required when a species is listed. Critical habitat is an administrative designation of a defined area with specific characteristics important to the survival and recovery of a listed species. Designation of critical habitat can affect federal actions, but not state or private actions without a federal nexus.

The Arizona Game and Fish Department (AGFD) manages and conserves wildlife in Arizona. Nearly all take of wildlife is regulated in some manner through the hunting and fishing license system. Arizona does not have a counterpart to the federal ESA, but a list of rare species (Wildlife Species of Concern [WSC]) was created in 1996 without creating any specific statutory protections for those species. However, hunting regulations are used to provide some protection, and no hunting or capture of any of those species is currently allowed.

Arizona prepared a Comprehensive Wildlife Conservation Strategy in 2006 (AGFD 2006), later renamed State Wildlife Action Plan (SWAP), through a state-federal partnership and grant program. The SWAP was updated in 2012 (AGFD 2012). The SWAP identifies Species of Greatest Conservation Need (SGCN), in several tiers. Tier 1A includes ESA-listed species and other rare species. Tier 1B includes species that are

not ESA-listed but are regionally rare or declining, species with a U.S. range primarily in Arizona that are dependent on conservation efforts within the state, and other species with identified conservation issues that may warrant management action. Tier 1C includes species with substantial data gaps and unknown conservation status, but where conservation concern may be warranted. Other tiers include species that are common, widespread, or are in stable populations. Exhibit C addresses Tier 1A and 1B SGCNs. Species identified as WSC in 1996 are included as SGCNs in the SWAP and are addressed as SGCNs in Table C-1 and the discussion in this exhibit.

Native plants in Arizona are managed by the Arizona Department of Agriculture, which regulates harvest and salvage. Harvest or salvage of most plant species may be permitted or required, and fees may be assessed on state land. Plants listed as Highly Safeguarded category may only be taken or salvaged for scientific or conservation purposes. No Highly Safeguarded plant species, or any other rare plant species, are present in the Study Area.

No other federal or state agency has jurisdiction over sensitive biological resources in the Project area.

INVENTORY

On July 8, 2019, EPG requested an automated database query report with SGCNs that may be present in the Study Area. The AGFD's database query is based on a 3-mile buffer of the Project area, which may result in the inclusion of habitat types and species not present in the 2-mile buffer used for the remainder of the analysis. However, Table C-1 addresses the full results of that query. The USFWS maintains an online database, the Information for Planning and Conservation (IPaC) database, that generates lists of ESA-listed species and their critical habitat that may be present in an area subject to a query. The IPaC query results for the Study Area are attached to this exhibit.

A biologist from EPG visited the Project area and Study Area on July 9, 2019. The biologist conducted a reconnaissance-level survey to document existing conditions on the site, and to note whether habitat features important to any special-status species were present on the site.

Protected Areas

The Study Area includes part of the Gila River floodplain, beginning at its confluence with the Salt River. Several areas managed for wildlife conservation are present along this portion of the Gila River, where riparian habitat is supported by treated wastewater.

Lower Salt and Gila Riparian Ecosystem Important Bird Area

The international Important Bird Area (IBA) program is managed in the United States by the National Audubon Society. Areas important to bird conservation are identified by the National Audubon Society or by local chapters. IBAs may be important to a single rare or declining bird species, provide important habitat for a diverse bird community, or support high seasonal concentrations of wintering, migrating, or nesting birds.

The Lower Salt and Gila Riparian Ecosystem IBA was identified as important at the global level. The IBA provides substantial riparian, wetland, and marsh habitat, all of which have declined in the Southwest. The species that supported the identification of the IBA's global importance are all associated with aquatic and riparian habitat.

Base and Meridian Wildlife Area

The AGFD owns and manages the Base and Meridian Wildlife Area, which includes part of the channel of the Gila River.

El Rio Research Area

The El Rio Research Area, owned by the City of Phoenix, provides public access to the Gila River in an area supported by treated wastewater. The area provides riparian, open-water, and marsh habitat.

Estrella Mountain Regional Park

Estrella Mountain Regional Park is owned by Maricopa County Parks and Recreation and preserves undeveloped Sonoran Desertscrub in a part of a major desert mountain range. Estrella Mountain Regional Park supports nearly all of the Sonoran Desertscrub remaining in the Study Area.

Special-status Species

Table C-1 addresses species listed in the reports from the AGFD and IPaC databases. Table C-1 provides summary information, including notes on whether each species may be present in the Study Area. If a species may be present, Exhibit C includes a discussion of the species and how it may be affected by the Project.

Because the Project area has been previously subjected to ground disturbance, and portions of the Project area are within a substation, no intact native vegetation remains. Most sensitive species in Table C-1 are dependent on native vegetation and are not present in the Project area. However, some species, including some bats and migratory birds, can live or forage in modified habitat such as that within the Project area, and Table C-1 addresses the potential for those species to be present.

The discussions of species and potential impacts of the Project following Table C-1 addresses species with similar habitat uses or types of impacts collectively wherever possible.

Determinations in Table C-1 regarding the potential presence in the Study Area are based on conditions observed during a reconnaissance survey, as well as information from the following sources:

- Mammals: AGFD Heritage Database Management System, Hoffmeister 1986
- Birds: eBird 2012, Sibley 2014
- Reptiles: Brennan and Holycross 2006, Jones and Lovich 2009
- Amphibians: Brennan and Holycross 2006
- Fish: Minckley and Marsh 2009

Table C-1.
Special-Status Species that May Occur in the Vicinity of the Project

E: Endangered, ESA
T: Threatened, ESA
DPS: Distinct Population Segment
NEP: Nonessential Experimental Population, ESA
SGCN: Species of Greatest Conservation Need, AGFD **1A, 1B:** SGCN Tier

Common Name *Scientific name*	Habitat and Notes	Status
Mammals		
Bat Colony *Species not identified*	Bat colonies can be in a variety of locations with minimal disturbance and shelter from extreme temperatures, including caves, mines, rock crevices, old buildings, and vegetation.	None
Lesser Long-nosed Bat *Leptonycteris curasoae yerbabuenae*	Habitat: Sonoran Desertscrub, grasslands, and forests with Saguaros and Agaves as forage plants. Potential: Study Area is outside the range of the species.	SGCN 1A
California Leaf-nosed Bat *Macrotus californicus*	Habitat: Roosts in caves, mines, and tunnels. Forages in desertscrub. Potential: May forage in or near the Study Area.	SGCN 1B
Townsend's Big-eared Bat *Corynorhinus townsendii*	Habitat: Roosts in caves, mines, tunnels, and occasionally buildings. Potential: May forage in or near the Study Area.	SGCN 1B
Spotted Bat *Euderma maculatum*	Habitat: Roosts in high cliffs and canyons, prefers to forage high above water. Potential: No suitable habitat in Study Area.	SGCN 1B
Western Red Bat *Lasiurus blossevillii*	Habitat: Roosts in large trees in riparian areas. Forages above tree canopy, often near water. Potential: May forage in or near the Study Area.	SGCN 1B
Western Yellow Bat *Lasiurus xanthinus*	Habitat: Roosts in trees, particularly palms. Potential: May forage in or near the Study Area.	SGCN 1B
Arizona Myotis *Myotis occultus*	Habitat: Woodlands and riparian areas across central Arizona. Potential: Not likely to occur in or near Study Area.	SGCN 1B
Yuma Myotis *Myotis yumanensis*	Habitat: Roosts in buildings, cliffs, swallow nests, and caves or mines. Forages near or over water. Potential: May forage in or near the Study Area.	SGCN 1B
Cave Myotis *Myotis velifer*	Habitat: Roosts in caves, mines, and bridges. Forages in desertscrub, but generally near water. Potential: May forage in or near the Study Area.	SGCN 1B
Pocketed Free-tailed Bat *Nyctinomops femorosaccus*	Habitat: Roosts in cliffs and occasionally buildings. Forages widely for large insects. Potential: May forage in or near the Study Area.	SGCN 1B
Brazilian Free-tailed Bat *Tadarida brasiliensis*	Habitat: Roosts in caves, tunnels, and buildings. Forages widely, often over farmland. Potential: May forage in or near the Study Area.	SGCN 1B
Western Mastiff Bat *Eumops perotis*	Habitat: Roosts in crevices in cliffs. Forages widely for large insects. Potential: May forage in or near the Study Area.	SGCN 1B
Antelope Jackrabbit *Lepus alleni*	Habitat: Desertscrub and sparse grasslands. Potential: No suitable habitat in Study Area.	SGCN 1B
American Beaver *Castor canadensis*	Habitat: Lakes, rivers, and large streams. Potential: A small population is present in or near the Study Area.	SGCN 1B

Table C-1.
Special-Status Species that May Occur in the Vicinity of the Project

E: Endangered, ESA
T: Threatened, ESA
DPS: Distinct Population Segment
NEP: Nonessential Experimental Population, ESA
SGCN: Species of Greatest Conservation Need, AGFD **1A, 1B:** SGCN Tier

Common Name *Scientific name*	**Habitat and Notes**	**Status**
Harris's Antelope Squirrel *Ammospermophilus harrisii*	Habitat: Rocky slopes in Sonoran Desertscrub. Potential: Likely to occur in or near Study Area.	SGCN 1B
Little Pocket Mouse *Perognathus longimembris*	Habitat: Arid valley bottoms in Sonoran Desertscrub, near the Colorado River and in central Arizona. Potential: May occur in or near Study Area. Distribution is unclear in Maricopa County.	SGCN 1B
Kit Fox *Vulpes macrotis*	Habitat: Prefers flat, open desertscrub with soft or sandy soils. Potential: May occur in or near Study Area.	SGCN 1B
Jaguar *Panthera onca*	Habitat: Rugged or mountainous habitat with large herbivore prey, preferably near water sources. Potential: Outside known range of species.	E, SGCN 1A
Sonoran Pronghorn *Antilocapra americana sonoriensis*	Habitat: Sonoran Desertscrub valley bottoms. Potential: Not likely to occur in or near Study Area.	E (NEP), SGCN 1A
Desert Bighorn Sheep *Ovis canadensis mexicana*	Habitat: Steep, rugged desert mountain ranges. Potential: Not likely to occur in or near Study Area, although present elsewhere in the Sierra Estrella.	SGCN 1B
Birds		
Wood Duck *Aix sponsa*	Habitat: Prefers streams and ponds with trees and other dense vegetation. Potential: May occur incidentally or during migration in or near the Study Area.	SGCN 1B
California Least Tern *Sterna antillarum browni*	Habitat: Forages over open water, and nests on sandbars and beaches. Potential: Not likely to occur in the Study Area.	E, SGCN 1A
American Bittern *Botaurus lentiginosus*	Habitat: Marshes and wetlands, preferably with reeds and emergent vegetation. Potential: May occur incidentally in or near the Study Area.	SGCN 1B
Yuma Clapper Rail *Rallus longirostris yumanensis*	Habitat: Marshy vegetation in shallow water around large ponds or backwater areas. Potential: Likely to occur in or near Study Area.	SGCN 1A
Ferruginous Hawk *Buteo regalis*	Habitat: Grasslands and open deserts, and often in agricultural areas in winter. Potential: Likely to occur in or near Study Area during winter.	SGCN 1B
Bald Eagle *Haliaeetus leucocephalus*	Habitat: Prefers large bodies of water with large fish for prey. Potential: May occur incidentally in or near the Study Area.	SGCN 1A
Golden Eagle *Aquila chrysaetos*	Habitat: May forage widely, but often in open areas. Nest sites are on rocky cliffs or large trees. Potential: May occur incidentally in or near the Study Area.	BGEPA, SGCN 1B
Peregrine Falcon *Falco peregrinus*	Habitat: Forages widely, often near water where large bird prey is present. Potential: Likely to occur in or near Study Area.	SGCN 1A
Burrowing Owl *Athene cunicularia*	Habitat: Open areas with low brush cover, including grasslands, agricultural margins, and desertscrub. Potential: Likely to occur in or near Study Area.	SGCN 1B
Gilded Flicker *Colaptes chrysoides*	Habitat: Sonoran desertscrub with Saguaros present, or riparian woodlands with mature trees. Potential: Likely to occur in or near Study Area.	SGCN 1B

Table C-1. Special-Status Species that May Occur in the Vicinity of the Project		
E: Endangered, ESA **T:** Threatened, ESA	**DPS:** Distinct Population Segment **NEP:** Nonessential Experimental Population, ESA	**SGCN:** Species of Greatest Conservation Need, AGFD **1A, 1B:** SGCN Tier
Common Name ***Scientific name***	**Habitat and Notes**	**Status**
Gila Woodpecker *Melanerpes uropygialis*	Habitat: Sonoran desertscrub with Saguaros present, or riparian woodlands with mature trees Potential: Likely to occur in or near Study Area.	SGCN 1B
Yellow-billed Cuckoo, Western DPS *Coccyzus americanus*	Habitat: Nests in late summer in riparian woodlands, generally with large, mature trees. Potential: Likely to occur in or near Study Area. Proposed critical habitat within Study Area.	T, SGCN 1A
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Habitat: Dense, seasonally flooded riparian woodlands. Potential: May be present in or near Study Area. Critical habitat designated outside Study Area.	E, SGCN 1A
Le Conte's Thrasher *Toxostoma lecontei*	Habitat: Sonoran desertscrub dominated by creosote bush, with scattered trees used for nesting Potential: No suitable habitat in Study Area.	SGCN 1B
Bell's Vireo *Vireo bellii*	Habitat: Dense vegetation along desert washes and streams. Potential: Likely to occur in or near Study Area.	SGCN 1B
Pacific Wren *Troglodytes pacificus*	Habitat: Uncommon in Arizona deserts. Prefers dense vegetation near water. Potential: May occur incidentally or during migration in or near the Study Area.	SGCN 1B
Yellow Warbler *Setophaga petechia*	Habitat: Migrates through central Arizona, using riparian areas, landscaping, often near water. Potential: Likely to occur in or near Study Area.	SGCN 1B
Sprague's Pipit *Anthus spragueii*	Habitat: Winters in central Arizona, generally in close-cropped or bare agricultural fields. Potential: Study Area is outside the range of the species.	SGCN 1A
Abert's Towhee *Melozone aberti*	Habitat: Dense, brushy vegetation, often but not always near water. Potential: Likely to occur in or near Study Area.	SGCN 1B
Savannah Sparrow *Passerculus sandwichensis*	Habitat: Winters in central Arizona. Widespread in desertscrub, grassy fields, and near farmland. Potential: Likely to occur in or near Study Area.	SGCN 1B
Lincoln's Sparrow *Melospiza lincolnii*	Habitat: Winters in central Arizona. Prefers dense, brushy areas, often near water. Potential: Likely to occur in or near Study Area.	SGCN 1B
Reptiles		
Sonoran Mud Turtle *Kinosternon sonoriense*	Habitat: Occurs in various aquatic habitats, most often in natural stream systems. Potential: No longer present in Study Area.	SGCN 1B
Sonoran Desert Tortoise *Gopherus morafkai*	Habitat: Rocky slopes, boulder fields, and washes throughout the Sonoran Desert up to 5,300 feet. Potential: Likely to occur in or near Study Area.	SGCN 1A
Sonoran Collared Lizard *Crotaphytus nebrius*	Habitat: Rocky areas in Sonoran Desertscrub. Potential: Likely to occur in or near Study Area.	SGCN 1B
Goode's Horned Lizard *Phrynosoma goodei*	Habitat: Valley bottoms in Sonoran Desertscrub. Potential: Likely to occur in or near Study Area.	SGCN 1B

Table C-1. Special-Status Species that May Occur in the Vicinity of the Project		
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Common Name ***Scientific name***	**Habitat and Notes**	**Status**
Regal Horned Lizard *Phrynosoma solare*	Habitat: Valley bottoms in Sonoran Desertscrub and desert grasslands, avoiding the lowest elevations. Potential: No suitable habitat in Study Area.	SGCN 1B
Gila Monster *Heloderma suspectum*	Habitat: Widespread in Sonoran Desertscrub. Typically absent from disturbed and developed areas. Potential: Likely to occur in or near Study Area.	SGCN 1A
Variable Sandsnake *Chilomeniscus stramineus*	Habitat: Sandy valley soils in Sonoran Desertscrub. Potential: Likely to occur in or near Study Area.	SGCN 1B
Tucson Shovel-nosed Snake *Chionactis occipitalis klauberi*	Habitat: Sandy valley soils in Sonoran Desertscub. Potential: No suitable habitat in Study Area.	SGCN 1A
Sonoran Whipsnake *Coluber bilineatus*	Habitat: Widespread, particularly in desert canyons and washes, in the Sonoran Desert. Potential: Likely to occur in or near Study Area.	SGCN 1B
Sonoran Coralsnake *Micruroides euryxanthus*	Habitat: Widespread in Sonoran Desertscrub up to oak woodlands. Potential: Likely to occur in or near Study Area.	SGCN 1B
Tiger Rattlesnake *Crotalus tigris*	Habitat: Rocky slopes in Sonoran Desertscrub. Potential: Likely to occur in or near Study Area.	SGCN 1B
Amphibians		
Lowland Leopard Frog *Lithobates yavapaiensis*	Habitat: Permanent or near-permanent water sources at low to moderate elevations. Potential: No longer present in Study Area.	SGCN 1A
Arizona Toad *Anaxyrus microscaphus*	Habitat: Rivers and streams across a wide elevation range. Potential: Study Area is outside the range of the species.	SGCN 1B
Sonoran Green Toad *Anaxyrus retiformis*	Habitat: Valley bottoms with soft soils and areas that can capture summer rainfall in temporary pools. Potential: Study Area is outside the range of the species.	SGCN 1B
Sonoran Desert Toad *Incilius alvarius*	Habitat: Widespread throughout Sonoran Desert valleys and mountains. May occur in farmland. Potential: May be present in Study Area.	SGCN 1B
Fish		
Sonora Sucker *Catostomus insignis*	Habitat: Shallow, free-flowing streams. Potential: Study Area is outside the range of the species.	SGCN 1B
Flannelmouth Sucker *Catostomus latipinnis*	Habitat: Large desert rivers and their tributaries. Potential: No longer present in Study Area.	SGCN 1A
Desert Sucker *Catostomus clarkii*	Habitat: Shallow, free-flowing streams. Potential: Study Area is outside the range of the species.	SGCN 1B
Little Colorado Sucker *Catostomus sp. 3*	Habitat: Little Colorado River watershed in northern Arizona. Potential: Study Area is outside the range of the species.	SGCN 1A

Table C-1. Special-Status Species that May Occur in the Vicinity of the Project		
E: Endangered, ESA **T:** Threatened, ESA	**DPS:** Distinct Population Segment **NEP:** Nonessential Experimental Population, ESA	**SGCN:** Species of Greatest Conservation Need, AGFD **1A,** **1B:** SGCN Tier
Common Name ***Scientific name***	**Habitat and Notes**	**Status**
Razorback Sucker *Xyrauchen texanus*	Habitat: Desert streams and large rivers. Potential: No longer present in Study Area.	E, SGCN 1A
Gila Topminnow *Poeciliopsis occidentalis*	Habitat: Shallow or densely vegetated areas in slow-moving or standing water. Potential: No longer present in Study Area.	E, SGCN 1A
Desert Pupfish *Cyprinodon macularis*	Habitat: Shallow or densely vegetated areas in slow-moving or standing water. Potential: No longer present in Study Area.	E, SGCN 1A
Longfin Dace *Agosia chrysogaster*	Habitat: Widespread in tributaries throughout the Gila River basin. Potential: No longer present in Study Area.	SGCN 1B
Colorado Pikeminnow *Ptychocheilus lucius*	Habitat: Desert streams and large rivers. Potential: No longer present in Study Area.	E, SGCN 1A
Bonytail Chub *Gila elegans*	Habitat: Desert streams and large rivers. Potential: No longer present in Study Area.	E, SGCN 1A
Roundtail Chub *Gila robusta*	Habitat: Desert streams and large rivers. Potential: No longer present in Study Area.	,SGCN 1A

Eight species of special-status bats were identified as having records near the Project area, discussed together here because the potential issues are similar for all species. The Project area does not appear to support suitable roost habitat for any bat species. However, the surrounding region likely includes features used by roosting bats, such as bridges, old buildings, and large trees.

Many desert bat species prefer to forage over water, where insect prey is most available. Agricultural areas often also support high densities of insects and can be an important resource for foraging bats. Because some bat species travel long distances to forage, the Project area likely supports foraging bats regardless of the absence of roost sites within the Project area. Important foraging habitat is also present along the Gila River and associated wetlands in the Study Area.

Special-status terrestrial mammals, including the Little Pocket Mouse, Harris' Antelope Squirrel, and Kit Fox, are native to the surrounding Sonoran Desert. All of these species are associated with natural vegetation. Because the Project area is isolated and surrounded by farmland, native small mammal dispersal from surrounding natural areas is likely to be infrequent. A population of American Beavers is also present in the Gila River in the Study Area, although this species requires large bodies of water and has no potential to occur in the Project area.

Special-status raptors, including Golden Eagles, Ferruginous Hawks, and Bald Eagles, are not likely to nest in the Project area. Golden Eagles and Bald Eagles select nest sites without human disturbance, and the Project area is surrounded by agricultural activities and rural residences. Ferruginous Hawks do not nest in the Sonoran Desert, but spend portions of the winter in farmland surrounding the Project area. However, all species forage widely, and may occasionally pass through or hunt prey in or near the Project area. Burrowing Owls use or modify existing small mammal burrows in areas with soft soils and open vegetation structure, including grasslands, desertscrub, and agricultural areas.

Special-status waterbirds include the Yuma Clapper Rail, Wood Duck, and American Bittern. The Yuma Clapper Rail prefers shallow, marshy habitat with emergent vegetation. The Wood Duck and American Bitters prefer bodies of water with vegetation, although either species may occasionally be observed in non-typical habitat. All of these species are likely to be associated with the Gila River and nearby wetlands in the Study Area.

Special-status birds, other than those previously discussed, include several species of passerines (songbirds) that may occasionally occur in the Project area or the surrounding region. Some species, such as the Pacific Wren, Lincoln's Sparrow, and Savannah Sparrow, only occur in the Sonoran Desert during winter or migration, and do not nest in the region. Table C-1 notes habitats used by these species during winter or migration. Other special-status birds are associated with riparian areas and may occur in the Study Area along the Gila River away from the Project area. Critical habitat has been proposed for the Yellow-billed Cuckoo in the Study Area along the Gila River outside the Project area. Most other species listed in Table C-1 nest or are year-round residents in the region, and regularly use human-modified landscapes or are occasionally observed in those landscapes. The level of disturbance and human activity may preclude some species from successfully nesting in the Project area, but these species may still occasionally forage or disperse through the Project area.

Special-status reptiles listed in Table C-1 occur in the surrounding Sonoran Desert, primarily in the northern Sierra Estrella in the Study Area. The Sonoran Coralsnake also occasionally occurs in riparian habitat and may be present along the Gila River. None of these species are likely to be present in the Project area.

The Sonoran Desert Toad is the only special-status amphibian that may be present in the Project area. This species depends on pools formed after summer rains for reproduction but can also use manmade bodies

of water if predators are absent. Sonoran Desert Toads spend the majority of the year beneath ground and are only surface-active during and shortly before the midsummer monsoon season.

Special-status fish were historically present in the Gila River and its tributaries in the Study Area. Records of past occurrences resulted in many of these species being identified by the queries that supported Table C-1. However, permanent water in the Study Area now supports many species of introduced fish, including aggressive predators and competitors of native fish. No species of native fish are likely to be present in any of the bodies of water in the Study Area.

ASSESSMENT OF POTENTIAL IMPACTS

Potential impacts to special-status bats: Bats can collide with manmade structures during long-distance migration. Migrating bats often fly high above ground level and do not actively echolocate. However, during normal foraging activity, bats are actively using echolocation and are typically able to detect and avoid features such as overhead transmission lines. No information suggests that transmission lines in a setting such as the Project area would pose a risk to bats. Ground disturbance from the Project, taking place in previously disturbed areas and farm fields, would not appreciably affect any bat species by removing foraging habitat. Abundant foraging habitat is present in the Study Area, including farmland as well as riparian and wetland habitat along the Gila River.

Potential impacts to all special-status birds: Transmission lines can pose a collision risk to birds, including raptors (Avian Powerline Interaction Committee [APLIC] 2012). However, many factors influence whether birds are likely to collide with a specific transmission line. Collision risk is relatively low when multiple transmission lines are co-located or placed near other infrastructure, so that the collective infrastructure is likely to be perceived by birds and avoided. Birds also often attempt to fly above transmission lines and other obstacles. The Project would be constructed in an area with numerous existing transmission lines and are not likely to contribute to an increase in bird mortality within the Project area.

Electrical transmission and distribution lines can also cause bird electrocution, although the risk is highest with lower-voltage lines. Electrocution occurs when a bird simultaneously contacts energized and grounded electrical components. High-voltage lines require spacing between those components that cannot be spanned even by very large birds, so that electrocution risk is precluded almost entirely (APLIC 2006).

Most special-status birds are not likely to nest in the Project area, given the entirely altered vegetation and ongoing human disturbance and activity associated with farming. However, Burrowing Owls can occupy and nest in fallow farmland, field margins, and canal banks. Because Burrowing Owls may in some cases retreat underground when alarmed rather than flying, and because their nests are underground, they are at risk of harm from ground-disturbing activities such as that resulting from construction of the Project. Burrowing Owls were observed during a reconnaissance survey of the Study Area on both the Wildcat Data Center site and Cyclone Data Center site and may also be present along the transmission line alternative routes.

No special-status birds are regularly dependent on the disturbed, altered habitat present in the Project area. Although some ground disturbance and vegetation removal would occur as a result of the Project, this is not likely to have a detectable effect on any special-status bird species.

Potential impacts to special-status small mammals, reptiles, and amphibians: Ground disturbance creates a risk of harm to any small, terrestrial mammals. While some active, diurnal species may successfully avoid construction activities and move out of work areas, burrowing and nocturnal species would not. However, as discussed above, the human-modified landscape surrounding the Project area likely limits the potential for any of these special-status species to be present. The small patches of uncultivated

vegetation within the Project area are isolated and are not likely to be important to the maintenance of local population levels for any of these species, and habitat loss is not likely to have a detectable effect on any of these species.

Potential impacts to special-status fish: No impacts to special-status fish would occur from the Project.

