

ENVIRONMENTAL ASSESSMENT

Arizona Peaking Capacity Energy Storage Project, DOE/EA-2123



Prepared by



U.S. Department of Energy
Western Area Power Administration
Headquarters, Lakewood, Colorado

Cooperating Agencies

U.S. Department of the Interior
Bureau of Reclamation
Phoenix Area Office

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LIST OF ACRONYMS AND ABBREVIATIONS

AES	AES Energy Storage, LLC	MW	megawatt
ACC	Arizona Corporation Commission	NAAQS	National Ambient Air Quality Standards
ADA	Arizona Department of Agriculture	NEPA	National Environmental Policy Act
ADOT	Arizona Department of Transportation	NESC	National Electrical Safety Code
AGFD	Arizona Game and Fish Department	NHPA	National Historic Preservation Act
APLIC	Avian Power Line Interaction Committee	NRHP	National Register of Historic Places
Applicant	AES Energy Storage, LLC	NSTS	Navajo Southern Transmission System
APS	Arizona Public Service	O&M Project	operations and maintenance Arizona Peaking Capacity Energy Storage Project
ASM	Arizona State Museum	Proposed Action	Federal Action
BESS	battery energy storage system	ROW	right-of-way
BLM	Bureau of Land Management	sf	square feet
BMP	Best Management Practice	SHPO	State Historic Preservation Officer
BMS	Battery Management System	State	Arizona
CEC	Certificate of Environmental Compatibility	SWPPP	Stormwater Pollution Prevention Plan
CESA	Cumulative effects study area	TCP	Traditional cultural properties
CFR	Code of Federal Regulations	TIP	Transmission Infrastructure Program
DOE	United States Department of Energy	USACE	U.S. Army Corps of Engineers
EA	Environmental Assessment	Reclamation	U.S. Bureau of Reclamation
EPA	Environmental Protection Agency	USFWS	United States Fish and Wildlife Service
ESA	Endangered Species Act	WAPA	Western Area Power Administration
F-Stop	fast response shutdown sequence	WOTUS	Waters of the U.S.
FERC	Federal Energy Regulatory Commission		
GHG	Greenhouse gas		
HDMS	Heritage Data Management System		
HV	high voltage		
HVAC	heating, ventilation, and air conditioning		
KOP	Key Observation Point		
kV	kilovolt		
LGIA	Large Generator Interconnection Agreement		
LV	low-voltage		
MBTA	Migratory Bird Treaty Act		
MPH	miles per hour		
MV	medium-voltage		

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EXECUTIVE SUMMARY

PROJECT LOCATION

The Arizona Peaking Capacity Energy Storage Project (Project) is located in Maricopa County, Arizona, approximately 25 miles northwest of Phoenix and 11.8 miles west of Interstate 17 on approximately 6 acres of privately owned land.

PROJECT PARTICIPANTS AND BACKGROUND

Western Area Power Administration (WAPA), a Federal power marketing agency within the U.S. Department of Energy (DOE), is the lead Federal agency for the Project under the National Environmental Policy Act (NEPA) review. The U.S. Bureau of Reclamation (Reclamation) Phoenix Area Office is a cooperating agency under NEPA. AES Energy Storage, LLC (AES or the Applicant) is a private energy company and the Project proponent.

WAPA is responding to a request to fund the Applicant's proposed Project for project financing under the Transmission Infrastructure Program (TIP) for the proposed Project. As an owner of a share of the Navajo Southern Transmission System (NSTS), Reclamation is responding to the Applicant's Large Generator Interconnection Agreement (LGIA) request for the proposed Project. AES proposes to build, operate and maintain, and decommission an approximately 100-megawatt (MW) battery energy storage system (BESS) facility on approximately 6 acres of a 10-acre parcel of private land.

PURPOSE AND NEED

WAPA

WAPA's purpose and need is to consider responding to AES's request for project financing through its TIP. The TIP leverages WAPA's borrowing authority and transmission development expertise to help selected project applicants secure financing for a project, and if needed, address barriers and streamline project development activities. In addition to considering providing project financing, WAPA must also ensure that the proposed Project will not adversely impact its transmission system reliability or operations.

Reclamation

Reclamation's purpose and need is to respond to AES's LGIA request. If the proposed Project is funded, Reclamation would review and, if appropriate, approve the LGIA with AES. Approval or disapproval of the LGIA is the responsibility of the Regional Director of Reclamation's Lower Colorado Basin.

AES Proposed Project

The primary purpose of the AES BESS facility is to provide advanced energy storage that contributes to a strong grid and aids in the incorporation of variable power generation.

PROPOSED ACTION

WAPA

WAPA's Proposed Action is the consideration to provide funding in response to a request from AES for project financing under the TIP for their proposed Project. WAPA could provide project financing from the United States Treasury under authority granted to WAPA under Section 402 of the Recovery Act of 2009 (Public Law 111-5), which amended the Hoover Power Plant Act of 1984 (Public Law 98-381). To

support AES's request for project financing, WAPA needs to complete an environmental review to analyze the environmental effects of the Project.

Reclamation

The Proposed Action for Reclamation would be to approve and sign the LGIA with AES. The approval of the LGIA by Reclamation, and other participants, would allow AES to interconnect to the Arizona Public Service (APS) Westwing Substation. Because Reclamation is a Federal agency and owner of a share of the NSTS, interconnections are subject to environmental review under NEPA. Therefore, Reclamation's underlying purpose is to analyze the effect of the interconnection to the surrounding environment.

AES Proposed Project

AES proposes to build, operate, maintain, and decommission an approximately 100-MW BESS facility on private land per their agreement with APS. Construction of the proposed battery storage facility would include battery storage enclosures, inverters/transformers, communications equipment, switchgear, heating, ventilation, and air conditioning (HVAC) units. In addition, transmission poles and associated electricity transmission facilities would connect the proposed facility to the APS Westwing Substation to the south.

ALTERNATIVES

A No Action Alternative was evaluated to provide a baseline against which the impacts of the Proposed Action can be compared. Under the No Action Alternative, WAPA would not provide financing to AES for their proposed Project and the Project would not be built using financing from the United States Treasury. Under the No Action Alternative, the Project would not be built and would potentially increase grid instability without addressing storage needs at the local load center. Construction activities associated with the Proposed Action would not occur. Additionally, under this alternative, Reclamation would not enter into a LGIA with AES.

SUMMARY OF THE PROPOSED ACTION'S ENVIRONMENTAL CONSEQUENCES

Cultural Resources

No direct or indirect impacts on National Register of Historic Places (NRHP)-eligible, or indeterminate cultural resources or historic properties are expected from construction, O&M, or decommissioning activities associated with the Project. There are no known historic properties that would fall within the temporary and/or permanent disturbance footprint and/or the 30-meter buffer of the temporary/permanent disturbance footprint of the Project. Ground disturbance activities associated with construction of the Project would be limited to temporary disturbance associated with staging areas for the installation of the proposed battery storage facility, pulling sites for the overhead transmission line, and replacement of existing transmission poles. Ground disturbing activities associated with operations and maintenance (O&M) and decommissioning of the Project would be confined to areas in the disturbance footprint created during construction. No additional impacts on historic properties are expected from O&M or decommissioning activities. The implementation of design elements and conservation measures (e.g., restricting vehicular traffic to existing access roads) would further minimize potential impacts to historic properties, should they exist, from the construction, O&M, and decommissioning of the Project.

Biological Resources

There would be negligible to minor, localized, short- and long-term, direct and indirect adverse impacts to biological resources due to the construction, O&M, and decommissioning of the Project. There would be a temporary loss of approximately 7.01 acres and permanent loss of about 5.18 acres of wildlife habitat as a result of the Project.

Direct and indirect adverse impacts to general and special status wildlife species during construction include potential disturbance from noise and activity, potential disturbance from artificial lighting, and risk for direct mortality from ground disturbance, vehicle strikes, and collision with transmission lines. Activities associated with O&M would be infrequent and would have a negligible impact on general and special status wildlife species. Impacts from decommissioning would be similar to those during construction. The implementation of design elements and conservation measures would minimize potential impacts to biological resources from the construction, O&M, and decommissioning activities.

Visual Resources

The Project would create a long-term, permanent change in the local visual landscape; however, it would be a minor change in the characteristic landscape and in the scenic quality of the Project area from the construction, O&M, and decommissioning activities. The new BESS facility and associated transmission line replacement would represent a long-term, permanent change in the visual landscape in terms of form and color in comparison to the existing setting. However, the landscape already consists of large-scale utility structures, including the Westwing Substation, and an existing transmission line corridor; installation of a low-profile BESS facility and associated interconnection among the dense backdrop of numerous utility towers and facilities would result in a noticeable but minor change in the overall visual landscape consistent with existing visual character. The Project would be consistent with the existing scenic quality and character of the visual landscape. In addition, the implementation of design elements such as screening, and conservation measures such as restoration of disturbance areas, would further reduce impacts to visual resources during construction, O&M, and decommissioning activities.

1.0 INTRODUCTION

1.1 Project Background

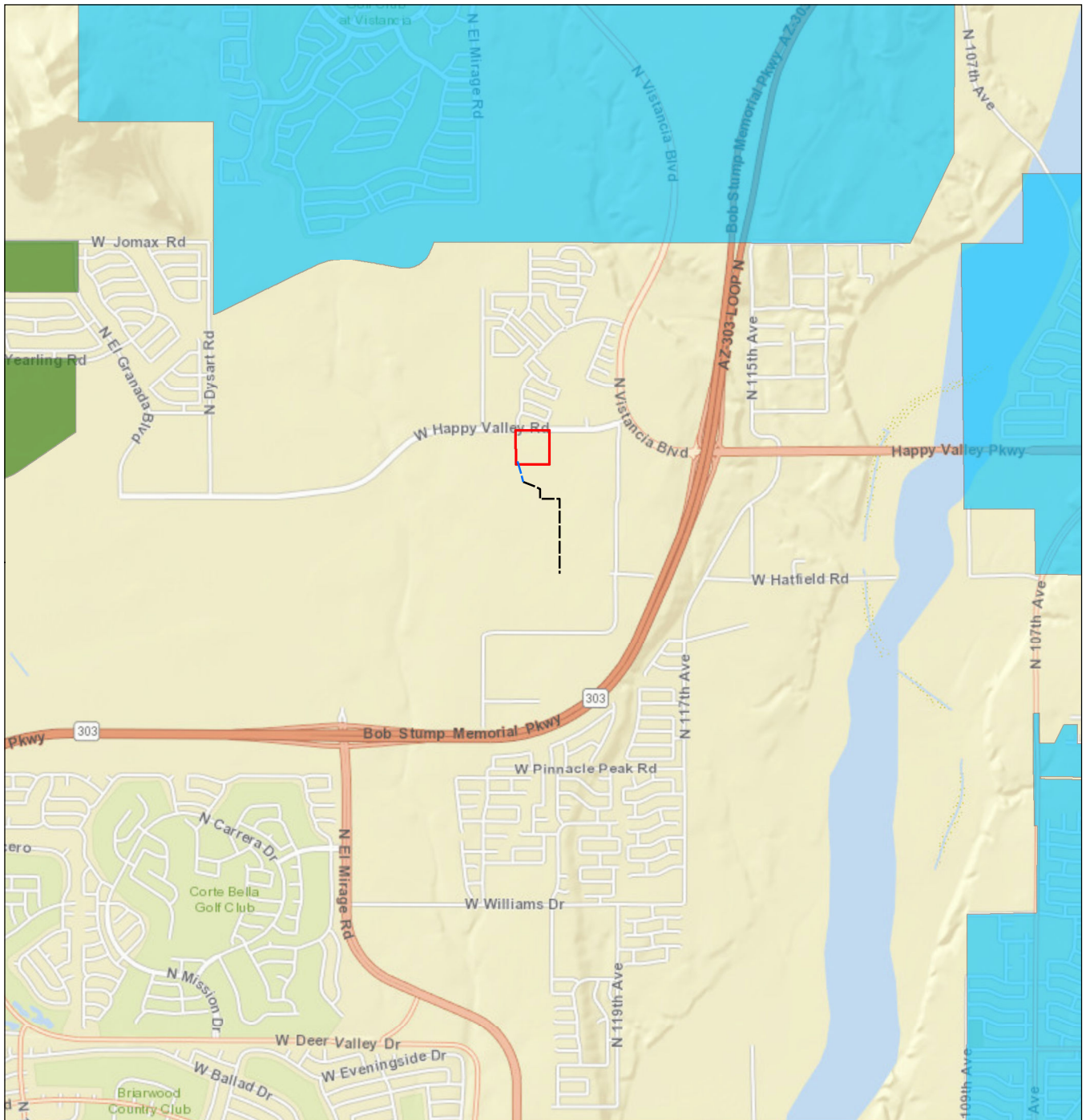
Western Area Power Administration (WAPA) is considering providing funding in response to a request from AES Energy Storage, LLC's (AES or Applicant) proposed Arizona Peaking Capacity Energy Storage Project (Project) under WAPA's Transmission Infrastructure Program (TIP). WAPA could provide project financing from the United States Treasury under authority granted to WAPA under Section 402 of the American Recovery and Reinvestment Act of 2009 (Recovery Act) (Public Law 111-5), which amended the Hoover Power Plant Act of 1984 (Public Law 98-381).

WAPA is a Federal power-marketing agency within the U.S. Department of Energy (DOE) that operates and maintains electric transmission lines and associated facilities in accordance with the Federal Power Act, Section 211, and our Open Access Transmission Service Tariff. WAPA's TIP is a unique Federal infrastructure financing program aimed at expanding and modernizing the electric grid. TIP manages WAPA's statutory \$3.25 billion borrowing authority and can make strategic loans to project applicants for qualifying projects and offer experience and expertise to address development hurdles when needed. The program's primary goal is to leverage Federal funds and attract private and other non-federal co-investment companies to support the development of critical transmission and related infrastructure.

The United States Bureau of Reclamation (Reclamation) is a Federal agency with partial ownership of the Navajo Southern Transmission System (NSTS). Reclamation is proposing to approve AES's request to interconnect their proposed battery energy storage system (BESS) facility into the NSTS. The NSTS, which terminates at the Arizona Public Service (APS) Westwing Substation, powers the Central Arizona Project Canal System and provides power to private and public utilities in the Southwest.

Reclamation shares ownership of the NSTS with five other entities, including APS, but is the only Federal owner of this transmission system. A 1976 Co-Tenancy Agreement established ownership of the NSTS, and the NSTS Operating Agreement establishes the authorized use of the transmission system. AES's request for interconnection to the NSTS is processed through APS; however, all six owners of the system must review and approve a Large Generator Interconnection Agreement (LGIA) with AES. LGIAs are required for generators of more than 20 megawatts (MW), which includes battery storage facilities such as AES's proposed Project (Federal Energy Regulatory Commission [FERC] Order 845, 2018). As a Federal agency, Reclamation must also comply with the National Environmental Policy Act (NEPA) prior to approving AES's LGIA.

AES plans to build, operate and maintain, and decommission an approximately 100-megawatt (MW) BESS facility per their agreement with APS on approximately 6 acres of a 10-acre parcel of private land as (see Figures 1-1 and 1-2). This proposed facility would be located approximately 25 miles northwest of the City of Phoenix near the City of Peoria, Maricopa County, Arizona. Construction of the BESS facility would include battery storage enclosures, inverters/ transformers, communications equipment, switchgear, heating, ventilation, and air conditioning (HVAC) units. In addition, transmission poles and associated electricity transmission facilities would connect the facility to the APS Westwing Substation to the south. Construction and operation of AES's battery storage facility is not part of WAPA's Federal funding action, but its impacts are considered and presented alongside that of the Federal action as part of a comprehensive analysis in this Environmental Assessment (EA).



- Proposed AES Battery Storage Facility
- Proposed AES 230kV Transmission Interconnection
- Proposed APS 230kV Transmission Line
- Cities**
- PEORIA
- SURPRISE
- County Boundaries**
- MARICOPA

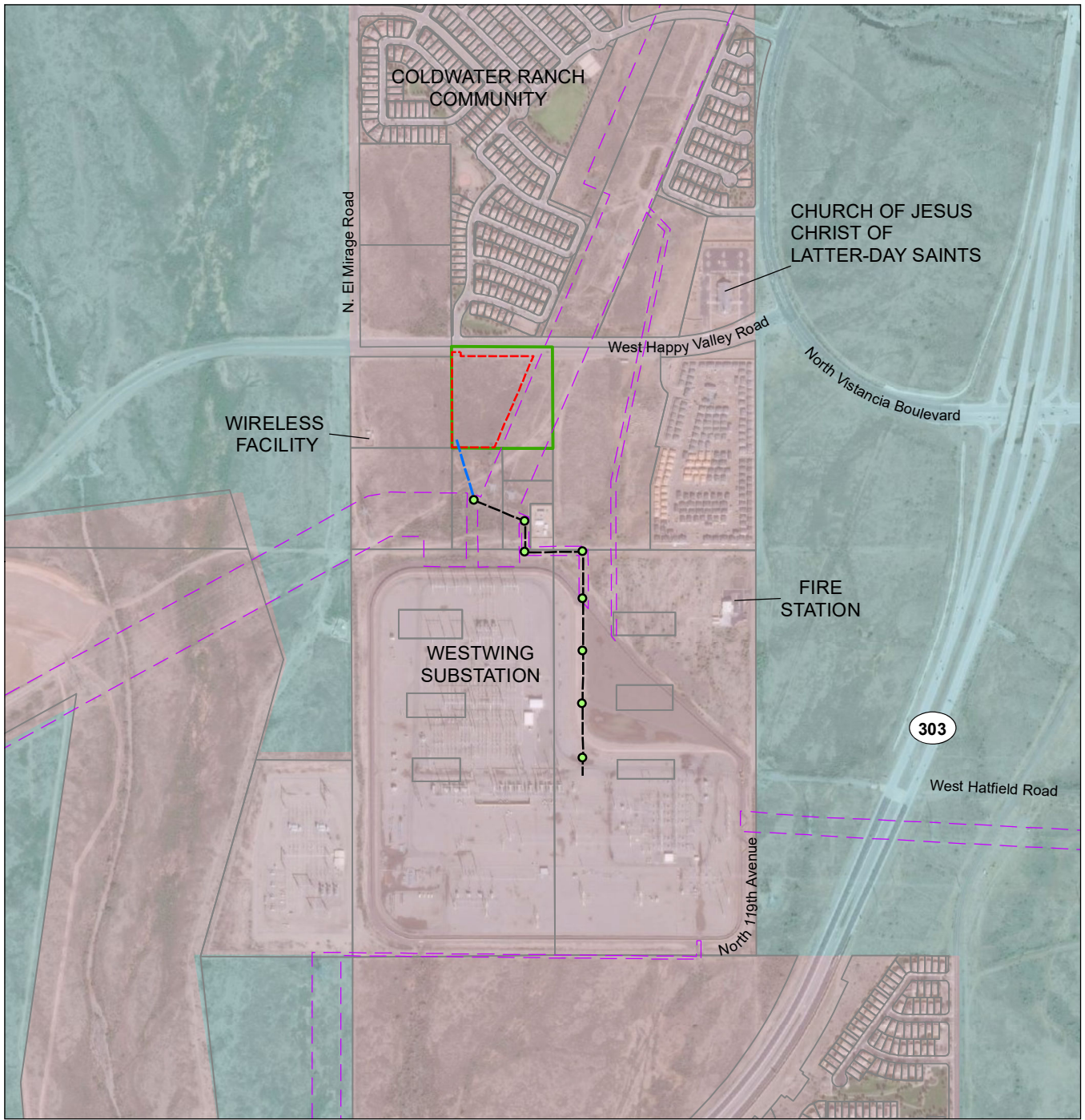
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Project Location
Maricopa County, Arizona
Client/Project
Arizona Peaking Capacity
Energy Storage Project
Figure No.
1-1
Title
Project Location Map

Notes

1. Coordinate System: NAD 1983 StatePlane Arizona Central FIPS 0202 Feet
2. Data Sources: Stantec 2021. Parcels From Maricopa County 2021.
3. Background: © OpenStreetMap (and) contributors, CC-BY-SA
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

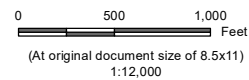


- Proposed AES Battery Storage Facility
 - Parcel Boundary
 - Pole Replacement Locations
 - Approximate Location of Existing Transmission Line Corridors
 - Proposed AES 230kV Transmission Interconnection
 - Proposed APS 230kV Transmission Line
 - Maricopa County Parcels
- Ownership**
- Private

Notes

1. Coordinate System: NAD 1983 StatePlane Arizona Central FIPS 0202 Feet
2. Data Sources: Stantec 2021. Parcels From Maricopa County 2021.
3. Background: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

State



Project Location Prepared by DL on 2021-05-22
 Maricopa County, Arizona TR by ST on 2021-05-28
Client/Project 185805080 IR by LZ on 2021-05-28

Arizona Peaking Capacity
 Energy Storage Project

Figure No.
1-2

Title
Project Vicinity Map

On August 9, 2019, WAPA made a determination to prepare an EA for the Proposed Action in accordance with Section 3.b.(3) of Department of Energy Policy 451.1 and the NEPA implementing procedures (10 Code of Federal Regulations [CFR] 1021) to analyze the effects of the Project.

1.2 Need for Action

WAPA needs to consider responding to AES's request for project financing through its TIP. The TIP leverages WAPA's borrowing authority and transmission development expertise to help selected project applicants secure financing for a project, and if needed, address barriers and streamline project development activities. A project applicant does not have to request project development assistance to pre-qualify for a loan. To be eligible for a project loan or project development assistance from TIP, prospective utility-scale transmission and/or related projects must meet and demonstrate, at minimum, the following eligibility requirements:

- Have at least one terminus in WAPA's 15-state service territory;
- Demonstrate a reasonable expectation of repayment;
- Facilitate the delivery of clean energy;
- Not adversely impact system reliability or operations; and
- Serve the public interest.

More information about WAPA's Transmission Infrastructure Program can be found here:

<https://www.wapa.gov/transmission/TIP/Pages/tip.aspx>

As an owner of a share of the NSTS, Reclamation needs to respond to AES's LGIA request. If the proposed Project is funded, Reclamation would review and, if appropriate, approve the LGIA with AES. If approved, Reclamation's Lower Colorado Basin Regional Director would be the signatory on the LGIA.

1.3 Purposes of Action

In addition to considering providing project financing, WAPA must also ensure that the Project will not adversely impact its transmission system reliability or operations. The characteristics of advanced energy storage, such as fast, firm, and exact power control, ability to act as load and supply, and no minimum generation level make storage ideally suited as a resource that contributes to a strong grid and aids in the incorporation of variable power generation. Such a flexible and resilient grid can add and maximize the most beneficial forms of power generation available, whether those are emissions-free renewables, efficient combined cycles, or other forms of power generation. Once those new renewable or efficient generating sources come online, the battery storage facilities would make sure they are able to be used in the most efficient way to maximize available power production, minimize fuel cost, and maintain power system reliability.

The battery storage facility would be located in Arizona and interconnected to the APS grid. The battery storage facility is not expected to impact transmission system reliability or operations. In fact, one of the operational benefits of battery storage is improved system reliability through reducing transmission congestion and providing ancillary services, such as spinning reserves. Energy storage is the most flexible

power resource for the grid, allowing for a flexible range of twice the interconnected capacity. A battery storage facility can provide spinning reserves in excess of its nameplate capacity while charging and can be conveniently located near load to further reduce any transmission-related constraints.

Energy storage is cost competitive with other peaking resources and provides more grid benefits than open cycle peaking plants. The benefits include no air emissions, no water requirements, and faster response speeds. The Project would allow for increased utilization of existing resources thus allowing the region to avoid procurement of single function peaker power plants which burn fossil fuels and contribute to air pollution. Energy storage can meet peak capacity, while also supplying ancillary services to the grid with unmatched availability and reliability.

1.4 Public Participation and Tribal Consultation

1.4.1 Public Involvement

Per 40 CFR § 1501.7, WAPA initiated its Scoping process by conducting public outreach for the Project through various means, including providing notice of the Project, describing the environmental review process and opportunities to comment. On September 25, 2019, WAPA sent a letter to potentially interested parties including adjacent landowners, public interest groups, local governments, tribes, and State and Federal agencies.

WAPA also created a website specifically for the Project where interested parties can access current information about the Proposed Action and the environmental review process. That website can be found at: <https://www.wapa.gov/transmission/EnvironmentalReviewNEPA/Pages/AZ-Energy-Storage-Project.aspx>.

The public scoping period began on September 25, 2019, and WAPA accepted comments on the Project until October 25, 2019. No public scoping meetings were held. A total of 18 comments were received. Comments received during the scoping comment period were considered in the environmental analysis. Comments were received during the scoping comment period on the following topics:

- Consider the environmental effects of battery disposal at their end-of-life versus more environmentally friendly options;
- Consider the economic impacts to adjacent residential neighborhoods and local businesses;
- Requests to consider siting the proposed battery storage facility in a less populated area;
- Requests to consider the visual and traffic-related impacts and to an adjacent residential development; and
- Requests to consider fire and other public health hazards to an adjacent residential development.

WAPA addressed the scoping comments in appropriate sections in this EA as applicable.

On June 23, 2021, WAPA released a Draft EA and initiated a 30-day public comment period which concluded on July 23, 2021. The Draft EA was made available on the Project website (<https://www.wapa.gov/transmission/EnvironmentalReviewNEPA/Pages/AZ-Energy-Storage-Project.aspx>) and postcard notices were sent to approximately 700 landowners in the Project area to

inform them of its availability. Comments were accepted via email, postal mail, and telephone. No comments were received during the 30-day comment period, and no updates or additional analysis were required to the Proposed Action.

1.4.2 Tribal Consultation

WAPA identified six tribes that may have resources of traditional religious and cultural significance in the Project area including the following: the Fort McDowell Yavapai Nation, the Salt River Pima-Maricopa Indian Community, the Hopi Tribe, the White Mountain Apache Tribe, the Yavapai-Prescott Indian Tribe, and the Pascua Yaqui Tribe. WAPA provided Project information and described the cultural resources review process to tribal cultural resources specialists. WAPA also requested information from the consulting tribes on historic properties in the Project area and solicited comments from tribal representatives. The tribal comments were used to shape the Project's cultural resource field investigation.

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action, the No Action Alternative, and alternatives considered but eliminated from detailed study. This chapter also compares the Proposed Action and the No Action Alternative to the Project purpose, as well as to the potential environmental impacts.

2.1 Proposed Action

2.1.1 WAPA's Proposed Action

The Proposed Action for WAPA is to consider providing funding in response to a request from AES for project financing under the TIP for their proposed Project. WAPA could provide project financing from the United States Treasury under authority granted to WAPA under Section 402 of the Recovery Act of 2009 (Public Law 111-5), which amended the Hoover Power Plant Act of 1984 (Public Law 98-381). To support AES's request for project financing, WAPA needs to complete an environmental review to analyze the environmental effects of the Project.

2.1.2 Reclamation's Proposed Action

The Proposed Action for Reclamation would be to approve and sign the LGIA with AES. The approval of the LGIA by Reclamation, and other participants, would allow AES to interconnect to the Arizona Public Service (APS) Westwing Substation. Because Reclamation is a Federal agency and an owner of a share of the NSTS, interconnections are subject to environmental review under NEPA. Therefore, Reclamation's underlying purpose is to analyze the effect of the interconnection to the surrounding environment.

2.1.3 Proposed Project Facilities

AES plans to build, operate, maintain, and decommission an approximately 100-MW BESS facility on approximately 6 acres of a 10-acre parcel of private land per their agreement with APS. Construction of the battery storage facility would include battery storage enclosures, inverters/transformers, communications equipment, switchgear, and heating, ventilation, and HVAC units, as depicted in Figure 2-1. The facility would also include a stormwater retention basin system and fire access road. In addition, a 34.5-kilovolt (kV)/230-kV substation with a transformer, transmission poles, and associated electricity transmission facilities would connect the Project to the APS Westwing Substation to the south, as summarized in Table 2-1.



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Project Location	Prepared by DL on 2021-03-26
Maricopa County, Arizona	TR by ST on 2021-03-26 IR by LZ on 2021-06-01
Client/Project	185805080

Arizona Peaking Capacity
Energy Storage Project

Figure No.
2-1
Title
Project Features Map

Notes

1. Coordinate System: NAD 1983 StatePlane Arizona Central FIPS 0202 Feet
2. Data Sources: Stantec 2021. Parcels From Maricopa County 2021.
3. Background: © OpenStreetMap (and) contributors. CC-BY-SA

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Table 2-1. Project Summary

Project Component	Quantity	Approx. Dimensions (each)
Battery Core	37	68' 5"L x 30' 7"W x 8'H
Inverter/Transformer Skid	37	27'L x 8'W
High Voltage Substation	1	300' L x 95' W
Overall Facility Area	1	600'L x 250-500'W
Transmission Poles ⁽²⁾	8	6-8'W ⁽¹⁾ x 80-150'H

(1) Diameter width at base, depending on if the pole is tangent or an angle.

(2) The transmission line and poles would be constructed by APS and approved by the ACC.

AES is obtaining zoning and development permits from Maricopa County Planning and Development for construction and operation of the proposed battery storage facility, subject to County Planning and Zoning Commission and Board of Supervisors approvals. Development of the proposed battery storage facility would be required to follow Maricopa County ordinances, regulations, and codes which regulate the use, occupancy, location, design, and construction.

2.1.3.1 Battery Storage Facility

The proposed battery storage facility would consist of thirty-seven (37) battery storage “cores.” The initial installation would include thirty-one (31) cores and an additional six (6) cores would be added over the life of the proposed facility to maintain the required capacity. Each energy storage core consists of three (3) bi-directional inverters, transformer, and twenty-four (24) battery “cubes.” Each “cube” is an approximately 7-foot by 8-foot by 9-foot, non-entry, self-contained enclosure housing batteries, fire detection and suppression systems, controls, and cooling chiller units (chillers). Balance of Plant (BOP) equipment would also include two (2) medium-voltage (MV) transformers and pad, two (2) low-voltage (LV) switchboards, one (1) approximately 320-square foot (sf) (8-foot by 40-foot) storage enclosures, and a 300-sf control enclosure with electrical and HVAC equipment. A detailed list of the major equipment is as follows:

- **Batteries:** Battery modules are assembled in racks within the cubes and monitored by the Battery Management System (BMS) to prevent overheating and risk of thermal runaway. Electrical isolation monitoring devices are present on each battery to detect faults and disconnect the system, and allow isolated replacement as necessary.
- **Power Conversion System:** The proposed facility would utilize up to 111 bi-directional inverters to convert direct current into alternative current and vice versa.
- **Chillers systems:** Each cube would be equipped with integral wall-mounted chiller units to keep battery cores at optimal operating temperature.
- **Fire Detection/ Suppression Systems:** Each non-entry cube would be equipped with a three-zone fire detection and suppression system, incorporating photoelectric smoke detectors which would be monitored remotely 24/7. The system would utilize aerosol suppressant supplied via two canisters. The fire suppression system may also be manually activated via pull stations. Combination horn/ strobe devices would indicate that the system has been deployed. Each non-entry cube is designed to be electrically isolated to contain potential fire inside and prevent propagation to battery modules in adjacent cubes.

- Gas Detection: Each cube would be equipped with incipient gas detection. This allows for early detection and mitigation as off-gassing is a symptom indicating potential battery failure. The non-entry cubes would utilize carbon monoxide detectors. In the event gas is detected, the system would initiate a fast response shutdown sequence (F-Stop).
- Fire Water: A fire water loop would be installed with five fire hydrants and requisite isolation valves. Fire water would be supplied from a water supply main running along Happy Valley Road on the northern site boundary.
- LV and MV electrical switching equipment and auxiliary power panels
- Plant Controller: Computer and telecommunications equipment integrating the individual BMS, inverter controls, Chillers, and fire detection systems
- MV transformers: 37 MV transformers, one for each inverter lineup, plus 2 for station auxiliary power
- MV switchgear
- Battery array control house
- Operations room
- Security lighting at every turning point of the access road plus intermediate locations along the access road spaced no greater than 200 feet and directed downward and shielded to minimize offsite visibility
- Signage (entrance sign at each entrance up to 4'x6' and required safety signage)
- Perimeter wall (8-foot-tall solid masonry wall plus intrusion detection system on top of wall) along all proposed facility boundaries. Intrusion detection system to alert the system operators of any potential intruders. The Intrusion detection system would consist of infrared beam columns approximately 8 inches diameter by 2 meters high to be located approximately every 100 meters.
- Chain-link fencing with sleeved, removable post and vehicle access gates on the north side of the high-voltage (HV) substation within the perimeter wall
- Stormwater retention basins along the eastern facility boundary (100-year, 2-hour, 49,875 cubic foot capacity, 3-foot deep)
- 20-foot-wide fire access road

WAPA would not construct, operate or maintain, or decommission the new battery storage facility. AES would be responsible for construction, operation and maintenance, and decommissioning activities.

2.1.3.2 High-Voltage Substation and Transformer

A new HV substation and transformer would be needed for the proposed battery storage facility to transform the stored energy from the facility from 34.5-kV to 230-kV. The substation would be connected to the new transmission line that would be carrying electricity from the facility to the existing Westwing Substation. The substation would be pad-mounted and fenced within an approximately 300-by 95-foot area at the southern end of the facility accessed by two internal gates, and would include an HV step-up transformer, circuit breakers, protective relaying, unmanned control house, and associated

structures. WAPA would not construct, operate or maintain, or decommission the new transformer. AES would be responsible for construction, operation and maintenance, and decommissioning activities.

2.1.3.3 *Transmission Line Interconnection*

Completion of the proposed battery storage facility and integration into the regional electrical grid system would require a new, approximately 0.54-mile, 230-kV transmission line for interconnection between the proposed facility and the existing APS Westwing Substation to the south. As depicted in Figure 1-2, the new transmission line would exit the proposed facility at the southwestern corner from the facility HV substation and continue south and east following existing transmission line rights-of-way (ROWs) until connecting into the APS Westwing Substation. The first span would be approximately 0.07-mile (370-feet) from the facility to an existing APS transmission pole and would be constructed and operated by AES (AES responsibility). The remainder of the 230-kV transmission line would be approximately 0.47-mile (2,482-feet) and would be a rebuild of an existing transmission line which would be constructed and operated by APS (APS responsibility). The rebuild would include adding a 230-kV circuit to the APS 69-kV portion of the existing 69-kV Calderwood-Westwing transmission line (from single to double circuit). It is anticipated that eight new steel monopole structures, ranging in height from approximately 80- to 150-feet tall, would replace the existing APS transmission poles which are approximately 55- to 60-feet tall. Additional structure types may be needed depending on final design. Three of the new transmission poles would be located within the boundaries of the existing Westwing Substation, while five would be located within the existing transmission line corridor.

The transmission line interconnection is subject to approval by the Arizona Corporation Commission (ACC) and would be managed by APS through the Line Siting process which requires the preparation of an application to support issuance of a Certificate of Environmental Compatibility (CEC) resulting in ACC approval. Additionally, authorization for the transmission line interconnection would require a LGIA, which would need approval by all six owners of the NSTS, including Reclamation. APS would be responsible for constructing and operating the interconnection infrastructure. WAPA and Reclamation would not be responsible for constructing, operating or maintaining, or decommissioning the new transmission line.

2.1.3.4 *Access Roads, Rights-of-Way and Easements*

Site Access. Primary access to the proposed battery storage facility would be via West Happy Valley Road, which is a major east-west arterial roadway (Road of Regional Significance), with two, east-bound paved lanes and a raised median (with a median break) adjacent to the property. The typical half-street roadway dedication for an arterial/road of regional significance is 65 feet. There is no half-street dedication adjacent to the site. Driveway access on West Happy Valley Road would be paved and would be permitted through the Maricopa County Department of Transportation. The primary access driveway would be gated and connect to the onsite access road.

Site Circulation. The proposed battery storage facility site currently consists of vacant, partially disturbed (dirt roads) land. Circulation within the site would consist of a 20-foot-wide internal fire access loop around the perimeter of the facility which would consist of aggregate. The primary access gate would be located at the northwest corner of the site. An additional access gate would be located at the northeast corner of the site, and two internal access gates would provide access to the HV substation at the southern end of the facility. Parking would be accommodated onsite for part-time staff to perform

routine maintenance activities on a periodic (monthly) basis. In compliance with County requirements, parking would consist of one paved Arizona Department of Agriculture (ADA)-Accessible space (12 ft. x 18 ft.) located adjacent to the control house, and one aggregate base standard spaces (9 ft. x 22 ft.) adjacent to the station auxiliary transformer at the northeast corner of the site and two standard spaces (9 ft. x 22 ft.) along the south road.

Transmission Line Access Roads. Transmission line access roads exist underneath or adjacent to the majority of the proposed transmission line ROW. An access road extension may be needed underneath or adjacent to the first approximately 0.07-mile (370-feet) AES span of the new transmission line ROW from the proposed battery storage facility to the existing APS transmission pole. Improvements to existing access roads as well as new temporary or permanent access roadway may be needed for construction and operation and maintenance of the new transmission line. Typically, upgrading existing roads and constructing temporary and permanent new access roads requires a construction width of 14 feet along straightaways and 16 to 20 feet around corners to facilitate safe movement of equipment and vehicles. However, all temporary roads would be restored to pre-existing conditions when they are no longer needed, and all upgraded existing roads and new permanent roads would be restored to a width of 12 feet. Maximum road grades would vary depending on the erosion potential of the soil: 6-8% on erodible soils, or 10-15% for erosion resistant soils.

Dirt roads in the area of the proposed facility can become slippery and impassible when wet. Gravel would be placed on roads, where needed, to assist with dust abatement, stability, load bearing, and to keep them passable during wet soil conditions.

Rights-of-Way and Easements. An existing transmission tower and several easements traverse the eastern portion of the property (east of the proposed battery storage facility perimeter), including a natural gas pipeline, ROW, temporary access, temporary workspace, and road and incidental easements.

The existing APS 69-kV Calderwood-Westwing transmission line and Westwing Substation are located in a utility corridor with numerous existing transmission lines ranging from 69-kV to 500-kV. The proposed new transmission line route would cross under the 500-kV Navajo-Westwing transmission line. Other transmission lines in proximity include 500-kV Westwing-Perkins, 500-kV Palo Verde-Westwing, WAPA 230-kV Westwing-Raceway, APS 69-kV Westwing- Hatfield, SRP 230-kV Westwing-Dove Valley/Westwing-Agua Fria, WAPA 230-kV Westwing-Pinnacle Peak/Westwing -Liberty, APS 69-kV Westwing-Westbrook/ Westwing-Rio Vista, APS 230-kV Westwing- Surprise, TEP 345-kV Westwing-Pinal West, and APS 69-kV Westwing-McMicken.