MITIGATION

Because the Project would be constructed entirely in areas subject to previous disturbance, outside of areas that provide essential habitat for rare or endangered species, impacts to most special-status species present in the region would not occur or would not rise to a level that would warrant mitigation. The following measures address the risk that electrical infrastructure poses to special-status birds, and the risk that ground-disturbing activities pose to Burrowing Owls.

- Transmission structures would be constructed in compliance with standards provided by APLIC (APLIC 2006). When these standards are used, the risk of electrocution for large birds, including all special-status species in the Project area, is essentially eliminated.

- Preconstruction surveys for Burrowing Owls would be conducted by qualified biologists according to a current protocol. Burrows occupied by Burrowing Owls would be avoided if feasible. If any Burrowing Owl relocation is necessary, this would be performed by a licensed wildlife rehabilitator.

CONCLUSION

The Project is not likely to significantly affect any rare species. No ESA-listed species are present, and none would be affected by the Project. No protected areas, or any areas of biological wealth, are within the Project area. The risk that electrical infrastructure poses to birds would be addressed by following standard guidelines as design features for the Project, and preconstruction surveys for the Burrowing Owl would address potential impacts to that species.

Impacts to Burrowing Owls and any other special-status species that may be incidentally present would be similar among alternatives, but proportional in extent to the length of the alternatives. However, given the low sensitivity of the area affected, differences in impacts to any sensitive biological resources among the alternatives would be negligible and difficult to discern.

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EXHIBIT D: BIOLOGICAL RESOURCES

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

> *List the fish, wildlife, plant life, and associated forms of life in the vicinity of the proposed site or route and describe the effects, if any, other proposed facilities will have thereon.*

PROJECT AREA SETTING

The Project vicinity, or Study Area, is generally defined as all areas within a 2-mile buffer of the Project's features, including all alternatives, as identified in this application. The Project area includes all areas where ground disturbance associated with the Project may occur.

Physical Setting

The Study Area is set within the Sonoran Desert, which is the wettest, most productive, and most diverse of the North American deserts. Geologically, the Sonoran Desert is a part of the Basin and Range Province (physiographic region), which is a large area of North America generally between the Sierra Nevada and Rocky Mountains, extending into Mexico. The Basin and Range Province is represented by numerous steep, rugged mountain ranges separated by valleys with deep alluvial fill and relatively low slopes. Some of these valleys contain regionally major rivers, although most rivers have been hydrologically altered with dams and water diversion.

The Study Area is set in a broad, nearly level valley, formed by the confluences of the Gila River with the Salt River and Agua Fria River. Much of the Phoenix metropolitan area is constructed on alluvial fill deposited by these rivers. The Agua Fria River is dammed at Lake Pleasant upstream, supported primarily by urban runoff and treated wastewater in the Phoenix area, and is ephemeral or intermittent within the Study Area. The Gila River has perennial flow within the Study Area, primarily supported by treated wastewater from the Phoenix metropolitan area.

The Sonoran Desert experiences a bimodal precipitation pattern, with winter storms from the Pacific Ocean often providing widespread regional rainfall, and a midsummer monsoon season bringing tropical moisture into the region. Rainfall in the summer monsoon season is typically provided by isolated, but potentially strong, thunderstorms. Rainfall during summer can be extremely variable, both seasonally depending on the strength and duration of the overall monsoon weather pattern, and locally depending on the occurrence of individual thunderstorms. Rainfall generally increases with elevation, but the Project area is at a relatively low elevation, between 900 and 950 feet. The highest elevation in the Study Area, approximately 1,300 feet, is in the foothills of the Sierra Estrella. Average annual rainfall is approximately 8.35 inches (Western Region Climate Center 2019).

Vegetation

The Sonoran Desertscrub biotic community, as described by Turner (1994) and mapped by Brown (1994), is divided in two major subdivisions. The Arizona Upland subdivision is typical of rocky slopes and moderate elevations and is dominated by numerous desert tree species and the Saguaro (*Carnegiea gigantea*). The Study Area is set within the more-arid Lower Colorado River Valley subdivision. The Lower Colorado River Valley subdivision is much less diverse than the Arizona Upland subdivision and is typical

of lower elevations and valley bottoms. Creosote Bush (*Larrea tridentata*) is the dominant species in many areas and cacti are uncommon, although some Saguaros and other cacti may be present near the lower slopes of mountain ranges. On the lowest slopes, particularly level areas in or near river floodplains, Creosote Bush and other upland plants can be replaced by Saltbush (*Atriplex* spp.) and other plants adapted to higher soil salinity.

Although the Study Area is set within an area that was once typical of the Lower Colorado River Valley subdivision of Sonoran Desertscrub, much of the Study Area has been subject to human disturbance and converted to non-native vegetation types. Agriculture is the primary land use within the Study Area, with scattered rural residences, energy facilities, and industrial development. Although some relatively natural vegetation is present in the floodplain of the Agua Fria River and Gila River, and in the foothills of the Sierra Estrella, the entire Project area has been subject to ground disturbance and development, and no undisturbed native vegetation remains. Scattered native plants that are tolerant of disturbance are present along field margins and in fallow fields.

Biotic communities (Brown 1994) are mapped at a broad, regional scale. Table D-1 provides results from vegetation (or landcover type) as mapped by Southwest ReGAP, derived from satellite imagery. However, Table D-1 also notes where landcover types correspond with native biotic communities and non-native vegetation. Table D-1 provides the acres of each landcover types within the Study Area.

Southwest ReGAP data is not intended for use in assessing conditions in small areas, such as the relatively short length and small area crossed by each Project alternative. Additionally, all alternative routes are within modified, non-native vegetation types, and no impacts to native vegetation would occur from construction of any of the alternative routes. Thus, Table D-1 presents the overall vegetation conditions in the Study Area, but no clear differences or meaningful comparisons can be made among alternative routes based on vegetation as identified by this dataset.

Table D-1.
Southwest ReGAP Vegetation in the Study Area

Type	Description	Study Area Acres
Native Vegetation (Lower Colorado River Subdivision of Sonoran Desertscrub)	Mogollon Chaparral	2
	North American Warm Desert Riparian Mesquite Bosque	43
	North American Warm Desert Riparian Woodland and Shrubland	323
	North American Warm Desert Wash	1
	Sonora-Mojave Creosotebush-White Bursage Desert Scrub	2,475
	Sonora-Mojave Mixed Salt Desert Scrub	123
	Sonoran Paloverde-Mixed Cacti Desert Scrub	441
	Total:	**3,408**
Non-native Vegetation and Modified Areas	Agriculture	4,732
	Barren Lands, Non-specific	18
	Developed, Medium - High Intensity	2,553
	Invasive Southwest Riparian Woodland and Shrubland	466
	Open Water	122
	Total:	**7,891**

Wildlife Species

This section discusses wildlife species that may be present in the Study Area. Although the Study Area and Project area are largely converted to non-native vegetation, native vegetation is present in the Sierra Estrella. Additionally, some mobile or disturbance-tolerant wildlife species may occur elsewhere

throughout the Study Area. However, the number of species present in any location or at any one time would be a small proportion of the species discussed here.

Mammals

Parts of the Sonoran Desert support very high mammal diversity, particularly in bats and small rodents. Few large mammal species are tolerant of highly modified landscapes, and many small burrowing mammals cannot persist in areas subject to tilling and ground disturbance. However, some disturbance-tolerant small mammals can be very abundant in farmland, using canal banks and road margins for burrow construction. Coyotes (*Canis latrans*) can become tolerant of human activities and will prey on small mammals in agricultural areas. Some bats can use ornamental trees, old buildings, and other manmade features as roost sites. Other bats may roost outside of developed areas but travel miles to forage on the high numbers of insects associated with farmland. Surface water associated with human activity is also an important resource for bats in arid regions. The Gila River and associated wetlands in the Study Area are likely to be important food and water resources for bats and other mammals. Table D-2 lists mammal species that may be present in the Study Area.

Table D-2
Mammal Species that May Occur in the Study Area

Common Name ***Scientific Name***	**Habitat**
California Leaf-nosed Bat *Macrotus californicus*	Sonoran and Mojave desertscrub. Roosts in caves, mines, and rock shelters. Forages for large arthropods, capturing them on the ground or in vegetation.
Cave Myotis *Myotis velifer*	Roosts primarily in mines or caves in xeric habitats. Requires a permanent water source near roost sites; may also utilize bridges or buildings for roosts.
Yuma Myotis *Myotis yumanensis*	Riparian woodland, desertscrub, and woodlands. Roosts in caves, mines, attics, buildings, and underneath bridges. Forages for insects over water.
California Myotis *Myotis californicus*	Desertscrub with rock faces. Roosts in crevices, occasionally caves and mines. Preys on insects.
Western Mastiff Bat *Eumops perotis*	Sonoran desertscrub adjacent to cliffs. Roosts in rock crevices; requires a 10-foot vertical drop to launch flight. Forages for insects at considerable heights.
Western Yellow Bat *Lasiurus xanthinus*	Associated primarily with palm trees, although they will use riparian gallery forests. Forages for flying insects.
Western Red Bat *Lasiurus blossevillii*	Riparian gallery forests. Roosts in trees, occasionally leafy shrubs. Forages for insects in open areas.
Townsend's Big-eared Bat *Corynorhinus townsendii*	Desertscrub, piñon-juniper woodland, and other coniferous woodlands. Roosts in caves, mines, and buildings. Captures small insects in flight.
Western Pipistrelle *Parastrellus hesperus*	Areas with canyon walls or cliff faces for roosting, streambeds and tanks for foraging.
Big Brown Bat *Eptesicus fuscus*	Ponderosa pine forest, piñon-juniper woodlands, and desertscrub. Uses a wide range of roost sites. Preys on beetles and moths.
Hoary Bat *Lasiurus cinereus*	Mixed deciduous-coniferous forests and woodlands. Roosts among foliage in trees. Preys on a variety of insects. Migratory.
Pallid Bat *Antrozous pallidus*	Desertscrub and evergreen woodlands. Roosts in caves, mines, cliffs, and bridges. Preys on ground-dwelling insects.
Pocketed Free-tailed Bat *Nyctinomops femorosaccus*	Desertscrub and arid lowland habitats. Roosts in crevices in cliffs or in rocky areas. Preys on flying insects.
Brazilian Free-tailed Bat *Tadarida brasiliensis*	Desertscrub and foothills. Roosts in mines, caves, bridges, rock crevices and old buildings. Captures small insects in flight.

Table D-2 Mammal Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Desert Cottontail *Sylvilagus audubonii*	Desertscrub, semi-desert grassland
Black-tailed Jackrabbit *Lepus californicus*	Desertscrub and other areas with open ground cover.
American Beaver *Castor canadensis*	Requires permanent water, including large ponds and rivers. A small number are present in major rivers in the Phoenix area.
Harris' Antelope Squirrel *Ammospermophilus harrisii*	Rocky slopes in Sonoran Desertscrub.
Round-tailed Ground Squirrel *Xerospermophilus tereticaudus*	Creosote bush/saltbush desert with sandy or gravelly soil.
Rock Squirrel *Otospermophilus variegatus*	Rocky slopes in Sonoran Desertscrub.
Botta's Pocket Gopher *Thomomys bottae*	Any area with soil suitable for digging burrows from sea level to above timberline.
Little Pocket Mouse *Perognathus longimembris*	Arid valley bottoms in Sonoran Desertscrub. Unclear distribution in central Arizona.
Arizona Pocket Mouse *Perognathus amplus*	Arid valley bottoms in Sonoran Desertscrub.
Desert Pocket Mouse *Chaetodipus penicillatus*	Sandy areas of desertscrub with sparse vegetation.
Bailey's Pocket Mouse *Chaetodipus baileyi*	Flats and lower slope areas of desertscrub.
Merriam's Kangaroo rat *Dipodomys merriami*	Sandy areas of desertscrub.
Desert Kangaroo Rat *Dipodomys deserti*	Areas with friable sand such as washes, or wind-blown sands stabilized by creosote bush or other vegetation.
Western Harvest Mouse *Reithrodontomys megalotis*	Desertscrub or chaparral.
Cactus Mouse *Peromyscus eremicus*	Desertscrub, rocky areas, chaparral.
Southern Grasshopper Mouse *Onychomys torridus*	Desertscrub or semi-desert grassland with compact soil.
Cactus Mouse *Peromyscus eremicus*	Widespread in desertscrub and desert grasslands in Arizona.
Deer Mouse *Peromyscus maniculatus*	May occur in riparian areas in the Study Area.
White-footed Mouse *Peromyscus leucopus*	Mixed deciduous forests, agriculture fields and semi-desert grasslands.
Arizona Cotton Rat *Sigmodon arizonae*	Mesquite scrub and weedy areas along canals and washes.
Desert Woodrat *Neotoma lepida*	Rocky and densely vegetated areas in Sonoran Desertscrub.
White-throated Woodrat *Neotoma albigula*	Areas below the conifer belt, especially with Prickly Pear or Paloverde.
Brown Rat *Rattus norvegicus*	Grain fields, salt marshes and urban areas. Introduced, non-native species. Population status unclear in Arizona.
Roof Rat *Rattus*	Strongly associated with human development but may stray into open woodlands. Introduced, non-native species.
House Mouse *Mus musculus*	Cultivated fields, in or at the edges of towns in rural areas. Introduced, non-native species.

Table D-2 Mammal Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Coyote *Canis latrans*	Cosmopolitan, from spruce forest to low desert. Tolerant of urban areas and human presence.
Kit Fox *Vulpes macrotis*	Desertscrub and desert grassland with sandy or softer clay soils.
Gray Fox *Urocyon cinereoargenteus*	Open desertscrub, chaparral, lower-elevation woodland.
Ringtail *Bassariscus astutus*	Widespread in Sonoran Desertscrub, including occasionally around agricultural activity.
Northern Raccoon *Procyon lotor*	Occupies a ride range of habitats ranging from wetlands and mesic woodlands to urban areas.
Western Spotted Skunk *Spilogale gracilis*	Open woods, canyons, and agriculture fields.
American Badger *Taxidea taxus*	Flats and drainages adjacent to mountains, grasslands.
Mountain Lion *Puma concolor*	Almost any area that provides prey. Individuals from desert mountains such as the Sierra Estrella may enter developed areas.
Bobcat *Lynx rufus*	Rocky upland areas interspersed with open desert, grassland, or woodland.
Collared Peccary *Pecari tajacu*	Desertscrub and up to approximately 6,500 feet; washes and brushy hillsides; shelter in mine adits.
Mule Deer *Odocoileus hemionus*	Semi-desert grasslands, desertscrub and dry coniferous forests.
Source: Hoffmeister 1986	

Birds

A small number of bird species are year-round residents in the Sonoran Desert. However, a much larger number of species are migratory, and may winter in the Study Area, pass through the Study Area during migration, or nest in the Study Area but winter elsewhere. Because of the high mobility of birds, many species may be uncommon or prefer natural vegetation but still occasionally be recorded in agricultural landscapes.