The entirety of the proposed new transmission line route is within privately-owned land and within an existing 69-kV sub-transmission line corridor, for which APS currently holds easement.

AES would need to negotiate an approximate 60-foot-wide easement for the first 0.07-mile (370-feet) span of the new transmission line ROW from the proposed battery storage facility to the existing APS transmission pole with the underlying landowner. WAPA and Reclamation would not participate in or have any interest regarding these ROW negotiations.

2.2 Project Location

The Project is located off West Happy Valley Road within the north-central portion of Maricopa County, approximately 7 miles west of the City of Phoenix, 1 mile south of the Village of Vistancia and the City of Peoria, and 0.7-mile west of State Route 303 (Township: 4 North, Range: 1 West, Section: 1).

The proposed battery storage facility site is adjacent to West Happy Valley Road and single-family residential development (Coldwater Ranch) on the north, privately-owned land under development for a storage facility on the east and construction of a housing complex beyond, privately-owned undeveloped land and the existing APS Westwing Substation on the south, and privately-owned and mostly undeveloped parcel except for an existing cellular tower facility on the west. Within the larger context, land uses surrounding the site generally consist of residential and State Trust lands with the addition of golf courses to the southwest and Bureau of Land Management (BLM) and mining lands east of State Route 303. A fire station is located to the southeast, adjacent to the APS Westwing Substation.

2.3 Schedule

Construction is anticipated to occur in one phase over a duration of approximately 12 months. The proposed battery storage facility would be constructed to include 31 battery cores installed initially with the addition of 6 future augmentation battery cores in the northern portion of the site, which are planned to be installed over the life of the facility as batteries degrade from the first phase of construction. The future installations are not there to add capacity in any way, but to ensure that the Project consistently provides 100 MW of capacity as the capacity of the batteries degrade over time.

2.4 Project Implementation

The Project would store and deliver electricity to the grid through a Power Purchase Agreement with APS. AES, who leases the land, would build and commission the proposed battery storage facility. The proposed facility would be owned and operated by AES, while the current landowner, Sunbelt Land Investment, would retain land ownership.

The following sections describe the construction, operations and maintenance (O&M), and decommissioning activities for the Project. Table 2-2 provides a detailed account of all temporary and permanent disturbances related to Project implementation. The Project would result in 7.01 acres of total disturbance, of which 5.18 acres would be permanent disturbance.

Table 2-2. Proposed Project Disturbance Estimates

Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Battery Storage Facility	0.85 ¹	4.5 ²
HV Substation	0.25 ¹	0.67 ²
Transmission Line/Access Roads	0.73 ³	0.01 ⁴
Total	1.83	5.18

¹ Staging areas outside the proposed battery facility site

² Within the proposed battery storage facility site boundary

³ Use of existing access roads

⁴ Replacement of existing pole structures

2.4.1 Construction, Operations and Maintenance, and Decommissioning

2.4.1.1 Construction

Construction activities would include site grading, foundation/concrete work, battery cube installation, electrical component and cable installation, inverter/ transformer and controls installation, installation of the HV substation and overhead transmission line to the existing APS Westwing Substation, and final grading/paving. Recycling, reduction, and reuse of materials would be incorporated whenever feasible. Construction equipment to be used would include a scraper, excavators, dump trucks, a drum roller, forklifts, a crane, pump trucks, concrete trucks, manlifts, and a boom truck. A temporary construction staging/laydown/storage area would be located adjacent to the BESS, contained within the property boundaries. The limited water required during the construction phase would be supplied from an existing water line or trucked-in, as necessary. The Project would implement stormwater Best Management Practices (BMPs) during construction, including erosion/sediment control and materials/waste management.

Transmission Line Structures. Transmission tower structure foundations are used to transfer loads to provide a stable and secure platform for the structure to permanently rest. Numerous factors enter into the selection of the foundation type and depth. In general, excavation depths could be up to 40-feet deep and 8-feet wide. Some of these factors include, but are not limited to, geotechnical information, foundation loading, base size of the monopole structure, rotation and deflection limits, site accessibility, site conditions, economics, and aesthetics. Foundation types that are commonly utilized throughout the industry for high-voltage steel tubular monopole structures are described below:

- Direct-embedded foundations are typically utilized with steel monopoles. They consist of a single steel shaft installed vertically into an over-excavated hole and back-filled with concrete or gravel. Connection of the monopole to the direct-embedded foundation can be either through a slip-joint connection or a bolted base-plate to top-plate connection. Each direct-embedded foundation is approximately 1-foot larger in diameter than the largest diameter of the monopole base section. Excavation for the direct-embedded foundation is completed with heavy equipment such as a truck-mounted auger drilling rig. The material excavated is not reused as back-fill at the monopole site and is disposed of at an approved location or reused in another approved manner for the Project. Diameter and depth of each direct-embedded foundation is directly related to the monopole load, monopole base diameter, and geological soil condition at each monopole location.
- Vibratory Caisson foundations are typically utilized with steel monopoles. They consist of a single steel shaft “driven” vertically into the ground using a vibratory hammer. Connection of the monopole to the vibratory caisson foundation can be through a slip-joint connection, bolted base-plate to top-plate connection, or inset and grout connection. Each vibratory caisson foundation is approximately the same diameter as the monopole base section at ground level. No excavation is required for vibratory caisson foundations because they are “driven” directly into the ground with a vibratory hammer that is suspended from a piece of heavy equipment such as a crane. The diameter and depth of each vibratory caisson foundation is directly related to the monopole load, monopole base diameter, and geological soil condition at each location. Vibratory caisson foundations can be difficult, if not impossible, to install in areas with certain cohesive soils such as dense clays, bedrock, boulders, or larger cobblestone.

- Drilled Concrete Pier foundations can be used with either lattice tower or steel monopoles. They consist of concrete, steel reinforcing bars and embedded anchor bolts. For a monopole, this foundation consists of a single reinforced concrete pier placed in a vertically excavated hole and projects aboveground. Connection of the monopole to the projected drilled concrete pier foundation is embedded anchor bolts to a base-plate connection. Each drilled concrete pier foundation is approximately 2 feet larger in diameter than the monopole anchor bolt circle diameter. Excavation for the drilled concrete pier foundations is completed with truck mounted auger drilling rigs. Excavated material is not reused as back-fill at the monopole site and is disposed of at an approved location or reused in another approved manner for the Project. Diameter and depth of each drilled concrete pier foundation is directly related to the monopole load, monopole anchor bolt circle diameter, and geological soil condition at each monopole location.

Wires that carry electrical current on a transmission line are called conductors. Conductors are supported above the ground by transmission monopoles. Each transmission line monopole supports three phases. A phase consists of at least one individual conductor, typically having an approximate diameter of 1.4 inches. A typical phase of conductors would have an 18-inch separation between conductors in either a vertical or horizontal configuration.

Conductors are attached to the supporting monopoles using insulators, typically made up of a string of individual discs or bells that provide the necessary insulation between the energized conductor and the supporting monopole. The insulator bells are typically made of porcelain or glass. Porcelain insulators are either brown or gray in color, and glass insulators are either clear or blue.

Design practices utilized by APS must meet or exceed requirements set forth by the National Electrical Safety Code (NESC) and Arizona Revised Statutes 40-360.42 and 40-360.43. These requirements identify the minimum clearances required from the conductors to the ground, objects being crossed, and objects near the transmission line.

WAPA would not be involved with construction of the proposed battery storage facility or interconnection/transmission line. AES would be responsible for construction activities associated with the proposed battery storage facility, as well as the first approximately 0.07 mile (370 feet) span of the transmission line from the facility to the existing APS transmission pole. The remainder of the rebuilt transmission line would be constructed by APS.

2.4.1.2 *Operations and Maintenance*

AES would be responsible for O&M of the proposed battery storage facility, as well as the first approximately 0.07 mile (370 feet) span of the transmission line from the facility to the existing APS transmission pole. O&M of the remainder of the transmission line would be the responsibility of APS. The proposed battery storage facility would be owned and operated by AES for a planned useful life of 20 to 25 years. The long-term operational workforce would entail AES-contracted maintenance staff who would maintain the facility on a periodic basis over the Project life. The Project would require up to a four-person crew for maintenance visits twice a month on average. The crew would normally consist of one operator, one contracted field engineer, and two mechanical or electrical technicians. The Project would be primarily operated remotely. An office with a computer control monitor along with a restroom would be used periodically for operations troubleshooting and maintenance planning.

Planned maintenance would typically be developed and scheduled a few months in advance. Typical maintenance intervals for major Project components include:

- Fire protection system – twice a year
- HVAC and Chillers – twice a year
- Battery core – once a year
- Relay protection – once in two years
- Project performance testing – once a year
- Project HV substation – once a year

The proposed battery storage facility would be designed with multiple automatic and manual power-down/safety mechanisms. Electrical and fire systems are designed to open breakers automatically during fault conditions. Each cube fire protection system would have a signal that would trigger core power-down during fire, electrical fire, overheating, etc. The entire facility power-down would occur automatically during electrical fault conditions (e.g., high-voltage, high-frequency, ground fault etc.). Each cube includes a F-Stop button/switch that would de-energize the entire core upon activation. In addition, the proposed facility would be equipped with breakers that could be opened manually to power-down different equipment or the facility as a whole. The manual power-down could be done by local personnel.

Public Utilities and Services. The proposed BESS facility would include an operations room with plumbed restrooms; therefore, water and wastewater utilities and services would be connected to existing EPCOR Water Arizona water supply and sewer lines running in Happy Valley Road. Fire water would also be supplied from water connection located near the northwest entrance gate and would feed a fire water loop and fire hydrants. Fiber optic cable would be provided for internet services. Limited water required during the construction phase would be trucked in as necessary until water service is available. An electric distribution service feed from APS may be added to provide emergency backup power in the event of a main service outage. Police and fire services would be provided by Maricopa County Sheriff's Office and North County Fire and Medical, respectively.

The Project would be designed to be operational for 20 years, with the option to be reassessed for an additional 5 years of continued operation, up to 25 years.

2.4.1.3 Decommissioning

After completion of 25 years of operations, most of the Project's electrical equipment (breakers, transformers, inverters) would be removed and recycled. Project batteries would be returned to the battery manufacturer for recycling. Equipment foundations and pads would be demolished and removed. Following decommissioning, the interconnection infrastructure would remain in place as it would continue to serve transmission from other area energy facilities.

2.4.2 Design Elements and Conservation Measures

Design elements and conservation measures specific to Project facilities are presented below and are considered part of the Project. APS Construction Standards would also be implemented as part of the Project.

Soil/Erosion

- Grading would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project.
- Construction and operational activities would be conducted in compliance with a Stormwater Pollution Prevention Plan (SWPPP) that would include BMPs and other erosion-control measures designed to minimize soil erosion and limit sheet flow and downstream sedimentation. The SWPPP would also incorporate adaptive management actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site.
- To minimize wind erosion, all construction activities shall comply with the Fugitive Dust Control Plan that would be developed and implemented for the Project.
- A Site Restoration Plan would be implemented as needed to limit impacts to temporary disturbance areas as much as practicable.
- Soil-disturbing activities on wet soils would be minimized.
- Temporary disturbance areas that are no longer needed would be recontoured and revegetated in order to increase infiltration and reduce soil compaction.
- Routine site inspections would be performed to assess the effectiveness of maintenance requirements for erosion and sediment control systems. Roadway ditches, and culverts would be regularly maintained.

Hydrology/Water Quality

- The proposed battery storage facility would include stormwater retention basins designed to maintain existing drainage patterns and control surface water runoff.
- The site would be graded so that downstream flows would not be adversely impacted as a result of proposed changes to natural washes from grading or drainage management measures.
- The number of drainage crossings would be minimized to the extent possible and each would be designed to accommodate adequate flow.
- A Spill Prevention and Emergency Response Plan would be developed and implemented during construction and the operations/maintenance phases of the Project. Adequately sized secondary spill containment would be incorporated around transformers to ensure proper capture and control measures for potential spills. The Spill Prevention and Emergency Response Plan would also provide for hazardous material spill prevention and cleanup measures, were a spill to occur.
- Although not anticipated, any necessary permits in accordance with the Clean Water Act Section 404 (which regulates the discharge of dredged or fill material into Waters of the U.S. [WOTUS]) and Section 401 (which requires federally licensed or permitted projects to comply with applicable water quality and discharge requirements into WOTUS) would be obtained and complied with, if applicable.

Air Quality

- The area of grading and vegetation removal would be limited to only that area required for construction and operation.

- Ground disturbing activities would be undertaken in accordance with the approved Fugitive Dust Control Plan to minimize the amount of time areas would be exposed to wind erosion.
- Vehicular speeds on unpaved roads would be limited to 25 miles per hour (MPH).
- Grading operations would be phased, where appropriate, to limit the amount of disturbance at any one time, and water would be used for stabilization of disturbed surfaces under windy conditions.
- Water would be applied to disturbed areas to control dust and facilitate soil compaction, where necessary. Water would be applied using water trucks and application rates would be monitored to prevent runoff and ponding. Palliatives would be used to control dust as required.
- Exposed material stockpile areas would be covered, and excavation and grading would be suspended during windy conditions (forecast or actual wind conditions of approximately 25 MPH or greater).
- All trucks hauling soil and other loose material would be covered or at least 2 feet of freeboard would be maintained.
- All paved roads would be kept clean of mud, dirt, or debris, as necessary. Gravel or other similar material would be used where unpaved access roads intersect paved roadways to prevent mud and dirt track-out.
- Unnecessary idling of equipment would be limited.

Invasive Species and Weed Management

- AES would implement controls at entry locations to facilitate weed management and invasive species control and to minimize infestation of the Project site from outside sources. A controlled inspection and cleaning area would be established to visually inspect construction equipment arriving at the Project area and to remove and collect seeds that may be adhering to tires and other equipment surfaces.
- Develop and implement control of noxious weeds and invasive species, which could occur as a result of new surface disturbance at the site.

Biological Resources

- To minimize activities that attract prey and predators during construction and operations/maintenance, garbage would be placed in approved containers with lids and removed promptly when full to avoid attracting nuisance wildlife. Open containers that may collect rainwater would also be removed or stored in a secure or covered location to avoid attracting wildlife.
- Lighting would be designed to provide the minimum illumination needed to achieve operations/maintenance objectives and to not emit excessive light to the night sky by installing light absorbing shields on top of all light fixtures and by focusing lights in a downward direction.
- If required, worker environmental awareness training conducted by APS staff would be implemented, for all operations/maintenance staff for the duration of the Project.
- Transmission lines, poles, and associated structures:

- As recommended by Avian Power Line Interaction Committee (APLIC 2006), transmission lines would have at least 60 inches of horizontal separation and a vertical separation of 40 inches between phase conductors, which is greater than the physical dimensions of all large birds and bats that could potentially use the structures for perching.
- In situations where particular hardware would present an electrocution risk (e.g., jumpers, cutouts, arrestors, transformers, etc.), perch guards and/or insulators would be installed per APLIC (2006) guidelines to minimize electrocution risk.
- Line marking devices would be installed as needed to reduce risk of avian collisions (APLIC 2012).
- Vegetation:
 - All vegetated areas disturbed by construction activities, except permanent road surfaces, would be reseeded with a native seed mix as applicable.
 - Herbicides and pesticides may be used, as needed, to control invasive/noxious weeds and/or pests on site. AES would use only Environmental Protection Agency (EPA)-registered pesticides and/or herbicides that also comply with Arizona State (State) and local regulations. Herbicide and pesticide use shall be limited to non-persistent immobile herbicides/pesticides and shall only be applied in accordance with label and application permit directions and stipulations for terrestrial applications.
- Lighting:
 - Utilize the minimum intensity lighting that meets safety criteria.
 - Fully shield all permanent lighting (e.g., full cut-off), except for emergency lighting triggered by alarms.
 - Mount lighting so that no light is emitted above an imaginary horizontal plane through the fixture.
 - Consider lighting control through timers, sensors, dimmers, or switches that are available to facility operators.

Cultural Resources

- Project-related vehicular traffic would be restricted to existing access roads and overland travel within the transmission line ROW whenever feasible. If improvements to existing access roads or new temporary or permanent access roadway is needed for construction and operation and maintenance of the new transmission line, all roads would be restored to pre-existing conditions when they are no longer needed. All improvements to existing access roads or new temporary or permanent access roadway would be located within the area covered by the Class III Archaeological Survey completed for the Project.
- In the event that previously unreported historic properties are encountered during ground disturbing activities, all work must cease immediately within 100 feet until a qualified archaeologist procured by AES has documented the discovery and evaluated its eligibility for the National Register of Historic Places (NRHP), in consultation with WAPA, Arizona State Museum (ASM), Arizona State Historic Preservation Office (SHPO), and tribes, as appropriate. Work must not resume in this area without approval of WAPA.

- If human remains are encountered during ground-disturbing activities, all work must immediately cease within 100 feet of the discovery. The ASM, WAPA, SHPO, and appropriate tribes must be notified of the discovery in accordance with Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 United States Code 3001-3013) or Arizona burial laws (A.R.S. § 41-844 and A.R.S. § 41-865), as appropriate, and work must not resume in this area without proper authorization.

Transportation

- Deliveries of materials would be scheduled for off-peak hours, when practical, to reduce effects during periods of peak traffic.
- Truck traffic would be phased throughout construction, as much as practical.
- Carpooling or mass transportation options for construction workers would be encouraged.
- AES would obtain the applicable permits needed to transport equipment and materials (e.g., oversized transformers, etc.) and coordinate closely with Arizona Department of Transportation (ADOT) and other State transportation departments, as appropriate.

Public Health and Safety

- Proposed battery storage facility design would include an 8-foot-tall solid masonry wall, plus intrusion detection system on top, to ensure secure access along all facility boundaries.
- Proposed battery storage facility design would include a First Responder Station at the emergency access entrance, and a fire water loop with five fire hydrants and requisite isolation valves.
- Proposed battery storage facility design would include fire and gas detection and fire suppression systems in each individual battery storage cube. Each cube would be equipped with a three-zone fire detection and suppression system, incorporating photoelectric smoke detectors which would be monitored remotely 24/7. The system would utilize aerosol suppressant supplied via two canisters. The fire suppression system may also be manually activated via pull stations. Combination horn/ strobe devices would indicate that the system has been deployed. Each non-entry cube is designed to be electrically isolated to contain potential fire inside and prevent propagation to battery modules in adjacent cubes.
- The Project would be designed in accordance with all applicable Federal and industrial standards including the American Society of Mechanical Engineers, NESC, International Energy Conservation Code, International Building Code, Uniform Plumbing Code, Uniform Mechanical Code, National Fire Protection Association standards, and Occupational Safety and Health Administration regulations.
- AES would develop and maintain a Spill Prevention and Emergency Response Plan in coordination with the Fire Marshall. The Emergency Response Plan would include description of the BESS, operational states, emergency scenarios, system actions, recommendations for extinguishing, site access, and control and roles of stakeholders. A copy of the plan would be kept onsite at all times, and facility staff, First Responders, and fire personnel would be trained annually and as needed on the procedures outlined in the plan.

Wastes and Hazardous Materials

- AES would design and operate systems containing regulated materials (e.g., transformer oil) in a manner that limits the potential for their release.
- Vehicles and equipment would be kept in proper working condition to reduce the potential for leaks of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials.
- The containment and disposal of hazardous waste would be outlined in a Spill Prevention and Emergency Response Plan developed by the AES construction contractor to reduce the likelihood of substantial spills.