Wetlands along the Gila River in the Study Area support large and diverse bird populations, particularly in winter and during migration. Some raptor species are common in the Study Area, exploiting the increased availability of rodent and bird prey around fields. Agricultural landscapes also provide suitable wintering and foraging habitat for some wading birds, shorebirds, and grassland species that prefer sparse vegetation, shallow water, and other characteristics of farmed areas. Table D-3 lists bird species that may be present in the Study Area, focused on species that occur somewhat regularly. Species that normally do not occur in the Study Area but may have been recorded in the past on very few occasions are generally not listed. Because many bird species are not necessarily present year-round in any single location, Table D-3 also notes the seasonal use of the Study Area by each bird species.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Eared Grebe *Podiceps nigricollis*	Lakes and ponds. Present in Study Area in winter.
Clark's Grebe *Aechmophorus clarkii*	Lakes, ponds, and lagoons. Migrates though Study Area.
Western Grebe *Aechmophorus occidentalis*	Open, deep water lakes and bays. Winters within Study Area.
Pied-billed Grebe *Podilymbus podiceps*	Shallow ponds and marshes with emergent vegetation. Present in Study Area year-round.
American White Pelican *Pelecanus erythrorhynchos*	Shallow, protected water. Migrates through the Study Area.
Brown Pelican *Pelecanus occidentalis*	Primarily coastal habitats; occasionally inland at large water bodies. May rarely occur in Study Area year-round.
Neotropic Cormorant *Phalacrocorax brasilianus*	In the inland Southwest, occurs around large, usually manmade bodies of water. May occur in Study Area year-round.
Double-crested Cormorant *Phalacrocorax auritus*	Lakes, ponds, streams, and aqueducts. Present in Study Area year-round.
American Bittern *Botaurus lentiginosus*	Freshwater habitats with dense emergent vegetation. Present in Study Area in winter.
Least Bittern *Ixobrychus exilis*	Marshy wetlands with dense, tall emergent vegetation. Present in Study Area year-round.
Black-crowned Night-heron *Nycticorax*	Freshwater swamps, marshes, and ponds with emergent vegetation. Present in Study Area year-round.
Green Heron *Butorides virescens*	Streams, ponds, or marshes that include edge canopy. Present in Study Area year-round.
Cattle Egret *Bubulcus ibis*	Pastures, weedy fields, along weedy irrigation ditches. Present in Study Area year-round.
Snowy Egret *Egretta thula*	Marshes, drainage ditches, wetlands. Present in Study Area year-round.
Great Egret *Ardea alba*	Wetland habitats including marshes, drainage ditches, and ponds. Present in Study Area year-round.
Great Blue Heron *Ardea herodias*	Rivers, streams, lakes, reservoirs, canals, and agricultural fields. Present in Study Area year-round.
White-faced Ibis *Plegadis chihi*	Any open water source. Migrates through the Study Area.
Mallard *Anas platyrhynchos*	Lakes, ponds, streams, and canals. Present in Study Area year-round, although many residents are of captive origin.
Mexican Duck *Anas diazi*	Formerly considered a subspecies of the Mallard. Occurs in similar habitat. uncommon in Study Area year-round.
Gadwall *Anas strepera*	Shallow fresh water. Winters within the Study Area.
Green-winged Teal *Anas crecca*	Shallow ponds, marshes, and flooded fields. Winters within the Study Area.
Northern Pintail *Anas acuta*	Shallow ponds and marshes with emergent vegetation. Winters within the Study Area.
American Wigeon *Mareca americana*	Freshwater lakes and ponds; may graze in fields. Winters within the Study Area.
Cinnamon Teal *Spatula cyanoptera*	Ponds, streams, and canals. Winters within the Study Area.
Blue-winged Teal *Spatula discors*	Often in shallow, marshy wetlands. Winters within the Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Northern Shoveler *Spatula clypeata*	Shallow, weedy or grassy ponds. Winters within the Study Area.
Redhead *Aythya americana*	Lakes and ponds. May nest within Study Area.
Ring-necked Duck *Aythya collaris*	Ponds and rivers, often near trees. Winters within the Study Area.
Lesser Scaup *Aythya affinis*	Ponds, lakes, and protected bays. Winters within the Study Area.
Bufflehead *Bucephala albeola*	Open lakes, harbors, and bays. Winters within the Study Area.
Common Goldeneye *Bucephala clangula*	Diving duck, most often found in open water. Winters within the Study Area.
Common Merganser *Mergus merganser*	Deep, clear lakes and rivers. Winters within the Study Area.
Hooded Merganser *Lophodytes cucullatus*	Wetlands, streams, and rivers. Winters within the Study Area.
Red-breasted Merganser *Mergus serrator*	Occasionally present in larger bodies of water in the Study Area in winter.
Ruddy Duck *Oxyura jamaicensis*	Lakes and ponds. Present in Study Area year-round.
Black-bellied Whistling-duck *Dendrocygna autumnalis*	Wetland and riparian areas. Present in Study Area year-round.
Wood Duck *Aix sponsa*	Sheltered ponds, rivers, and swamps; usually stays near emergent vegetation. May winter within the Study Area.
Canvasback *Aythya valisineria*	Marshes and ponds. Winters within the Study Area.
Snow Goose *Chen caerulescens*	Roosts on sheltered water and forages on agriculture fields. May winter within the Study Area.
Ross's Goose *Chen rossii*	Roosts on sheltered water and forages on agriculture fields. May winter within the Study Area.
Greater White-fronted Goose *Anser albifrons*	May be present around farm fields and shallow marshy areas in the Study Area in winter.
Canada Goose *Branta canadensis*	Common around bodies of water, including in highly urbanized areas. Some individuals may be present year-round.
Turkey Vulture *Cathartes aura*	Open country, woodlands, farms. May nest within the Study Area.
Black Vulture *Coragyps atratus*	Sonoran desertscrub with abundant trees. Present in Study Area year-round.
Osprey *Pandion haliaetus*	Lakes, rivers, and estuaries. Perches in trees, poles, and towers. Migrates through the Study Area.
White-tailed Kite *Elanus leucurus*	Open grasslands with scattered shrubs. Present in Study Area year-round.
Northern Harrier *Circus cyaneus*	Wetlands, grasslands, and fallow agricultural fields. Winters within the Study Area.
Ferruginous Hawk *Buteo regalis*	Healthy, arid grasslands and adjacent agriculture fields. Winters within the Study Area.
Harris's Hawk *Parabuteo unicinctus*	Semi-arid woodland and desertscrub. May nest within the Study Area.
Red-tailed Hawk *Buteo jamaicensis*	Plains, prairie groves, desert. May nest within the Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Red-shouldered Hawk *Buteo lineatus*	Most likely to be associated with riparian areas and wetlands in the Study Area.
Swainson's Hawk *Buteo swainsoni*	Prairies and agriculture fields. May nest within the Study Area.
Cooper's Hawk *Accipiter cooperii*	Broken woodlands or streamside groves. May nest within the Study Area.
Sharp-shinned Hawk *Accipiter striatus*	Mixed coniferous forests; forages along forest edges, hedgerows, and urban areas. Winters within Study Area.
Zone-tailed Hawk *Buteo albonotatus*	Foothill canyons with permanent streams and open woodland. Present in Study Area in summer.
Bald Eagle *Haliaeetus leucocephalus*	Commonly found adjacent to lakes, reservoirs and perennial rivers, and rare elsewhere in the region. Winters in Study Area.
American Kestrel *Falco sparverius*	Open country in a variety of habitat types, as well as cities. May nest within the Study Area.
Prairie Falcon *Falco mexicanus*	Dry, open country; prairies. Present in Study Area year-round.
Peregrine Falcon *Falco peregrinus*	Predator on birds such as doves and waterfowl, often foraging near water. Nesting habitat not present in the Study Area.
Crested Caracara *Caracara cheriway*	Sonoran desertscrub. Rare migrant within the Study Area but becoming increasingly more common in Pinal County.
Merlin *Falco columbarius*	Open forests. Winters within the Study Area.
Gambel's Quail *Callipepla gambelii*	Desert scrublands and thickets. May nest within the Study Area.
Common Gallinule *Gallinula galeata*	Lakes and pond with abundant emergent vegetation. Year-round resident within the Study Area.
Sandhill Crane *Grus canadensis*	Winters in large flocks on open grasslands and agriculture fields and roosts in shallow waters. Winters within the Study Area.
American Coot *Fulica americana*	Lakes, ponds, streams, and marshes. May nest within the Study Area.
Ridgway's Rail [Yuma Clapper Rail] *Rallus ridgwayi*	Occurs in marshes and other wetlands with dense emergent vegetation. Present in Study Area year-round.
Virginia Rail *Rallus limicola*	Occurs in marshes and other wetlands with dense emergent vegetation. Present in Study Area year-round.
Sora *Porzana carolina*	Occurs in marshes and other wetlands with dense emergent vegetation. Present in Study Area year-round.
Killdeer *Charadrius vociferus*	Open terrain, not always associated with shores; disturbed ground; agricultural areas. May nest within the Study Area.
American Avocet *Recurvirostra americana*	Open, shallow bodies of water. Present in Study Area year-round.
Black-necked Stilt *Himantopus mexicanus*	Shallow, open waters of treatment plants and ponds. Present in Study Area year-round.
Greater Yellowlegs *Tringa melanoleuca*	Shallow water and mudflats. May winter within the Study Area.
Lesser Yellowlegs *Tringa flavipes*	Shallow water and mudflats with scattered emergent vegetation. Migrates through the Study Area.
Solitary Sandpiper *Tringa solitaria*	Small freshwater mudflats and ponds with emergent vegetation. Migrates through the Study Area.
Spotted Sandpiper *Actitis macularius*	Any manmade or natural aquatic habitat. Winters within the Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Western Sandpiper *Calidris mauri*	Mudflats and sandy beaches. Migrates through the Study Area.
Least Sandpiper *Calidris minutilla*	Mudflats with scattered vegetation. Migrates through the Study Area.
Baird's Sandpiper *Calidris bairdii*	Mudflats and adjacent short-grass fields. Migrates through the Study Area.
Stilt Sandpiper *Calidris himantopus*	Shallow muddy ponds and flooded fields. Migrates through the Study Area.
Pectoral Sandpiper *Calidris melanotos*	Mudflats with scattered vegetation. Migrates through the Study Area.
Dunlin *Calidris alpina*	Mudflats with scattered vegetation. Migrates through the Study Area.
Willet *Tringa semipalmata*	Open beaches and mudflats. Migrates through the Study Area.
Long-billed Curlew *Numenius americanus*	Wetlands; fallow agricultural fields. Winters within the Study Area.
Long-billed Dowitcher *Limnodromus scolopaceus*	Shallow muddy pools and freshwater ponds. Winters within the Study Area.
Wilson's Snipe *Gallinago delicata*	Most damp to shallow wet habitats with adjacent vegetation. May winter within the Study Area.
Wilson's Phalarope *Phalaropus tricolor*	Shallow ponds and grassy marshes. Migrates through the Study Area.
Ring-billed Gull *Larus delawarensis*	Lakes, ponds, and rivers. Migrates through the Study Area.
Bonaparte's Gull *Larus delawarensis*	Uses various wetlands and bodies of water during migration. Migrates through the Study Area.
California Gull *Larus delawarensis*	Uses large bodies of water during migration, often forages in urban areas and near landfills. Migrates through the Study Area.
Forster's Tern *Sterna forsteri*	Open water and marshes. Migrates through the Study Area.
Caspian Tern *Hydroprogne caspia*	Often found over open water. Migrates through the Study Area.
Black Tern *Chlidonias niger*	Marshes and ponds; roosts on sandbars. Migrates through the Study Area.
Rock Pigeon *Columba livia*	Nonnative. Towns, parks, agricultural landscapes; associated with human developments. May nest within the Study Area.
Eurasian Collared-dove *Streptopelia decaocto*	Associated with human development. Non-native, invasive species. May nest within the Study Area.
Mourning Dove *Zenaida macroura*	Wide variety of habitats. May nest within the Study Area.
White-winged Dove *Zenaida asiatica*	Habitat generalists. May nest within the Study Area.
Inca Dove *Columbina inca*	Associated with urban and rural human developments. May nest within the Study Area.
Common Ground-dove *Columbina passerina*	Open or brushy areas near washes. May nest within the Study Area.
Greater Roadrunner *Geococcyx californianus*	Scrub desert and mesquite groves, less common in chaparral and oak woodland. May nest within the Study Area.
Yellow-billed Cuckoo *Coccyzus americanus*	Prefers large patches of riparian woodland for nesting, but individuals may also use lower-quality riparian areas. Present in Study Area in summer.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Barn Owl *Tyto alba*	Open country; nests in embankments, mine adits, buildings, bridges, and other locations. May nest within the Study Area.
Western Screech-owl *Megascops kennicottii*	Open woodlands, streamside groves, deserts, suburban areas. Present in Study Area year-round.
Great Horned Owl *Bubo virginianus*	Common in wide variety of habitats. May nest within the Study Area.
Burrowing Owl *Athene cunicularia*	Open country, golf courses, and airports. May nest within the Study Area.
Lesser Nighthawk *Chordeiles acutipennis*	Dry, open country, scrubland, desert. May nest within the Study Area.
Common Nighthawk *Chordeiles minor*	Open environments including clearings, ponds, and urban areas. May nest within the Study Area.
Common Poorwill *Phalaenoptilus nuttallii*	Occurs in a wide range of vegetation communities in arid and semi-arid country. May nest within the Study Area.
Vaux's Swift *Chaetura vauxi*	May occur anywhere insect prey is present while foraging. Migrates through the Study Area.
White-throated Swift *Aeronautes saxatalis*	May occur anywhere insect prey is present while foraging. Present in Study Area year-round.
Black-chinned Hummingbird *Archilochus alexandri*	Habitat generalists in lowlands and low mountains. May nest within the Study Area.
Rufous Hummingbird *Selasphorus rufus*	Mountain meadows and riparian habitats. Migrates through the Study Area.
Anna's Hummingbird *Calypte anna*	Coastal lowlands, mountains, deserts. May nest within the Study Area.
Costa's Hummingbird *Calypte costae*	Desert washes, dry chaparral. May nest within the Study Area.
Broad-tailed Hummingbird *Selasphorus platycercus*	Can occur in a wide range of habitat, including urban areas, while migrating.
Belted Kingfisher *Megaceryle alcyon*	Sheltered, open water. Winters within the Study Area.
Gila Woodpecker *Melanerpes uropygialis*	Towns, scrub desert, cactus country, streamside woods. May nest within the Study Area.
Acorn Woodpecker *Melanerpes formicivorus*	Open mixed coniferous forests with an abundance of oaks. Present in Study Area year-round.
Ladder-backed Woodpecker *Picoides scalaris*	Dry shrublands; mesquite and cactus country; towns and rural areas. May nest within the Study Area.
Gilded Flicker *Colaptes chrysoides*	Sonoran Desert upland; favors Saguaro forests. May nest within the Study Area.
Northern Flicker *Colaptes auratus*	Riparian woodlands. May nest within the Study Area.
Rosy-faced Lovebird *Agapornis roseicollis*	Only present in urban and developed landscapes in Arizona. Widespread in the Phoenix area. Non-native. Present in Study Area year-round.
Black Phoebe *Sayornis nigricans*	Rivers, streams, canals, ponds, reservoirs, and other aquatic habitats. May nest within the Study Area.
Say's Phoebe *Sayornis saya*	Dry, open areas; canyons, cliffs. Present in Study Area year-round.
Olive-sided Flycatcher *Contopus cooperi*	Prefers montane woodlands but uses other habitat types during migration. Migrates through the Study Area.
Western Wood Pewee *Contopus sordidulus*	Riparian areas and other woodlands. Migrates through the Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Hammond's Flycatcher *Empidonax hammondii*	Mixed coniferous forests. Winters within the Study Area.
Dusky Flycatcher *Empidonax oberholseri*	Brushy patches of forest clearings. Winters within Study Area.
Gray Flycatcher *Empidonax wrightii*	Sagebrush shrublands within arid piñon-juniper woodlands. Winters in Study Area.
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Dense riparian thickets. May nest within Study Area. Critical habitat designated outside the Study Area.
Pacific-slope Flycatcher *Empidonax difficilis*	Riparian areas and other woodlands. Migrates through the Study Area.
Vermilion Flycatcher *Pyrocephalus rubinus*	Streamside shrubs, bottomlands; near small wooded ponds. Present in Study Area year-round.
Ash-throated Flycatcher *Myiarchus cinerascens*	Wide variety of habitats. May nest within the Study Area.
Brown-crested Flycatcher *Myiarchus tyrannulus*	Saguaro desert, riparian woodlands, groves, and low elevation woodlands. May nest within the Study Area.
Western Kingbird *Tyrannus verticalis*	Dry, open country. May nest within the Study Area.
Cassin's Kingbird *Tyrannus vociferans*	Mixed coniferous forests with interspersed meadows. May nest within the Study Area.
Thick-billed Kingbird *Tyrannus crassirostris*	Lowland riparian woodlands. May nest within the Study Area.
Tropical Kingbird *Tyrannus melancholicus*	Lowland riparian woodlands and urban areas. May nest within the Study Area.
Loggerhead Shrike *Lanius ludovicianus*	Open and relatively flat habitats with thorny trees and shrubs. May nest within the Study Area.
Common Raven *Corvus corax*	Mountains, deserts, coastal areas. May nest within the Study Area.
Bell's Vireo *Vireo bellii*	Riparian areas, especially in mesquite trees. Present in Study Area in summer.
Plumbeous Vireo *Vireo plumbeus*	Open ponderosa pine and mixed conifer woodlands. Present in Study Area in summer.
Cassin's Vireo *Vireo cassinii*	Mixed coniferous woodlands. Migrates through the Study Area.
Warbling Vireo *Vireo gilvus*	Riparian woodlands. Present in Study Area in summer.
Horned Lark *Eremophila alpestris*	Habitat generalists in areas with open, barren ground. May nest within the Study Area.
Northern Rough-winged Swallow *Stelgidopteryx serripennis*	Banks of streams and canals, streams, ponds, and lakes. May nest within the Study Area.
Cliff Swallow *Petrochelidon pyrrhonota*	Lakeside, cliffs, and canals; nesting under nearby bridges, buildings, and other overhangs; streams and ponds. May nest within the Study Area.
Barn Swallow *Hirundo rustica*	Variety of open habitats; nest in on bridges, buildings, culverts, etc.; require access to mud for nest building. May nest within the Study Area.
Bank Swallow *Riparia*	Often forages over or near water, and also in farmlands, where insect prey is abundant. Migrates through the Study Area.
Tree Swallow *Tachycineta bicolor*	Often forages over or near water, and also in farmlands, where insect prey is abundant. Migrates through the Study Area.
Violet-green Swallow *Tachycineta thalassina*	Open habitats; nest in tree cavities and cliff crevices. May nest within the Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Purple Martin *Progne subis*	Sonoran desertscrub in the presence of saguaros. May nest within the Study Area.
Verdin *Auriparus flaviceps*	Southwestern deserts, including Sonoran Desertscrub. May nest within the Study Area.
Red-breasted Nuthatch *Sitta canadensis*	Wooded areas, including riparian forests. Winters within Study Area.
Brown Creeper *Certhia americana*	Prefers montane forests in the Southwest, but occasionally present in desert riparian woodlands such as those in the Study Area in winter.
Cactus Wren *Campylorhynchus brunneicapillus*	Desertscrub habitats. May nest within the Study Area.
Canyon Wren *Catherpes mexicanus*	Rocky slopes and canyons in Sonoran Desertscrub. Present in Study Area year-round.
Bewick's Wren *Thryomanes bewickii*	Dense, brushy habitats from mesquite thickets to chaparral and riparian thickets. May nest within the Study Area.
Pacific Wren *Troglodytes pacificus*	Uncommon in Arizona deserts. Prefers dense vegetation near water. Present in Study Area in winter.
Rock Wren *Salpinctes obsoletus*	Rocky habitats in canyons, open hillsides, talus slopes. May nest within the Study Area.
House Wren *Troglodytes aedon*	Dense, brushy areas. May nest within Study Area.
Marsh Wren *Cistothorus palustris*	Marshes of cattails, tules, or reeds. Winters within Study Area.
Ruby-crowned Kinglet *Regulus calendula*	Woodlands, thickets. Winters within Study Area.
Black-tailed Gnatcatcher *Polioptila melanura*	Desert, especially washes. May nest within the Study Area.
Blue-gray Gnatcatcher *Polioptila caerulea*	Interior chaparral and arid piñon-juniper woodlands. May nest within the Study Area.
Northern Mockingbird *Mimus polyglottos*	Variety of habitats. May nest within the Study Area.
Mountain Bluebird *Sialia currucoides*	Winters in piñon-juniper woodlands, desertscrub, and agriculture fields. Winters within the Study Area.
Western Bluebird *Sialia mexicana*	Mixed coniferous forests with open grassy patches and occasionally in urban environments such as parks. Present in Study Area in winter.
American Robin *Turdus migratorius*	Often present in urban landscapes in winter. Present in Study Area in winter and during migration.
Hermit Thrush *Catharus guttatus*	Present in winter in the Southwest, including the Study Area, in dense vegetation, such as riparian and landscaped urban areas.
Bendire's Thrasher *Toxostoma bendirei*	Desertscrub and brushy grasslands. May nest within the Study Area.
Curve-billed Thrasher *Toxostoma curvirostre*	Cholla deserts and suburban areas. May nest within the Study Area.
Crissal Thrasher *Toxostoma crissale*	Tall, dense brush and shrub thickets. May nest within the Study Area.
Sage Thrasher *Oreoscoptes montanus*	Sagebrush shrublands; as well as shrub-steppe. Winters within the Study Area.
Phainopepla *Phainopepla nitens*	Riparian areas, especially in trees with mistletoe. May nest within the Study Area.
European Starling *Sturnus vulgaris*	Generally distributed. Non-native, invasive species. May nest within the Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
American Pipit *Anthus rubescens*	Expansive open prairies, fields, and beaches. Winters within the Study Area.
Cedar Waxwing *Bombycilla cedrorum*	Winters in open woodlands with abundant fruit, including urban environments. Winters within the Study Area.
Lucy's Warbler *Oreothlypis luciae*	Mesquite and cottonwood along water courses and xeric washes. May nest within the Study Area.
Orange-crowned Warbler *Oreothlypis celata*	Winters in brushy habitats, including interior chaparral, open woodlands, desertscrub, and urban environments. Winters within the Study Area.
MacGillivray's Warbler *Geothlypis tolmiei*	Dense thickets in riparian woodlands and piñon-juniper woodlands. Present in Study Area during migration.
Virginia's Warbler *Oreothlypis virginiae*	Dense, brushy undergrowth of open piñon-juniper woodlands. Present in Study Area in winter and during migration.
American Redstart *Setophaga ruticilla*	Uncommon but regularly present in riparian areas in winter in the Sonoran Desert.
Yellow Warbler *Setophaga petechia*	Riparian thickets. Present in Study Area in summer.
Yellow-rumped Warbler *Setophaga coronata*	Brushy undergrowth of piñon-juniper woodlands, as well as riparian thickets. Winters within Study Area.
Black-throated Gray Warbler *Setophaga nigrescens*	Pine-oak woodlands but uses-lower elevation habitats outside of nesting season. Present in Study Area in winter.
Hermit Warbler *Setophaga occidentalis*	Mixed coniferous forests. Migrates through the Study Area.
Townsend's Warbler *Setophaga townsendi*	Mixed coniferous forests with an oak understory. Migrates through the Study Area.
Wilson's Warbler *Cardellina pusilla*	Riparian thickets, especially willows. Migrates through the Study Area.
Common Yellowthroat *Geothlypis trichas*	Thick, low vegetation in damp areas. Present in Study Area year-round.
Yellow-breasted Chat *Icteria virens*	Dense thickets and brush, often in marshes or near water. Present in Study Area in summer.
Canyon Towhee *Melozone fuscus*	Sonoran desertscrub. Present in Study Area year-round.
Abert's Towhee *Melozone aberti*	Riparian areas, suburban areas. May nest within the Study Area.
Green-tailed Towhee *Pipilo chlorurus*	Dense brush; in lowlands in winter. Winters within the Study Area.
Spotted Towhee *Pipilo maculatus*	Chaparral, shrub-steppe, riparian thickets, and oak stands in piñon-juniper woodlands. Present in Study Area in winter.
Chipping Sparrow *Spizella passerina*	Brushy edges and riparian areas. Present in Study Area in winter.
Grasshopper Sparrow *Ammodramus savannarum*	Semidesert grasslands with scattered shrubs. Winters in Study Area.
Black-chinned Sparrow *Spizella atrogularis*	Brush hillsides in chaparral or desertscrub vegetation. Present in Study Area year-round.
Brewer's Sparrow *Spizella breweri*	Deserts, field edges, and suburban areas. Winters within Study Area.
Sagebrush Sparrow *Artemisiospiza nevadensis*	Sagebrush shrublands and arid shrub-steppe. Winters within Study Area.
Savannah Sparrow *Passerculus sandwichensis*	Semidesert grasslands, marshes, and agriculture fields. Winters within Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Lark Sparrow *Chondestes grammacus*	Brushy, weedy areas, riparian areas, and field edges. Present in Study Area in winter.
Lark Bunting *Calamospiza melanocorys*	Semidesert grasslands and desertscrub. Winters within the Study Area.
Song Sparrow *Melospiza melodia*	Dense undergrowth near water. Present in Study Area year-round.
Lincoln's Sparrow *Melospiza lincolnii*	Upland grasslands near riparian areas. Winters within Study Area.
Swamp Sparrow *Melospiza georgiana*	Fallow agriculture fields adjacent to water. Winters within the Study Area.
Vesper Sparrow *Pooecetes gramineus*	Habitat generalists. Winters within Study Area.
Black-throated Sparrow *Amphispiza bilineata*	Desertscrub. May nest within the Study Area.
White-crowned Sparrow *Zonotrichia leucophrys*	Suburban, riparian, and other brushy areas. Winters within the Study Area.
White-throated Sparrow *Zonotrichia albicollis*	Mixed coniferous-deciduous forests. Winters within the Study Area.
Dark-eyed Junco *Junco hyemalis*	Open woodlands including urban environments. Winters within Study Area.
Northern Cardinal *Cardinalis*	Woodland edges, swamps, streamside thickets, suburban gardens. May nest within the Study Area.
Pyrrhuloxia *Cardinalis sinuatus*	Thorny brush, mesquite thickets, desert, woodland edges, ranchlands. May nest within the Study Area.
Black-headed Grosbeak *Pheucticus melanocephalus*	Open woodlands including deciduous and mixed conifer-deciduous forests, as well as riparian woodlands. Present in Study Area in summer.
Blue Grosbeak *Passerina caerulea*	Riparian areas and mesquite bosques. Present in Study Area in summer.
Lazuli Bunting *Passerina amoena*	Weedy and shrubby areas along irrigation ditches and other bodies of water and suburban areas. Winters within Study Area.
Summer Tanager *Piranga rubra*	Mature riparian woodlands. May nest within the Study Area.
Western Tanager *Piranga ludoviciana*	Prefers montane coniferous woodlands but may be present in low-elevation riparian areas in winter and during migration.
Western Meadowlark *Sturnella neglecta*	Fields and other open areas; deserts. May nest within the Study Area.
Yellow-headed Blackbird *Xanthocephalus xanthocephalus*	Marshy areas with emergent vegetation. Winters within the Study Area.
Red-winged Blackbird *Agelaius phoeniceus*	Emergent vegetation in wetland habitats; including irrigated agricultural lands. May nest within the Study Area.
Great-tailed Grackle *Quiscalus mexicanus*	Open areas with reliable water sources; including agricultural and urbanized areas. May nest within the Study Area.
Brewer's Blackbird *Euphagus cyanocephalus*	Open habitats; gregarious. Winters within the Study Area.
Brown-headed Cowbird *Molothrus ater*	Habitat generalists; common in human modified environments. May nest within the Study Area.
Bronzed Cowbird *Molothrus aeneus*	Rural and urban areas. May nest within the Study Area.
Bullock's Oriole *Icterus bullockii*	Riparian woodlands. May nest within the Study Area.

Table D-3 Bird Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Scott's Oriole *Icterus parisorum*	Arid scrub and open woodland landscapes. May nest within the Study Area.
Hooded Oriole *Icterus cucullatus*	Open woodlands often adjacent to fan palms. May nest within the Study Area.
House Finch *Haemorhous mexicanus*	Riparian and suburban areas, farmland, desert. May nest within the Study Area.
Lesser Goldfinch *Carduelis psaltria*	Riparian areas. May nest within the Study Area.
American Goldfinch *Spinus tristis*	Orchards, hedgerows, overgrown fields and gardens. Winters within the Study Area.
Lawrence's Goldfinch *Spinus lawrencei*	Riparian corridors and piñon-juniper grasslands. Winters within the Study Area.
House Sparrow *Passer domesticus*	Associated with human presence. Introduced non-native. May nest within the Study Area.
Sources: Corman and Wise-Gervais 2005; Sibley 2014; eBird 2012.	

Reptiles

Although the Sonoran Desert has a very high diversity of snakes and lizards, few species are tolerant of extensive disturbance and agricultural activities. However, some species are able to persist in modified environments, and may prey on rodents and insect pests associated with farmland. Most native reptiles are only likely to be present in the Study Area in the foothills of the Sierra Estrella. No native aquatic turtles would be present in the Study Area, although some introduced aquatic turtles may be present in the Gila River and associated wetlands. Table D-4 lists reptile species that may be present in the Study Area. Dumping of unwanted captive turtles can result in the presence of unanticipated species that are not listed in Table D-4, although self-sustaining populations of these species are not likely to be present.

Table D-4 Reptile Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Spiny Softshell *Apalone spinifera*	Rivers, urban lakes, and irrigation canals. Non-native.
Pond Slider *Trachemys scripta*	Commonly kept in captivity and frequently released into ponds, canals, and rivers in Arizona. Non-native.
Painted Turtle *Chrysemys picta*	Commonly kept in captivity and frequently released into ponds, canals, and rivers in Arizona. Non-native.
Sonoran Desert Tortoise *Gopherus agassizii*	Rocky slopes with adequate shelter sites, and sometimes along incised desert washes.
Common Chuckwalla *Sauromalus ater*	Boulder piles and slopes with large rocks that provide shelter in Sonoran Desertscrub.
Desert Iguana *Dipsosaurus dorsalis*	Creosote bush desert to subtropical scrub, most common in sandy habitats, also along rocky streambeds, on bajadas, floodplains, and clay soils.
Zebra-tailed Lizard *Callisaurus draconoides*	Frequents washes, desert pavements of small rocks, and hardpan.
Long-tailed Brush Lizard *Urosaurus graciosus*	Lower Colorado River and Mojave desertscrub; brushy habitats along drainages and also on valley flats.
Ornate Tree Lizard *Urosaurus ornatus*	Often in riparian and xeroriparian areas, but also may occur in treeless areas in desertscrub.

Table D-4 Reptile Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Common Side-blotched Lizard *Uta stansburiana*	Arid or semi-arid regions with sand, rock, hardpan, or loam with grass, shrubs, and scattered trees; often found along sandy washes.
Desert Spiny Lizard *Sceloporus magister*	Arid and semi-arid regions on plains and lower slopes of mountains, found in most desertscrub habitats and associated riparian areas.
Goode's Horned Lizard *Phrynosoma goodei*	Flat valley bottoms in Sonoran Desertscrub, restricted to areas south of the Gila River.
Desert Horned Lizard *Phrynosoma platyrhinos*	Flat valley bottoms in Sonoran Desertscrub, restricted to areas north of the Gila River.
Long-nosed Leopard Lizard *Gambelia wislizenii*	Widespread in Sonoran Desertscrub, although usually in valley bottoms.
Sonoran Collared Lizard *Crotaphytus nebrius*	Rocky slopes in desert mountains.
Tiger Whiptail *Aspidoscelis tigris*	Inhabits deserts and semi-arid habitats, usually where plants are sparse; also found in woodland, streamside growth, and in warmer, drier forests.
Western Banded Gecko *Coleonyx variegatus*	Widespread throughout desertscrub communities.
Mediterranean House Gecko *Hemidactylus turcicus*	Introduced non-native gecko associated with urbanized areas.
Gila Monster *Heloderma suspectum*	Widespread in Sonoran Desertscrub, but most often in canyons and areas near watercourses.
Western Threadsnake *Rena humilis*	Inhabits elevations from desertscrub up to chaparral; primarily nocturnal.
Variable Sandsnake *Chilomeniscus stramineus*	Arizona Upland desertscrub but may occur at lower elevations along drainages.
Western Groundsnake *Sonora semiannulata*	Inhabit elevations from Lower Colorado River desertscrub up into woodland habitats.
Sonoran Lyresnake *Trimorphodon lambda*	Rocky slopes in Sonoran Desertscrub.
Desert Nightsnake *Hypsiglena chlorophaea*	Inhabits Lower Colorado Subdivision Sonoran Desert up into Petran Montane Conifer Forest; crepuscular to nocturnal.
Gophersnake *Pituophis catenifer*	Nearly all terrestrial habitats from mountains to low desert and coastal areas.
Glossy Snake *Arizona elegans*	Below 6,000 feet in sparsely vegetated woodland, chaparral, grassland or desertscrub with loose soil.
Spotted Leaf-nosed Snake *Phyllorhynchus decurtatus*	Open desert with finer loose soils, especially creosote bush.
Desert Patch-nosed Snake *Salvadora hexalepis*	Piñon–juniper woodland to low deserts on variety of soil types .
Sonoran Whipsnake *Coluber bilineatus*	Widespread in Sonoran Desertscrub, although uncommon at the lowest elevations.
Coachwhip *Coluber flagellum*	Sparsely vegetated areas from juniper woodland to low desert.
Long-nosed Snake *Rhinocheilus lecontei*	Desertscrub, prairie, tropical woodland to 5,500 feet.
California Kingsnake *Lampropeltis californiae*	Inhabits elevations from desertscrub up to lower portions of Great Basin Conifer Woodland and Madrean Evergreen Woodland.
Black-tailed Rattlesnake *Crotalus molossus*	Widespread in mountains throughout southern and central Arizona, from Sonoran Desertscrub into coniferous woodlands.
Speckled Rattlesnake *Crotalus mitchellii*	Widespread in desert mountains in western Arizona.

Table D-4 Reptile Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Mojave Rattlesnake *Crotalus scutulatus*	Wide range of habitat preferences, but generally in valley bottoms in the Study Area.
Tiger Rattlesnake *Crotalus tigris*	Prefers rocky slopes in desert mountains.
Western Diamondback Rattlesnake *Crotalus atrox*	Wide range of habitats below 7,000 feet; predominantly nocturnal.
Sidewinder *Crotalus cerastes*	Desertscrub elevations; flat, open desert in the presence of sandy or loamy soils; predominantly in stabilized aeolian sands.
Sonoran Coralsnake *Micruroides euryxanthus*	Widespread in the Sonoran Desert, but often in rocky areas and canyons, as well as near riparian areas.
Sources: Brennan and Holycross; Jones and Lovich 2009.	

Amphibians

Several species of toads are the only native amphibians likely to be present in the Study Area. Toads in the Sonoran Desert typically depend on summer rainfall and reproduce rapidly in temporary pools that are formed. Some of these species, particularly the Sonoran Desert Toad (*Incilius alvarius*) can also use manmade bodies of water and may occur in agricultural areas. The introduced American Bullfrog (*Lithobates catesbeianus*) requires permanent water and would be present in many of the ponds and wetlands along the Gila River in the Study Area. Table D-5 lists amphibian species that may occur in the Study Area.

Table D-5 Amphibian Species that May Occur in the Study Area	
Common Name ***Scientific Name***	**Habitat**
Couch's Spadefoot *Scaphiopus couchii*	Frequents shortgrass plains, mesquite savannah, creosote bush desert, thornscrub, tropical deciduous forest, and other areas of low rainfall.
Red-spotted Toad *Anaxyrus punctatus*	Occurs from Lower Colorado River desertscrub up to Petran Montane Conifer Forest; creeks, washes, rocky hillsides, cattle tanks.
Woodhouse's Toad *Anaxyrus woodhousii*	Desertscrub, woodland, and agricultural habitats.
Great Plains Toad *Anaxyrus cognatus*	Inhabits valley bottoms in prairies or deserts, often breeding after heavy rains in summer in shallow temporary pools or quiet streams.
Sonoran Desert Toad *Incilius alvarius*	Ranges from arid lowlands and arid grasslands into riparian mountain canyons, often found near permanent water.
American Bullfrog *Lithobates catesbeianus*	Highly aquatic, remaining in or near permanent standing water. Introduced, invasive species.
Sources: Brennan and Holycross 2006.	

Fish

No native fish species are likely to be present in the Study Area. Native species that were historically present are now generally absent from the highly modified remnants of river systems in the Phoenix area (Minckley and Marsh 2009, Marsh and Minckley 1982). Some introduced fish species are present in the Gila River and associated ponds and wetlands. Sport fishery opportunities exist in the Study Area along the Gila River, such as at the Tres Rios Wetlands and the Baseline and Meridian Wildlife Management Area. No major canals are crossed by the Project, although several small irrigation delivery ditches support farm fields in

the Project area. Table D-6 lists fish species most likely to occasionally be present in the Study Area. Many of the introduced fish are the result of intentional introduction for sport fishing, mosquito control, and other aquatic management objectives. However, unmanaged releases, such as dumping of aquarium fish, result in the presence of unanticipated fish species not listed in Table D-6.