Visual Resources

- Reduce visual impacts during construction by minimizing areas of surface disturbance, controlling erosion, using dust suppression techniques, and, if applicable, restoring exposed soils as closely as possible to their original contour and vegetation.
- Incorporation of view-obscuring 8-foot solid masonry wall along all proposed battery storage facility boundaries.
- New artificially weathered (dulled) galvanized steel transmission poles and non-specular conductors would be used to reduce visual impacts.

2.5 No Action Alternative

Under the No Action Alternative, WAPA would not provide financing to AES for their proposed Project and the Project would not be built using financing from the United States Treasury. Under this alternative, the Project would not be built and would potentially increase grid instability without addressing storage needs at the local load center. Construction activities associated with the Proposed Action would not occur. Additionally, under this alternative, Reclamation would not enter into an LGIA with AES.

2.6 Alternatives Considered but Not Further Evaluated

Prior to submitting the request for Project financing, the Project Applicant considered multiple factors in the evaluation of potential Project locations, including proximity to the Westwing Substation, contiguous parcel(s) of private lands suitable for battery storage development and with low resource value, proximity to existing transportation and utility infrastructure, and proximity to developed areas to minimize materials transportation and workforce commute. Based on these and other development factors, the Project Applicant optioned the proposed 10-acre parcel for development.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

The information in this chapter describes the affected (existing) environment within the Project area and presents the potential effects of the Project and the No Action Alternative on the resources identified for analysis. The resource issues addressed in this EA were developed using comments received from the public, tribes, and agencies during internal and external scoping. Resource issues considered but dismissed from further analysis are described in Section 3.2.

3.2 Impact Analysis Methodology

The terms “impacts” and “effects” are used interchangeably, and the terms “increase” and “decrease” are used for comparison purposes in this EA. Direct, indirect, and cumulative impacts are described in this chapter. Potential impacts are described in terms of duration, intensity, type, and context. Definitions of impact terms are provided below.¹

- **Direct:** caused by the action, same time and place.
- **Indirect:** caused by the action, but later in time or further in distance, but still reasonably foreseeable.
- **Cumulative:** caused by the incremental impact of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions.

For the purposes of this analysis, duration (temporal scale) of the direct or indirect effects of the analysis is defined as follows. These durations would apply to each of the resources/uses that are analyzed in this EA but may vary slightly depending on the resource/use.

- **Short-term:** impacts that would be less than 5 years in duration, includes temporary construction-related impacts.
- **Long-term:** impacts that would be greater than 5 years in duration.

For the purposes of this analysis, intensity or severity of the impact is defined as follows:

- **Negligible:** changes would not be detectable and/or measurable. The resource/use would be essentially unchanged or unaltered.
- **Minor:** changes would be detectable and/or measurable and would have a slight change or alteration to the resource/use.

¹ Preparation of this EA commenced prior to September 14, 2020 and is proceeding pursuant to 40 CFR § 1506.13 which provides “the regulations in this subchapter apply to any NEPA process begun after September 14, 2020. An agency may apply the regulations in this subchapter to ongoing activities and environmental documents begun before September 14, 2020.” Since scoping was conducted in 2019 for this Project, this EA has been prepared in accordance with the Council on Environmental Quality (CEQ) regulations implementing the provisions of NEPA as were codified in 1978.

- **Moderate:** changes would be clearly detectable, measurable, and/or have an appreciable effect on the resource/use. The resource/use would be notably changed or altered, and the effect is apparent. Project activities could change the indicator over a small area or to a lesser degree.
- **Major:** changes would be readily detectable, and/or have a severe effect on the resource. The resource/use would be substantially changed or altered over a large area or to a large degree.

For the purposes of this analysis, the type of impact is defined as follows:

- **Adverse:** impacts that would have a detrimental effect to a resource/use.
- **Beneficial:** impacts that would have a positive effect to a resource/use.

Context is the setting within which an impact is analyzed. For the purposes of this analysis, the contexts are defined as follows:

- **Local:** within and immediately adjacent to the Project area.
- **Regional:** remaining area outside of but within 15 miles of the Project area.

Table 3-1 identifies the presence or absence of resource elements or uses in the Project area, and states the rationale for the inclusion or exclusion of a detailed analysis of those resource elements in the EA.

Table 3-1. Determination and Rationale for Resources Considered/Dismissed from Further Analysis

Resource/Use	Additional Analysis Determination and Rationale
Air Quality	<p>The Federal Clean Air Act of 1970 was the first comprehensive legislation aimed at reducing levels of air pollution throughout the country. The 1970 law required the EPA to establish National Ambient Air Quality Standards (NAAQS), which set maximum allowable concentrations for seven criteria pollutants: carbon monoxide, nitrogen dioxide, ozone, particulate matter and fine particulate matter, sulfur dioxide, and lead. The General Conformity Rule of the Federal Clean Air Act (42 USC 7401) implements Section 176(c) of the Clean Air Act, and establishes minimum thresholds (de minimis thresholds) for ozone, CO, and other regulated pollutants for nonattainment and maintenance areas. The General Conformity Rule ensures that federal actions comply with the NAAQS. Actions would conform to a SIP if their annual direct and indirect emissions remain less than the applicable de minimis thresholds. Formal conformity determinations are required for any actions that exceed these thresholds.</p> <p>The Project area is in serious nonattainment for the 1987 particulate matter 10 microns or smaller (PM₁₀) standard and moderate nonattainment for the 2008 ozone standard and marginal nonattainment for the 2008 ozone standard (EPA 2021a, 2021b). Because the Project site is in nonattainment for ozone, the following de minimis thresholds would apply:</p> <ul style="list-style-type: none"> • Volatile organic compounds (VOCs) = 100 tons per year • Oxides of nitrogen (NO_x) = 100 tons per year

	<p>The following PM₁₀ de minimis threshold would apply because the Project site is in nonattainment for PM₁₀:</p> <ul style="list-style-type: none"> PM₁₀ = 70 tons per year <p>Potential impacts from construction, O&M, and decommissioning of a battery storage facility and interconnection on local and regional air quality would result from fugitive dust emissions and vehicle exhaust emissions, primarily during the construction and decommissioning phases. The main source of fugitive dust (particulates) in the vicinity of the Project area would include vehicular traffic on unpaved roads and windblown dust from disturbed areas. Fugitive dust on unpaved roads would be reduced through watering the roads or other dust control measures as described in Section 2.4.2, including implementation of a Fugitive Dust Control Plan. With the implementation of BMPs for dust control, impacts would be minor and would not require additional measures to minimize or avoid adverse impacts.</p> <p>During construction and decommissioning activities, there would be short-term, localized, negligible increases in vehicle emissions and fugitive dust from ground disturbance and vehicle travel associated with the Project, however the increases would be well below the de minimis thresholds for VOCs, NO_x, and PM₁₀. Once these activities are completed (construction activities are estimated to take up to 12 months), operation of the unmanned battery storage facility is not expected to contribute to measurable or detectable impacts to air quality. Long-term, negligible increases in emissions from a limited amount of maintenance vehicle traffic is expected with the Project. No additional detailed analysis in the EA is warranted.</p>
Climate Change/ Greenhouse Gas Emissions	<p>Climate change is a global issue that results from several factors, including, but not limited to, the release of greenhouse gases (GHGs), land use management practices, and the albedo effect, or reflectivity of various surfaces (including reflectivity of clouds). Specific to the Project, GHGs are produced and emitted by various sources during the development and operational phases of transmission lines and battery energy storage. The primary sources of GHGs associated with transmission lines and substations are carbon dioxide, methane, and nitrous oxide from fuel combustion in construction and maintenance vehicles and equipment. In addition, removing vegetation may result in a small, short-term, indirect increase in GHG emissions due to the reduction in carbon uptake.</p> <p>Construction of the Project would result in temporary activity and minor levels of GHG emissions that would cease after the construction period. During the O&M phase, periodic O&M activities would generate negligible GHG emissions. Overall emissions from construction and operation of the Project would be minimal in comparison to global GHG emissions. Furthermore, the development of a 100-MW battery storage facility would offset the emissions of GHGs that would occur if the same amount of energy were generated by a traditional, fossil fuel powered energy facility.</p>

	<p>In addition, equipment (switches and reclosers) containing the GHG sulfur hexafluoride are not planned for this Project.</p> <p>The GHG emissions from the Project would result in negligible, short-term, incremental impacts to climate change and GHG emissions, and would be limited to activities during Project implementation. No additional analysis in this EA is warranted.</p>
Cultural Resources	See Detailed Analysis in Section 3.3
Environmental Justice	<p>There are no minority or low-income populations identified residing or working within or adjacent to the Project area in the communities of Coldwater Ranch (0.27 mile north of the Project area) or Sun City West (2.06 miles southwest of the Project area) (U.S. Census Bureau 2010). 7.5 percent of the population of the adjacent City of Peoria, 7.5 percent of the population of Sun City West, and 7.3 percent of the population of the City of Surprise (0.92 mile southwest of the Project area) are below the poverty level. These communities may experience minor beneficial socioeconomic impacts from the Project. Therefore, there are no disproportionate impacts to environmental justice populations. No additional detailed analysis in the EA is warranted.</p>
Farmlands (Prime or Unique)	<p>There are no U.S. Department of Agriculture designated prime or unique farmlands within the Project area (USDA 2019). No additional detailed analysis in the EA is warranted.</p>
Floodplains	<p>Executive Order 11988, Floodplain Management, requires an evaluation of impacts to floodplains for all Federal actions and directs Federal entities to reduce impacts to floodplains and minimize flood risks to human safety. Further, the DOE is required under 10 CFR § 1022.11 to determine if a proposed action would be located in a floodplain.</p> <p>The Project site is not located in a designated 100-year floodplain (FEMA 2013). The Project site would not fall within a floodplain, and thus would have no impact on existing floodplains. No additional detailed analysis in the EA is warranted.</p>
Geology, Mineral Resources, and Energy Production	<p>There are no geologic or mineral resources within the Project area, so no impact to these resources would result from the Project (AZGS 2021). No additional detailed analysis in the EA is warranted.</p>
Indian Trust Assets	<p>Indian Trust Assets are legal assets associated with rights or property held in trust by the United States for the benefit of federally recognized Indian tribes or individual tribal members. The United States, as trustee, protects and maintains the specific rights reserved by, or granted to, Indian tribes or individuals by treaties, statutes, and executive orders. There are no known Indian Trust Assets within the Project area, therefore the Project would result in no adverse effects to any Indian Trust Asset. No additional detailed analysis in the EA is warranted.</p>

Intentional Acts of Destruction	<p>The Project presents an unlikely target for an act of terrorism or sabotage, with an extremely low probability of attack. The DOE requires that NEPA documents explicitly address potential environmental consequences of intentional acts of destruction (DOE 2006). The purpose is to inform the decision-maker and the public about chances that reasonably foreseeable accidents associated with proposed actions and alternatives could occur, and their potential adverse consequences. Reasonably foreseeable means events that may have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is with the rule of reason or reasonably foreseeable (40 CFR § 1502.22). This includes determining the appropriate level of detail for analysis based on the type of project, level of risk, and sensitivity for releasing information to the public.</p> <p>The addition of the proposed interconnection and associated battery storage facilities would continue to support the reliability of delivering electricity in the vicinity as it would contribute to a more flexible and resilient grid. Energy storage improves system reliability as it can meet peak capacity while supplying ancillary services to the grid. Vandalism and intentional acts of destruction (sabotage) of the proposed facility and related interconnection are unpredictable events. The chances of such acts occurring would be reduced by the limited and secure access to the proposed battery storage facility, including an 8-foot-tall solid masonry wall, plus intrusion detection system on top, along all proposed facility boundaries. Intrusion detection system to alert the system operators of any potential intruders. In addition, the facility and transmission lines would be inspected on a regular O&M schedule for any signs of sabotage or vandalism and immediate action would be taken if a potential hazard is found. The potential for serious injury resulting from vandalism is negligible; therefore, impacts would be less than significant. No additional detailed analysis in the EA is warranted.</p>
Lands and Realty	<p>The proposed battery storage facility would be located entirely on privately owned lands. The proposed transmission line route would follow an existing APS 69-kV transmission line ROW across privately owned and Salt River Project land to interconnect into the existing APS Westwing Substation to the south. The AES proposed Project would need to negotiate an approximate 60-foot-wide easement for the first 0.07-mile (370-feet) span of the new transmission line ROW from the proposed battery storage facility to the existing APS transmission pole with the underlying landowner. WAPA would not participate in or have any interest regarding these ROW negotiations.</p> <p>Although ROWs may be present, impacts to WAPA or other entities would be negligible. No temporary or permanent access limitations or alterations are anticipated to lands outside of the Project area; therefore, there would</p>

	<p>be no impacts to privately owned lands. No additional detailed analysis in the EA is warranted.</p>
Native American Religious Concerns	<p>On September 25, 2019, WAPA initiated consultation with tribes that have an affiliation with the Project area (See Section 1.4.2 Tribal Consultation). WAPA provided Project information and described the cultural resources review process to tribal cultural resources specialists. WAPA also requested information from the consulting tribes on historic properties in the Project area and solicited comments from tribal representatives. The tribal comments were used to shape the Project's cultural resource field investigation. To date, the Hopi Tribe has provided input on their desire to consult when there is potential to adversely affect prehistoric sites that would be caused by the Project. In addition, the White Mountain Apache Tribe has determined the Project plans would "Not have [an] Adverse Effect" on the White Mountain Apache tribe's historic properties and/or traditional cultural properties, and no further consultation is necessary.</p> <p>No sacred sites were identified within the Project area during the archaeological surveys conducted in November 2019 and May 2020. Government-to-government consultation will continue with tribes through Project implementation. No additional detailed analysis in the EA is warranted.</p>
Noise	<p>The Project area would be located in undeveloped terrain north of Arizona State Route 303. The nearest sensitive receptors are residences in the Coldwater Ranch community across West Happy Valley Road north of the Project area. Noise would be generated by equipment and vehicles during construction, O&M, and decommissioning, similar to existing and ongoing noise levels. Noise generated by construction and decommissioning of the proposed battery storage facility and interconnection would result in short-term, temporary, adverse impacts. Noise generated during O&M would result in long-term, but negligible, adverse impacts over the life of the unmanned BESS and interconnection. No additional detailed analysis in the EA is warranted.</p>
Noxious and invasive Weeds	<p>Non-native species including stinknet (<i>Oncosiphon piluliferum</i>), prickly Russian thistle (<i>Salsola tragus</i>), Mediterranean grass (<i>Schismus</i> sp.), red brome (<i>Bromus rubens</i>), and buffelgrass (<i>Pennisetum ciliare</i>) have been observed in the Project area (Stantec 2020a). Of these non-native species, stinknet and buffelgrass are listed as noxious weeds by the ADA under Arizona Administrative Code R3-4-245.</p> <p>Ground-disturbing activities associated with the construction of the Project may create conditions that could increase the potential for introduction and/or establishment of nonnative plants, including noxious and invasive weeds. Short-term, negligible, adverse impacts would result from the BESS facility being cleared of vegetation prior to construction. During O&M, long-</p>

	term, negligible, beneficial impacts would result from the ongoing site and vegetation maintenance. The Project would comply with all Federal, State, and local weed control regulations and implement noxious and invasive weed BMPs, therefore, the potential for spread of invasive and/or noxious weeds would be very low. No additional detailed analysis in the EA is warranted.
Paleontology	The Project area is located north of the Salt River and along the western bank of the Agua Fria River (Stantec 2020b). The surrounding area can be characterized as very typical of valley floor within a larger desert, without any observable granite outcrops, or any other prominent geologic features. While the entire proposed battery storage facility site is located in an undeveloped open field adjacent to the existing Westwing Substation, most of the surrounding Study Area is located along existing paved roadways within existing residential and commercial developments that have been constructed and developed in the last 25 years. Therefore, the Project area has low potential for paleontological materials. No additional detailed analysis in the EA is warranted.
Public Health and Safety	Workers would be exposed to noise and exhaust from motorized equipment and vehicles during construction, O&M, and decommissioning of the Project. The use of hearing protection and operation of equipment in well-ventilated areas would minimize effects to operator health. It is unlikely that the public would be at risk from any construction, O&M, or decommissioning activities by maintaining safety zones around active work areas. AES Energy Storage, LLC would be required to comply with all applicable design codes and implement a range of plans to minimize risks to workers and public alike, such as spill prevention and emergency response plans, hazardous materials management plans, fire management plans, and health and safety programs. Further, the proposed battery storage facility design includes fire and gas detection and fire suppression systems in each individual battery storage cube. Therefore, the potential risk to worker and public health during construction, O&M, and decommissioning would be negligible. No additional detailed analysis in the EA is warranted.
Recreation	There are no designated public recreation facilities, such as trails, known to occur within or adjacent to the Project area. Because the land where the proposed battery storage facilities would be built is privately owned, there are also no opportunities for dispersed recreation activities, such as motorized and non-motorized activities, wildlife viewing, hunting, camping, hiking, and off-highway vehicle (OHV) use. Therefore, no impact to this resource would result from the Project. No additional detailed analysis in the EA is warranted.
Biological Resources	See Detailed Analysis in Section 3.4
Socioeconomics	Within the vicinity of the Project area, the only concentrated areas of population are the Peoria (175,961 people) and Surprise (141,664 people)

	<p>Census Designated Places (CDPs). 7.5 percent of people in Peoria and 7.3 percent of people in Surprise are below the poverty level (U.S. Census Bureau 2010). The Project may result in minor beneficial impacts to the socioeconomic conditions of the two CDPs during construction when workers would be onsite daily. The improvements made to vacant land would subject that land to a potentially higher tax assessment ratio, which would affect the long-term property tax revenue paid to Maricopa County.</p> <p>The Project's construction and decommissioning activities would have a negligible, beneficial impact to socioeconomics from onsite crews using local services. During O&M, there would be no impact on socioeconomics because they would not employ any local community members. No additional detailed analysis in the EA is warranted.</p>
Soils	<p>Soils in the Project area are typical warm desert soils, showing modification of the parent materials associated with aridity. Distinguishing features are the low humus content and high content of readily soluble salts (Stantec 2020). Impacts to soils from the Project, including soil compaction and soil erosion by wind and water, would mainly occur from construction and decommissioning activities and would result in short-term, minor, adverse impacts. During O&M activities, maintenance vehicles would be restricted to designated roads. With the implementation of BMPs, including those for stormwater, erosion, and fugitive dust control, impacts to soils would be minimized. Project long-term, adverse impacts to soil resources would be negligible. No additional detailed analysis in the EA is warranted.</p>
Transportation	<p>Primary access to the proposed battery storage facility site would be via West Happy Valley Road, which is a major east-west arterial. Transmission line access roads exist underneath or adjacent to the majority of the proposed transmission line ROW. An access road extension may be needed underneath or adjacent to the first approximately 0.07-mile (370-feet) AES span of the new transmission line ROW from the proposed facility to the existing APS transmission pole. Improvements to existing access roads as well as new temporary or permanent access roadway may be needed for construction and operation and maintenance of the new transmission line. All temporary roads would be restored to pre-existing conditions when they are no longer needed, and all upgraded existing roads and new permanent roads would be restored to a width of 12 feet. Maximum road grades would vary depending on the erosion potential of the soil: 6-8% on erodible soils, or 10-15% for erosion resistant soils.</p> <p>During construction, the Project would result in a minor, short-term increase in traffic on West Happy Valley Road in the immediate vicinity of the Project area as equipment is transported to the site. Delays may occur during delivery of large equipment, such as the substation components; however, deliveries would be directed to the laydown areas within the Project area to minimize traffic delays on local roadways or at intersections, even during peak construction. There would be no road closures required and delays are not expected to impede the existing use of West Happy</p>