Table D-6
Fish Species that May Occur in the Study Area

Common Name ***Scientific Name***	**Habitat**
Red Shiner *Cyprinella lutrensis*	Occupies a variety of habitats and can thrive in waters of high turbidity, high temperatures, and intermittency. Non-native.
Yellow Bullhead *Ameiurus natalis*	Present in many types of water bodies throughout the Southwest. Non-native.
Black Bullhead *Ameiurus melas*	Stagnant or slow-moving waters. Non-native.
Flathead Catfish *Pylodictis olivaris*	Present in large rivers, canals, and reservoirs. Non-native.
Channel Catfish *Ictalurus punctatus*	Widespread in diverse bodies of water, although generally not present in small, fast-flowing streams. Non-native.
Blue Tilapia *Oreochromis aureus*	Herbivorous, and prefers standing or slow-moving bodies of water. Non-native.
Smallmouth Bass *Micropterus punctulatus*	Present in lakes, reservoirs, larger ponds, and slow-moving rivers. Non-native.
Largemouth Bass *Micropterus salmoides*	Present in lakes, reservoirs, larger ponds, and slow-moving rivers. Non-native.
Black Crappie *Pomoxis nigromaculatus*	Widespread in diverse bodies of water, although generally not present in small, fast-flowing streams. Non-native.
Bluegill *Lepomis macrochirus*	Prefers standing water such as ponds and lakes, but also may be present in slow-moving rivers. Non-native.
Green Sunfish *Lepomis cyanellus*	Warm-water lakes and streams. Prefers rocky substrate and piles of rubble. Non-native.
Fathead Minnow *Pimephales promelas*	Occupies a variety of habitats and can thrive in waters with high turbidity and low oxygen. Non-native.
Western Mosquitofish *Gambusia affinis*	Shallow waters or in dense vegetation protected from larger fish. Non-native.
Grass Carp *Ctenopharyngodon idella*	Sterile Grass Carp are introduced into canals in the Phoenix area to manage vegetation growth. Non-native.
Common Carp *Cyprinus carpio*	Large bodies of slow-moving or standing water. Non-native.
Sources: Minckley and Marsh 2009.	

ASSESSMENT OF POTENTIAL IMPACTS

All potential impacts of the Project have the same potential to occur, regardless of which alternative is selected. All alternatives cross similar biological resources, and no clear differentiation among alternatives can be made based on the types of impacts that may occur. However, impacts would be proportional to the length of each alternative and resulting amount of ground disturbance.

Potential Impacts to Mammals

Ground disturbance creates a risk of harm to any small, terrestrial mammals. While some active, diurnal species are likely to successfully avoid construction activities and move out of work areas, burrowing

species would not. However, as discussed above, the human-modified landscape surrounding the Project area likely limits the potential for most native mammal species to be present. The cultivated and fallow fields and field margins within the Project area are not likely to be important to the maintenance of local population levels for any of these species, and loss of this type of habitat is not likely to have a detectable effect on any of these species.

Bats can collide with manmade structures during long-distance migration. Migrating bats often fly high above ground level and do not actively echolocate. However, during normal foraging activity, bats are actively using echolocation and are typically able to detect and avoid features such as overhead transmission lines. Ground disturbance from the Project, taking place in previously disturbed areas with little vegetation, would not appreciably affect any bat species by removing foraging habitat. Higher-quality foraging habitat is available nearby along the Gila River and in associated wetland areas.

Potential Impacts to Birds

Transmission lines can pose a collision risk to birds, including raptors (APLIC 2012). However, many factors influence whether birds are likely to collide with a specific transmission line. Collision risk is relatively low when multiple transmission lines are co-located or placed near other infrastructure, so that the collective infrastructure is likely to be perceived by birds and avoided. Birds also often attempt to fly above transmission lines and other obstacles. The Project would be constructed in an area with numerous existing transmission lines and are not likely to contribute to an increase in bird mortality within the Project area.

Electrical transmission and distribution lines can also cause bird electrocution, although the risk is highest with lower-voltage lines. Electrocution occurs when a bird simultaneously contacts energized and grounded electrical components. High-voltage lines require spacing between those components that cannot be spanned even by very large birds, so that electrocution risk is precluded almost entirely (APLIC 2006).

Most native birds are not likely to nest in the Project area. However, Burrowing Owls can use nests in fallow farmland, field margins, and canal banks. Because Burrowing Owls may in some cases retreat underground when alarmed rather than flying, and because their nests are underground, they are at risk of harm from ground-disturbing activities such as that resulting from construction of the Project. Burrowing Owls were confirmed to be present during a reconnaissance survey of the Project area. Burrowing Owls could occur anywhere in the Project area.

Some native birds regularly forage in farmland such as that present in the Project area. However, the Project would result in a minimal loss of farmland, and substantial farmland is present elsewhere in the Study Area. Although some ground disturbance and vegetation removal would occur as a result of the Project, this is not likely to have a detectable effect on any bird species.

Potential Impacts to Reptiles

Potential impacts to reptiles would be the same as those described for terrestrial mammals and would be related to the risk of harm during ground-disturbing activities. Very few reptiles are likely to be present in the Project area.

Potential Impacts to Amphibians

Potential impacts to amphibians would be the same as those described for terrestrial mammals and would be related to the risk of harm during ground-disturbing activities. Very few amphibians are likely to be present in the Project area.

Potential Impacts to Fish

Irrigation ditches pass through the Project area, but do not have surface water continuously present and do not provide permanent fish habitat. Because the Project would not affect any canals, irrigation facilities, the Gila River, or any associated wetlands, and because no self-sustaining population of fish is present in the Project area, the Project would have no impacts on fish.

Potential Impacts to Vegetation

No impacts to vegetation are anticipated as a result of the Project. The Project would be constructed in previously disturbed area that do not support native vegetation communities.

MITIGATION MEASURES

Because the Project would be constructed entirely in areas subject to previous disturbance, outside of areas that provide essential habitat for native wildlife, impacts to most species present in the region would not occur or would not rise to a level that would warrant mitigation. The following measures address the loss of native vegetation, the risk that electrical infrastructure poses to birds, and the risk that ground-disturbing activities pose to nesting birds, including Burrowing Owls.

- Transmission structures would be constructed in compliance with standards provided by APLIC (APLIC 2006). When these standards are used, the risk of electrocution for large birds, including all special-status species in the Project area, is essentially eliminated.

- Preconstruction surveys for nesting birds and Burrowing Owls would be conducted by qualified biologists. Burrowing Owl surveys would be conducted according to a current protocol. Burrows occupied by Burrowing Owls would be avoided if feasible. If any Burrowing Owl relocation is necessary, this would be performed by a licensed wildlife rehabilitator.

CONCLUSION

Because construction of the Project would take place in a setting that is highly altered and contains little or no native vegetation, and is surrounded by disturbed areas and farmland, the Project would not contribute significantly to the loss of native vegetation that provides wildlife habitat or declines in any native plant or wildlife species.

Impacts that may occur as a result of the Project would be similar among alternatives, but proportional in extent to the length of the alternatives. However, given the low sensitivity of the area affected, differences in impacts to biological resources among the alternatives would be negligible and difficult to discern.

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EXHIBIT E: SCENIC AREAS, HISTORIC SITES AND STRUCTURES, AND ARCHAEOLOGICAL SITES

SCENIC AREAS AND VISUAL RESOURCES

Overview

This section of Exhibit E addresses the inventory of and potential effects to scenic or visual resources in relation to construction and operation of the Project. The methodology for this assessment is identified below and includes separate discussions for scenery and sensitive viewers. The methodology is followed by the results of the inventory and the impact assessment—both of which include separate discussions for scenery (i.e., scenic quality) and sensitive viewers within the context of each route alternative. The Project would not cross lands managed by the BLM, United States Forest Service (USFS), or any other agency that requires conformance with visual resource management objectives or guidelines, and the Study Area does not include designated national, state, or local scenic areas.

METHODOLOGY

The purpose of the visual impact assessment is to identify and characterize the level of visual modification in the landscape that would result from the construction and operation of the Project. Modification of the landscape is typically described in levels of visual contrast, which can potentially affect both scenic quality and sensitive viewers. While scenic quality refers to the general characteristics and value of the landscape as a resource regardless of specific viewers, the term sensitive viewers refers to specific viewers and/or groups of viewers whose views could be affected by potential changes to the landscape. The methods used to conduct this visual impact assessment are consistent with past visual resource studies conducted for similar projects that have been approved by the Siting Committee.

The Study Area for the visual assessment was defined as a 2-mile-wide buffer around the route alternatives. Visual resource information and data for this assessment was developed based on research, available GIS data, aerial photography, and on-site field verification and photo documentation. This data was collected for all lands, regardless of jurisdiction, and used to develop a comprehensive understanding of the existing landscape and associated visual resources.

Impacts to both scenic quality and sensitive viewers are determined, in part, by evaluating the visual contrast the proposed facilities would have with the existing landscape. Visual contrast refers to the degree that the Project features would either match/repeat existing features in the landscape or contrast with features of the existing landscape. The degree of visual contrast considers the existing landforms, vegetation, and built features present in the landscape and is described in terms of the degree of perceptible change in the basic design elements of form, line, color, and texture that would be evident by the introduction of the Project in the landscape.

The impact thresholds for this assessment are categorized as follows:

- **High:** Project features would result in a strong degree of contrast and would appear as a dominant feature within the existing landscape.
- **Moderate:** Project features would result in a moderate degree of contrast and would appear as co-dominant features within the existing landscape.
- **Low:** Project features would result in a weak degree of contrast and would be subordinate to the features of the existing landscape.

Scenery

In the context of the Project, scenery is a measure of the inherent aesthetic value of the landscape based on the appearance of existing landscape features, including landforms, vegetation, and built features. In general terms, the scenic quality is based on the premise that landscapes with greater diversity in landforms and vegetation are more aesthetically pleasing, and therefore hold greater value. For this analysis, impacts to scenic quality were based on comparing the inventoried quality of the scenery to the anticipated quality considering any contrast related to construction and operation of the Project.

Sensitive Viewers

The concept of sensitive viewers refers to members of the public that could have potential views of the Project and may be sensitive to potential changes in the scenery that surrounds them. With regard to sensitive viewers, the concept of Project contrast is dependent on several factors, including viewing distance, duration of view, viewing condition, and degree of visibility. When combined, these factors indicate the overall visual dominance of the Project within the landscape. The term "viewing distance" refers to the viewer's physical distance from the Project components and is predicated on the fact that one's ability to see details dissipates over distance. The duration of view refers to the length of time that the Project would be viewed and is based on the idea that viewer attention is attracted to a higher degree as the duration of view increases. Viewing conditions refer to whether the viewer is looking down at the Project from a superior position, looking up at the Project from an inferior position, or viewing the Project from an elevation that is similar to that of the Project (i.e., a neutral view). The term "degree of visibility" refers to whether views of the Project would be either open and unobstructed, or partially to fully obstructed by other features in the existing landscape (i.e., topography, vegetation, or built features). The degree of visibility also refers to whether the Project would be viewed against the sky (i.e., skylined) or viewed against a backdrop of landforms, vegetation, and/or built features.

Anticipated viewer sensitivities to visual changes are also discussed within the analysis, including brief discussions regarding the potential sensitivities of different types of viewers within the vicinity of the Project. Along these lines, residential and recreational users are typically considered to have high sensitivities to visual changes in the landscape, while viewers moving along travel routes are considered to have overall moderate sensitivities to visual changes (unless travelling along a designated scenic travel route).

INVENTORY RESULTS

Scenery

The Study Area falls within the Sonoran Basin and Range Level III ecoregion, and more specifically within the Middle Gila/Salt River Floodplains, Gila/Salt Intermediate Basins, and Central Sonoran/Colorado Desert Mountains Level IV ecoregions (US DOI 2014). The Middle Gila/Salt River Floodplains ecoregion covers the central and southeastern portions of the Study Area, generally encompassing the river basin floors and adjacent terraces of the middle Gila and Agua Fria rivers. Riparian and wetland habitats in the river basin floors remain mostly undeveloped but have been extensively altered over time. The adjacent terraces (in which the alternative routes are located) include a variety of urban and suburban land uses but are dominated by agricultural development. The Gila/Salt Intermediate Basins ecoregion covers the northern portions of the Study Area outside of the river corridors. These flat to slightly rolling areas are part of the area that makes up the urban and agricultural core of south-central Arizona and are dominated by urban, suburban, and agricultural land uses within the Study Area. The Central Sonoran/Colorado Desert Mountains ecoregion covers a relatively small area in the southwestern portion of the Study Area and

encompasses erosional highlands of exposed rock that rise above the adjacent low lands. Within the Study Area, these areas encompass the northern portions of the Estrella Mountains and include some park and recreation facilities but are otherwise undeveloped.

In addition to agricultural, suburban, and urban land uses, the Study Area also includes a variety of large-scale infrastructure facilities. These facilities are generally located to the south and east of the Project and include a major transmission corridor comprising two 230kV lines, one 345kV line, and one 500kV line. In addition, the Project alignments are bisected by a 69kV line and a 230kV line that generally parallels West Broadway Road.

Vegetation within the Study Area is dominated by crops and undeveloped lands of both disturbed and undisturbed desert landscape. Views of the landscape within the Study Area are mostly open and panoramic in nature but are often obstructed by existing built features such as power lines, street/parking lot lights, urban trees, and buildings associated with the urban, suburban, and agricultural development.

The scenic quality within the central and northern portions of the Study Area is considered to be relatively low based on the general lack of interesting landforms and vegetation, and the prominence of existing built features that do not blend with the appearance of the natural landscape. In the southern portion of the Study Area (encompassing the Gila River corridor and adjacent Estrella Mountains), the scenic quality is considered to be higher based on the more interesting landforms and vegetation, less visible built features, and the presence of water within portions of the river corridor.

Sensitive Viewers

Several important viewer types are located within the Study Area, including residential, recreational, and viewers using travel routes.

Residences. A variety of residences are located within the Study Area, including individual ranches, clusters of residences in rural neighborhoods, and moderately dense suburban residential developments. The nearest residential viewers are located within approximately 100 feet of the Project. Views from residences within the Study Area typically include suburban commercial and residential development, agricultural croplands, parks, and open space. The existing transmission infrastructure within the Study Area is also visible from many residences and the heights of these features make them highly visible and dominant features in many portions of the landscape. With the exception of those located within the interior of neighborhoods, views from residences are mostly open and panoramic in nature and include views of distant mountains. Residential viewers are expected to have a relatively long duration of view and relatively high sensitivities to visual changes.

Recreation Areas. Recreation areas within the Study Area include a number of local parks, pocket parks (typically located within suburban residential developments), and Maricopa County's Estrella Mountain Regional Park. These parks are scattered throughout the Study Area, with the nearest pocket park located approximately 0.75 miles from the Project, and the nearest municipal park (City of Avondale's Festival Fields Park) located approximately 0.85 miles from the Project. Maricopa County's Estrella Mountain Regional Park is located approximately 1 mile from the nearest Project alternative. The Gila and Agua Fria river corridors also include designated open space areas with both planned and unplanned recreation trails. Open space within the Agua Fria River corridor is located as close as approximately 500 feet from the Project alternatives, and open space associated with the Gila River corridor is located as close as approximately 0.60 miles from the Project alternatives. The Goodyear Ballpark and practice facilities (located approximately 1 mile from the Project) also support recreational uses within the Study Area—drawing large crowds of recreational viewers. Views from recreational users within the Study Area typically include suburban commercial and residential development, agricultural croplands, and the parks and open

space areas in which they are often located. The existing transmission infrastructure within the Study Area is also visible to many recreational users, and the heights of these features make them highly visible and dominant features in many portions of the landscape. With the exception of recreational viewers within the interior of neighborhoods (e.g., most neighborhood pocket parks), views from recreational viewers are mostly open and panoramic in nature and include views of distant mountains. Recreational viewers are expected to have a relatively moderate duration of view and fairly high sensitivities to visual changes.

Travel Routes. The primary travel route within the Study Area is MC 85 (approximately 0.50 miles from the nearest Project features), which runs generally southwest to northeast. A number of collector roads are also located within the study area, including Yuma Road, Buckeye Road, Lower Buckeye Road, Lower Buckeye Parkway, West Broadway Road, Vineyard Avenue, Indian Springs Road, Southern Avenue, Estrella Parkway, Bullard Avenue, South Litchfield Road, Central Avenue, Dysart Road, El Mirage Road, Avondale Boulevard, 107th Avenue, and 143rd Avenue. The collector roads nearest the Project include West Broadway Road (directly crossed by several Project alignments), South Litchfield Road (directly paralleled by a Project alignment), and Bullard Avenue (approximately 0.25 miles from a Project alignment). Views from travel routes within the Study Area typically include suburban commercial and residential development, agricultural croplands, and parks and open space. The existing transmission infrastructure within the Study Area is also visible to many travel route users, and the heights of these features make them highly visible and dominant features in many portions of the landscape. With the exception of travel routes surrounded by existing buildings and vegetation, views from travel routes are mostly open and panoramic in nature and include views of distant mountains. Viewers moving along travel routes are expected to have a relatively short duration of view and relatively moderate sensitivities to visual changes.

IMPACT ASSESSMENT RESULTS

The descriptions below provide a general description of the potential impacts on scenic quality and sensitive viewers—based on the construction and operation of the Project. The impact analysis results are organized by Project route alternative and include a discussion of impacts to both scenery and viewers from construction and operation of the Project.

Preferred Route

Scenery

The Project would introduce additional transmission lines and tall, vertical monopole structures into the landscape. The lines, forms, colors, textures, and scale of the proposed facilities would be similar in appearance to those within the existing landscape. The Project is therefore expected to create minimal impacts to the existing scenery. Project features would be subordinate to the many transmission line features of the existing landscape (some of which are larger in scale than the proposed project features) and result in a weak degree of contrast, and low degree of impact.

Sensitive Viewers

Residences. Although views of the Project from residences would vary from unobstructed to partially and even fully obstructed, most views would be at least partially obstructed by existing features within the landscape, such as existing trees, buildings and other built features. Further screening would also occur from buildings currently under construction and/or to be constructed as part of the data center developments. Based on the flat to slightly rolling landforms in which the Project and existing residences would be located, views of the Project from residences would generally be from a neutral position and would include skylined views of the transmission lines and monopole structures, where visible.

Approximately 14 residences are located within 0.40 miles of the Project, including a cluster of approximately six residences on Bullard Avenue, three individual residences on West Broadway Road, a cluster of approximately three residences on South Litchfield Road, and two other individual residences (one on Lz2 Ranch Road and another on South Litchfield Road that sits further back off the road). Views from these residences would generally include unobstructed to partially obstructed views of the Project. Impacts to views from these residences would vary from high to low depending on specific viewing conditions from each residence:

- Bullard Avenue Residences. These six residences are approximately 0.30 miles from the nearest portion of the Project. Based on this viewing distance, and the presence of existing transmission line features in the general viewing direction, the lines, forms, colors, textures, and scale of the Project would repeat those of the existing landscape. Where visible, the Project would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact.

- West Broadway Road Residence #1 (Key Observation Point [KOP] 1). This residence is approximately 50 feet from the nearest Project features. Based on the presence of existing transmission line features in views to the north from the residence, the lines, forms, colors, textures, and scale of the Project would appear co-dominant and result in a moderate degree of contrast and impacts. However, views from the residence to the east and southeast would be dominated by the Project based on the close viewing distance. The lines, forms, colors, and textures of the Project would repeat those in the landscape, but the close viewing distance would increase the relative scale of the Project and result in a high degree of contrast and impact.

- West Broadway Road Residence #2 (KOP 2). This residence is approximately 600 feet from the nearest Project features. Based on this viewing distance, and the presence of existing transmission line alignments within approximately 85 feet of the residence (in the same northward viewing direction), the lines, forms, colors, textures, and scale of the Project would repeat those of the existing landscape. Where visible, the Project would be co-dominant with the features of the existing landscape and result in a moderate degree of contrast and impact.

- West Broadway Road Residence #3 (KOP 3). This residence is approximately 600 feet from the nearest Project features. Based on this viewing distance, and the presence of existing transmission line features within approximately 85 feet of the residence, the lines, forms, colors, textures, and scale of the Project features would repeat those of the existing landscape. Where visible, the Project features would be co-dominant with the features of the existing landscape and result in a moderate degree of contrast and impact.

- South Litchfield Road Residences (KOP 4). These 3 residences are approximately 0.30 miles from the nearest Project features. Based on this viewing distance and the presence of existing transmission line features in the same general viewing direction, the lines, forms, colors, textures, and scale of the Project would repeat those of the existing landscape. Where visible, the Project would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact.

- Lz2 Ranch Road residence and additional South Litchfield Road Residence that sits back off of the road. These two residences are approximately 0.40 to 0.45 miles from the nearest Project features. Based on these viewing distances and views toward the Project that would be mostly to fully obstructed by existing vegetation and built features, the Project features would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact, if visible.

Recreation Areas. Views of the Project from recreation areas within the Study Area would typically vary from partially obstructed to fully obstructed. Most views would be partially obstructed by existing features within the landscape, such as trees, existing buildings, and other built features—including existing transmission lines. Based on the flat to slightly rolling landforms in which the Project would be located and the varying topography in which existing recreational viewers would be located, views of the Project from recreation viewers would be from inferior, neutral, and superior viewing positions. Views from inferior and neutral viewing positions would typically include skylined views of the transmission lines and monopole structures, while superior viewing positions would typically include backdropped views of the Project.

The nearest park is a neighborhood pocket park located near the corner of Lower Buckeye Road and South Litchfield Road. This park is located within a depressed stormwater collection area and is surrounded by a concrete block wall that would fully obstruct views of the Project components. The City of Avondale's Festival Fields Park at the intersection of Lower Buckeye Road and Central Avenue is the nearest municipal park to the Project, at a distance of approximately 0.85 miles. Based on this viewing distance, and the presence of a variety of existing transmission line features in the same viewing direction, the lines, forms, colors, textures, and scale of the Project would repeat those of the existing landscape. Where visible, the Project would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact. Views from Maricopa County's Estrella Mountain Regional Park are from a nearest distance of approximately 1 mile, with views that vary from neutral to superior. Based on this viewing distance, the presence of a variety of existing transmission line features in the same viewing direction, and backdropping from some superior viewing angles (i.e., existing trails in upper elevations of the mountains), the lines, forms, colors, textures, and scale of the Project would repeat those of the existing landscape. Where visible, the Project would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact.

Open space within the Agua Fria River corridor is located as close as approximately 0.30 miles from the Project, and open space associated with the Gila River corridor is located as close as approximately 0.60 miles from the Project. These areas are typically lower in elevation than the Project site, which would partially to fully obstruct most views of the Project. Where visible from these open space corridors, the Project would typically be seen in context with a variety of transmission lines. The lines, forms, colors, textures, and scale of the Project would therefore repeat those of the existing landscape. Where visible, the Project would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact.

Views from the Goodyear Ballpark and practice facilities (approximately 1 mile from the Project) would be partially to fully obstructed by existing vegetation and built features. Based on these viewing distances and the presence of a variety of existing transmission line features in the same viewing direction, the lines, forms, colors, textures, and scale of the Project would repeat those of the existing landscape. Where visible, the Project would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact.

Travel Routes. Views from the travel routes within the Study Area would vary from unobstructed to partially and even fully obstructed by existing features within the landscape, such as trees, existing buildings, and other built features. Based on the flat to slightly rolling landforms in which the Project and travel routes would be located, views of the Project from travel routes would generally be from a neutral position and would include skylined views of the transmission lines and monopole structures, where visible.

MC 85 is the primary travel route within the area and is located approximately 0.50 miles from the Project. Based on this viewing distance and the presence of a variety of existing transmission line features in the same viewing direction, the lines, forms, colors, textures, and scale of the Project would repeat those of the

existing landscape. Where visible, the Project would be subordinate to the features of the existing landscape and result in a weak degree of contrast and low degree of impact.

The collector road with the nearest views of the Project would be West Broadway Road, which would be crossed twice by the Project. Because this road is already paralleled by a 230kV transmission line (north side of road) and a 69kV transmission line (south side of road), views of the Project would appear similar to the lines, forms, colors, textures, and scale of the existing landscape features. The Project would be co-dominant with the features of the existing landscape and result in a moderate degree of contrast and impact.

Alternative Route #1

Scenery

Alternative Route #1 would introduce a slightly greater amount of new built features into the landscape as those described for the Preferred Route. Impacts to scenery associated with Alternative Route #1 would be similar to those described for the Preferred Route (low degree of impact) but would be slightly higher based on the greater amount of new built features expected.

Sensitive Viewers

Residences. Typical residential viewing conditions associated with Alternative Route #1 would be similar to those described for the Preferred Route. Alternative Route #1 also includes the same 14 residences within approximately 0.40 miles of the Project, with similar typical viewing conditions. Specific impacts to views from these residences would vary from high to low depending on viewing conditions from each residence:

- Bullard Avenue Residences. Impacts to these six residences would be similar to those described for the Preferred Route (low degree of impact).
- West Broadway Road Residence #1 (KOP 1). Impacts to this residence would be similar to those described for the Preferred Route (moderate degree of impact to northern views; high degree of impact to eastern/southeastern views).
- West Broadway Road Residence #2 (KOP 2). Impacts to this residence would be similar to those described for the Preferred Route (moderate degree of impact).
- West Broadway Road Residence #3 (KOP 3). Impacts to this residence would be similar to those described for the Preferred Route (moderate degree of contrast and impact), but impacts would be slightly less than those of the Preferred Route based on the further location of the proposed alignment to the east of the residence.
- South Litchfield Road Residences (KOP 4). Impacts to these three residences would be similar to those described for the Preferred Route (low degree of impact) but would result in a slightly greater amount of low impacts based on the closer location of the proposed alignments to the residences.
- Lz2 Ranch Road residence and additional South Litchfield Road Residence. Impacts to these two residences would be similar to those described for the Preferred Route (low degree of impact).

Recreation Areas. Typical recreational viewing conditions associated with Alternative Route #1 would be similar to those described for the Preferred Route and impacts to the nearest pocket park would also be similar (no impacts). In addition, impacts to views from the City of Avondale's Festival Fields Park,

Maricopa County's Estrella Mountain Regional Park, Agua Fria and Gila river open space corridors, and the Goodyear Ballpark and practice facilities would also be similar to those described for the Preferred Route (low degree of impacts).

Travel Routes. Typical travel route viewing conditions associated with Alternative Route #1 would be similar to those described for the Preferred Route. Impacts to views from MC 85 would also be similar to those described for the Preferred Route (low degree of impact).

Impacts to the nearest collector road (West Broadway Road) would be relatively similar to those described for the Preferred Route (moderate degree of impact).

Alternative Route #2

Scenery

Alternative Route #2 would introduce a greater amount of new built features into the landscape as those described for the Preferred Route and Alternative Route #1. Impacts to scenery associated with Alternative Route #2 would be similar to those described for the Preferred Route and Alternative Route #1 (low degree of impacts), but would result in a larger amount of low impacts based on the greater amount of new built features when compared to the Preferred Route and Alternative Route #1.

Sensitive Viewers

Residences. Typical residential viewing conditions associated with Alternative Route #2 would be similar to those described for the Preferred Route. Alternative Route #2 also includes the same 14 residences within approximately 0.40 miles of the Project, with similar typical viewing conditions. Specific impacts to views from these residences would vary from high to low depending on viewing conditions from each residence:

- Bullard Avenue Residences. Impacts to these six residences would be similar to those described for the Preferred Route and Alternative Route #1 (low degree of impact), but there would be a slightly greater amount of low impacts associated with Route Alternative #2 based on the larger number of Project features visible to the east/southeast.

- West Broadway Road Residence #1 (KOP 1). Impacts to this residence would be similar to those described for the Preferred Route and Alternative Route #1 (moderate degree of impact to northern views; high degree of impact to eastern/southeastern views). However, there would be a slightly greater amount of high impacts associated with Route Alternative #2 based on the larger number of Project features visible to the east/southeast.

- West Broadway Road Residence #2 (KOP 2). This residence is approximately 80 feet from the nearest Project features. Based on the presence of existing transmission line features to the north of the residence, the lines, forms, colors, textures, and scale of the Project would appear co-dominant and result in a moderate degree of contrast and impacts. However, views from the residence to the east and southeast would be dominated by the Project based on the close viewing distance. The lines, forms, colors, and textures of the Project would repeat those in the landscape, but the close viewing distance would increase the relative scale of the project features and result in a high degree of contrast and impact. The Alternative Sub-Route would result in a lesser degree of impacts as compared to the standard configuration of Route Alternative #2—including moderate impacts for both northern and eastern/southeastern views.

- West Broadway Road Residence #3 (KOP 3). This residence is approximately 80 feet from the nearest Project features. Based on the presence of existing transmission line features to the north of the residence, the lines, forms, colors, textures, and scale of the Project from views in this direction would appear co-dominant and result in a moderate degree of contrast and impacts. However, views from the residence to the west and southwest would be dominated by the Project based on the close viewing distance. The lines, forms, colors, and textures of the Project would repeat those in the landscape, but the close viewing distance would increase the relative scale of the Project and result in a high degree of contrast and impact. The Alternative Sub-Route would result in a lesser degree of impacts as compared to the standard configuration of the Route Alternative #2—including moderate impacts for both northern and western/southwestern views.

- South Litchfield Road Residences (KOP 4). Impacts to these three residences would be similar to those described for the Preferred Route and Route Alternative #1 (low degree of impact) but would be slightly greater than either of these routes based on the closer location of the proposed alignments to the residences.

- Lz2 Ranch Road residence and additional South Litchfield Road Residence. Impacts to these two residences would be similar to those described for the Preferred Route (weak degree of contrast and low degree of impact).

Recreation Areas. Typical recreational viewing conditions associated with Alternative Route #2 would be similar to those described for the Preferred Route and impacts to the nearest pocket park would also be similar (no impacts). In addition, impacts to views from the City of Avondale's Festival Fields Park, Maricopa County's Estrella Mountain Regional Park, Agua Fria and Gila river open space corridors, and the Goodyear Ballpark and practice facilities would also be similar to those described for the Preferred Route (low degree of impacts).

Travel Routes. Typical travel route viewing conditions associated with Alternative Route #2 would be similar to those described for the Preferred Route. Impacts to views from MC 85 would also be similar to those described for the Preferred Route (low degree of impacts).

Impacts to the nearest collector road (West Broadway Road) would be relatively similar to those described for the Preferred Route and Route Alternative #1 (moderate degree of impact) but would result in a slightly greater amount of impacts based on the presence of two additional proposed road crossings. The Alternative Sub-Route would result in a lesser degree of impacts as compared to the standard configuration of Route Alternative #2 based on the co-located alignment that would replace two new alignments associated with Route Alternative #1.

CONCLUSION

Overall, the Preferred Route would result in the least amount of visual impacts. In comparison, Alternative Route #1 would result in a slightly greater amount of low impacts to scenery, and a slightly greater amount of low impacts to South Litchfield Road Residences (KOP 4).

In contrast, Alternative Route #2 would result in a slightly greater amount of low impacts to scenery in comparison to the Preferred Route and Alternative Route #1. As compared to both the Preferred Route and Alternative Route #1, Alternative Route #2 would also result in a slightly greater amount of low impacts to the Bullard Avenue Residences and the South Litchfield Road Residences (KOP 4); a slightly greater amount of moderate impacts to the West Broadway Road Residence #1 (KOP 1) and West Broadway Road travel route; and additional high impacts to the West Broadway Road Residence #2 (KOP 2) and West Broadway Road Residence #3 (KOP 3). The Alternative Sub-Route would result in a lesser amount of

moderate impacts to the West Broadway Road travel route and would reduce high impacts to moderate impacts associated with the West Broadway Road Residence #2 (KOP 2) and West Broadway Road Residence #3 (KOP 3).

HISTORIC SITES AND STRUCTURES AND ARCHAEOLOGICAL SITES

As stipulated by ARS § 40-360.06, the Siting Committee shall consider "historic sites and structures or archaeological sites at or in the vicinity of the proposed site" when evaluating the suitability of plant or transmission line siting. The assessment also supports Arizona Corporation Commission compliance with the State Historic Preservation Act (ARS § 41-861 through 41-864), which requires state agencies provide the State Historic Preservation Officer 30 days to review any of the agency's plans "which involve a property which is included on or may qualify for inclusion on the Arizona register of historic places, including any construction project, sale, lease or acquisition of historic properties" (ARS § 41-864). Although the Arizona register of historic places requires certain qualifications for listing a property, any such qualifications are not relevant for compliance with ARS § 40-360.06, which does not include such stipulations, and are not considered here.

RECORDS REVIEW

In order to identify historic sites and structures and archaeological sites at or in the vicinity of the Project, a review of existing historic and archaeological records was conducted within the Study Area. Records from the following sources were examined:

- Arizona State Historic Preservation Office (SHPO)
- Arizona State Museum (ASM)/AZSITE
- Arizona State Register of Historic Places
- General Land Office (GLO) survey plats
- Maricopa County Historic Aerial Photos
- National Register of Historic Places
- USGS Historical Topographic Maps

RECORDS REVIEW RESULTS

The records review revealed that there are no known historic sites, structures or archaeological sites within the alignment of the Preferred Route or the route alternatives. There are 20 known historic sites, structures, or archaeological sites within the Study Area. These are summarized in Table E-1.

Table E-1
Historic Sites, Structures or Archaeological Sites within Two Miles of Preferred and Alternative Routes

No.	Site Name or Number	Description	Distance from Project (miles)
1	Alkali Ruin	Prehistoric village	0.50
2	Buckeye Canal	Historic canal	0.60
3	Bullard Avenue	Historic road	0.30
4	La Cienega	Prehistoric village	1.20
5	Mica Hill	Prehistoric petroglyphs and structure	1.20
6	Monument Hill	Prehistoric petroglyphs and Historic US-Mexico border marker	2.00 plus
7	NA14722	Prehistoric artifacts	1.00
8	NA14723	Historic farm	1.00
9	Pebble Creek Parkway	Historic road	1.20

Table E-1 Historic Sites, Structures or Archaeological Sites within Two Miles of Preferred and Alternative Routes			
No.	**Site Name or Number**	**Description**	**Distance from Project (miles)**
10	Phoenix Goodyear Airport	Historic WWII Navy Air Field	0.60
11	Southern Pacific Railroad	Historic railway	0.50
12	St. John's Canal	Historic canal	1.20
13	State Route 80	Historic road	0.50
14	AZ T:11:4(ASM)	Prehistoric rock shelter	2.00
15	AZ T:11:5(ASU)	Prehistoric canal	1.50
16	AZ T:11:11(ASM)	Prehistoric bedrock grinding features	1.40
17	AZ T:11:13(ASM)	Prehistoric petroglyphs	1.80
18	AZ T:11:54(ASM)	Historic canal	1.70
19	AZ T:11:196(ASM)	Archaeological site (type unknown)	1.70
20	AZ T:11:197(ASM)	Archaeological site (type unknown)	1.80

IMPACT ASSESSMENT

A project can negatively impact historic sites, structures, and archaeological sites either directly, through physically damaging, removing, or altering the site or structure itself, or indirectly by introducing visual, atmospheric, or audible elements that diminish the integrity of the property's historic characteristics. To understand potential indirect impacts, it is important to consider the existing built environment in which the Project will be sited.

Built Environment

The built environment in the Study Area includes agricultural fields, an airport, several large commercial structures, residential neighborhoods, a street network, and a transmission corridor. Agricultural fields are visible north and south of the Project and include ditches and informal roads. The Phoenix Goodyear airport is less than 0.50 miles to the northwest of the Project. Although the runway and a hangar are historic, dating to World War II (WWII), they are obscured by several new facilities that have been constructed at the airport, including a new terminal, T-hangars, and an airport maintenance facility. Immediately adjacent to the Project is a handful of 2- to 3-story modern commercial buildings. Residential neighborhoods are present nearly 1 mile to the north-northeast, including some religious facilities. The street network includes two improved asphalt roads adjacent to or crossing the Project area. A transmission corridor at the southern edge of the Project includes three large transmission lines at 345kV or higher, built on lattice structures, and two transmission lines at 230kV on monopoles.

Direct Impacts

No historic sites, structures, or archaeological sites have been identified at the Project location, so there will be no direct impacts for any of the proposed alternatives.

Indirect Impacts

A total of 20 historic sites, structures or archaeological sites are within the Study Area. A historic road (Bullard Avenue) is 0.30 miles from the Project. The remaining 19 sites are 0.50 miles or further away, and include historic structures and sites, and archaeological sites. Siting of any of the proposed alternatives would result in the introduction of a new visual component in the landscape. However, the built environment includes numerous modern structures including large transmission lines, so these visual

introductions would not represent a significant change to the visual landscape. As a result, construction of any of the alternatives would have no indirect effects on historic sites, structures, or archaeological sites.

CONCLUSION

Selection of any of the proposed alternatives will have no impacts to historic sites, structures, or archaeological sites.

REFERENCES

U.S. Department of Interior. 2014. Ecoregions of Arizona. Accessed on July 15, 2019. Available at: https://pubs.usgs.gov/ of/2014/1141/pdf/ofr2014-1141_front.pdf.

EXHIBIT F: RECREATIONAL PURPOSES AND ASPECTS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

> *State the extent, if any, the proposed site or route will be available to the public for recreational purposes, consistent with safety considerations and regulations and attach any plans the applicant may have concerning the development of the recreational aspects of the proposed site or route.*

There are no plans at present to formally designate land within the requested right-of-way for public recreation purposes. The Applicant shall affirmatively offer to work with the affected jurisdictions to join in long-range plans for the corridor.

Existing and future recreational sites within the Study Area of the Project are managed by the City of Goodyear, City of Avondale, and Maricopa County. These recreational sites provide active recreational opportunities such as youth and adult organized sports, swimming, hiking, and biking. Recreational sites also offer passive recreational opportunities like walking, picnicking, and gardening.

Numerous existing formal recreation opportunities are found within the Goodyear portion of the Study Area. Approximately 1 mile northwest of the Project site, located along Bullard Avenue is the City of Goodyear Ballpark. The Goodyear Ballpark complex is approximately 108 acres in size and is the spring training home to two Major League Baseball teams, the Cleveland Indians and the Cincinnati Reds. Three neighborhood parks are located within the Goodyear portion of Study Area and provide residential neighborhoods access to recreational amenities. These parks include Estrella Vista Park North and Estrella Vista Park South, both located approximately 1.80 miles northwest of the Project site, and Palmateer Park located approximately 1.80 miles north of the Project site. Two specialty parks (Roscoe Dog Park and BMX racing track AZ PROTRAC) are located approximately 1.50 miles southwest of the Project site and approximately 1.30 miles west of the Preferred Route. Currently, there are no existing, developed recreational resources within the Project sites or crossed by any of the transmission line alternative routes.

Within the Goodyear portion of the Study Area, numerous proposed trails and paths, and a future park location are identified in The City of Goodyear Parks, Recreation, Trails and Open Space Master Plan (Goodyear PRTOSMP) (Goodyear 2014). The Goodyear PRTOSMP identifies a proposed 10- to 12-foot-wide paved path adjacent to and south of the Project alternatives. The proposed path runs in a northeasterly direction along the existing transmission line corridor. Coordination with the city for construction and maintenance of any of the Project alternative routes would avoid unnecessary conflicts with proposed recreational facilities. All other City of Goodyear proposed park and recreation facilities will not be affected by the construction and maintenance of the Project.

The City of Avondale Parks, Recreation, Libraries and Trails Master Plan Update (Avondale PRLTMP) (Avondale 2017) identifies existing and proposed recreation opportunities. Within the City of Avondale portion of the Study Area there are several existing parks. Approximately 0.85 miles northeast of the Cyclone Project site is the 56.5-acre Festival Fields Community Park. Three Avondale neighborhood parks (Dennis DeConcini Park, Dessie Lorenz Park, and Mountain View Park) are located approximately 1.10 to 2 miles northeast of the Project site. A pocket park (Doc Rhodes Park) and Sernas Plaza are located approximately 1.80 to 2 miles north and northeast of the Project site. The Project will not cross any existing or proposed park and recreation facilities within the City of Avondale.

The confluence of the Gila and Agua Fria rivers located approximately 1 mile south of the Project sites provide both active and passive recreation opportunities. The Agua Fria River corridor generally runs north to south through the Study Area and along the eastern edge of the Project site, and the Gila River corridor generally runs from west to east approximately 1 mile south of the Project sites. The river corridors provide open space, and active and passive recreation opportunities. The Maricopa County Regional Trail System Plan (Maricopa County 2004), the Goodyear PRTOSMP, and the Avondale PRLTMP identify future non-motorized unpaved regional trails along the river corridors. Portions of the proposed Maricopa Trail along the Gila River and the proposed Sun Circle Trail along the Agua Fria River are within the Study Area. Maricopa County generally considers transmission line corridors as suitable locations for recreational trails. The Project will not cross either regional trail system.

Portions of The Estrella Mountain Regional Park (EMRP) are located in the southern portion of the Study Area. The EMRP is a component of the Maricopa County regional park system and offers passive and active recreational activities (e.g., hiking, walking, horseback riding, picnicking, camping, nature study, and sightseeing) (Maricopa County 2016). The Project will not cross the EMRP.

If planned recreational activities are developed near the Project, APS will cooperate with the appropriate planning authorities and communities to accommodate the appropriate recreational uses with due consideration for the transmission line operational and maintenance requirements, as well as safety considerations. It is not anticipated that the Project will affect the future siting of proposed recreational facilities.

REFERENCES

City of Avondale. 2017. City of Avondale Parks, Recreation, Libraries and Trails Master Plan Update. Accessed July 1, 2019. Available at: http://www.avondaleaz.gov/Home/ShowDocument?id=5378.

City of Goodyear. 2014. City of Goodyear Parks, Recreation, Trails and Open Space Master Plan. Accessed July 1, 2019. Available at: http://www.goodyearaz.gov/home/showdocument?id=21984.

Maricopa County Parks and Recreation. 2016. Estrella Mountain Regional Park Master Plan Update. Accessed July 1, 2019. Available at: https://www.maricopacountyparks.net/park-locator/estrella-mountain-regional-park/park-information/park-master-plan/.

Maricopa County Trails Commission. 2004. Maricopa County Regional Trail System Plan. Accessed July 1, 2019. Available at: https://www.maricopacountyparks.net/assets/1/6/MaricopaTrailMasterPlan.pdf.

EXHIBIT G: CONCEPTUAL DRAWINGS OF TRANSMISSION FACILITIES

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

> *Attach any artist's or architect's conception of the proposed plan or transmission line structures and switchyards, which applicant believes may be informative to the committee.*

Exhibit G-1 – Typical Single-Circuit Delta Configuration 230kV Monopole Transmission Structure

Exhibit G-2 – Typical H-frame 230kV Transmission Structure

Exhibit G-3 – Typical Single-Circuit Delta Configuration 230kV Monopole with Single-Circuit 69kV Underbuild Transmission Structure

Exhibit G-4 – Typical Single-Circuit Stacked 230kV Monopole

Exhibit G-5 – Typical Single-Circuit Stacked 230kV Monopole with Single-Circuit Stacked 69kV Underbuild Transmission Structure

Exhibit G-6 – Typical Single-Circuit 230kV Three-Pole Turning Transmission Structure

Exhibit G-7 –TS15 Substation Layout

Exhibit G-8 –TS18 Substation Layout

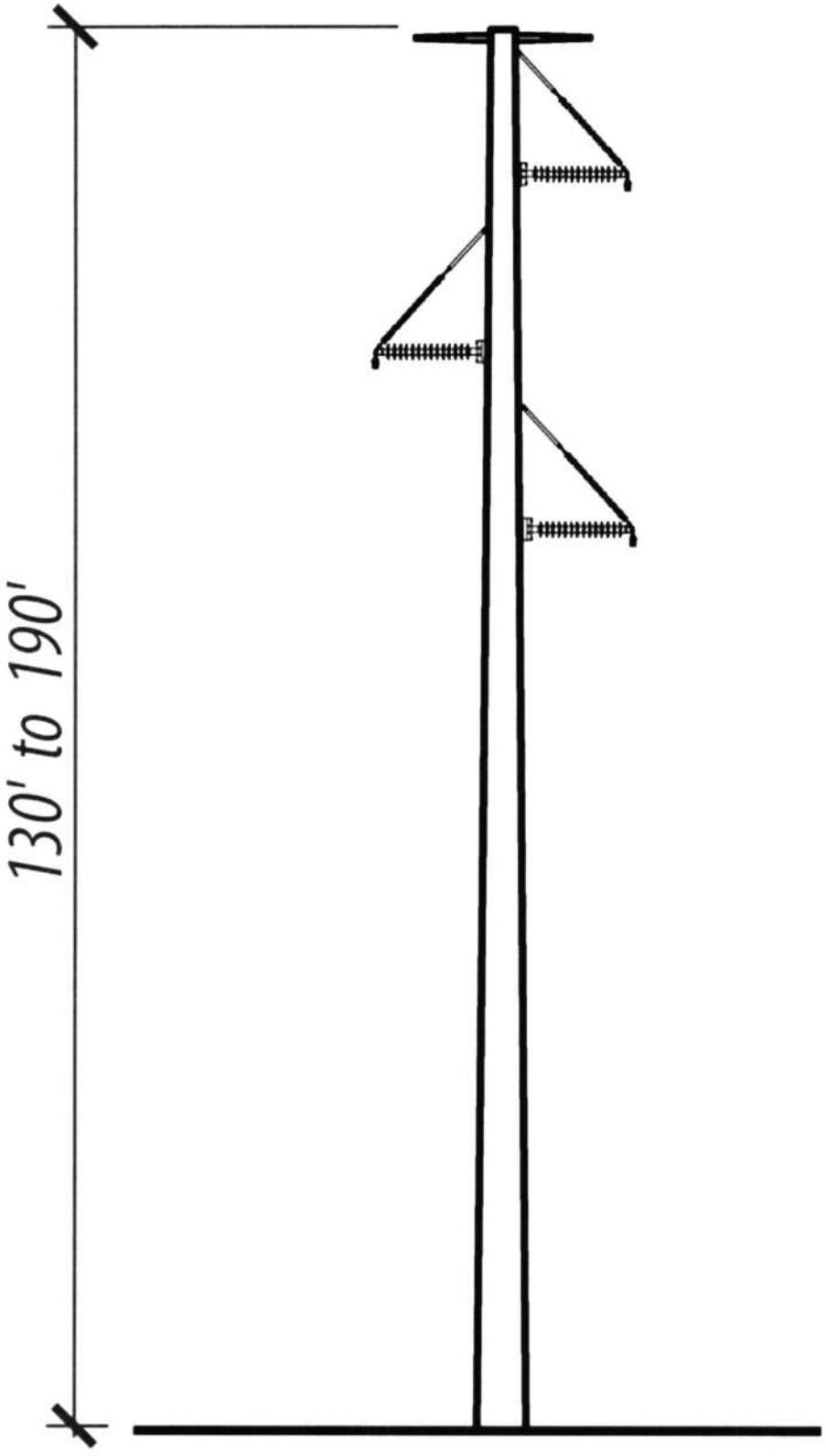


Exhibit G-1. Typical Single-Circuit Delta Configuration 230kV Monopole Transmission Structure

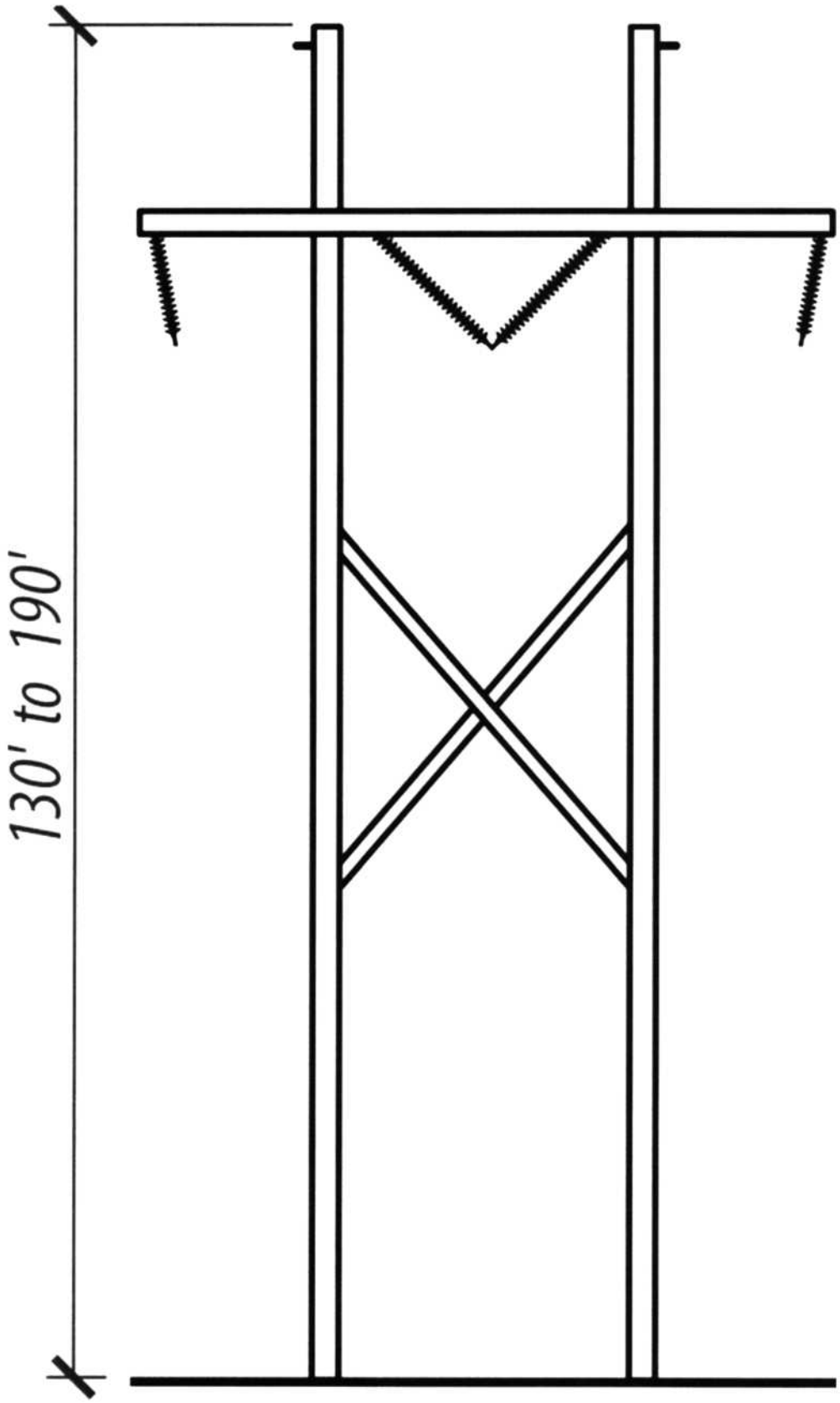


Exhibit G-2. Typical H-frame 230kV Transmission Structure

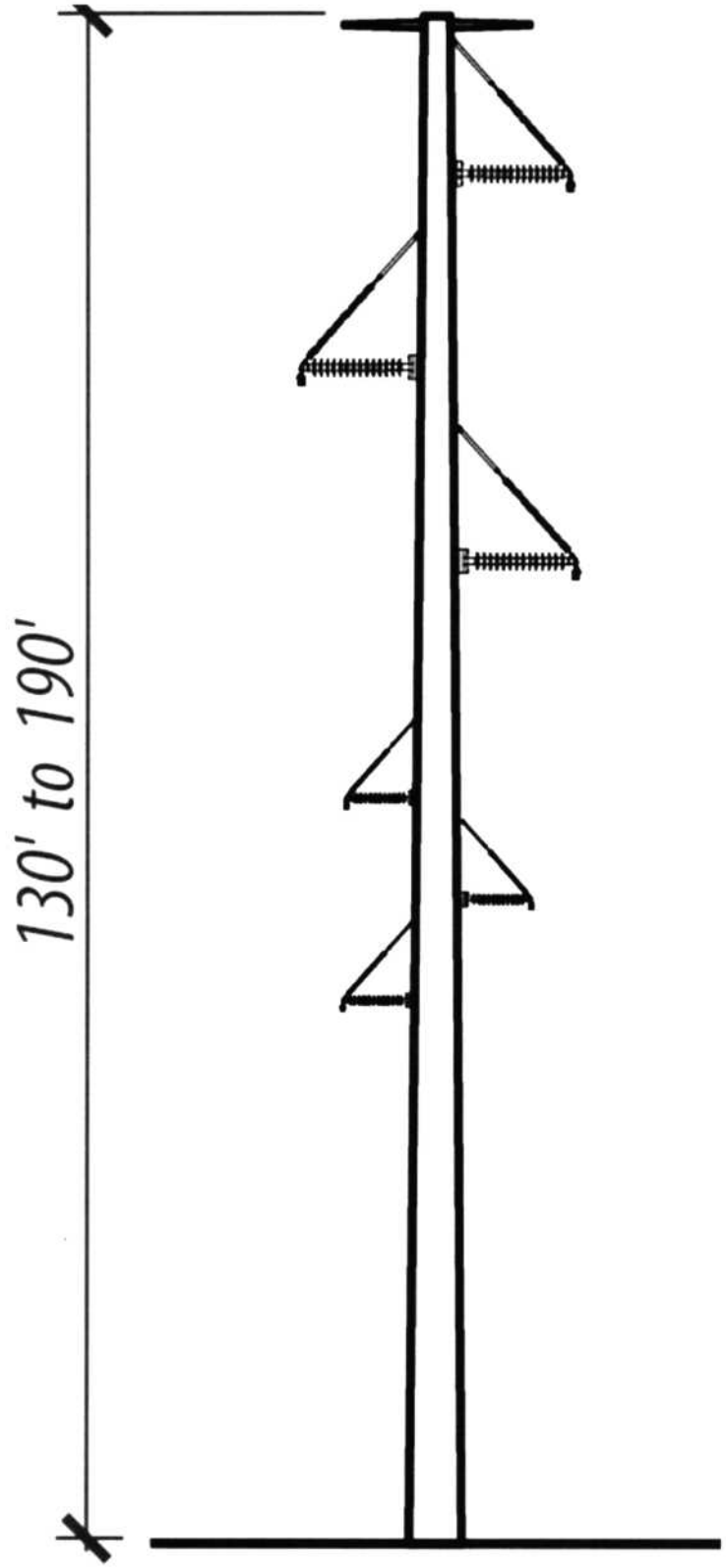


Exhibit G-3 Typical Single-Circuit Delta Configuration 230kV Monopole with Single-Circuit 69kV Underbuild Transmission Structure