	<p>Valley Road. Construction traffic would also result in a negligible impact to Arizona State Route 303. Impacts to transportation from O&M activities would be negligible and would not impact traffic flow on local roadways as the BESS facility would be primarily operated remotely and would only be visited for maintenance visits twice a month on average. No additional detailed analysis in the EA is warranted.</p>
Water Resources and Quality (Drinking/ Surface/ Groundwater)	<p>The Project area is located within the Phoenix AMA hydrologic subbasin (HUC 15070102). All-natural drainage features identified on the Project site are ephemeral and flow only in direct response to localized precipitation events. These natural ephemeral drainages would not be considered WOTUS by the U.S. Army Corps of Engineers (USACE) because all show poor development of bed and banks, have discontinuous or non-existent Ordinary High-Water Marks, and in most cases can be described as small erosional features or swales. This is owing to the very low gradient of the site soil characteristics, and low annual precipitation, which promotes infiltration and evaporation over long-distance stormwater runoff (Stantec 2020a).</p> <p>The results of the desktop research and field investigation indicate that there are no WOTUS in the Project area as defined by the USACE because of a lack of hydrophytic vegetation, stream hydrology, and hydric soil development. The Project area contains no relatively permanent surface water features and there are no mapped hydric soils in the Project area (Stantec 2020a).</p> <p>The Project would implement BMPs for stormwater and erosion control as part of the Project SWPPP to prevent runoff and sedimentation into the washes in the Project area during construction. Once operational, the proposed battery storage facility would be designed to maintain existing drainage patterns and control the rate and amount of surface water runoff through implementation of stormwater retention basins along the eastern facility boundary.</p> <p>The proposed battery storage facility would require limited water and wastewater utilities and services during O&M via connection to existing EPCOR Water Arizona water supply and sewer lines running in Happy Valley Road. Limited water required during the construction phase would be trucked in as necessary until water service is available.</p> <p>Therefore, impacts to water resources and quality from construction, O&M, and decommissioning activities would be negligible. No additional detailed analysis in the EA is warranted.</p>
Wetland, Riparian Areas	<p>There are no wetlands/riparian zones in the Project area, so no impact to this resource would result from the Project (USFWS 2021). No additional detailed analysis in the EA is warranted.</p>

Wild and Scenic Rivers	There are no Congressionally designated Wild and Scenic Rivers within or immediately adjacent to the Project area, so no impact to this resource would result from the Project (NWSRS 2021). No additional detailed analysis in the EA is warranted.
Wilderness Area	There are no known Wilderness Areas, Wilderness Study Areas, or Lands with Wilderness Characteristics within or immediately adjacent to the Project area, so no impact to this resource would result from the Project. No additional detailed analysis in the EA is warranted.

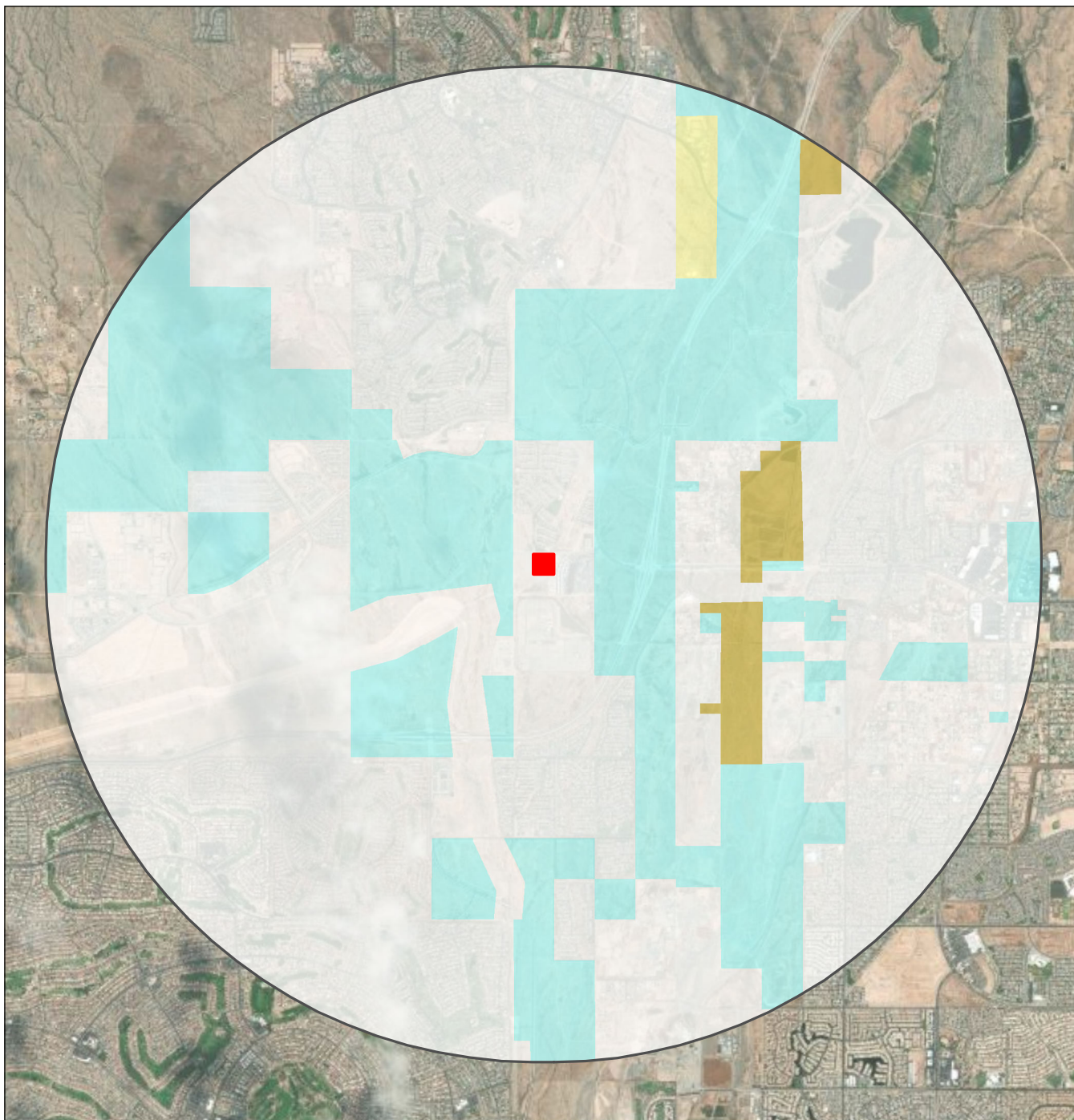
3.2.1 Cumulative Impacts

The determination of what past, present, and reasonably foreseeable future actions to consider in the impact analysis is based on the resources being affected by the Project. A cumulative effect is defined under NEPA as “the change in the environment which results from the incremental impact of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR Part 1508.7). Past, present, and reasonably foreseeable future actions that incrementally add to the potential cumulative impacts of the Project and the No Action alternatives are considered in this EA. The intent of this analysis is to capture the total effects of several actions over time that would be missed by evaluating each action individually.

3.2.2 Cumulative Effects Analysis Area and Timeframe of Effects

Geographic (spatial) and time (temporal) boundaries have been established for the cumulative effects analysis. Each resource that may have a minor, moderate, or major impact from the Project has a defined cumulative effects study area (CESA). The geographic area of the CESA for visual resources would include the area within 3 miles of the Project, which is the roughly the maximum distance from which a casual observer could distinguish the elements of the Proposed Action. The cultural resources CESA would be the same 3-mile radius and would encompass the area of indirect impacts for any cultural property based with the discernible view of the Project area. For general wildlife and special status wildlife species, the CESA is also 3 miles from the Project area and is based on the distance that Arizona Game and Fish Department (AGFD) uses to identify species that may be present in the landscape.

The Project CESA represents 19,050 acres and the Project area is 5.23 percent of this CESA. The BLM manages 2 percent of the CESA, Reclamation manages 1 percent, 30 percent consists of State-managed lands, and 67 percent is privately owned. Figure 3-1 shows the 3-mile CESA boundary in relationship to the Project area. A 20- to 25-year timeframe is considered for the cumulative effects analysis, which would be the operational life of the Project.



- Project Parcel**
- Cumulative Effects Study Area (3 Miles)**
- Ownership**
- Bureau of Land Management
 - Bureau of Reclamation
 - Private
 - State

0 2,500 5,000 Feet
(At original document size of 8.5x11)
1:60,000



Notes

1. Coordinate System: NAD 1983 StatePlane Arizona Central FIPS 0202 Feet
 2. Data Sources: Stantec 2021. Parcels From Maricopa County 2021.
 3. Background: © OpenStreetMap (and) contributors, CC-BY-SA
- Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure No.

3-1

Title

Arizona Peaking Capacity Energy Storage Project Visual and Cultural Resources, and Wildlife Species CESA

3.2.3 Past and Present Actions

In order to understand the contribution of past actions to the cumulative effects of the Project and the No Action alternative, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. Existing conditions reflect the aggregate impact of prior human actions and natural events that have affected the environment and could contribute to cumulative effects. The cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. By looking at current conditions, the residual effects of past human actions and natural events are captured, regardless of which particular action or event contributed those effects. The Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.”

3.2.4 Reasonably Foreseeable Future Actions

WAPA developed a list of reasonably foreseeable future actions that, when combined with impacts from the Proposed Action, would have a potential for impacts resulting in cumulative effects (Table 3-2). Specific projects by land managers within the CESA have been reviewed, including the BLM, Reclamation, ADOT, Maricopa County, APS, and WAPA. Arizona State Land Department was contacted but did not respond with information regarding their current projects. Other reasonably foreseeable future actions and management activities occurring in the CESA which are highly probable include range improvements, vegetation management, recreation (e.g., OHV use, hiking), road improvements, utility projects, and potentially the addition of special designation areas and Special Recreation Permit. Other disturbances that are ongoing include wildland fire and establishment and spread of noxious weeds and invasive plant species.

Table 3-2. Reasonably Foreseeable Future Actions

Project Name	Proximity to Project Area	Description
Commercial Alteration (Maricopa County)	0.32 mile	Convert recreational amenities to natural gas service instead of propane at Christopher Todd Communities on Happy Valley
Residential Alterations (Maricopa County)	0.32 - 3 miles	Various minor residential alterations (e.g., construction and installation of fences, canopies, pools with gas lines, electric panels, and underground propane tanks)
Outside of 3-mile buffer		
69-kV Power Line Siting Project (APS)	4.58 miles	The proposed APS 69-kV line would cross Reclamation land along the Central Arizona Project canal.
West Valley Central 230-kV Connection Project (APS)	10.05 miles	APS is in the process of identifying appropriate routes for new 230-kV powerlines that will connect the Contrail Substation two miles to the east into the existing 230-kV transmission line or directly into the El Sol Substation, and approximately 5 miles to the west into the planned TS-2 Substation.

Project Name	Proximity to Project Area	Description
Co. Ltd Project (APS)	At least 13.22 miles away	APS will be relocating 3 to 4 miles of an existing 500/230-kV transmission line approximately 0.5 mile to the north and expanding a planned (but unbuilt) 230-kV substation that will serve the plant, and consideration of an additional 500/230-kV substation that may also serve the plant. The location is currently undisclosed.

3.2.5 Cumulative Impacts on Resources

For this analysis, cumulative resource impacts for the CESA are the combined direct and indirect effects of the present and reasonably foreseeable future actions, in addition to the direct and indirect impacts of the Project and the No Action alternatives, respectively. The levels of direct and cumulative impacts are categorized as major, moderate, or minor based on the same thresholds defined in Section 3.1. If the results of the analysis of direct or indirect impacts were considered to be none or negligible as a result of the Project and the No Action alternative, there would be no measurable contribution to a cumulative effect and, therefore, no cumulative effects analysis for the respective resource/use has been done.

Based on the analysis of direct and indirect impacts provided in Chapter 3.0, neither the Project nor the No Action Alternative would have long-term, minor, moderate, or major direct effects to the following resources: air quality; climate change/ greenhouse gas emissions; environmental justice; prime or unique farmlands; floodplains; geology, mineral resources and energy production; intentional acts of destruction; lands and realty; Native American religious concerns; noise; noxious and invasive weeds; paleontology; public health and safety; recreation; socioeconomics; soils; transportation; water resources and quality; wetlands and riparian areas; Wild and Scenic Rivers; or Wilderness Areas within the Project area. There would be no measurable contribution to these resources' use's respective cumulative impacts; therefore, there is no cumulative effects analysis for these resources/uses. Refer to Table 3-1 for detailed information regarding the potential impacts to these resources/uses. Potential short- and long-term, minor to major, direct effects to cultural, biological, and visual resources associated with the Project are analyzed in further detail in Sections 3.3 through 3.5.

3.3 Cultural Resources

For the purposes of the Project, the term "cultural resource" refers to buildings, districts, sites, and objects that have historical or cultural value. A historic property is defined in 36 CFR § 800.16 as: "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places." The term "eligible for inclusion in" refers to properties that meet the criteria for listing in the National Register are not listed in the National Register but do meet the criteria for listing in the National Register. This section of the EA describes cultural resources, historic properties, and the impacts that the Project and the No Action Alternative would have on those resources. This analysis is based on the Archaeological Survey of 51.0 Acres of Land for the Project (Stantec 2020b).

The Archaeological Survey Area of Potential Effects (APE) includes the footprint of the proposed battery storage facility, alignment of the 0.6-mile long 230-kV transmission line, additional project alternatives,

and any proposed Project staging areas, including a 30-meter buffer surrounding each area, for the total of 51.0 acres. The 0.47-mile-long portion of the existing transmission corridor, which would be rebuilt, was not surveyed as it lies within the existing Westwing Substation property boundary walls on previously disturbed (leveled and graded) land. The Study Area includes the APE and the ½-mile radius surrounding the APE (Figure 3-2). The Study Area is examined in the archaeological analysis to account for Project surroundings. The CESA was also examined to account for how the impacts of the Project would interact with surrounding land uses and development.

3.3.1 Affected Environment

3.3.1.1 Cultural Setting

ARCHAIC PERIOD

The end of the Pleistocene witnessed the retreat of the continental glaciers and initiated a trend of increasing temperatures and aridity resulting in vegetation shifts and desiccation of pluvial lakes in the Great Basin (Stone 1986). As a result, to the changing conditions, many large mammal species became extinct and in western Arizona there appears to have been a rapid retreat of the juniper woodlands. Furthermore, the end of the Pleistocene was also accompanied by shifts in human subsistence strategies include reliance on a broad range of plants and fauna with much less emphasis on the hunting of large game (Stone 1986).

Cultural developments of the Archaic Period in the region have been variously categorized as the San Dieguito-Pinto Complex (Cordell 1984), San Dieguito-Amargosa (Haury 1975), or the Western tradition of the Picoa Culture (Irwin-Williams 1979), or treated as separate cultural phenomena as the Amargosa tradition and the Pinto complex (Ezzo 1994; Sterner 1992). Rogers (1939) who defined the Amargosa tradition believed that an Amargosan incursion resulted in the displacement or absorption of San Dieguits groups in western Arizona (Rogers 1958). In general, this time period witnessed the addition of grinding implements and various projectile points reminiscent of the early San Dieguito tradition, which included scrapers, scraper planes, and flake choppers. Some late Archaic groups in the region began to focus on agriculture or horticulture as part of their subsistence and had adopted more sedentary agriculture-based lifestyle. Generally, the Archaic Period, including the various subdivisions and phases extends roughly from 6,000 B.C. to A.D 1.

PATAYAN AND HOHOKAM CULTURAL CHRONOLOGY

Stone (1986) points out that by definition, the Archaic Period in the Southwest ended with the introduction of ceramics and the practice of agriculture. While this transition took place over a long period of time, however, the events and processes that caused this transformation are unclear. Wilcox (1979) argues that near the end of the Archaic Period increasing population densities and decline in average effective precipitation may have reduced the efficiency of small hunting groups and favored the adoption of farming, and thus, increasing the reliance on storage, and caused a major shift towards rivers and perennial streams. Regional cultures continued to diverge, with the Patayan in the west and the Hohokam in the east.

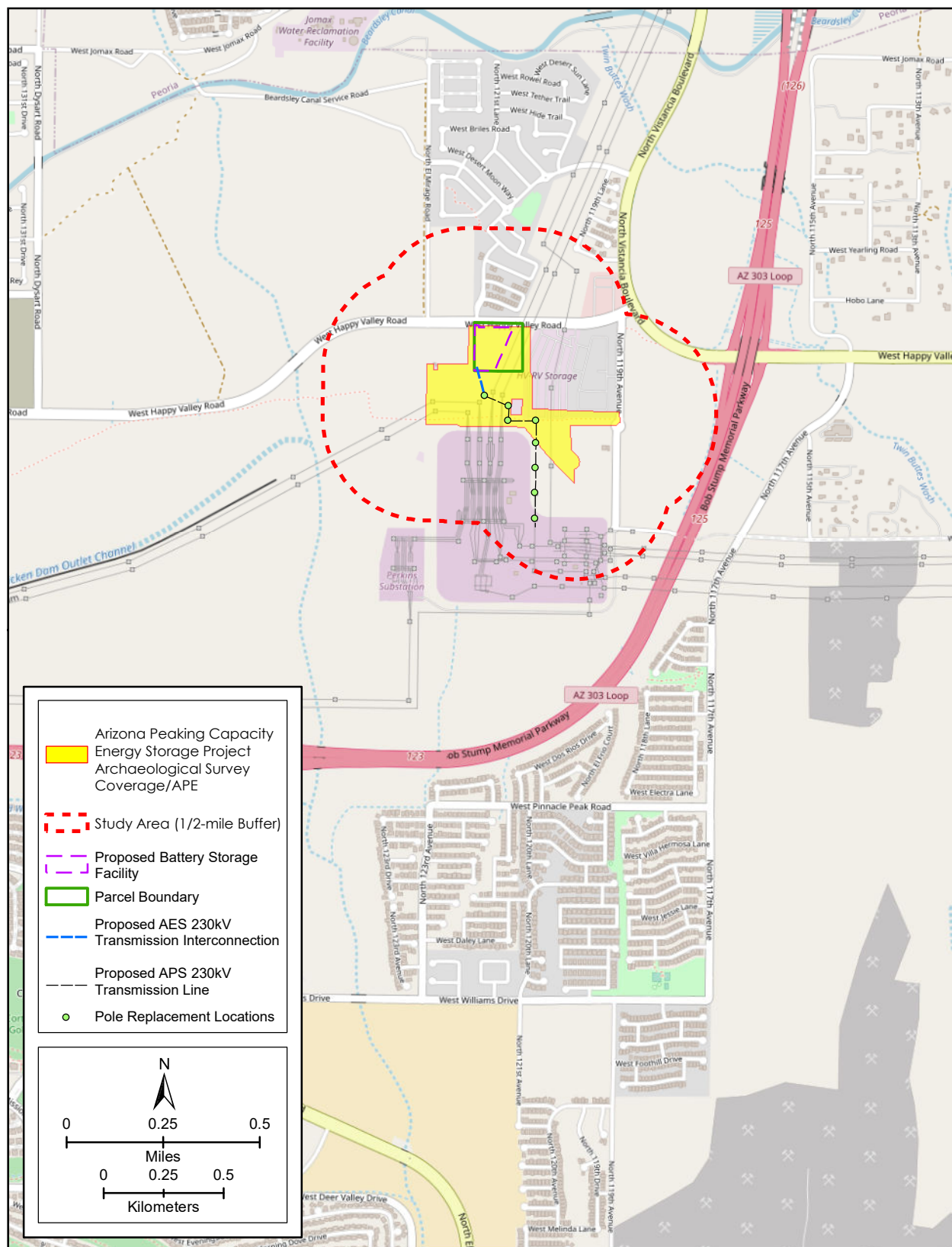


Figure 3-2
Arizona Peaking Capacity Energy Storage Project
Project Components and Archaeological Survey Coverage

As with most studies based on surface evidence, pottery is one of the most useful indicators of the temporal and cultural affiliation of the Native Americans who occupied the general Study Area. Based on observations and collections from several sites along the Colorado River, Rogers (1929) and Ezell (1954) concluded that the ceramic evidence points overwhelmingly toward Patayan or Yuman use during the latest prehistoric period and into historical times. Rogers emphasized differences in surface treatments and vessels and rim forms and proposed three periods of Patayan prehistory, which he coined Yuman I, II and III; however, this terminology was changed by Colton (1939), who rejected the terms, claiming it was a reference to an ethnographic culture and therefore not appropriate for prehistoric assemblages and replaced the term Yuman with Patayan, and renamed Rogers' phases accordingly to Patayan I, II, and III. Patayan (also known as Yuman or Hakataya) groups are thought to have occupied the Lower Gila River east to Gila Bend by A.D 900-1000.