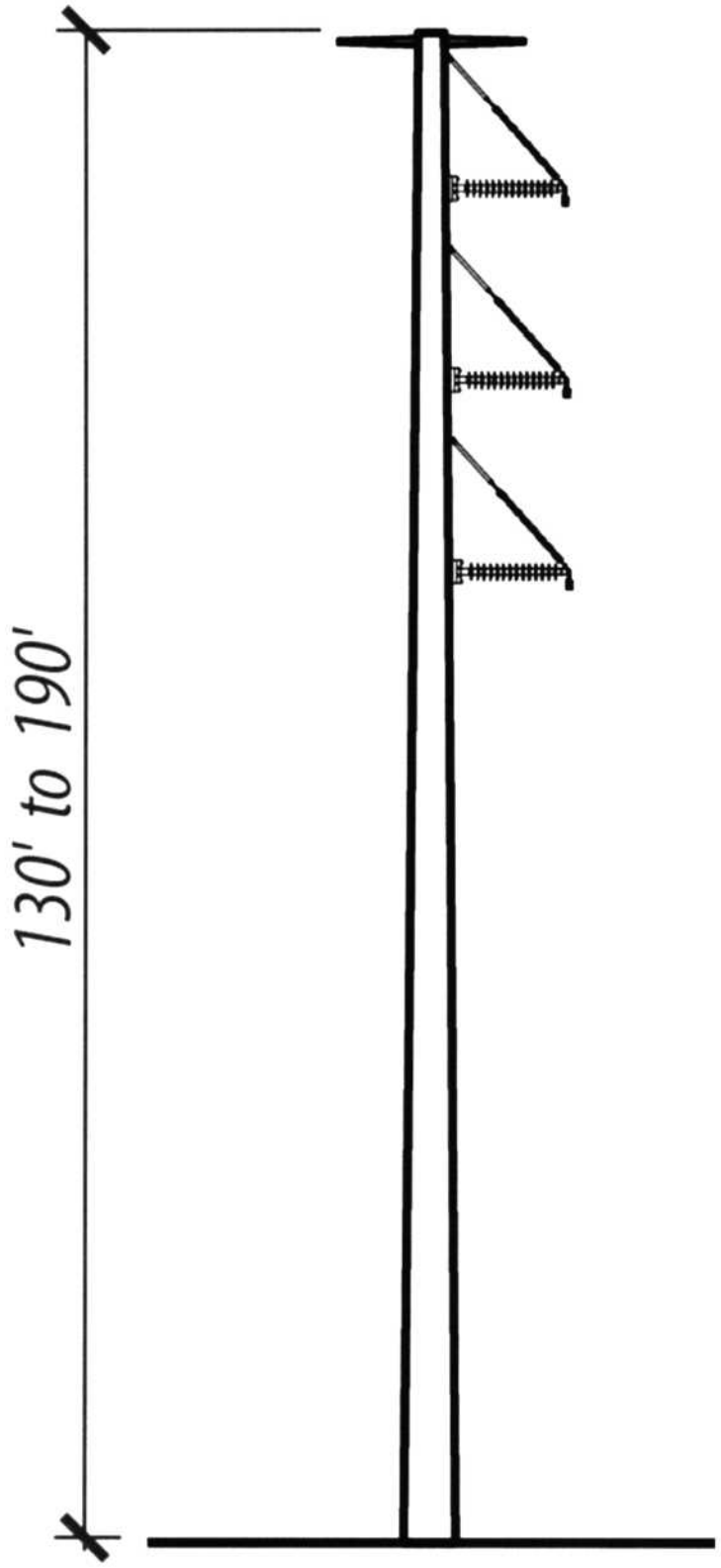


Exhibit G-4. Typical Single-Circuit Stacked 230kV Monopole Transmission Structure

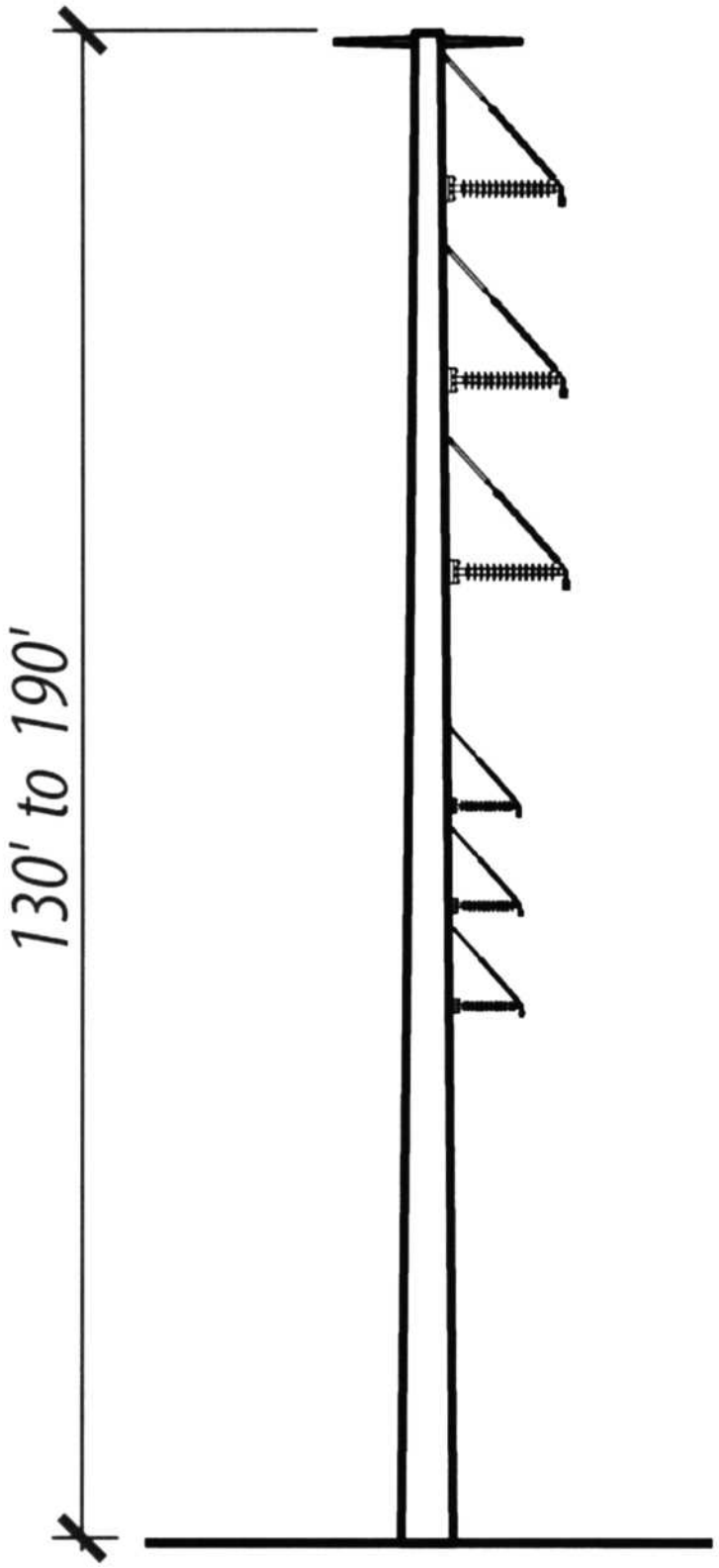


Exhibit G-5. Typical Single-Circuit Stacked 230kV Monopole with Single-circuit Stacked 69kV Underbuild Transmission Structure

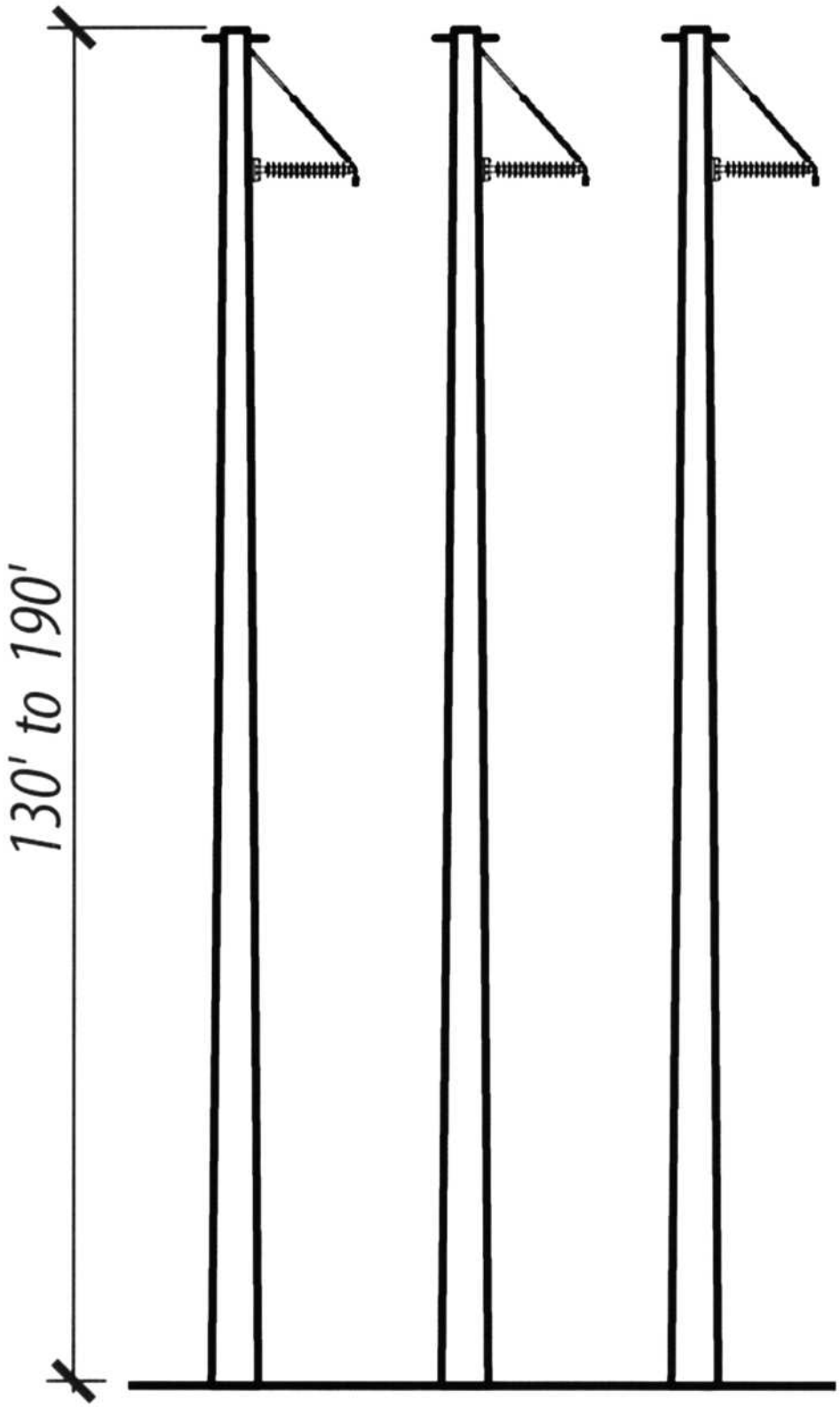


Exhibit G-6. Typical Single-Circuit 230kV Three-Pole Turning Transmission Structure

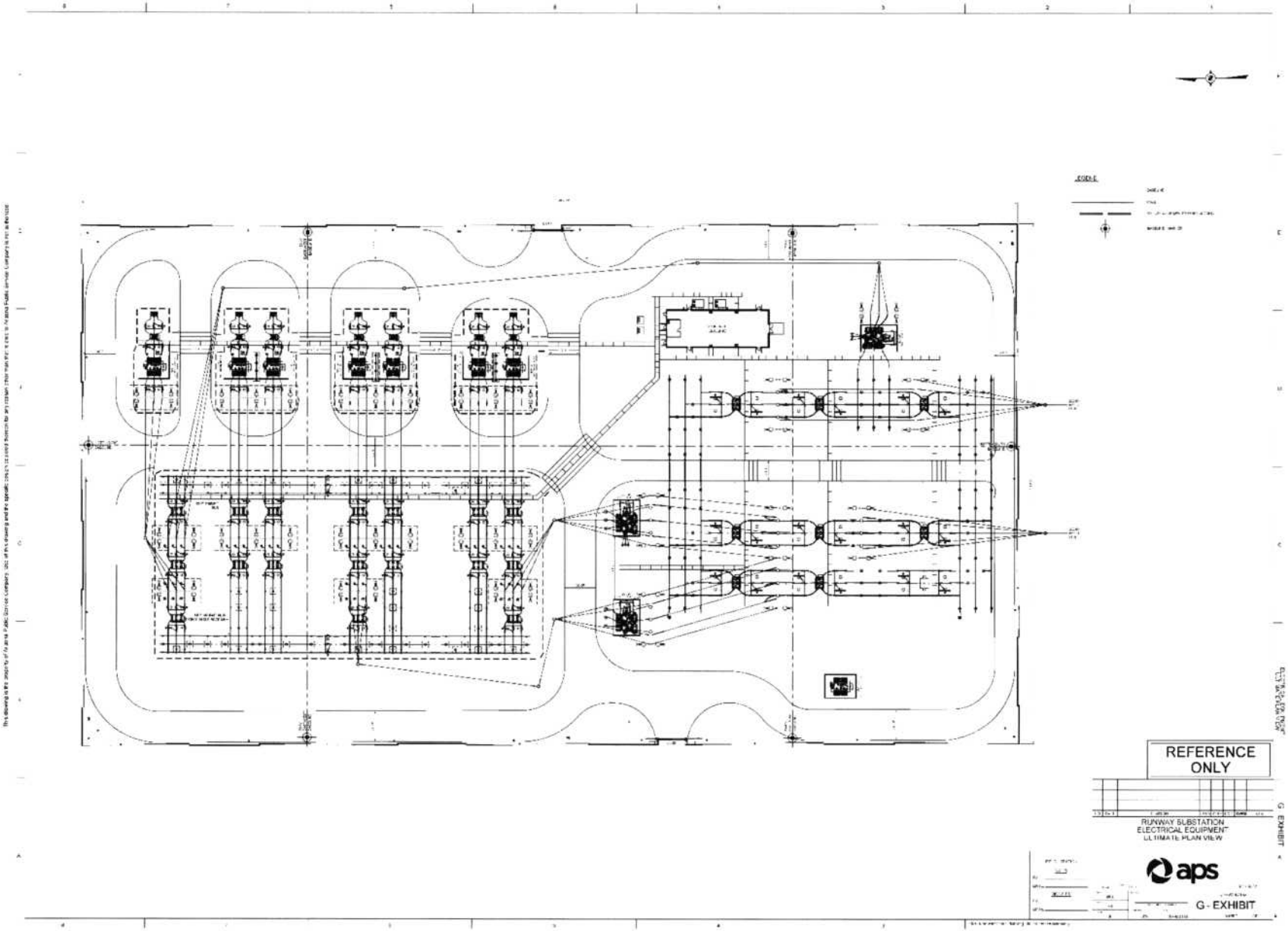


Exhibit G-7. TS15 Substation Layout

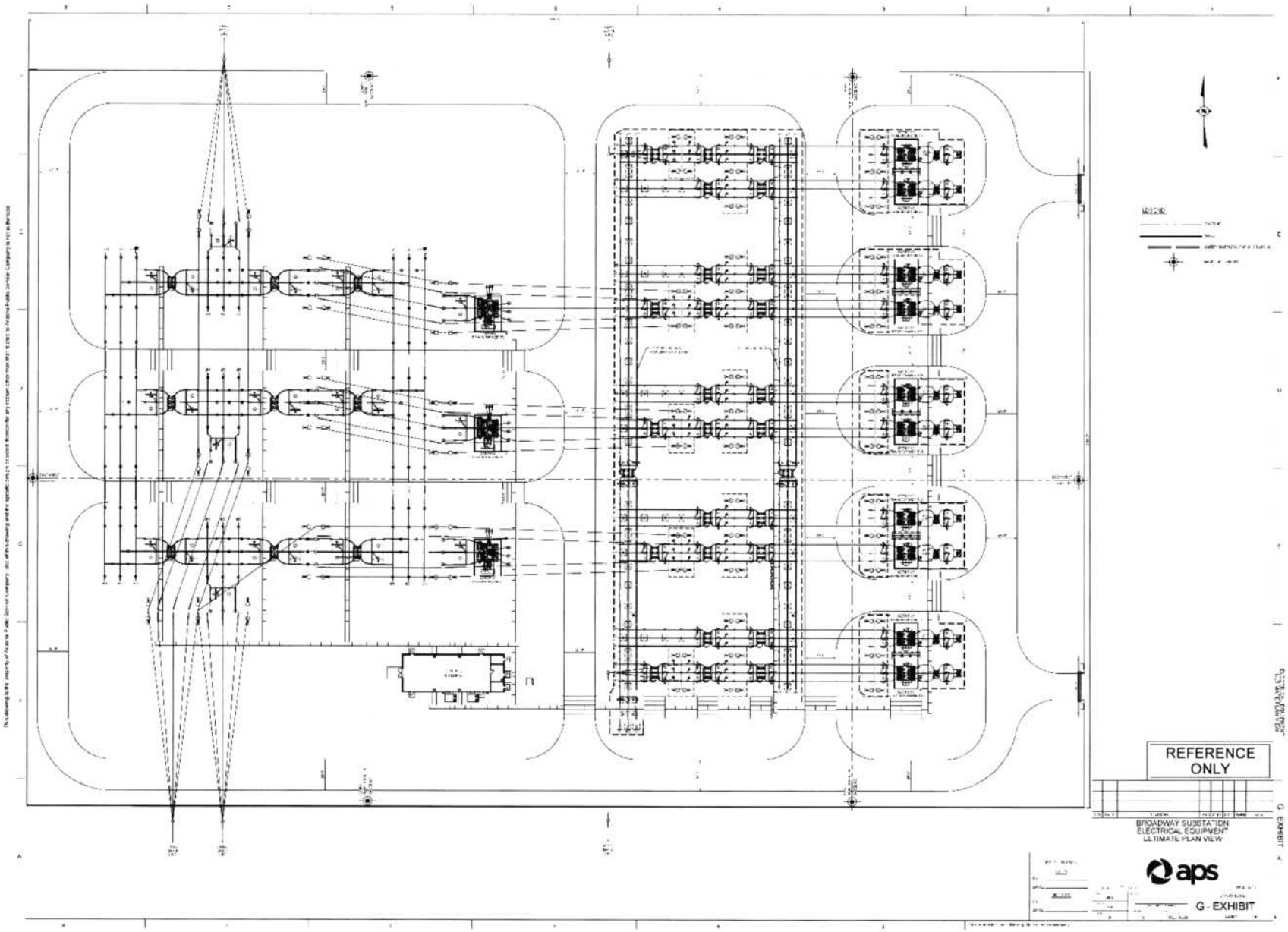


Exhibit G-8. TS18 Substation Layout

EXHIBIT H: EXISTING PLANS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

> *To the extent applicant is able to determine, state the existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site or route.*

Land uses are mapped in Exhibits A-3 and A-4 and discussed in Exhibit B. As part of the land use study, General and Comprehensive plans were gathered for the Study Area from the cities of Goodyear and Avondale, and Maricopa County, as well as the Phoenix Goodyear Airport. Representatives from these entities were also invited to participate in the Project open house meeting. The purpose of this representation was to ensure consistency with plans and to identify potential issues throughout the environmental and public planning and outreach process.

During the process, members of the Project team also met and coordinated with representatives from the cities of Goodyear and Avondale, Maricopa County, Phoenix Goodyear Airport, ADOT, and private land owners within the Project area. In July 2019, letters were sent to the jurisdictions (listed in Table H-1) to provide Project information, announce the route alternatives, and request new or additional information on plans or planned developments. Exhibit H-1 provides a copy of the letter. Exhibits H-2a through H-2g includes written responses and other correspondence from relevant jurisdictions.

Table H-1 Entities that Received Letters with Project Information		
Contact Name	**Title**	**Jurisdiction/Agency**
Troy Sieglitz	State Route 30 Project Manager	Arizona Department of Transportation
Randy Everett	Senior Division Administrator	Arizona Department of Transportation, Central District Office
Ginger Ritter		Arizona Game and Fish Department
Kathryn Leonard	State Historic Preservation Officer	Arizona State Historic Preservation Office
Ruben Ojeda	Manager, Right-of-Way Section	Arizona State Land Department
Noel Carter	Superintendent	Buckeye Water Conservation and Drainage District
Ed Kender	Lower Sonoran Field Office Manager	Bureau of Land Management
Jodie Novak	Planning Manager	City of Avondale
Katie Wilken	Planning Manager	City of Goodyear
Pam Maslowski	Planning Services Director	City of Litchfield Park
Alan Stephenson	Planning and Development Director	City of Phoenix
Jordan D. Feld, CM, AICP	Deputy Aviation Director	City of Phoenix Aviation Department Planning and Environmental Division
Randy Payne	Project Manager	City of Phoenix Aviation Department Planning and Environmental Division
Michael Smith	Inspection & Enforcement Branch Manager	Flood Control District of Maricopa County
Kimberly Antone	Director	Gila River Indian Community, Land Use Planning and Zoning
Matt Holm	Planning Supervisor	Maricopa County
Jennifer Toth	Transportation Director/County Engineer	Maricopa County Department of Transportation
Ken Vonderscher	Planning and Development Manager	Maricopa County Parks and Recreation Dept.
Glen Vortherms	General Manager	Maricopa Water District
Bradley Hagen	Airport Manager	Phoenix Goodyear Airport
Donovan Neese	Superintendent	Roosevelt Irrigation District
Eldon Pulcifer		Saint Johns Irrigation District
Janeen Rohovit	Public Involvement Representative	Salt River Project
Yvonne Martinez		Salt River Project
Kenny Varga		Tucson Electric Power
Eduardo Uribe		Western Area Power Administration, Desert Southwest Region

Sustainable Solutions. epg Thriving Environments.

July 18, 2019

Katie Wilken
Planning Manager
City of Goodyear
190 N. Litchfield Road
Goodyear, AZ 85338

RE: APS Wildcat and Cyclone 230kV Transmission Line Projects

Dear Katie Wilken:

Arizona Public Service Company (APS) plans to file application(s) for Certificate(s) of Environmental Compatibility (CEC) for two customer-driven 230-kilovolt (kV) Transmission Line Projects referred to as the Wildcat and Cyclone 230kV Transmission Line Projects (Projects) with the Arizona Power Plant and Transmission Line Siting Committee (Siting Committee) in August 2019. The Projects include the development of 230kV transmission lines and associated substation facilities needed to serve two separate but adjacent data center projects (Data Centers). The Data Centers are located northwest of the intersection of W. Broadway Rd. and S. Litchfield Rd. in Goodyear. The proposed Projects are designed to deliver power to the Data Centers from the nearby existing APS Palm Valley – Rudd 230kV transmission line, which is located approximately ¼ to ½ mile to the south of the sites where they will be located.

APS and its consultant, Environmental Planning Group (EPG), developed and implemented a comprehensive planning process, including environmental studies, to identify and evaluate suitable locations for proposed transmission line routes. The process identified an APS-preferred corridor and two alternative corridors, which will be brought before the Siting Committee (see attached maps). APS will request Siting Committee approval for CEC(s) for the preferred corridor.

Arizona Administrative Code Rule R14-3-219 directs an applicant to include in its CEC application an Exhibit H addressing the following: "To the extent the applicant is able to determine, state the existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site or route."

Your organization is invited to provide information or written comments regarding development plans in the vicinity of the proposed Projects (as depicted on the maps). APS requests your comments be submitted in writing, specifically including your organization's existing or future development plans that you have identified or are known to you at this time.

To allow your information to be included in APS's CEC application(s), please forward your written comments to me by Friday, August 2, 2019, via email at dpetry@epgllc.co, or by physical mail at EPG, 4141 N. 32nd St., Ste. 102, Phoenix, AZ 85018.

Thank you for your cooperation.

Sincerely,

Devin Petry, Environmental Project Manager
Environmental Planning Group
cc: Brad Larsen, APS Senior Siting Consultant

Exhibit H-1. Example July 2019 Letter

From: Jordan D Feld
Sent: Wednesday, July 31, 2019 12:13 PM
To: 'dpetry@epgllc.com' <dpetry@epgllc.com>
Cc: D.Brad.Larsen@aps.com; 'Stephen.Eich@aps.com' <Stephen.Eich@aps.com>
Subject: APS Wildcat and Cyclone Projects// CEC vicinity local plans - Goodyear Airport

Devin,

Thank you for the invitation to submit plans informing the vicinity of the subject projects [EPG letter dated 7/18/19]. City of Phoenix owns and operates **Goodyear Airport (GYR), which abuts Wildcat and is near Cyclone**.

The recently completed GYR master plan anticipates aircraft operations will nearly double over the next 20 years **resulting in 300 acres of new aero-industrial and general aviation development at GYR** and appurtenant future electrical power needs. The GYR Land Use Plan is provided below:

In addition to future GYR growth and power demand, the **Federal Aviation Administration may require compatibility mitigations for both APS projects** due to flying public hazards caused by project-generated EMI and/or project construction and structure heights. APS can initiate FAA project review here: https://oeaaa.faa.gov/oeaaa/external/portal.jsp

Please let me know if you have questions or concerns
Thank you

Jordan D. Feld, CM, AICP
Deputy Aviation Director - Planning & Environmental
City of Phoenix Aviation Department
jordan.feld@phoenix.gov
602-273-4072

Exhibit H-2a. Written Responses and Other Correspondence from Relevant Jurisdictions – Page 1

August 1, 2019

Devin Patry
Environmental Planning Group
4141 N. 32nd St., Suite 102
Phoenix, AZ 85018

Re: Review of the APS Wildcat and Cyclone 230kV Transmission Line and Substations project

Dear Devin Patry,

The Arizona Game and Fish Department (Department) reviewed your Project Evaluation Request dated July 18, 2019, regarding the construction of two (2) new substation facilities for the installation of multiple 230kV transmission lines in the Goodyear area.

Based on the information provided, the Department offers the following general recommendations:

- As your project is located within agricultural fields, the western burrowing owl (*Athene cunicularia hypugaea*), a special status species that is regulated under the Migratory Bird Treaty Act (MBTA), may be present within your project location. The Department recommends conducting an occupancy survey for western burrowing owl to determine if this species occurs within your project footprint. Guidelines for conducting this survey are found in *Burrowing Owl Project Clearance Guidance for Landowners* which can be accessed on-line through the Department's website. Please note that the survey should be conducted by a surveyor that is certified by the Department. If an active burrowing owl burrow is detected, please contact the Department and the U.S. Fish and Wildlife Service for direction, in accordance with the *Burrowing Owl Project Clearance Guidance for Landowners*.
  https://www.azgfd.com/wildlife/speciesofgreatestconservneed/raptor-management/burrowing-owl-mangement/
- Minimize the potential introduction or spread of exotic invasive species, including aquatic and terrestrial plants, animals, insects and pathogens. Precautions should be taken to wash and/or decontaminate all equipment utilized in the project activities before entering and leaving the site. To view a list of documented invasive species in or near your project area visit http://login.imapinvasives.org/azimi/login/?next=/azimi/. To build a list: login, go to Query and Reports, select a geography value relevant to your project area, and select "View Report" for a list of reported species.
  - Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245); please see the Arizona Department of Agriculture website for prohibited and restricted noxious weeds.
    https://www.invasivespeciesinfo.gov/unitedstates/az.shtml

azgfd.gov | 602.942.3000
5000 W. CAREFREE HIGHWAY, PHOENIX AZ 85086

Exhibit H-2b. Written Responses and Other Correspondence from Relevant Jurisdictions – Page 2

https://agriculture.az.gov/pests-pest-control/agriculture-pests/noxious-weeds
https://plants.usda.gov/java/noxious?rptType=State&statefips=04

- If trenching will occur, trenching and backfilling crews should be close together to minimize the amount of open trenches at any given time. Avoid leaving trenches open overnight. Where trenches cannot be back-filled immediately, escape ramps should be constructed at least every 90 meters. Escape ramps can be short lateral trenches or wooden planks sloping to the surface. The slope should be less than 45 degrees (1:1). Trenches that have been left open overnight should be inspected and animals removed prior to backfilling.

The Department appreciates the opportunity to provide an evaluation of impacts to wildlife or wildlife habitats associated with the APS Wildcat and Cyclone 230kV Transmission Line project. The attached report created for you on Arizona's Online Environmental Review Tool should provide general recommendations and additional contact information. If you have any questions regarding this letter, please contact me at (623) 236-7222, and visit our website for additional guidelines at https://www.azgfd.com/wildlife/planning/wildlifeguidelines/.

Sincerely,

Andrew Cavalcant
Project Evaluation Program Specialist, Habitat Branch
Arizona Game and Fish Department

cc: Ginger Ritter, Project Evaluation Program Supervisor
Kelly Wolff, Habitat Program Manager, Region VI

AGFD# M19-07220944

Exhibit H-2c. Written Responses and Other Correspondence from Relevant Jurisdictions – Page 3

From: Uribe, Eduardo <Uribe@WAPA.GOV>
Sent: Friday, August 02, 2019 5:53 AM
To: Devin Petry
Subject: [EXTERNAL] Response to Letter
Attachments: Environment Planning Group Letter.pdf

Mr. Devin Petry,

I reviewed your proposed routes. While we won't have any specific comments pertaining to the environmental aspects of the project, I would like to add and not that your route listed as preferred is also a route that I believe is best for both parties. Although in either alternate #1 or alternate #2, our lines don't run parallel for a long distance, I do believe that we run the chance of having to coordinate more efforts with those configurations than the preferred route.

I did consult with other groups here in the office and at this time, we don't have any comments or concerns with your path forward with a formal design. At this time, and doubtfully in the near future, we have no plans on upgrading either of the circuits not any additional development plans.

I've been in touch with Ryan Adams and will coordinate with him on the License Agreement that must be in place before construction in our easement.

Thank you,

Eduardo D. Uribe | Electrical Engineer
Department of Energy
Western Area Power Administration | Desert Southwest Region
(O) 602.605.2914 | (M) 480.493.7542
Western Area
Power Administration

Exhibit H-2d. Written Responses and Other Correspondence from Relevant Jurisdictions – Page 4

From: David Jacobs <djacobs@azstateparks.gov>
Sent: Friday, August 02, 2019 2:33 PM
To: Devin Petry; Steve Swanson
Subject: Re: [EXTERNAL] Wildcat/Cyclone 230 kV projects

Follow Up Flag: Follow up
Flag Status: Flagged

Devin-
Thanks for the update. Last time I contacted Steve first, but this time I contacted you first; it is as I suspected, the home work has been done and when ACC sends us paperwork to review for the projects, the information will be there. Thanks.

On Fri, Aug 2, 2019 at 2:12 PM Devin Petry <dpetry@epgllc.co> wrote:

Mr. Jacobs,

Thank you for your email. In order to identify historic sites and structures and archaeological sites at or in the vicinity of the Project, EPG completed a review of existing historic and archaeological records within the Project Study Area (2 miles buffer around Project facilities). Records from the following sources were examined:

- Arizona State Historic Preservation Office
- Arizona State Museum /AZSITE
- Arizona State Register of Historic Places
- General Land Office survey plats
- Maricopa County Historic Aerial Photos
- National Register of Historic Places
- USGS Historical Topographic Maps

A total of 20 historic sites, structures or archaeological sites are within the Study Area, as indicated in Table 1 below.

Table 1. Historic sites, structures or archaeological sites within Study Area.

No.	Site Name or Number	Description	Distance from Project (miles)
1	Alkali Ruin	Prehistoric village	0.5
2	Buckeye Canal	Historic canal	0.6
3	Bullard Avenue	Historic road	0.3
4	La Cienega	Prehistoric village	1.2
5	Mica Hill	Prehistoric petroglyphs and structure	1.2
6	Monument Hill	Prehistoric petroglyphs and Historic US-Mexico border marker	2.0+
7	NA14722	Prehistoric artifacts	1
8	NA14723	Historic farm	1

1

Exhibit H-2e. Written Responses and Other Correspondence from Relevant Jurisdictions – Page 5

Table 1. Historic sites, structures or archaeological sites within Study Area.			
No.	Site Name or Number	Description	Distance from Project (miles)
9	Pebble Creek Parkway	Historic road	1.2
10	Phoenix Goodyear Airport	Historic WWII Navy Air Field	0.6
11	Southern Pacific Railroad	Historic railway	0.5
12	St. John's Canal	Historic canal	1.2
13	State Route 80	Historic road	0.5
14	AZ T:11:4(ASM)	Prehistoric rock shelter	2
15	AZ T:11:5(ASU)	Prehistoric canal	1.5
16	AZ T:11:11(ASM)	Prehistoric bedrock grinding features	1.4
17	AZ T:11:13(ASM)	Prehistoric petroglyphs	1.8
18	AZ T:11:54(ASM)	Historic canal	1.7
19	AZ T:11:196(ASM)	Archaeological site (type unknown)	1.7
20	AZ T:11:197(ASM)	Archaeological site (type unknown)	1.8

No historic sites, structures or archaeological sites have been identified at the Project location, and EPG has identified no direct impacts resulting from any of the proposed alternatives.

A historic road (Bullard Avenue) is 0.3 miles from the Project. The remaining 19 sites are 0.5 miles or further away, and include historic structures and sites, and archaeological sites. Siting of any of the proposed alternatives would result in the introduction of a visual component in the landscape. However, the built environment includes numerous modern structures including large transmission lines, so these visual introductions would not represent a significant change to the visual landscape. As a result, EPG has identified no indirect effects on historic sites, structures or archaeological sites resulting from any of the proposed alternatives.

The above information will also be included in the Application for a Certificate of Environmental Compatibility, which will be provided to SHPO for review once complete later this month. Please feel free to contact me, or our Cultural Resources Director – Steve Swanson (cc'd on this email), should you have any further questions.

Thank you.

Devin Petry

Exhibit H-2f. Written Responses and Other Correspondence from Relevant Jurisdictions – Page 6

From: David Jacobs <djacobs@azstateparks.gov>
Sent: Friday, August 02, 2019 12:29 PM
To: Devin Petry <dpetry@epgllc.co>
Subject: [EXTERNAL] Wildcat/Cyclone 230 kV projects

Devin-

Our office received a letter regarding APS and plans to file an application to the ACC for a CEC to two transmission line projects. In the past, EPG has done environmental checks, including for cultural resources, for such projects; question: has EPG conducted a Class I records check for the locations of the development of the two 230 kV transmission lines and associated substation facilities needed to serve the two separate [but adjacent] data centers in Goodyear?

David Jacobs, Arizona State Historic Preservation Office

Exhibit H-2g. Written Responses and Other Correspondence from Relevant Jurisdictions – Page 7

EXHIBIT I: NOISE

Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.

INTRODUCTION

Certain electromagnetic effects are inherently associated with overhead transmission of electrical power at high voltage (HV). These effects are produced by the electric and magnetic fields of the transmission line with one of the primary effects being corona discharge. Corona effects are manifest as audible noise (AN), radio interference (RI), and television interference (TVI). These particular effects are minimized by line location, line design, and construction practices. The Project lines were modeled using the Electric Power Research Institute (EPRI) ACDCLine software to calculate these various electromagnetic effects, which are presented here.

CORONA

Corona is a luminous discharge due to ionization of the air surrounding a conductor and is caused by a voltage gradient that exceeds the breakdown strength of air. Corona is a function of the voltage gradient at the conductor surface. This voltage gradient is controlled by engineering design and is a function of voltage, phase spacing, height of conductors above ground, phase geometry, and meteorological conditions. In particular, irregularities on the surface of the conductor such as nicks, scratches, contamination, insects, and water droplets, increase the amount of corona discharge. Consequently, during periods of rain and foul weather, corona discharges increase. For the transmission design configurations considered for this project, the calculated peak voltage gradient at the conductor surface was consistently in the range of 13.7 – 14.5 kVrms/cm. For comparison purposes, the breakdown strength of air is 21.1 kVrms/cm at 25 °C and 76 mm barometric pressure.

Corona represents power loss on the transmission line and creates transmission line noise. Successful operation of 230kV lines with similar gradients indicates that these transmission lines will not create adverse corona effects.

TRANSMISSION LINE AUDIBLE NOISE

AN is created by corona discharge along the transmission line. As a result, the amount of AN is directly related to the amount of corona, which is in turn affected by meteorological conditions (most notably rain). Transmission line AN is categorized into broadband high frequency sounds, which can be described as hissing or sputtering, and low frequency tones, which are best described as humming sounds.

The highest calculated AN levels generated by these transmission line designs during foul weather (rain) may occasionally reach 49.3 dB measured on an "A" weighted scale at the edge of the right-of-way. These noise levels will occur during very heavy rain conditions[1], which mask the noise. During light rain[2], or wet conductor conditions, the expected AN is in the range of 39.2 dB(A) or lower at the edge of the right-of-

[1]Heavy rain conditions are designated statistically as L5 conditions (95% of the time noise levels are at or below the specified values).

[2]Light to moderate rain levels are designated statistically as L50 conditions (50% of the time noise levels are at or below the specified values).

way. During fair weather, the AN generated by this line as heard at the edge of the right-of-way is significantly reduced with a maximum calculated value of 29.1 dB(A).

Study work of transmission line noise has categorized noise levels by the probability of complaints being generated. A level of 52.5 dB(A) or lower at a distance of 100 feet from the centerline of a line has been found to generate no complaint. The noise generated by this transmission line is well below this value and no noise problems are expected due to this line. Exhibit I-1 and Exhibit I-2 show the calculated L50 fair weather and L50 rain audible noise levels for the various spans modeled.

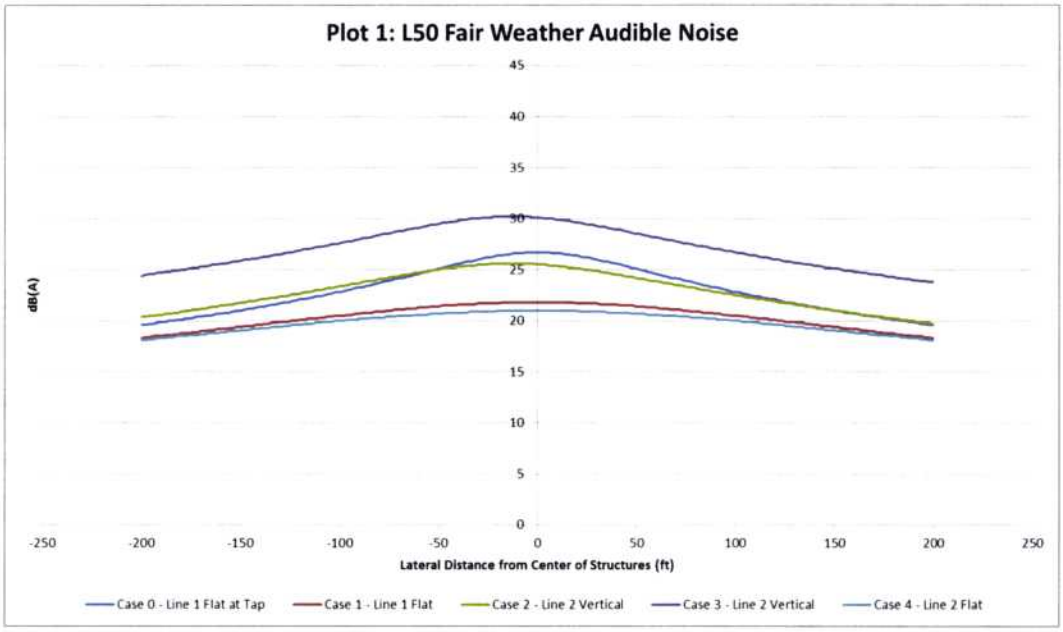


Exhibit I-1. Fair Weather Audible Noise

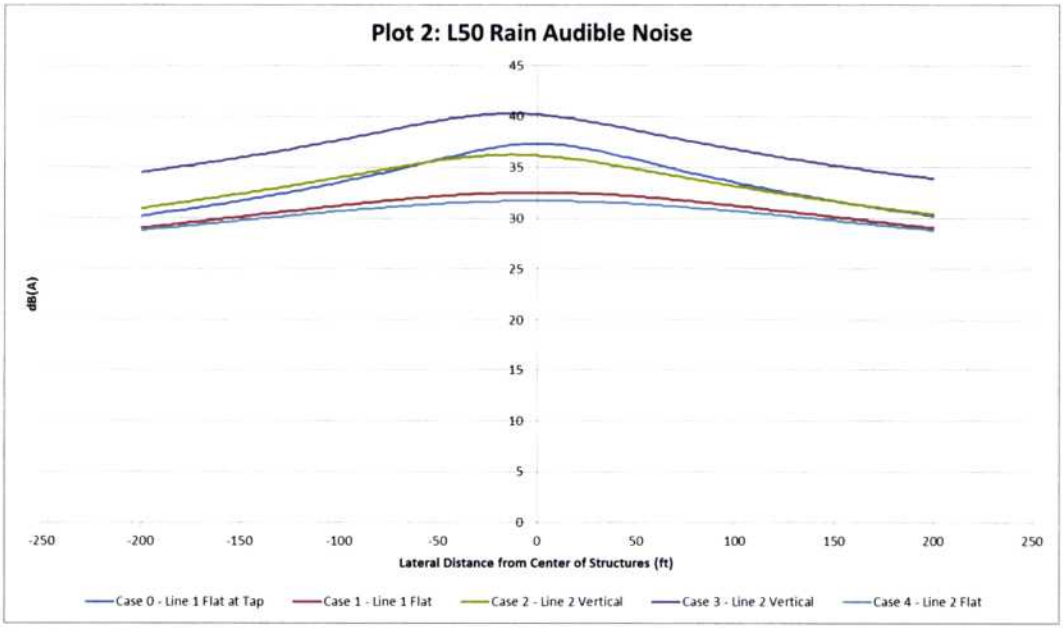


Exhibit I-2. Rain Audible Noise

RADIO INTERFERENCE

RI is the reception of spurious energy not generated by the transmitting station. This energy affects the amplitude modulated (AM) radio band, but not the frequency modulated (FM) radio band. Transmission line RI is caused by corona and by gap discharges. Gap discharges are electrical discharges across a small gap, with the most common cause being loose hardware. Gap discharges comprise a large percentage of all interference problems and are easily remedied. Experience shows that gap discharges are not a problem with steel structures but are more prevalent with wood structures due to the expansion and contraction of the wood causing hardware to loosen.

Corona caused RI impact is dependent on various factors, including distance from the line to the receiver, radio signal strength, ambient radio noise level, receiving antenna orientation, and weather conditions. A common practice of determining the expected level of RI is to calculate the transmission line RI at a frequency of 1 MHz. As the frequency of interest increases, corona produced radio noise reduces with typical reductions in the range of 20 – 40 dB for a frequency increase from 1 MHz to 100 MHz [EPRI] depending on the distance to the conductor.

Comparison of the calculated radio noise levels for the transmission line designs shows average stable fair-weather radio noise levels generated by these transmission lines in the range of 21.3 – 35.6 dB, at a distance of 100 feet from the outside phase. This compares favorably with the maximum suggested noise level of 40 dB. (Institute of Electrical and Electronics Engineers [IEEE]). During inclement weather, transmission line noise levels increase to levels in the range of 48 – 57.0 dB, 100 meters from the outside phase (average stable foul weather values). In addition to these comparisons of calculated and recommended interference values, transmission line experience for lines of similar design traversing similar terrain has shown radio interference to be acceptable. It is noted that other 230kV lines traverse the area near the proposed location. Should RI caused by the transmission line become unacceptable in a given situation, the utility is willing to work with the complainant to resolve the interference problem. Calculated RI plots for average stable fair weather and foul weather are given in Exhibit I-3 and Exhibit I-4.

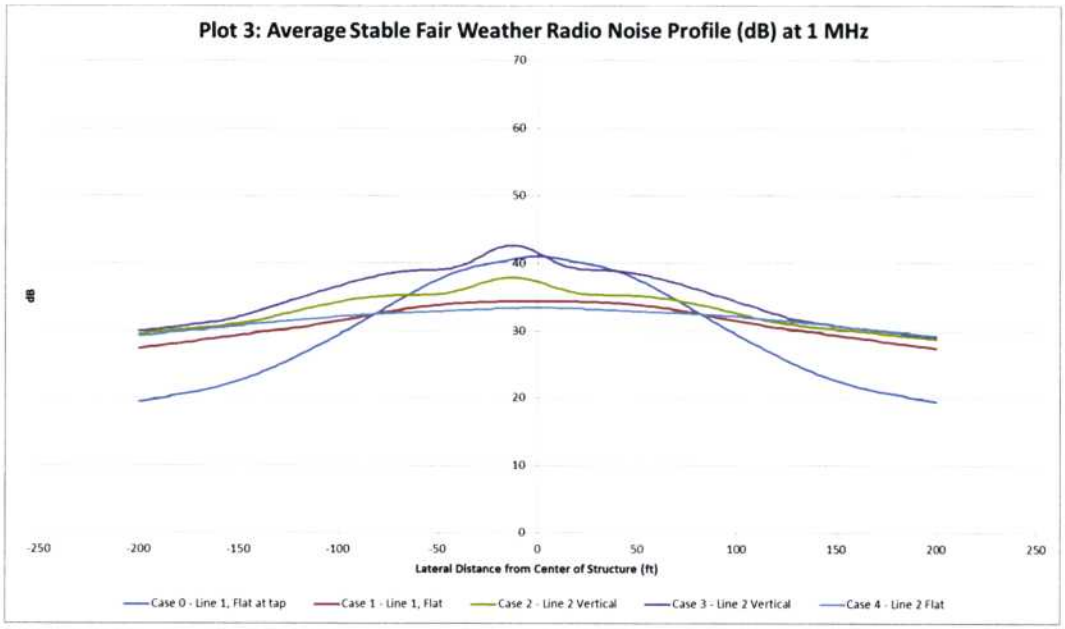


Exhibit I-3. Average Stable Fair-weather Radio Noise

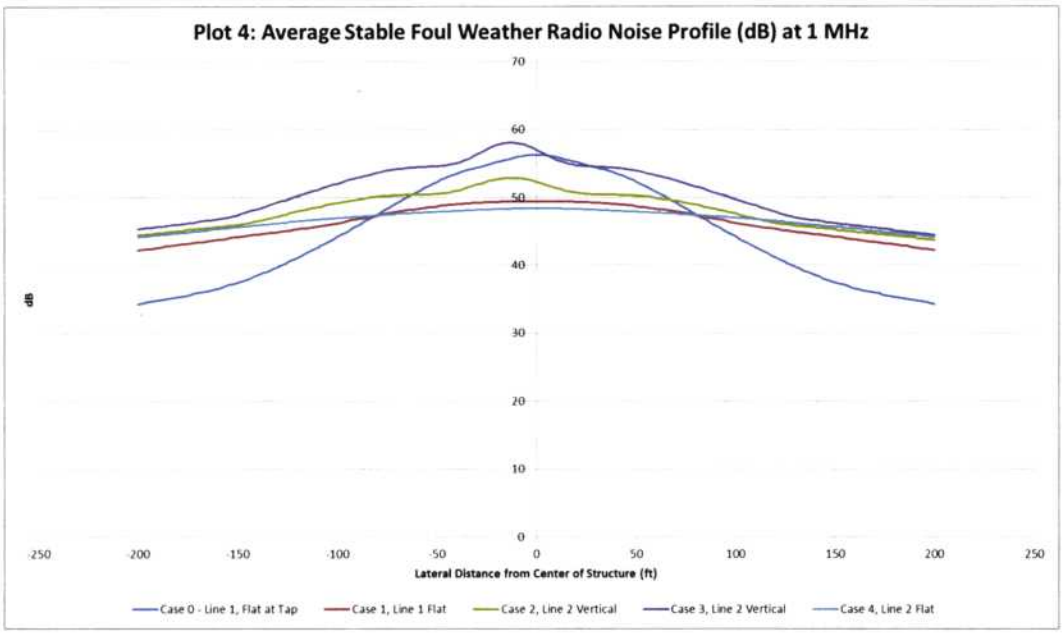


Exhibit I-4. Average Stable Foul Weather Radio Noise

TELEVISION INTERFERENCE

TVI effects are similar to radio interference. Traditional analog television broadcasts occur in three ranges:

- 54 - 88 MHz (Channels 2 - 6)
- 174 - 216 MHz (Channels 7 - 13)
- 470 - 890 MHz (Channels 14 - 83)

TVI reduces with increasing frequency above 100 MHz. Consequently, TVI only affects the lower VHF band (Channels 2 through 6) and no interference will be experienced in the upper VHF (Channels 7 - 13) and UHF bands (Channels 14 - 83) even during foul weather.

No transmission line generated TVI is expected along the lines, even during periods of inclement weather, since expected TVI levels at the edge of the right-of-way are expected to be similar to other operating 230kV lines, which traverse similar terrain.

In cases where transmission line generated TVI has been found to be a problem, it is generally the result of induced voltage on fences, conductors, and hardware, which are adjacent to the right-of-way. In these situations, the interference can be easily corrected by grounding the objects, or by realigning, relocating, or providing higher gain television antennas. APS is prepared to assist affected parties in resolving TVI problems resulting from the operation of our facilities. However, with the increasing popularity of newer technologies such as cable, satellite, and internet-based television, transmission line TVI problems warranting any sort of corrective action are even more unlikely.

ELECTRIC AND MAGNETIC FIELD EFFECTS

Electric and magnetic field (EMF) effects are primarily electric and magnetic induction effects whereby voltages and currents are induced in nearby conductive objects by the voltage and current associated with the line.

Electrostatic induction is the capacitive coupling of a voltage onto insulated objects near the transmission line. The induced voltage is a function of the electric field associated with the line, which in turn is a function of the line voltage. Other factors that affect the level of induced voltage include insulation, object orientation and dimensions, and line height. When a person reaches to touch a conducting object that has been charged by electrostatic induction, a spark discharge will occur similar to that experienced by a person reaching for a doorknob after walking on a nylon carpet, with the difference that sparking will continue to occur as long as the person's hand remains close enough to the object for the sparks to occur. Based on computer modeling, the electric fields associated with the proposed transmission lines will be consistent with the electric field values of similar existing 230kV transmission lines. No electrostatic induction problems are anticipated. Should any electrostatic induction problems occur, they can be easily corrected by grounding the conductive objects. The transmission lines will be designed to limit the value of short-circuit current from a conductive object to 5 mA or below, which is the maximum design limit permitted by the National Electrical Safety Code. Exhibit I-5 shows the expected electric field (calculated 1m above ground) for the various expected configurations of the lines. Note that the expected electric field is well below the 5 kV/m limit outside the right-of-way and 10 kV/m inside the right-of-way as specified by IEEE Standards (IEEE).