PATAYAN (YUMAN) CHRONOLOGY

Rogers (1945) argued that the Patayan sequence, which started at A.D. 900 and lasted until A.D. 1050, began with immigration by either Hokan (Yuman) people from southern California or non-Hokan people from Papaqueria or Sonora. He defined Pataya I phase ceramics as polished red ware and vessels with the Colorado shoulder. Additional ceramic types characteristic of this period as defined by Rogers (1945) include Black Mesa Buff, Black Mesa Red-on-buff, Colorado Beige, Colorado Red-on-beige, and Colorado Red.

The subsequent Patayan II Period, which lasted between A.D. 1050 to 1500, witnessed a greater variation in ceramics and the spread of these forms from the Colorado Basin into the California and Arizona Deserts. This also coincides with at least two of the major Lake Cahuilla filling episodes with settlements occurring primarily along the shores of the lake and the Colorado River. Habitation camps and sites tended to be relatively short-term, with temporary camps being established away from known and reliable water sources. Ceramics characteristic of this period seem to change forms, including the disappearance of the Colorado shoulder, and the introduction of recurved rims and flaring margins (Schaefer 1988).

The Patayan III (Protohistoric Period A.D. 1500 +) is a period of ceramic continuity, increasing population size, and changing settlement patters. Wasley and Johnson (1965) point to an increase and movement of human population to the Lower Gila River and its displacement of the Hohokam people. It is believed that a desiccation of the Salton Trough may have caused local populations reliant on lake resources, to migrate further south towards the Colorado River delta or farther west to inland mountains of California. This period is characterized by an increase and spread of buff wares and the introduction of smaller-sized projectile points such as the Desert side-notched and Cottonwood Triangular type points.

HOHOKAM CHRONOLOGY

While the Patayan pattern has not been well studied, the more dominant cultural tradition of the Hohokam has been the subjected to revisions of dates and phases in every conceivable manner (Gumerman and Haury 1979:76). In the Early Formative Period, between A.D. 1 and 800, the Hohokam developed pottery and increased their use agriculture. While population size of this period tended to be relatively small, they had large enough population to construct long, wide canals and to produce large quantities of luxury goods. These canals were used to irrigate fields of useful plants, predominantly maize; however, in some areas cotton and common bean were cultivated as well. Seasonal collecting beans, saguaro fruit and mesquite beans provided additional supplementary calories. Ceramics of the

Early Formative Period while simple, were technically well constructed and ranged in color from brown to gray (Gumerman and Haury 1979:68).

The Late Formative Period, which lasted between A.D 800 and 1100, was characterized by change in land use and village patterns. Implementation of agriculture resulted in the subsequent increase in population and village sizes. Ritual and ceremonial ball courts, such as platform mounds, were specifically constructed for religious functions (Wasley and Johnson 1965). There was also a considerable change in ceramic design and form change with large storage vessels and many, small thick-walled vessels produced during this period. The end of the Formative Period was marked by a movement of peoples from sites that have been occupied for hundreds of years, most likely a result of dramatic change within the desert environment (Gumerman and Haury 1979:90).

The Classic Period (A.D. 1100-1500) marks a time of change within the Hohokam population where village organization and settlement patterns witnessed restructuring, and departure from earlier Hohokam traditions due to increased interactions with other peoples. Gumerman and Haury (1979:86) suggest that there is so much change in the Classic Hohokam Period that it may no longer be truly Hohokam and are ascribed to the Salado peoples who moved into the Gila and Salt River basin from the north. The presence of the Salado culture within the Hohokam territory includes multistoried structures, polychrome pottery, inhumations, and tools such as hoes and adzes. Evidence of village abandonment and the construction of elevated settlements, suggesting hostilities with other groups or threat from other groups were also evident within the Classic Period. Some have argued (Schroeder 1961) that by the early Classic Period, the Hohokam culture had been replaced by the Hakataya (Patayan) tradition as suggested by the presence of mixed ceramic ware assemblages in the Gila Bend area. However, some have maintained that the peoples occupying the Gila Bend area may have maintained close relationship with the Hohokam and the Patayan. The Classic Period ended by A.D. 1500 and saw great territorial contraction of the earlier, core territory of the Hohokam. Areas away from the Gila and Salt River valley, such as the Upper Verde or Agua Fria Valley show no evidence of Hohokam occupation during the Classic, which also marks the end of the Hohokam culture.

PROTOHISTORIC CULTURE

When the Spanish arrived in the Gila and Salt River basin, they encountered several distinct native groups. The Yuman speaking peoples, including the Maricopa, Mohave, and Yavapai, among others, occupied the Lower Colorado and Lower Gila areas, while the speakers of the Piman (O'odham) language occupied the Salt-Gila River confluence and the arid areas further to the south. It is believed that the Pima, who most likely lived within the Study Area are the probable descendants of the Hohokam were practicing canal irrigation at the time of the European contact.

INDIGENOUS HISTORIC CULTURE

The Study Area encompasses lands that ethnographically may have been occupied by the Pima Indians, with the neighboring Yuman speaking tribes located further to the west and south. The Pima speak a Piman language of the Uto-Aztecan language family and were referred to as Pima Altos by the Spaniards, meaning Upper Pima to distinguish them from the Pima Bajo (Lower Pima), which lived further south in the lower Sonora (Fontana 1983:126). All Pima Indians call themselves O'odham, meaning the people, and they further separate themselves into Akimel O'odham and Tohono O'odham, meaning the 'river people' and the 'desert people', respectively. As the Study Area is located approximately 15 miles north of the Gila River and along the Aqua Fria River, it is very likely the overall

Study Area was occupied by the Akimel O'odham, who found an abundance of floral and faunal resources along the river and within its floodplain (Fontana 1983:125-126).

EURO-AMERICAN CULTURE:

The Euro-American history of the area, including early Spanish contact, is described in detail by Ezell (1983). By the time of the Euro-American contact in the early 1700s, the Pima occupied at least seven rancherias separated from each other by distances of seven to nearly 40 miles, which were clustered along Santa Cruz and Gila Rivers (Ezell 1983:150). Gathering of wild plant foods was an important source of supplementary or emergency food. While hunting was of less importance, with the deer being the largest game taken, the mountain sheep may have been important in pre-Hispanic times. However, rabbits seemed to be the animal most frequently sought (Ezell 1983:151-152). The focus of the Pima subsistence was the reliance on irrigation with the waters of the Gila, the Salt, and Santa Cruz rivers, and an extensive system of canals and irrigation ditches distributed to water the field.

By the beginning of the Hispanic Period (1694-1853), the Pima, who lived beyond the Hispanic frontier, seemed to be preoccupied with the growth of the Apache and Quechan raiding, rather than with the Spanish settlements further south. As the Spanish seemed to favor the Pima and their possession of land that no Spanish presidio nor Spanish or Mexican settlement was ever founded on the Gila (Ezell 1983:151-153).

During the American Period (1853-), the Pima enjoyed an expanding economy of the first 15 years of the American rule. However, in 1867, a construction of a canal intended to reclaim 4,000 acres of land using the water from the Salt River and completed in 1868, caused many settlers to occupy lands above the Pima reservation. Subsequently, the introduction of new settlers, government agents and teachers, started an irreversible and pervasive process of change within the Pima society (Ezell 1983:157-160).

3.3.1.2 Cultural Resources Study Area and Area of Potential Effects

The Cultural Resources Study Area includes the APE and the ½-mile radius surrounding the APE. The APE for direct and indirect effects includes the footprint of the proposed battery storage facility, alignment of the transmission line, and any proposed staging areas, including a 30-meter buffer surrounding each area. The APE comprises 51.0 acres. It is anticipated that any potential impacts from the Project would be contained within this acreage.

The APE is located west and north of the small community of Peoria and Sun City West, adjacent to the existing APS Westwing Substation. The APE is situated immediately south of West Happy Valley Road and North 119th Avenue, and it is surrounded by residential developments to the north and east.

3.3.1.3 Identification of Historic Properties

As part of the Archaeological Survey of 51.0 Acres of Land for the Project (Stantec 2020b), the background records search conducted at the ASM (ASM Job No. 1851) revealed that six archaeological surveys (Fangmeier 2002; Finney and Slawson 2001; Gicacobbe and Geller 2000; Keller 1983; Luhnnow *et al.* 2003; Schmidt and Mitchell 2003) were previously conducted within portions of the current APE, and 24 archaeological surveys were conducted within the ½-mile surrounding the APE. All the surveys were conducted within the last 36 years, including two projects for the construction and expansion of the APS Westwing Substation. While the Study Area is located less than 1 mile west of the Aqua Fria River, only

five archaeological sites were recorded north and west of the current APE, with the remaining site recorded on the western bank of the Aqua Fria River. One of the resources, the McMicken Dam Outlet Channel (AZ T:7:353 ASM), was documented as an in-use historic site. All of these resources were previously documented outside of the current APE.

Two Class III cultural resources surveys were completed in 2019 and 2020. Cultural resources surveys consisted of parallel transects space 10 to 15 meters apart and were conducted over the entirety of the 51.0-acre APE. During the survey, several water valves and sewer manhole covers were observed within the western portion of the APE, suggesting that at least portion of the APE has been disturbed during previous installation of underground utilities. A small cellular phone tower facility surrounded by a concrete wall, a small storage facility, and six steel lattice transmission towers were observed within the APE as well. No historic or prehistoric historic properties were identified (Stantec 2020b).

3.3.1.4 *Traditional Cultural Properties*

WAPA reached out to six federally recognized tribes regarding the identification of historic properties including traditional cultural properties (TCPs). No TCPs were identified by the tribes.

3.3.2 Environmental Consequences

This section discusses the impacts on cultural resources that would result from construction, O&M, and decommissioning of the Project. While no historic properties were identified within the 51-acre APE, 20 cultural resources were identified within the ½-mile study area. Impacts to historic properties involve resources listed in the NRHP, NRHP-eligible, or potentially NRHP-eligible (i.e., sites for which NRHP-eligibility determinations have not been made). Cultural resources of undefined NRHP-eligibility are treated as NRHP-eligible.

The analysis of potential impacts to historic properties utilized the criteria defined by the regulations for Protection of Historic Properties (36 CFR Part 800), which implement Section 106 of the National Historic Preservation Act (NHPA). An effect is defined as a direct or indirect alteration to the characteristic(s) of a cultural resource that qualifies it for inclusion in the NRHP. Effects are adverse when the alterations diminish the integrity of a cultural resource's location, design, setting, materials, workmanship, feeling, or association. For historic properties, effects could be the result of ground disturbances; visual or audible disturbances; increased erosion; or changes in public access, traffic patterns, or land use. For this EA, there would be effects on historic properties when a site 1) falls within the temporary disturbance footprint of the Project, and/or 2) lies within a 30-meter buffer of the temporary/permanent disturbance footprint of the Project.

3.3.2.1 *Direct and Indirect Impacts of the Project*

Construction activities that disturb or excavate soils may impact unidentified historic properties by destroying intact archaeological features or deposits. Construction activities that modify the slope of the natural terrain or compact soils have potential to increase erosion, which might affect the integrity of historic properties. Because construction activities would comply with regulations regarding the control of stormwater discharges, there is only minor potential for increased soil erosion to damage historic properties. Such secondary impacts would likely be confined to the immediate vicinity of construction zones. There are no known cultural resource sites that would fall within the temporary and/or

permanent disturbance footprint and/or the 30-meter buffer of the temporary/permanent disturbance footprint of the Project.

Ground disturbance activities associated with construction of the Project would be limited to temporary disturbance associated with staging areas for the installation of the proposed battery storage facility pulling sites for the overhead transmission line, and replacement of existing AES transmission poles with eight new steel monopole structures. Ground disturbing activities associated with O&M and decommissioning of the Project would be confined to areas in the disturbance footprint within the ROW created during construction of the Project. No additional impacts on historic properties are expected from O&M or decommissioning activities. Therefore, no impacts on NRHP-eligible, or indeterminate historic properties are expected from construction, O&M, or decommissioning activities associated with the Project.

3.3.2.2 *Additional Measures to Avoid and/or Minimize Impacts*

The implementation of the design elements and conservation measures described in Section 2.4.2 would minimize impacts to historic properties during construction, O&M, and decommissioning of the Project. Therefore, no additional measures to avoid and/or minimize impacts are required.

3.3.2.3 *Cumulative Impacts of the Project*

In addition to the identified reasonably foreseeable projects that could contribute impacts to historic properties, other developments such as community development and other renewable energy development may also affect historic properties in the vicinity. Although the extent of these disturbances is not readily quantifiable, much of the CESA remains undeveloped, and there is the potential for it to contain historic properties that have yet to be discovered and recorded. The majority of the identified reasonably foreseeable future projects and actions in the area has provided or could provide occasions to conduct studies that would likely not occur otherwise. Potential impacts to public land managed by Federal and State agencies would be considered for projects proposed in the future, and measures to avoid, reduce, or mitigate impacts on important historic properties are likely to be implemented.

Generally, construction in the Project area has the potential to affect previously unidentified historic properties. If disturbance to any unidentified cultural resource is unavoidable, recovery and preservation of artifacts and information and other potential mitigation measures would be implemented in accordance with Section 106 consultation. The Project, in combination with other highly probable reasonably foreseeable projects could result in cumulative indirect impacts to historic properties. Cumulative impacts resulting from most types of development projects are likely to be long-term because those facilities probably would be present for decades. The construction, O&M, and decommissioning of the Project would have a negligible contribution to cumulative effects to historic properties.

3.3.2.4 *Direct, Indirect, and Cumulative Impacts of the No Action Alternative*

Under the No Action Alternative, WAPA would not provide financing to AES for their proposed Project, Reclamation would not enter into an LGIA with AES, and the Project would not be constructed; no impacts on historic properties within the APE would occur. There would be no contribution to

cumulative impacts to historic properties because the No Action Alternative would not result in any impacts. As such, the No Action Alternative is not analyzed for cumulative impacts to historic properties.

3.4 Biological Resources

This section discusses effects on biological resources that may occur with the implementation of the Project, and the No Action Alternative. This analysis is based on the Biological Overview/Technical Memorandum prepared for the Project (Stantec 2020a), including field reconnaissance and pedestrian survey of the Project area to evaluate vegetation and landscape features considered important to the potential occurrence of special-status plant and animal species.

3.4.1 Affected Environment

The Project is located in a previously disturbed area in the Lower Colorado River Valley subdivision of the Sonoran Desert biome (Brown 1994). The Project area is located south of West Happy Valley Road and west of State Route 303 on unincorporated land in Maricopa County, Arizona. The Project vicinity consists of the Westwing Substation, paved roads, private residences, the Agua Fria River channel to the east, and undeveloped land to the west. The elevation within the Project area is approximately 1,142 feet above mean sea level. The topography of the Project area is generally flat open desert with some trees and shrubs.

3.4.1.1 Vegetation

Native plant species observed during the site visit include saguaro (*Carnegiea gigantea*), creosote (*Larrea tridentata*), ragweed (*Ambrosia* sp.), triangle bur ragweed (*A. deltoidea*), desert globemallow (*Sphaeralcea ambigua*), fourwing saltbush (*Atriplex canescens*), scarlet spiderling (*Boerhavia coccinea*), red barberry (*Mahonia haematocarpa*), brittlebush (*Encelia farinosa*), desert Indianwheat (*Plantago ovata*), yellow paloverde (*Parkinsonia microphylla*), velvet mesquite (*Prosopis velutina*), sweetbush (*Bebbia juncea*), Coues' cassia (*Senna covesii*), and Jerusalem thorn (*Parkinsonia aculeata*). Saguaro, velvet mesquite, and yellow paloverde are protected under the Arizona Native Plant Law (Arizona State Legislature 2021) as administered by the ADA (ADA 2015).

Non-native species observed during the site visit are found throughout the site and include stinknet (*Oncosiphon piluliferum*), prickly Russian thistle (*Salsola tragus*), Mediterranean grass (*Schismus* sp.), red brome (*Bromus rubens*), and buffelgrass (*Pennisetum ciliare*). Of these non-native species, stinknet and buffelgrass are listed as noxious weeds by the ADA under Arizona Administrative Code R3-4-245 (Arizona Secretary of State 2020).

3.4.1.2 Wildlife

Five avian species were documented within the Project area during the site visit: house finch (*Haemorhous mexicanus*); verdin (*Auriparus flaviceps*); black-throated sparrow (*Amphispiza bilineata*), house wren (*Troglodytes aedon*); mourning dove (*Zenaidura macroura*); Gambel's quail (*Callipepla gambelii*); and northern mockingbird (*Mimus polyglottos*). All avian species observed in the Project area, with the exception of Gambel's quail, are protected under the Migratory Bird Treaty Act (MBTA) (USHR 2021b), which provides Federal protection to all migratory birds, including active nests and eggs. In order to relocate or alter any MBTA-protected nests, a permit would have to be obtained from the U.S. Fish and Wildlife Service USFWS to maintain compliance with the MBTA. However, Section 1 of the

Interim Empty Nest Policy of the USFWS, Region 2, states that if the nest is completely inactive at the time of destruction or movement, a permit is not required to comply with the MBTA. If trees within the Project area are thought to potentially have nesting birds, they can be cleared prior to commencement of construction outside the nesting season to avoid take of migratory birds. If an active nest is observed before or during construction, measures should be taken to buffer work from around the nest, protect the nest from destruction, and to avoid a violation of the MBTA. If the active nest cannot not be avoided, construction would be delayed until the nest fledges.

Multiple, active, migratory bird nests were observed within the Project area during the field reconnaissance. No small-mammal burrows were observed in the project area during the field reconnaissance.

3.4.1.3 USFWS Federally Listed Species

The USFWS maintains a list of federally protected species and designated critical habitat occurring within each Arizona county and the USFWS online database was accessed to obtain information for the Project area. The species are currently listed or are proposed for listing as endangered or threatened under the Endangered Species Act of 1973 (USHR 2021a) (ESA). The list also includes candidate species proposed as threatened or endangered. The ESA specifically prohibits the “take” of a listed species. Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.” Search results included two candidate species and three migratory birds. The attached Information Planning and Conservation System (IPaC) Resource List describes each of the species potentially affected by activities in the Project location (Appendix A).

None of the five species listed by the USFWS as endangered, threatened, or non-essential experimental population for Maricopa County are likely to occur in the Project area. The Sonoran Desert Tortoise, a USFWS candidate species listed in the IPaC Resource List, was not detected during field reconnaissance. No designated critical habitat occurs in the Project area. The Project area is clearly beyond the known geographic or elevational range of these species, nor it does not contain vegetation or landscape features known to support these species, or both.

3.4.1.4 Arizona Game and Fish Department Database

AGFD maintains a statewide database, known as the Heritage Data Management System (HDMS), which tracks records for federally listed species and other species of special concern. The database provides information such as special-status species information, presence or absence of designated critical habitat, special handling guidelines for wildlife, and preliminary project-type recommendations as given by the AGFD.

The HDMS-generated response for the Project reported that no special-status species have been documented within three miles. The HDMS-generated response did report that the White Tank Flood Retainment Structures are present within three miles of the Project area. This special area is part of the Maricopa County Wildlife Movement Area – Landscape.

3.4.2 Environmental Consequences

3.4.2.1 *Direct and Indirect Impacts of the Project*

Vegetation

Under the Project, construction of a new battery storage facility, HV substation, transmission line, and access roads would cause approximately 7.01 acres of ground disturbance, with 5.18 acres being permanent disturbance. Activities associated with O&M would be infrequent and may cause ground disturbance or vegetation removal. Decommissioning would be confined to areas already disturbed during construction and would not lead to any additional ground disturbance. Temporary disturbance areas would be reclaimed by regrading so that surfaces drain naturally, blend with the natural terrain, and are left in a condition that would facilitate natural revegetation. A detailed description of proposed facilities and all construction, O&M, and decommissioning activities is provided in Section 2.4.1.

Terrestrial Wildlife

Ground-disturbing activities associated with construction are potential sources of direct mortality and injury to terrestrial wildlife. Impacts from equipment and vehicles can occur for slower moving species and species that have subsurface burrows. Mammals and reptiles are susceptible to visual and noise disturbances caused by the presence of humans and construction equipment and the generation of dust. Loss of burrows due to construction, ground vibration, or avoidance behavior would cause wildlife to search for and/or dig new burrows. Increased noise as a result of construction could result in wildlife temporarily avoiding the general area surrounding the Project. If trash is left out, wildlife could be attracted to the area. Predators may be attracted to elevated structures associated with the Project such as perimeter fencing and gen-tie line poles. Such disturbances could cause wildlife to alter foraging and breeding behavior and avoid suitable habitat.

Terrestrial wildlife occurring in and around the Project area would also be indirectly impacted. The removal and/or modification of natural vegetation communities would reduce forage, shelter, and nesting opportunities to wildlife. The long-term loss and/or degradation of approximately 5.18 acres of wildlife habitat could cause wildlife to rely more on habitat in surrounding areas.

However, measures would be taken to minimize the availability of perches of predators in the Project area (refer to Section 2.4.2). The vegetation within the Project area is common to the region and the area does not contain any sensitive, unique, or notable areas of ecological importance to terrestrial species.

Ground-disturbing activities during construction, O&M, and decommissioning could increase the spread of noxious/invasive weeds, which could potentially out-compete existing annual vegetation and therefore, could indirectly and adversely affect the quality of terrestrial wildlife habitat and forage. Compliance with weed control regulations and implementation of construction standards would reduce the potential spread of noxious/invasive weeds.

During construction and decommissioning, hazardous waste (e.g., motor oil, antifreeze, hydraulic fluid, and grease) could be generated at the site. Exposure to hazardous waste could be a direct source of wildlife mortality and/or injury through the poisoning of individuals. Spills of hazardous material could also indirectly adversely impact wildlife if the spill of the hazardous material results in the loss of natural vegetation community. The containment and disposal of hazardous waste as outlined in a Spill

Prevention and Emergency Response Plan developed by the construction contractor for the Project would reduce the likelihood that substantial spills would adversely affect wildlife species or habitat.

In summary, there would be negligible localized, short- and long-term, direct and indirect, adverse impacts to general and special status terrestrial species due to the construction, O&M, and decommissioning of the Project. There would be a temporary loss of approximately 7.01 acres and permanent loss of approximately 5.18 acres of wildlife habitat as a result of the development of the Project. The loss of wildlife habitat would result in the potential localized loss of shelter, nesting habitat, and forage for terrestrial species from the Project.

Avian Species

The Project site is not located in a sensitive, unique, or notable areas of ecological importance to avian species. Vulnerability to collision with overhead transmission lines depends on many factors including flight behavior and maneuverability, topography, weather, and power line design and placement. Bird collision with power lines has been documented for decades and risk of collision is considered highest in areas where birds congregate, such as power lines that bisect daily flight paths to meadows, wetlands, and river valleys (APLIC 2012). Transmission lines are the Project components that present the greatest risk of collision. Given that the Westwing Substation is located in a utility corridor with numerous existing transmission lines, and the Project would add a single, short stretch of overhead line, it is unlikely to increase in-air collisions. The existing lines have been in place for many years and foraging flight patterns have most likely adapted to the vast size of the utility infrastructure. To further reduce the risk of avian collisions, line marking devices would be installed, as needed, on the transmission lines to make the wires more visible to flying birds (APLIC 2012; refer to Section 2.4.2).

Power lines are present in many avian habitats and may result in the electrocution of raptors and other bird species (APLIC 2006; Lehman *et al.* 2010; and references therein). The potential for electrocutions depends on the arrangement and spacing of energized and grounded components of poles and towers that are sometimes used for perching, nesting, and other activities (APLIC 2006). However, nearly all electrocutions occur on smaller, more tightly spaced residential and commercial electrical distribution lines that are less than 69-kV (APLIC 2006). To protect avian species from electrocution, APLIC (2006) established guidelines for electric line design. Incorporating appropriate measures into the transmission line interconnection would minimize electrocution risk (refer to Section 2.4.2).

There is the potential for bird species to use the Project area for foraging and for nesting for some bird species. Ground-disturbing activities associated with construction and decommissioning are potential sources of direct mortality and injury to ground-nesting birds, particularly the western burrowing owl. However, the western burrowing owl, a BLM listed species included in the IPaC Resource List, was not detected during field reconnaissance. Vehicles and equipment can also impact any subsurface burrows. Loss of burrows due to construction, ground vibration, or avoidance behavior would cause owls or other ground-nesting birds to search for new burrows. Other birds would be susceptible to noise disturbance, potentially resulting in alteration of foraging and/or nesting behaviors.

There is potential for nest disturbance of birds during the construction and decommissioning phase of the Project due to noise, removal of vegetation, and leveling the ground. However, the proposed battery storage facility would occupy a very small area (approximately 5.18 acres), and the vegetation is common to the region. Impacts to vegetation and presence of humans and machinery would deter most

birds from the Project area. However, most bird species would return to the area after construction if substantial habitat and foraging opportunities exist.

Direct habitat loss would occur from the Project, and habitat fragmentation may reduce the functionality of this area for birds. An abundance of similar lands is available in the vicinity to provide habitat for any individuals displaced from the Project site. In addition, this Project site is not located in a sensitive, unique, or notable area of ecological importance to bird species. Impacts from the Project are likely to be minor and have no substantial population level effects on any bird species in the area.

Noise and activity disturbance would occur as a result of the O&M activities from the Project described in Section 2.4.1. The impacts would be minor and intermittent in nature and are expected to have little or no added impacts to birds in the area.

Additional light sources at the proposed battery storage facility could result in concentrated foraging locations of avian species that feed on insects nocturnally since the artificial lighting could attract insects. Artificial lighting also has the potential to adversely affect migration patterns of birds that move through the area.

In summary, there would be negligible to minor, localized, short- and long-term, direct and indirect, adverse impacts to avian species due to the construction, O&M, and decommissioning of the Project. The Project would result in the temporary loss of 7.01 acres of habitat and permanent loss of approximately 5.18 acres of habitat. Disturbance from human activity and the loss of wildlife habitat would result in a loss of shelter, nesting habitat, and forage for avian species and would result in wildlife having to rely more on habitat outside of the Project footprint.

3.4.2.2 *Additional Measures to Avoid and/or Minimize Impacts*

The implementation of the design elements and conservation measures described in Section 2.4.2 would minimize impacts to biological resources during construction, O&M, and decommissioning of the AES Project. Therefore, no additional measures to avoid and/or minimize impacts are required.

3.4.2.3 *Cumulative Impacts of the Project*

The types of projects or actions within the CESA that could contribute to impacts to biological resources include community development and vegetation management in addition to the identified reasonably foreseeable future actions. Wildlife movement may spread invasive plants and alter the cover and composition of plant communities used by wildlife. Community development and infrastructure development would potentially consume useable habitat and fragment large blocks of habitats into smaller isolated ones. Approximately 32 percent of the lands within the 19,050-acre CESA are Federally or State managed. In combination, past, present, and reasonably foreseeable future actions would result in long-term, direct and indirect, minor impacts to biological resources because a third of the CESA would have measures implemented by the BLM, Reclamation, and State to minimize potential effects to biological resources.

In the long-term, the Project would have adverse, localized, direct and indirect, minor effects to biological resources. These long-term effects would be reduced gradually over time as natural reclamation of plant composition and cover occurs following construction and decommissioning activities. Cumulatively, the effects of the Project, when combined with past, present, and reasonably

foreseeable future actions, would result in minor to moderate cumulative impacts to wildlife within the 3-mile CESA due to the potential for further habitat loss, degradation, and fragmentation. The Project would have a minor contribution to the cumulative effect on biological resources.

3.4.2.4 *Direct, Indirect, and Cumulative Impacts of the No Action Alternative*

Under the No Action Alternative, the Project would not be constructed, and no impacts on biological resources within the APE would occur. There would be no contribution to cumulative impacts to biological resources because the No Action Alternative would not result in any impacts. As such, the No Action Alternative is not analyzed for cumulative impacts to biological resources.

3.5 Visual Resources

The term “visual resources” refers to the composite of basic terrain, geologic, and hydrologic features; vegetative patterns; and built features that influence the visual appeal of a landscape. Visual impacts are defined as the change to the visual environment resulting from the introduction of modifications to the landscape. This section describes the existing context of the visual environment and assesses the potential impacts from the Project and the No Action Alternative within the visual resource impact analysis area, including impacts to residential areas near the Project area and impacts to views from public roadways.

The analysis of aesthetics and visual resources utilizes resource-specific, qualitative and quantitative terminology. The following defines terms utilized within this analysis:

- **Key Observation Point (KOP):** Points on a transportation corridor or at a public/private use area, where the view of a proposed activity would be most revealing or considered sensitive.
- **Viewshed:** The landscape that can be directly seen under favorable atmospheric conditions, from a KOP or along a transportation corridor.
 - Foreground View: 0-1 mile
 - Middleground View: 1-3 miles
 - Background View: 3-5 miles, and beyond
- **Visual Contrast:** Opposition or unlikeness of different forms, lines, colors, or textures in a landscape. Generally, increased visual contrast within foreground distances would be more noticeable to viewers than increased visual contrast within middleground and background view distances.
- **Visual Quality:** The relative worth of the overall impression or appeal of an area created by the physical features of the landscape, such as natural features (landforms, vegetation, water, color, adjacent scenery and scarcity), and built features (roads, buildings, agricultural patterns, and utility lines). These features create the distinguishable form, line, color, and texture of the landscape composition that can be judged for scenic quality using criteria such as contrast.

3.5.1 Affected Environment

The existing landscape character and condition of the visual resource impact analysis area is evaluated in terms of general landforms, vegetation, built features, and land use. The visual resource impact analysis area lies within the valley floor (Deer Valley) within the Lower Colorado River Valley of the northern portion of the Sonoran Desert. The Sonoran Desert is part of the Great American Desert of western North America, extending from the northern part of the United States deep into Mexico. This portion of south-central Arizona is within the Basin and Range Geologic Province, which stretches from southeastern Oregon and southward through Nevada into southern Arizona and is characterized by elongated mountain ranges which are separated by broad, nearly flat valleys (Stantec 2020b). The northern extension of the Sonoran Desert is largely determined by cold temperatures while the eastern boundary is delimited biologically, physically, and geographically by high mountain ranges to the south.

In the Sonoran Desert many craggy low to mid elevation mountain ranges rise above vast basins. These ranges generally trend northwest-southeast and parallel one another. With limited vegetative cover, there is a discrete break between the bedrock of the range and the eroded sands and gravel which form the relatively smooth skirt at their base. These alluvial fans form as rain washes weathered rock down into the valley from the slopes of the mountains above. A major period of volcanic activity occurred in southern Arizona about 25 million years ago leaving many volcanic deposits from this period.

The Project area can be characterized as very typical of valley floor within a larger desert, without any observable granite outcrops, or any other prominent geologic features, with White Tank Mountains and Hieroglyphics Mountains situated to the southwest and north, respectively.

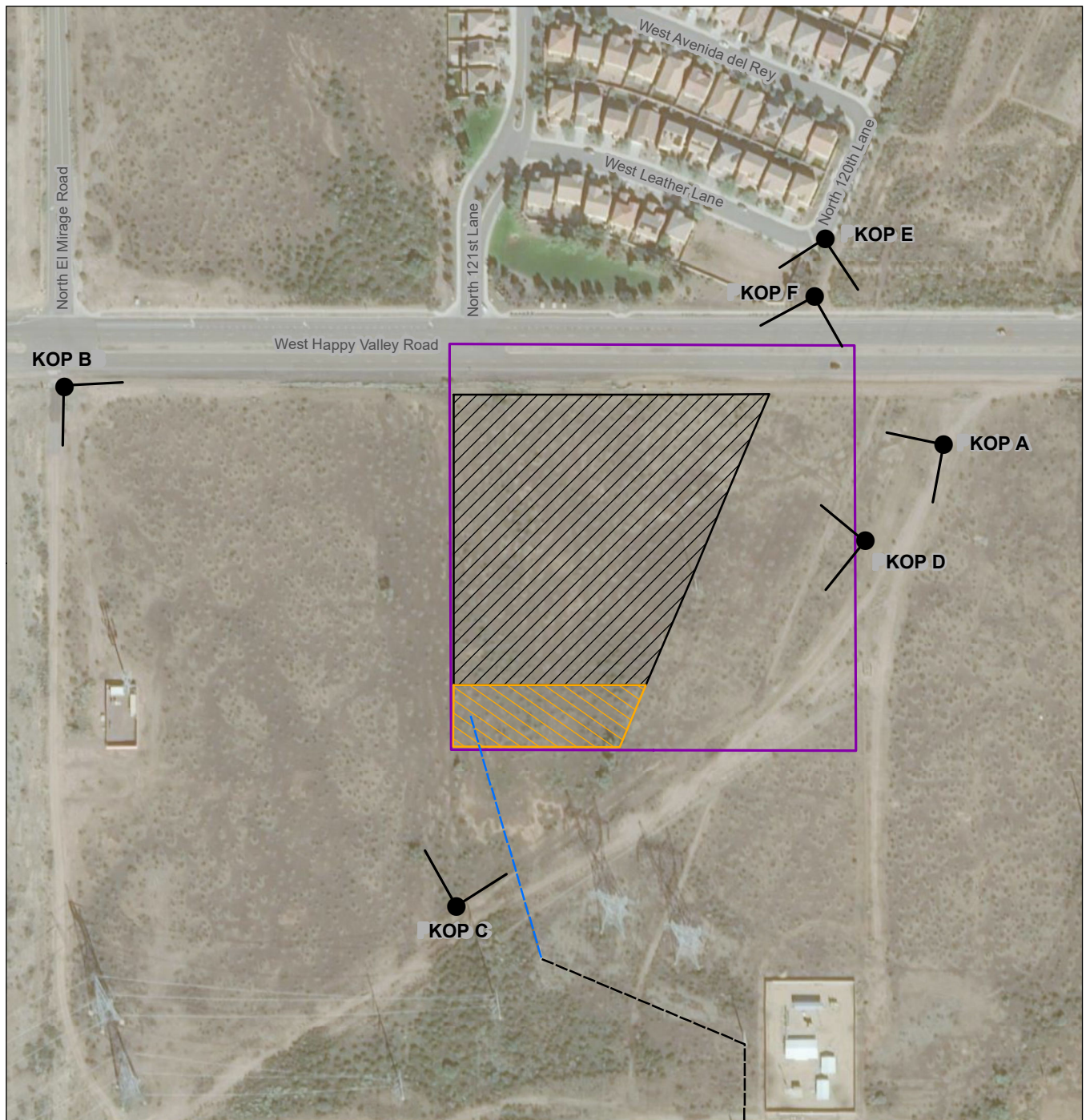
The Project area is flat and expansive and composed largely of olive green creosotebush and scattered yellow grasses. Views to the northeast and southwest are backdropped by mountains in the distant background. In general, the overall scenic quality of the Project area has low scenic value because of the lack of variety and distinctiveness of the vegetation, landform, and adjacent scenery to the region. The existing cultural modifications present in the foreground view (Westwing Substation and associated transmission lines and towers) are notable disturbances that attract attention away from the natural landscape.

The built environment of the Project area consists of existing paved roadways and residential and commercial developments, including the community of Coldwater Ranch and West Happy Valley Road adjacent to the north, the existing Westwing Substation and associated transmission lines adjacent to the south, and the State Route 303 corridor to the south and east (refer to Figure 1-2).

3.5.2 Key Observation Points

The primary views of the Project area are from West Happy Valley Road and the adjacent Coldwater Ranch residential community. Primary viewers would be traveling through the area by vehicle or are residents of the nearby communities. Key Observation Points (KOPs) were selected which would best represent these primary viewing locations, as well as others from adjacent properties where the public would potentially view the proposed battery storage facility and interconnection (Figure 3-3).

- **Key Observation Point A (KOP A) – View Looking Southwest from Adjacent Property Towards Project.** Figure 3-4, Existing Conditions, shows the current view from KOP A. This KOP is located east of the Project area from within an adjacent private parcel. When looking southwest, the level topography and limited natural features allow for views across the Project site to the mountains in the distant background which defines the horizon. Sparse vegetation and the adjacent Westwing Substation are dominant within the foreground views, with existing transmission lines and towers visible in the middleground. An adjacent wireless communications facility is also visible beyond the Project site. While these industrial-appearing forms are pronounced against the clear sky backdrop along the horizon, the view's immediate foreground is characterized by natural landscape and muted color tones.
- **Key Observation Point B (KOP B) – View Looking Southeast from West Happy Valley Road Towards Project.** Figure 3-5, Existing Conditions, shows the current view from KOP B. The KOP B view looks southeast towards the Project site as seen while traveling east on West Happy Valley Road. Similar to KOP A, from this location, foreground and middleground views are dominated by sparse vegetation with Westwing Substation and numerous existing transmission lines and towers punctuating the horizon. Views of a small cluster of white and tan residential structures can also be seen in the low horizontal form along the horizon. As shown, the KOP 2 viewshed is characterized by natural landscape and muted colors.
- **Key Observation Point C (KOP C) – View Looking North from Adjacent Property Towards Project.** Figure 3-6, Existing Conditions, shows the current view from KOP C. This KOP is located south of the Project site from an existing transmission line corridor on adjacent private parcel. Again, the level topography and limited natural features allow for views across the Project site to the mountains in the very distant background. Vegetation in the foreground consists of olive green creosotebush and yellow and brown grasses. Adjacent residential and commercial development can be seen in low horizontal forms along the horizon in the middleground. From this direction, the adjacent Westwing Substation is not visible; however, several associated towers and transmission lines are in view extending across the skyline into the background.