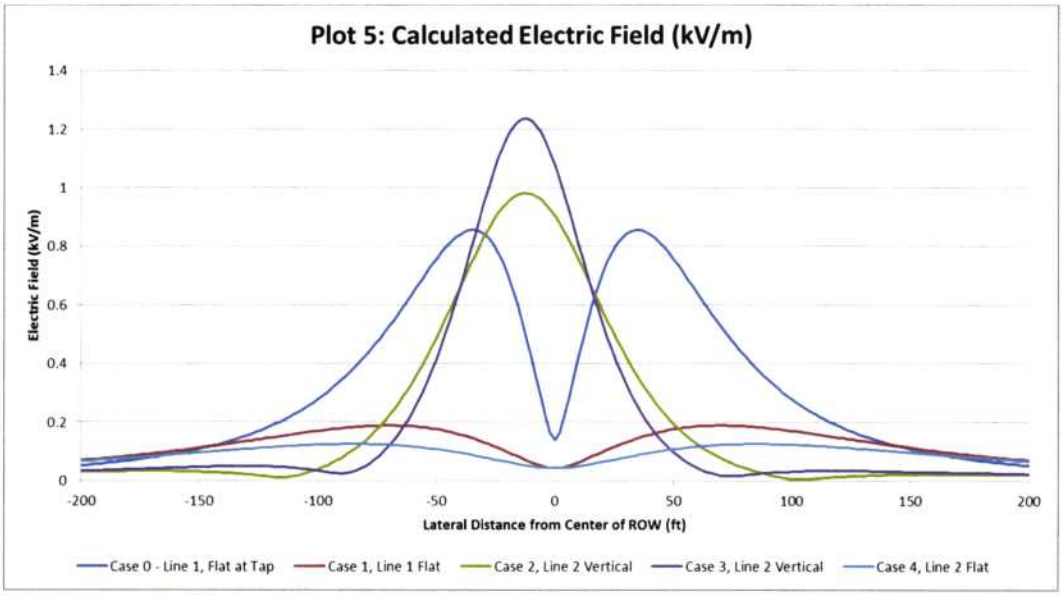


Exhibit I-5. Calculated Electric Field

The magnetic fields associated with transmission lines can also induce voltages and currents in conductive objects (e.g. fences, communication lines, railroads, pipelines, etc.) that are close to and run parallel to the transmission line. The magnetic field level is a function of the current level in the transmission line, which in turn is a function of the line loading.

In addition to the electric and magnetic field induction issues described above, scientific and public interest regarding potential health effects of human exposure to 60 hertz EMF has led to extensive study for more than 30 years. One recent example of such research was a study completed in 2007 by the World Health Organization (WHO). The report titled "Extremely Low Frequency Fields Environmental Health Criteria Monograph No. 238" details the results of a health risk assessment of extremely low frequency (ELF) EMF up to 100 kHz. The WHO study found that scientific evidence that demonstrates a consistent pattern of increased risk for childhood leukemia due to chronic low-intensity power-frequency magnetic field exposure is based on epidemiological studies. The report goes on to state that "Virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields

and changes in biological function or disease status" (WHO). The report concludes that "Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern" (WHO). The results of the WHO report support previous findings by the National Institute of Environmental Health Science and International Agency for Research on Cancer (IARC) that the use of electricity does not pose a major unrecognized health danger.

As noted above, the WHO report concurred with the overall conclusions of the 2002 IARC report on Electric and Magnetic Fields. The 2002 IARC report did not conclude that power frequency fields present a specific health risk; however, IARC stated that, with respect to childhood leukemia, power frequency magnetic fields are 'possibly carcinogenic to humans.' This finding was based on limited human evidence and inadequate evidence in experimental animals (IARC).

The actual electric and magnetic fields associated with these power lines will depend on the final construction, the amount of current in the lines, height of the conductors, and other nearby sources of fields. Based on computer modeling of expected construction configuration and operating conditions, the electric and magnetic fields associated with these lines is comparable to other already existing lines of this voltage in the state. Exhibit I-6 shows the calculated magnetic field for the expected line configuration (calculated 1 m above ground). The Exhibit I-6 simulation case was modeled with a line flow of 1600 A, which corresponds to the normal highest expected continuous flow on the lines because these lines are expected to have a consistent flow level in this range.

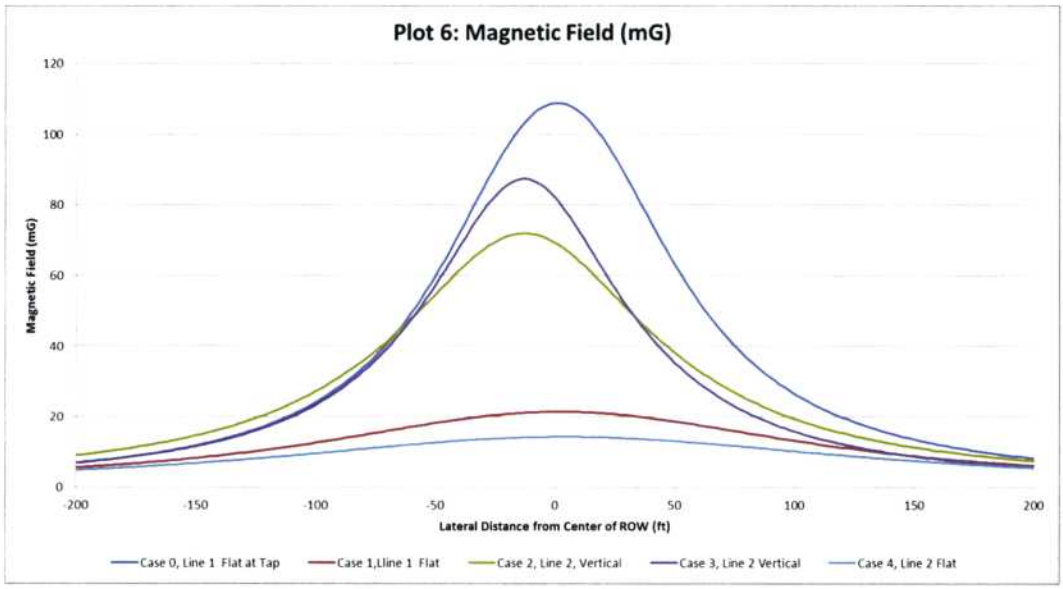


Exhibit I-6. Magnetic Field

CALCULATION NOTES

The EPRI "ACDCLine" program was used to calculate the various corona, noise, and electric/magnetic field quantities reported herein based on the expected transmission line designs for the lines of interest. Different cases based on the different expected conductor configurations of the lines were modeled to represent the conditions expected along the entire line lengths.

REFERENCES

Electric Power Research Institute (EPRI). 1982. EPRI Transmission Line Reference Book, 2nd Edition.

Institute of Electrical and Electronics Engineers (IEEE). 1980. Review of Technical Considerations on Limits to Interference from Power Lines and Stations, IEEE Radio Noise and Corona Subcommittee Report, RI Limits Task Force, Working Group #3, IEEE Transactions on Power Apparatus and Systems, Vol. PAS-99, No. 1, January/February 1980, pages 365-388.

_____. 2002."IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0–3 kHz."

International Agency for Research on Cancer (IARC). 2002. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 80, Non-Ionizing Radiation, Part 1: Static and Extremely Low Frequency (ELF) Electric and Magnetic Fields, 2002: Lyon, France.

National Institute of Environmental Health Science. 1999. Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields, National Institute of Environmental Health Sciences, National Institutes of Health, NIH Publication No. 99-4493, May 1999.

World Health Organization (WHO). 2007. Extremely Low Frequency Fields Environmental Health Criteria Monograph No. 238 World Health Organization, Geneva, Switzerland, ISBN 978-92-4-157238-5

EXHIBIT J: SPECIAL FACTORS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

> *Describe any special factors not previously covered herein, which applicant believes to be relevant to an informed decision on its application.*

Exhibit J-1a – Project Newsletter One – Page 1
Exhibit J-1b – Project Newsletter One – Page 2
Exhibit J-2 – Website
Exhibit J-3 – Open House Comment Form
Exhibit J-4 – Display Advertisement

INTRODUCTION

This exhibit includes information on the public and agency involvement program that has been conducted for the Project. Initial stakeholder outreach efforts began in February 2019. The outreach efforts provided information to agencies and individuals, solicited information on the Project area and preliminary alternatives, and helped to identify potential issues relative to the Project.

PUBLIC INVOLVEMENT PROGRAM SUMMARY

The public involvement program was initiated at the onset of the planning process to ensure that the local jurisdictions, relevant agencies, and community residents were provided with the opportunity to relay information or potential concerns.
To reach the affected residents and agencies, APS and EPG instituted multiple public participation activities, including a public open house meeting, jurisdictional meetings, agency briefings, landowner contacts, a newsletter mailing, newspaper advertisements, telephone information line, and a website. Feedback was received on how the public viewed proposed preliminary links and how those links may impact certain locations.

Project Newsletters

One newsletter (and two upcoming newsletters) was prepared during the public involvement process to provide technical information to the public, announce the public open house, and to inform the public of the various methods to comment on the Project (e.g., in writing, by telephone, and via the Project's website or email address) and otherwise become involved in the siting process.

Newsletter One

The first Project newsletter mailing (Exhibit J-1) was prepared and distributed in May 2019 to approximately 15,000 residents, businesses, land owners, agencies, and key stakeholders within the Study Area. The newsletter served to announce the Project to the public, and to provide notice of the public open house meeting held in June 2019. The content of the newsletter included an overview of the Project's purpose and need, an overview of the CEC process, a description of the infrastructure being proposed, and information about when, where, and how the public could be involved in the process.

Future Mailing Two

A second mailing is being prepared for distribution anticipated in early September 2019. The mailing will announce the alternative routes proposed within this CEC Application, as well as the dates of the Project's Siting Committee hearings. This mailing will be sent to the same mailing list used in the previous newsletter mailing.

Future Mailing Three

A third mailing will be distributed following any Project decisions made relative to this CEC Application by the ACC. The newsletter mailing will announce the selected routes and provide further information on the anticipated timing of the construction and operation of those facilities. This mailing will be sent to the same mailing list used in the previous newsletter mailings.

Website

A Project website (http://www.aps.com/siting) was created and continually maintained to provide access to Project information and electronic versions of distributed materials. Through the website, viewers can access the newsletter, maps, and public open house materials, and can provide their comments or questions on the Project through an embedded comment form. The website address was advertised in newsletters, at the public open house, and in paid newspaper advertisements. A copy of this website is included in Exhibit J-2.

Public Open Houses

One public open house meeting was held for the Project. The meeting was announced in the newsletter, through paid newspaper advertisements, and on the Project website and telephone information line.

The open house meeting was held on June 19, 2019, at the Desert Star Elementary School in Goodyear, AZ. The format of the meeting was an informal open house arrangement held from 5:00 p.m. to 7:00 p.m., which allowed community members to attend at their convenience, review information displays, and have one-on-one personal communication with members of the Project team in order to provide comments or ask questions. The meeting consisted of several stations with large maps; text boards with highlighted details of the Project, including the Project's purpose and need, proposed facilities, facility siting criteria and process, and environmental data; and a GIS workstation for interactive views of the Project and surrounding area.
At the meeting, an area was provided for attendees to sit and fill out comment forms. Not all attendees filled out comment form, but instead provided verbal comments about the Project to the Project team. A copy of a blank comment form is included in Exhibit J-3.

Media Relations

The Applicant placed paid advertisements in the *West Valley View* and the Zone 5 market segment of the *Arizona Republic* (*Southwest Valley Republic*), which has a distribution territory that encompasses the Project location. These advertisements introduced the Project and announced the open house meeting. Advertisements were published in The *West Valley View* on June 5th and 12th, 2019, and in the *Arizona Republic* on June 12th, 14th, and 15th, 2019. A copy of the display advertisement is included in Exhibit J-4.

Agency, Landowner, and Local Official Briefings

Throughout the Project, team members held meetings with local jurisdiction and agency representatives, including elected officials and planning staff, and others to relay information on the Project, answer questions, and request feedback. These meetings enable the Project team to identify stakeholder issues, consider suggestions during the planning process, and relay information on developments in the Project. The Applicant also met with and received information from private land owners/lessees during the planning process. A list of agency, stakeholder, and private land owner meeting/outreach is included as Table J-1.

Table J-1
Agency Briefings and Local Group Meetings

Jurisdiction/Representation	Date
Phoenix Goodyear Airport, City of Phoenix Aviation Department	April 29, 2019
ADOT SR30 Development Team	May 2, 2019
Luke AFB	May 8, 2019
City of Goodyear	May 8, 2019
City of Avondale	May 14, 2018

Telephone Line

APS created a dedicated telephone information line as an additional opportunity for members of the public to learn about the Project and to leave comments or questions. The telephone number was provided in the newsletter mailing, the newspaper advertisements, the Project website, and at the public open house meeting. Initially, the telephone line gave a brief message about the Project and announced the public open house meeting date, time, and location. Following the public open house meeting, APS updated the telephone line message to inform callers that the open house had occurred, and that APS was in the process of reviewing comments, refining Project alternatives, and developing a CEC application. The telephone line continued to provide callers with the opportunity to leave a voicemail comment or request information.

All voice messages requesting further information were returned within approximately 24 hours by a Project team member, unless received on a weekend or holiday.

Public Comment

Throughout the public involvement program, comments from the public were solicited and considered in the planning process. Ten public comments were received either by written comment form, email, or voicemail. In addition, many verbal comments were provided both in person to the Project team (at the open house) or over the phone with the APS Project Manager. Comments from agency and jurisdiction representatives were also received and considered in the planning process.

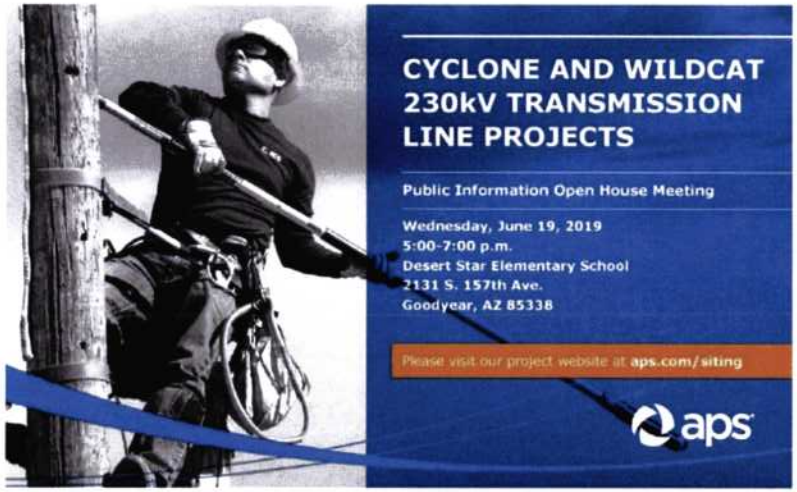
The majority of the comments received recommended avoidance of existing and planned residences/residential areas and requested that APS maximize the siting of the Project on the Wildcat Data Center site and Cyclone Data Center site to the extent feasible, as opposed to other privately owned land.

aps

Mail Station 3293
P.O. Box 53933, Phoenix, AZ 85072

IMPORTANT! NEW TRANSMISSION LINES COMING TO YOUR AREA

Presorted
Standard Mail
US Postage Paid
Phoenix, AZ
Permit No. 50



CYCLONE AND WILDCAT 230kV TRANSMISSION LINE PROJECTS

MAY 2019

The Greater Phoenix region has emerged as one of the top markets in the western U.S. for attracting high-tech companies, including data center or cloud storage companies. Goodyear, in particular, is benefiting from economic development activity that will bring jobs and revenue to the area. Arizona Public Service (APS) is dedicated to providing high-quality, reliable electrical service to support this growth.

With the arrival of these high-tech companies comes a need for new electrical infrastructure in the area. APS has begun studies to determine what electrical facilities are needed and to find appropriate locations for two customer-driven projects located northwest of the intersection of W. Broadway Rd. and S. Litchfield Rd. in Goodyear. APS is working to identify electrical facility locations that are acceptable to the public, regulatory agencies, and these new customers.

APS conducts a rigorous public process to site new facilities. This includes hiring an outside environmental consultant to study various factors, including cultural, biological, and visual inputs, and to assist with the public outreach process. APS and the environmental consultant will study options for locating power lines, take input from the community, and then identify a preferred corridor for the new lines.

At the conclusion of the environmental studies and public process, APS will present the results and the preferred siting option to the Arizona Power Plant and Transmission Line Siting Committee (Committee). The Committee will hear evidence from APS, the consultant, and other parties wishing to participate in the siting process. The hearing is open to the public and there will be time available for public comments.

If the Committee approves the proposal, the Committee will issue a Certificate of Environmental Compatibility (CEC) that is then submitted to the Arizona Corporation Committee (ACC) for final approval.

To support economic growth in the Goodyear area, APS has begun studies to determine appropriate locations for new 230kV electrical infrastructure.

New electrical infrastructure is required to provide high-quality, reliable energy to high-tech companies locating in Goodyear.

These two customer-driven projects are located northwest of the intersection of W. Broadway Rd. and S. Litchfield Rd., in Goodyear, and both require interconnections with an existing 230kV transmission line to the south.

aps

Exhibit J-1a. Project Newsletter One – Page 1

TYPICAL STRUCTURES*

Any new 230kV transmission lines will be built on a variety of steel structure types. Typical structures would range in height from approximately 130 feet tall to a maximum height of 195 feet depending on routing and crossing of other existing structures. The typical right-of-way will be approximately 120 feet wide.

**Exact structure, height, and right-of-way width may vary*

PUBLIC INPUT

An important component of our siting process is to receive input from residents, tenants, property owners, and businesses within the study area. Members of the public and all interested parties are invited to join APS for an open house on Wednesday, June 19, from 5:00 to 7:00 p.m., at Desert Star Elementary School, 2131 S. 157th Ave., in Goodyear, to learn more about the purpose and need for the projects, the siting process and route alternatives, and to ask questions and provide input.

APS welcomes your feedback for these projects. Please visit our project website at **aps.com/siting** and click "find out more" under current projects. Comments and questions may be submitted to:

BRAD LARSEN
Senior Siting Consultant
Project information phone number: 1-877-841-9851
GoodyearSouthSiting@apsc.com

Public Information Open House

Wednesday, June 19, 2019
5:00-7:00 p.m.
Desert Star Elementary School
2131 S. 157th Ave.
Goodyear, AZ 85338

PROJECT SCHEDULE

1ST/2ND QUARTER 2019
- Collect data
- Announce projects
- Hold open house
- Develop alternatives

2ND/3RD QUARTER 2019
- Narrow alternatives
- Develop and submit CEC Application to ACC

3RD/4TH QUARTER 2019
- Hold public hearings with Committee and ACC
- Determine final routes

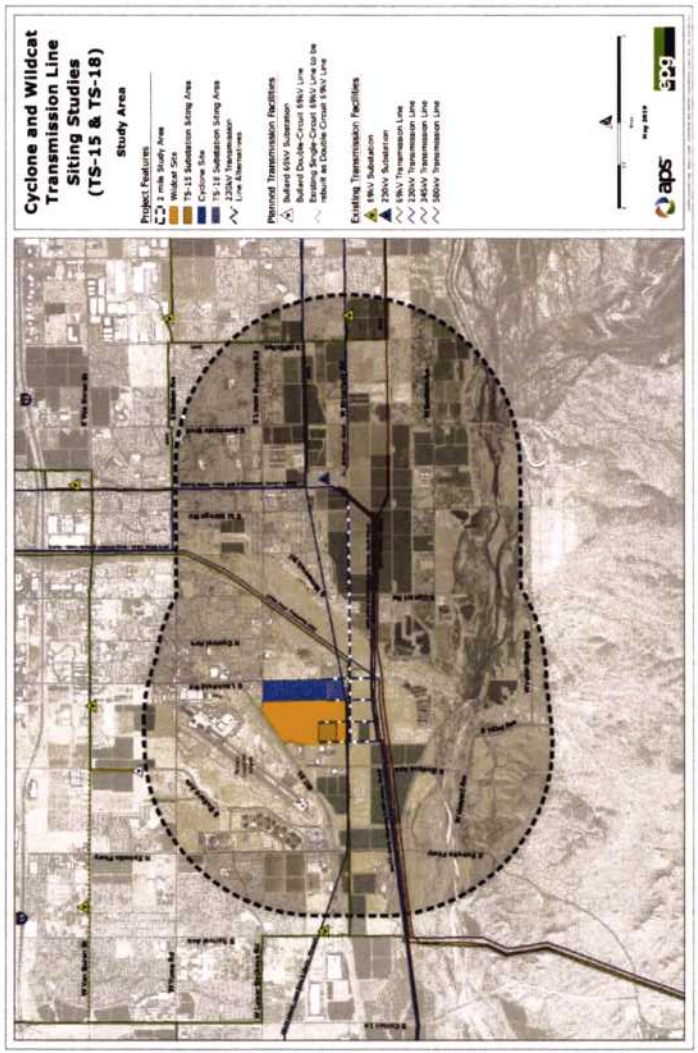


Exhibit J-1b. Project Newsletter One – Page 2

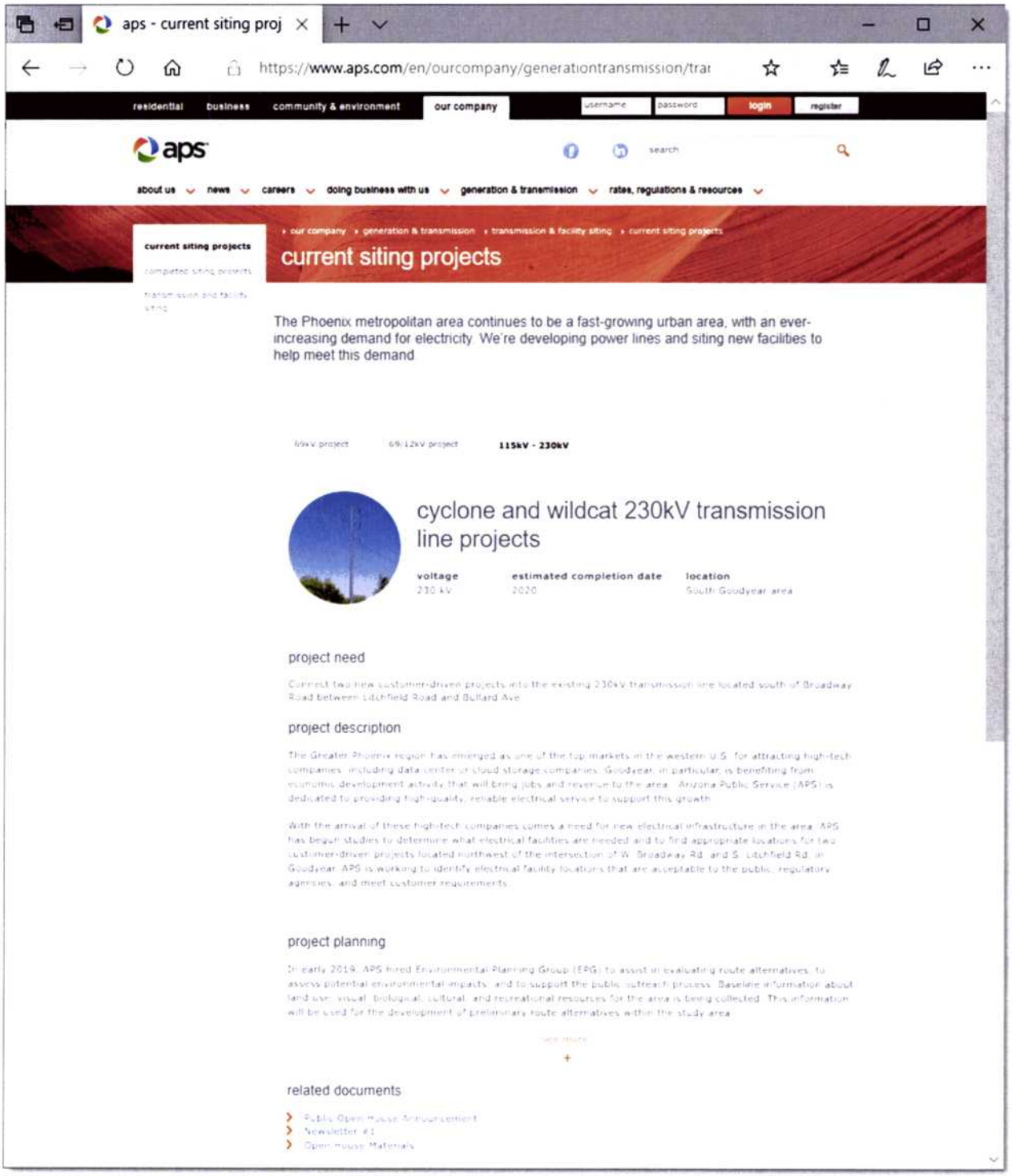


Exhibit J-2. Website

Cyclone and Wildcat 230kV Transmission Line Projects

aps

Comment Form

Name

Organization (if applicable)

Address

City State Zip Email

COMMENTS:

Mail comments to:
Cyclone and Wildcat 230kV Transmission Line Projects
c/o EPG, LLC | 4141 N. 32nd Street, Ste. 102 | Phoenix, AZ 85018

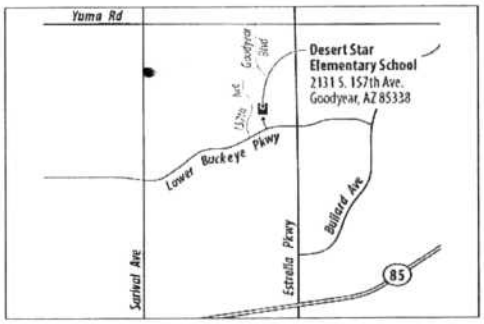
Exhibit J-3. Open House Comment Form

A PUBLIC INVITATION FROM APS

aps

APS 230-kV Power Line Projects Public Information Open House

June 19, 2019, 5–7 p.m.
Desert Star Elementary School
2131 S. 157th Avenue, Goodyear, AZ 85338



We are in the early stages of a public process to determine routes for new 230-kilovolt (kV) power lines in south Goodyear. The additional lines are needed to support electrical service reliability for two new customer-driven projects located northwest of the intersection of W. Broadway Road and S. Litchfield Road. APS is working to identify locations that are acceptable to the public, regulatory agencies, and these new customers.

Your input is very important to us. Members of the public and all interested parties are invited to join APS for an open house on Wednesday, June 19, from 5-7 p.m. You will be able to talk one on one with the project team to learn about the facilities needed; their locations and the siting process in general. You will have the opportunity to provide us with your comments and ideas.

Information about the projects can also be found on our projects webpage at aps.com/siting, click on "find out more" under current projects. Comments can be submitted by emailing GoodyearSouthSiting@apsc.com, or calling 1 (877) 841-9851

aps.com

Exhibit J-4. Display Advertisement