- Project Parcel
- AES Proposed Battery Storage Facility
- AES Proposed Facility Substation
- Proposed AES 230kV Transmission Interconnection
- Proposed APS 230kV Transmission Line
- Key Observation Point (KOP)

0 125 250 Feet
(At original document size of 8.5x11)
1:3,000



Notes

1. Coordinate System: NAD 1983 StatePlane Arizona Central FIPS 0202 Feet
 2. Data Sources: Stantec 2021. Parcels From Maricopa County 2021.
 3. Background: © OpenStreetMap (and) contributors, CC-BY-SA
- Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure No.

3-3

Title

**Arizona Peaking Capacity
Energy Storage Project Key
Observation Points (KOPs)**



Existing Conditions



Simulated View

Figure 3-4. KOP A: Existing Conditions and Simulated View



Existing Conditions



Simulated View

Figure 3-5. KOP B: Existing Conditions and Simulated View



Existing Conditions



Simulated View

Figure 3-6. KOP C: Existing Conditions and Simulated View

- **Key Observation Point D (KOP D) – View Looking West from Property Boundary Towards Project.** Figure 3-7, Existing Conditions, shows the current view from KOP D. This KOP is located on the eastern boundary of the Project. This KOP is oriented towards a less developed area which generally consists of State-owned land. Views across the level topography of the Project site show mountains in the distant background, while a few transmission towers and the adjacent wireless communications facility can be seen among the sparse vegetation in the foreground and middleground. Some smaller hills can also be seen in the middleground views. While the few transmission and communications towers stand out against the daytime sky along the horizon, the view is characterized by natural landscape and muted color tones.
- **Key Observation Points E and F (KOPs E and F) – Views Looking South from Coldwater Ranch Community Towards Project.** Figures 3-8 and 3-9, Existing Conditions, shows the current view from KOPs E and F. These KOPs are located north of the Project site from the adjacent Coldwater Ranch residential community across West Happy Valley Road. Level topography and limited natural features allow for views from these KOPs across the Project site of the existing Westwing Substation and numerous associated transmission lines and towers. Although the view from KOP E from within the community is largely blocked by existing border trees, the view from KOP F shows that open views of the Project site from this location are dominated by the existing towering structures from the middleground to the background. Mountains in the distant background can be seen faintly through gaps low on the horizon between structures. West Happy Valley Road occupies a substantial portion of the foreground in view from KOP F. In this view, the industrial shapes of the substation, transmission lines, and towers stand out against the daytime sky along the horizon and dominate this view.

3.5.3 Environmental Consequences

An analysis of visual dominance, scale, and contrast was used to determine the degree that the Project would attract attention and to assess the relative change in character as compared to the existing characteristic landscape and its inherent scenic quality. The amount of visual contrast created is directly related to the amount of attention that is drawn to a feature in the landscape. Changes in the viewsheds from sensitive viewing locations were also evaluated and characterized.

3.5.3.1 Direct and Indirect Impacts of the Project

Project construction, O&M, and decommissioning activities would take place in, and directly adjacent to, areas already disturbed by the existing Westwing Substation and associated transmission line corridors. During construction, approximately 7.01 acres of ground disturbance would occur, with 5.18 acres being permanent disturbance. The existing visual character and scenic quality would be affected during construction by the generation of fugitive dust; movement of equipment and vehicles in and out of the Project area; and the presence of a scraper, excavators, dump trucks, a drum roller, forklifts, a crane, pump trucks, concrete trucks, manlifts, a boom truck, and temporary staging areas. The construction activities would introduce forms, lines, colors, and textures that would temporarily attract attention and create a noticeable contrast with the existing setting of the Project area. However, implementation of design elements would minimize these temporary impacts to visual resources during construction by minimizing areas of surface disturbance, controlling erosion, using dust suppression techniques, and, if applicable, restoring exposed soils as closely as possible to their original contour and vegetation.



Existing Conditions



Simulated View

Figure 3-7. KOP D: Existing Conditions and Simulated View



Existing Conditions



Simulated View

Figure 3-8. KOP E: Existing Conditions and Simulated View



Existing Conditions



Simulated View

Figure 3-9. KOP F: Existing Conditions and Simulated View

The new BESS facility would represent a long-term, permanent change in the visual landscape. However, the landscape already consists of large-scale utility facilities within an existing transmission line corridor; installation of a lower-profile BESS facility and associated interconnection among this cluster of towers and facilities would result in a minor change in the visual landscape. The addition of eight new steel monopole structures with 230-kV circuit to replace existing 69-kV transmission line (from single to double circuit) in the transmission line ROW would also represent a long-term, permanent change in the visual landscape. The approximately 80- to 100-foot-high solid structures would be more visible features in the landscape in terms of form and color in comparison to the existing transmission structures. However, as the new transmission line would be replacing an existing line among dense backdrop of numerous utility structures, it would represent a noticeable but minor change to the overall visual landscape, consistent with existing visual character.

Activities associated with O&M would be infrequent and would not draw attention from KOPs. Decommissioning would be confined to areas already disturbed during construction and would not have any additional impacts. These activities would be visible from the Coldwater Ranch community and West Happy Valley Road and would attract some attention from the casual observer due to notable color and form contrast with the existing cultural modifications.

- **Effects on Views from KOPs A, C, and D – Adjacent Private Property.** The new BESS facility and associated transmission line replacement structures would be visible in the foreground of KOPs A, D, and C from adjacent private parcels (Figures 3-4, 3-6, and 3-7, Simulated Views). The potential magnitude of impacts to these views from the KOPs would vary depending primarily on the distance from the Project site. The proposed structures would draw attention in the visible landscape from these KOPs; however, the landscape already consists of large-scale utility facilities within an existing transmission line corridor. In addition, a design element to incorporate a view-obscuring 8-foot solid masonry wall along all proposed battery storage facility boundaries would be implemented to minimize impacts to visual resources by reducing additional visual clutter from BESS facilities. Overall, installation of a lower-profile BESS facility and associated interconnection among the existing backdrop of towers and utility facilities would result in a minor change in the visual landscape.
- **Effects on Views from KOPs E and F – Coldwater Ranch Residential Community.** The proposed BESS facility and associated transmission line replacement structures would be visible in the foreground of KOPs E and F from the Coldwater Ranch community to the north (Figures 3-8 and 3-9, Simulated Views). The proposed BESS facility would draw attention in the visible landscape from these KOPs. The landscape from this viewpoint would appear to be notably altered because of the dominance of the proposed BESS facility in color, line, texture, and form, which would create moderate level of contrast in the setting. However, the BESS facility would be a low-profile installation appearing in these views in front of existing large-scale utility facilities within an existing transmission line corridor. The facility would be consistent with the existing scenic character of the visual landscape. In addition, incorporation of the view-obscuring 8-foot solid masonry wall would minimize impacts to visual resources.
- **Effects on Views from KOP B – West Happy Valley Road.** Within the foreground distance zone of KOP B, a majority of the proposed BESS facility and associated transmission line replacement structures would be visible to eastbound motorists on West Happy Valley Road (Figure 3-5,

Simulated View). However, from this distance, the low profile of the BESS facility would result in a minor change in the visual landscape. The transmission line replacement structures would be more visible features in the landscape in terms of form and color in comparison to the existing transmission structures. However, amongst the dense backdrop of the numerous existing utility structures, it would represent a noticeable but minor change to the overall visual landscape, consistent with existing visual character.

In summary, the new BESS facility and transmission line replacement would represent a long-term, permanent change in the local visual landscape; however, it would be a minor change in the overall characteristic landscape and in the scenic quality of the Project area from the construction, O&M, and decommissioning of the Project.

3.5.3.2 *Additional Measure to Minimize Adverse Effects*

The implementation of the design elements and conservation measures described in Section 2.4.2 would minimize impacts to visual resources during construction, O&M, and decommissioning of the Project. Therefore, no additional measures to avoid and/or minimize impacts are required.

3.5.3.3 *Cumulative Impacts of the Project*

In addition to the identified reasonably foreseeable future actions, the types of projects or actions that could contribute to impacts to visual resources include overhead transmission lines, communication towers, wind and solar energy facilities, and community development. These actions generally result in a transformation of the natural landscape to a more developed setting when viewed during both day and night conditions over the long-term. The reasonably foreseeable future actions that have been identified may contribute to overall cumulative impacts to visual resources, though at this time there is not sufficient documentation to evaluate the level of impact associated with these identified projects. In addition, wildland fire would also create a substantial change in the characteristic landscape for decades depending on the scale and intensity of the wildfire. The expansion of residential areas would expand the footprint of developed areas through the addition of structures, roads, and electrical distribution lines. The expanded developed area would be particularly evident during nighttime conditions, when lighting would extend for a substantial distance from the developed area. Impacts of the combined actions would be perceived as strongest where viewed from KOPs and traditional areas identified by Native American tribes. In combination, past, present, and reasonably foreseeable future actions would result in long-term, direct and indirect, minor to moderate, impacts to visual resources that overall would reduce scenic quality and notably transform the characteristic landscape.

Cumulatively, effects of the Project, when combined with past, present, and reasonably foreseeable future actions, would result in long-term, direct and indirect, minor, cumulative impacts to the visual resources within the visual resources CESA. The Project would have a minor contribution to the cumulative effects to visual resources because of the low-profile BESS facility and associated transmission line replacement among a dense backdrop of numerous existing utility towers and structures. Further, visual resource impacts created by the Project would be largely reversible with decommissioning of the Project at the end of its useful life and restoration of the landscape.

3.5.3.4 *Direct, Indirect, and Cumulative Impacts of the No Action Alternative*

Under the No Action Alternative, WAPA would not provide financing to AES for their proposed Project, Reclamation would not enter into an LGIA with AES, and AES would not construct the BESS facility or the associated transmission line replacement. Therefore, no new disturbance to the characteristic landscape would occur, and no new elements or patterns would be introduced to the Project area. Therefore, there would be no impact on the casual viewer from KOPs. There would be no contribution to cumulative impacts to visual resources because the No Action Alternative would not result in any impacts. As such, the No Action Alternative is not analyzed for cumulative impacts to visual resources.

4.0 COORDINATION AND CONSULTATION

For this Project, WAPA and/or AES contacted the Federal, State, county, and tribal agencies listed below.

4.1 Federal Agencies

- U.S. Army Corps of Engineers, Arizona Field Office
- U.S. Bureau of Land Management, Phoenix District Office
- U.S. Bureau of Reclamation, Phoenix Area Office
- U.S. Department of Defense, Siting Clearinghouse
- U.S. Environmental Protection Agency, Region 9 Environmental Review Office
- U.S. Fish and Wildlife Service, Arizona Ecological Services

4.2 State Agencies

- Arizona Game and Fish Department
- Arizona Department of Environmental Quality
- Arizona State Parks, Arizona State Historic Preservation Office
- Arizona Corporation Commission / Arizona Power Plant and Transmission Line Siting Commission

4.3 County Government

- Maricopa County

4.4 Tribal

WAPA is the lead Federal agency in the NHPA Section 106 process. The following section describes WAPA's tribal consultation activities completed to date.

WAPA initiated tribal consultation with the following tribes in a letter dated September 25, 2019:

- Fort McDowell Yavapai Nation
- Salt River Pima-Maricopa Indian Community
- Hopi Tribe
- White Mountain Apache Tribe
- Yavapai-Prescott Indian Tribe
- Pascua Yaqui Tribe

5.0 APPLICABLE LAWS, REGULATIONS, AND OTHER REQUIREMENTS

Federal, State, and local agencies have jurisdiction over certain aspects of the Project. Major Federal, State, and local agencies and their respective permit/authorizing responsibilities are summarized in Table 5-1.

Table 5-1. Permit/Authorizing/Consultation Responsibilities

Permit/Authorization	Agency with Jurisdiction
Transmission Infrastructure Program Funding	WAPA
NEPA	WAPA; Reclamation (Cooperating Agency)
NSTS LGIA	Reclamation
Interconnection/CEC	ACC
APS ROW Grant	APS
Zoning Change/Development Permits	Maricopa County
Building/Grading Permits	Maricopa County
Dust Control Permit	Maricopa County
Easement Grants and Transportation Permits	Maricopa County
Stormwater Quality Permit	Maricopa County
NHPA	WAPA; SHPO
Native American Graves Protection and Repatriation Act	WAPA
American Indian Religious Freedom Act	WAPA
Construction Stormwater Permit	Arizona Department of Environmental Quality (AZDEQ)
Safety Plan	APS
Migratory Bird Treaty Act	USFWS; WAPA
Bald and Golden Eagle Protection Act	USFWS; WAPA

6.0 ENVIRONMENTAL ASSESSMENT PREPARERS AND CONTRIBUTORS

The following individuals were involved in the preparation of this EA:

6.1 Western Area Power Administration

Headquarters Office:

Andrew M. Montaña, NEPA Project Manager

Tim Langer, Ph.D., Biologist

Lisa M. Meyer, MA, RPA, Archaeologist

6.2 U.S. Bureau of Reclamation

Phoenix Area Office:

Sean Heath, Manager, Environmental Division

Kelly Bergin, Environmental Protection Specialist

6.3 Stantec

Shruti Ramaker, Project Manager

Linn Zukor, Senior Environmental Planner

Emily Ramos, Environmental Planner

Mitch Marken, Principal Scientist, Cultural Resources/ Indigenous Services

Dave Cubberly, Visual Resource Specialist

Danny Law, GIS Analyst

Meggan Dugan and Tyler Loomis, SWCA Environmental Consulting Biologists

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APPENDIX A: IPaC Resource List

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Maricopa County, Arizona



Local office

Arizona Ecological Services Field Office

☎ (602) 242-0210

📠 (602) 242-2513

9828 North 31st Ave

#c3

Phoenix, AZ 85051-2517

<http://www.fws.gov/southwest/es/arizona/>

http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME

STATUS

California Least Tern *Sterna antillarum browni* Endangered
Wherever found
No critical habitat has been designated for this species.
<https://ecos.fws.gov/ecp/species/8104>

Yellow-billed Cuckoo *Coccyzus americanus* Threatened
There is **final** critical habitat for this species. The location of the critical habitat is not available.
<https://ecos.fws.gov/ecp/species/3911>

Reptiles

NAME	STATUS
Sonoran Desert Tortoise <i>Gopherus morafkai</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9289	Candidate

Fishes

NAME	STATUS
Gila Topminnow (incl. Yaqui) <i>Poeciliopsis occidentalis</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1116	Endangered

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A
BREEDING SEASON IS INDICATED
FOR A BIRD ON YOUR LIST, THE
BIRD MAY BREED IN YOUR
PROJECT AREA SOMETIME WITHIN
THE TIMEFRAME SPECIFIED,
WHICH IS A VERY LIBERAL
ESTIMATE OF THE DATES INSIDE
WHICH THE BIRD BREEDS
ACROSS ITS ENTIRE RANGE.
"BREEDS ELSEWHERE" INDICATES

Costa's Hummingbird *Calypte costae*

Breeds Jan 15 to Jun 10

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/9470>

Gila Woodpecker *Melanerpes uropygialis*

Breeds Apr 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/5960>

Golden Eagle *Aquila chrysaetos*

Breeds Dec 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

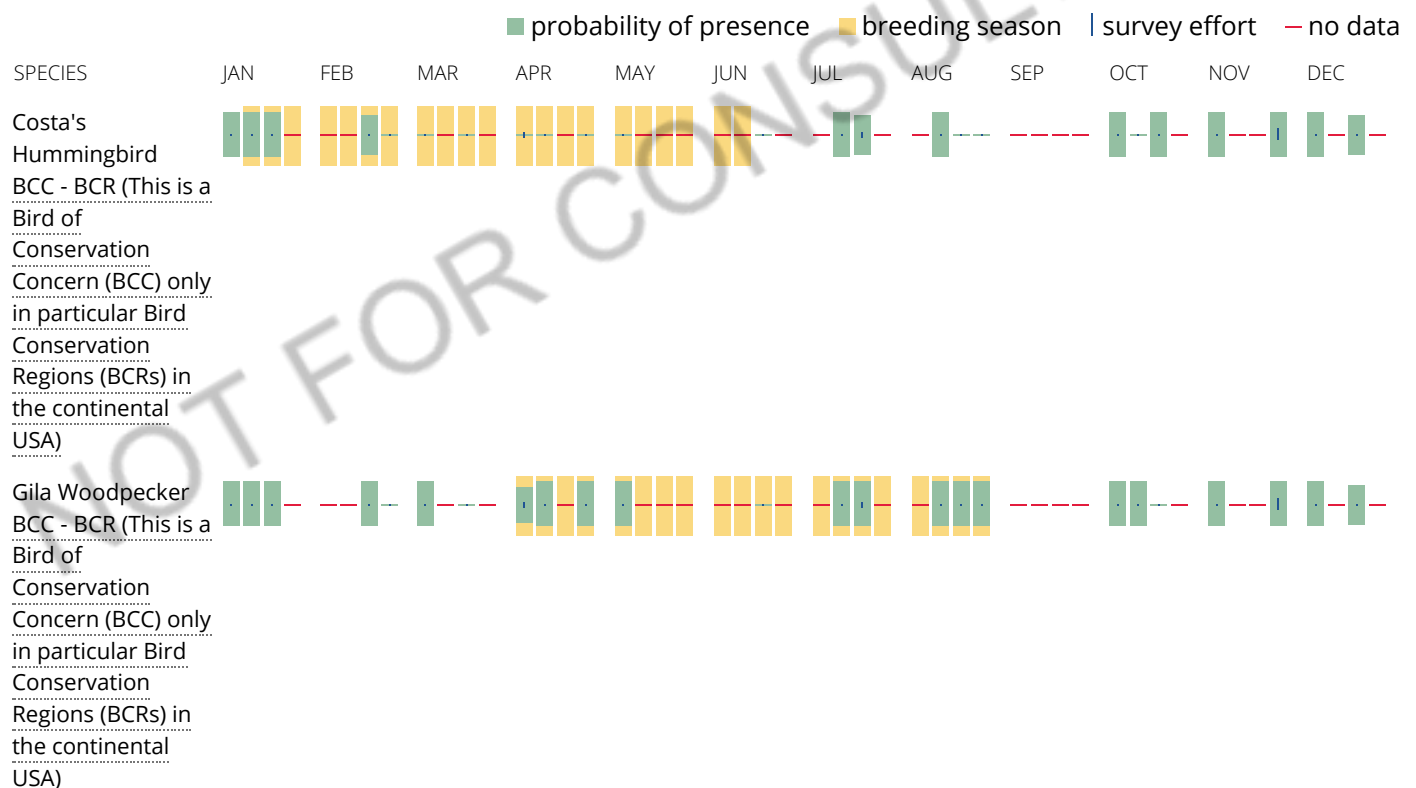
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Golden Eagle
Non-BCC
Vulnerable (This is
not a Bird of
Conservation
Concern (BCC) in
this area, but
warrants attention
because of the
Eagle Act or for
potential
susceptibilities in
offshore areas
from certain types
of development or
activities.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to

confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION