Final Environmental Impact Statement

Horse Heaven Wind Farm

Chapter 3 - Affected Environment

October 2023

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3.0 CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the existing environment without the construction and operation of the proposed Horse Heaven Wind Farm (Project, or Proposed Action), which represents the existing conditions under the No Action alternative.

Chapter 3 has been subdivided into separate sections, one for each element of the environment listed in Washington Administrative Code (WAC) 197-11-444[1] and an additional section describing existing conditions related to the socioeconomic environment:

- Earth Resources (including seismic hazards)
- Air Quality
- Water Resources
- Vegetation
- Wildlife and Habitat
- Energy and Natural Resources
- Land and Shoreline Use
- Historic and Cultural Resources
- Visual Aspects, Light and Glare
- Noise and Vibration
- Recreation
- Public Health and Safety
- Transportation
- Public Services and Utilities
- Socioeconomics

Chapter 4, Analysis of Potential Impacts and Mitigation presents an evaluation of potential impacts to the affected environment.

3.1.1 Use of Applicant-Prepared/Provided Information

This analysis of affected environment is based primarily on information provided by Horse Heaven Wind Farm, LLC (Applicant) in the Application for Site Certification (ASC) for the Project. A variety of documents and information sources provided by the Applicant were used during the preparation of this Environmental Impact Statement (EIS). These Applicant-provided documents include Applicant responses to formal Washington Energy Facility Site Evaluation Council data requests, preliminary engineering plans, and a variety of reports and technical documents prepared by the Applicant's consultants.

However, to support the decision-making process, a Washington State Environmental Policy Act review must be objective. To confirm what the Applicant has presented in their ASC, this EIS used information sourced from independent institutions and government agencies. Additionally, the EIS incorporates the professional judgment of specialists. Their insights and recommendations are supported by data, education, or experience and are substantiated with literature.

Pertinent sources used in addition to the ASC are listed in Chapter 6, References.

[1] Washington Administrative Code (WAC) 197-11-444 includes a list of "elements of the environment" that are typically considered for inclusion during preparation of an Environmental Impact Statement. The SEPA lead agency (i.e., EFSEC) has flexibility to narrow the topics addressed in the EIS within these topic areas.

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3.2 Earth Resources

This section describes existing earth resources and geologic hazards in the State of Washington and within the Lease Boundary for the proposed Horse Heaven Wind Farm (Project, or Proposed Action). The Project vicinity includes the areas 4 miles south/southwest of the City of Kennewick, Washington, and the larger Tri-Cities urban area along the Columbia River. Section 4.2 presents an evaluation of the Project's consistency with relevant earth resource documents and ordinances and adopted state, county, and local plans, goals, and policies, including the potential impact the Project would have on earth resources.

Regulatory Setting

The State of Washington has adopted the 2018 International Building Code (IBC) standards with statewide amendments, effective February 1, 2021. The 2018 IBC provides design-level seismic parameters consistent with the requirements of the American Society of Civil Engineers Standard 7-16 for Minimum Design Loads and Associated Criteria for Buildings and Other Structures. The seismic design parameters are dependent on the structural requirements based on occupancy.

The State of Washington Water Pollution Control Act requires compliance with the National Pollutant Discharge Elimination System (NPDES) through a Construction Stormwater General Permit. The NPDES Construction Stormwater General Permit would require the steps contractors must take to prevent erosion or the discharge of any unpermitted pollution.

The State of Washington's Growth Management Act (GMA), Revised Code of Washington 36.70A, requires all cities, towns, and counties in the state to identify critical areas and establish regulations to protect and limit development in those areas. Among the critical areas defined by the GMA are frequently flooded areas and geologically hazardous areas. As defined by Washington Administrative Code (WAC) 365-190-120, geologically hazardous areas are areas that are susceptible to erosion, landslide, seismic activity, or other geological events such as coal mine hazards, volcanic hazards, mass wasting, debris flows, rock falls, and differential settlement. The GMA requires that local governments establish critical area protection programs that address the following:

- Protecting members of the public, public resources, and facilities from injury, loss of life, or property damage due to landslides and slope failures, erosion, seismic events, volcanic eruptions, or flooding
- Maintaining healthy, functioning ecosystems through the protection of unique, fragile, and valuable elements of the environment
- Directing activities not dependent on critical area resources to less ecologically sensitive sites, and mitigating unavoidable impacts on critical areas by regulating alterations in and adjacent to those areas
- Preventing cumulative adverse environmental impacts on frequently flooded areas

As defined by WAC 463-62-020, the seismicity standard for construction of energy facilities shall be the standards contained in the state building code.

Benton County Code 15.02 designates and classifies ecologically sensitive and hazardous areas, protecting those areas and their function and values while also allowing for reasonable use of private property. Geologically hazardous areas are considered one of the five types of critical areas requiring protection by the GMA. The Benton County Hazard Mitigation Plan (Hazard Mitigation Plan) was originally approved by the Washington Military Department, Emergency Management Division, and the Federal Emergency Management Agency in 2004. The 2019 revision of the Hazard Mitigation Plan is in effect until 2024. The document assists with the

identification and assessment of various potential hazards and helps maintain Benton County's eligibility for grants and other funding. Relevant goals of the Hazard Mitigation Plan include:

- Goal 6: Local governments support hazard mitigation planning and support the implementation of the mitigation action items for their jurisdiction.
- Goal 6 Objective E: Support the location of new facilities outside of areas vulnerable to the impacts of natural hazards.
- Goal 6 Objective F: Design facilities to withstand the impacts of a disaster when it is not feasible to relocate them.

3.2.1 Affected Environment

The Lease Boundary is located in the Horse Heaven Hills area of Benton County, Washington, within the larger Columbia Basin Physiographic Province of Washington and the wider Pacific Northwest region of the United States and British Columbia, Canada (Clarke and Bryce 1997).

3.2.1.1 Regional Geology

The geology and earth resources within the Lease Boundary are part of, and subject to, geological forces and processes affecting the wider Pacific Northwest region, which includes Oregon, Washington, Idaho, and British Columbia. This section provides a brief description of the major regional geological processes that have produced the earth resources within the Lease Boundary and Project vicinity.

Geological Processes – Plate Tectonics

The geological history of the Pacific Northwest reflects the evolution of plate tectonic forces. In the region of the proposed Project, between about 17 and 6 million years ago, large volumes of lava erupted from deep crustal fissures above a "mantle hotspot." These basalt flows make up the Columbia River Basalt Group, which is the most common type of exposed rock in the region. The recent geology of the Pacific Northwest region has been strongly influenced by geological processes associated with the convergence of three major tectonic plates:

- North American
- Juan de Fuca
- Pacific

The region where the Juan de Fuca and North American tectonic plates interact is known as the Cascadia Subduction Zone (CSZ). The Juan de Fuca plate is entirely oceanic (below sea level) and is slowly sinking and moving eastward beneath the western edge of the North American plate (Yeats 2004). This type of movement is known as subduction. The Pacific plate is also an oceanic tectonic plate that lies beneath the Pacific Ocean and adjoins the Juan de Fuca plate. The separation of the Pacific and Juan de Fuca plates causes the Juan de Fuca plate to move eastward, beneath the western edge of the North American plate. As the Juan de Fuca plate moves away from the Pacific plate, the gap between the plates is filled with molten rock to form regions known as "spreading centers" that have many hot springs and undersea eruptions. The rate of the Juan de Fuca plate's eastward movement is about 2 inches per year (Swanson et al. 1989). This slow movement drives most of the active geological processes observed in the Pacific Northwest. These processes include the generation of large and small earthquakes, formation and eruption of volcanoes, and uplift and folding of the earth's surface.

The relative motions of the tectonic plates cause changes in the structure of the rocks in the overlying North American plate. Ongoing plate movements along the western edge of the North American plate have broken it into smaller pieces or crustal blocks. As shown in **Figure 3.2-1**, these blocks include the Oregon Coastal Range, Canadian Coastal Mountains, and Sierra Nevada blocks. The northward motion of the Oregon Coastal Range block has pushed western Washington against the Canadian Coast Mountains, which have not moved relative to the rigid North American plate. This process has caused most of Oregon and southwest Washington to rotate clockwise relative to North America at a rate of 0.4 to 1.0 degrees per million years (Wells and Heller 1988; Wells and Simpson 2001; Brocher et al. 2017). These rotations and block movements result in north-south-directed compression and the folding of the earth's crust in Washington.

The north-south-directed compression and folding in the shallow crust of eastern Washington has formed the Yakima Fold and Thrust Belt (YFTB). The YFTB is expressed as a series of alternating ridges and valleys known as anticlines (ridges) and synclines (valleys). An "anticline" is the geologically high part of one or more geological units that have been folded by geological forces. A "syncline" is a geological trough and, therefore, the lower part of one or more geological units. As shown in the inset in **Figure 3.2-1**, the geologically young ridge-and-valley topography of the YFTB consists of narrow anticlinal ridges up to 2,000 feet high, separated by broad synclinal valleys 1 to 10 miles wide over an area of about 5,500 square miles in eastern Washington (Reidel et al. 2003).

Geological Processes – "Ice Ages"

Another major impact on the geology of the region was the advance and retreat of the major continent-wide glaciers of many "ice ages" over at least the last million years. During the most recent period of major glaciation from about 15,000 to 10,000 years ago, glaciers created an ice dam on the Clark Fork River in northern Idaho. This caused the river to back up and form a lake, known as Lake Missoula. At the end of the ice age, ice began to melt, causing water to flow into the lake and further increase its size.

As the ice melted, glacial Lake Missoula overwhelmed the ice dam, causing it to suddenly collapse and release large-scale flooding across eastern Washington and around the Columbia River. This event caused huge volumes of lake water to flow rapidly west to the Pacific Ocean. Over a period of about 2,000 years, the ice dam of glacial Lake Missoula failed repeatedly, draining the lake and causing great floods down the Columbia River. These sudden releases of water carved wide and deep channels into the underlying basalt bedrock, forming a stripped and eroded "channeled scabland" landscape.

Evidence of the repeated flooding events caused by Lake Missoula can be seen today at the Wallula Gap and Grand Coulee. The Wallula Gap and Grand Coulee form a two-stage canyon 50 miles long and up to 900 feet deep. The giant floods through the Wallula Gap and Grand Coulee discharged an estimated 350,000,000 cubic feet per second each time the lake flooded. The extensive flooding from the repeated collapses of the Lake Missoula ice dams stripped most of the near-surface layers of topsoil and glacial deposits in eastern Washington and northern Oregon. Flood events before the last ice age deposited the older glacial and glacial lake sediments in western Washington and the Pacific Ocean. These sediments were subsequently blown back into the Columbia Basin by the dominant southwesterly winds (Sweeny et al. 2017). Geologists refer to these wind-blown silt and fine sand deposits as eolian loess.

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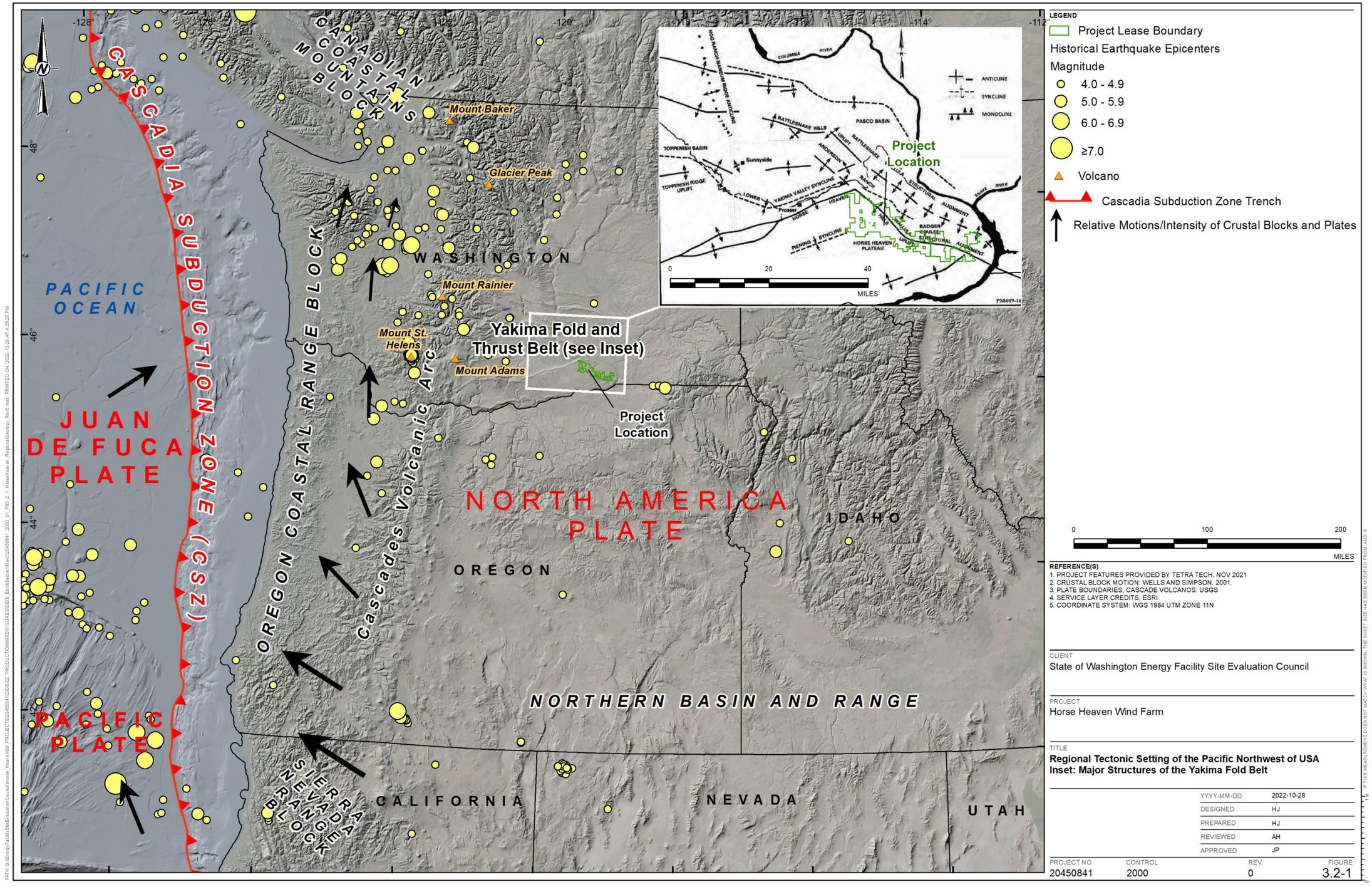

REFERENCE(S)
1. PROJECT FEATURES PROVIDED BY TETRA TECH, NOV 2021
2. CRUSTAL BLOCK MOTION: WELLS AND SIMPSON, 2001.
3. PLATE BOUNDARIES, CASCADE VOLCANOS: USGS
4. SERVICE LAYER CREDITS: ESRI
5. COORDINATE SYSTEM: WGS 1984 UTM ZONE 11N

CLIENT
State of Washington Energy Facility Site Evaluation Council

PROJECT
Horse Heaven Wind Farm

TITLE
Regional Tectonic Setting of the Pacific Northwest of USA
Inset: Major Structures of the Yakima Fold Belt

YYYY-MM-DD	2022-10-28
DESIGNED	HJ
PREPARED	HJ
REVIEWED	AH
APPROVED	JP

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Figure 3.2-1: Regional Plate Tectonics

3.2.1.2 Site Conditions

Geology

As shown in **Figure 3.2-2**, the surficial geology of the Lease Boundary consists of Columbia River Basalt Group lava flows that are overlain by wind-blown loess and some glaciolacustrine deposits. The Geologic Map of Washington describes the Lease Boundary geology as Quaternary-age (last 2.6 million years) non-marine loess and glaciolacustrine deposits consisting of the following:

- Homogeneous and unconsolidated fine-grained sand and silt with some gravel, clay, and diatomaceous earth
- Miocene-Pliocene dark gray, fine-grained basalt commonly interbedded with conglomerate, sandstone, and siltstone (Huntting et al. 1961).

As illustrated in **Figure 3.2-2**, the local bedrock is consistent with the Columbia River Basalt Group, with many lava flows interbedded with sedimentary layers formed by the erosion and deposition of the volcanic rocks. These basalt rocks and lava flows underlie the wind-blown loess and silt and form the bedrock within the Lease Boundary.

On-site Geotechnical Investigation

Horse Heaven Wind Farm, LLC (Applicant) conducted a preliminary geotechnical investigation of the Lease Boundary. The investigation found that:

- Basalt was encountered at various stages of weathering at depths of 5 to 45 feet below ground surface (bgs).
- Two basalt core samples from the geotechnical drilling were laboratory tested to evaluate the strength of the basalt for proposed facility foundations. The in-situ moist unit weight of basalt on site is estimated at 170 pounds per cubic foot, and the compressive rock strength of the basalt ranges from 470 to 2,415 tons per square foot.

The Applicant's preliminary geotechnical evaluation concluded that variability in compressive strength reflects the variability in the degree of weathering and fracturing of the basalt on site (Horse Heaven Wind Farm, LLC 2022).

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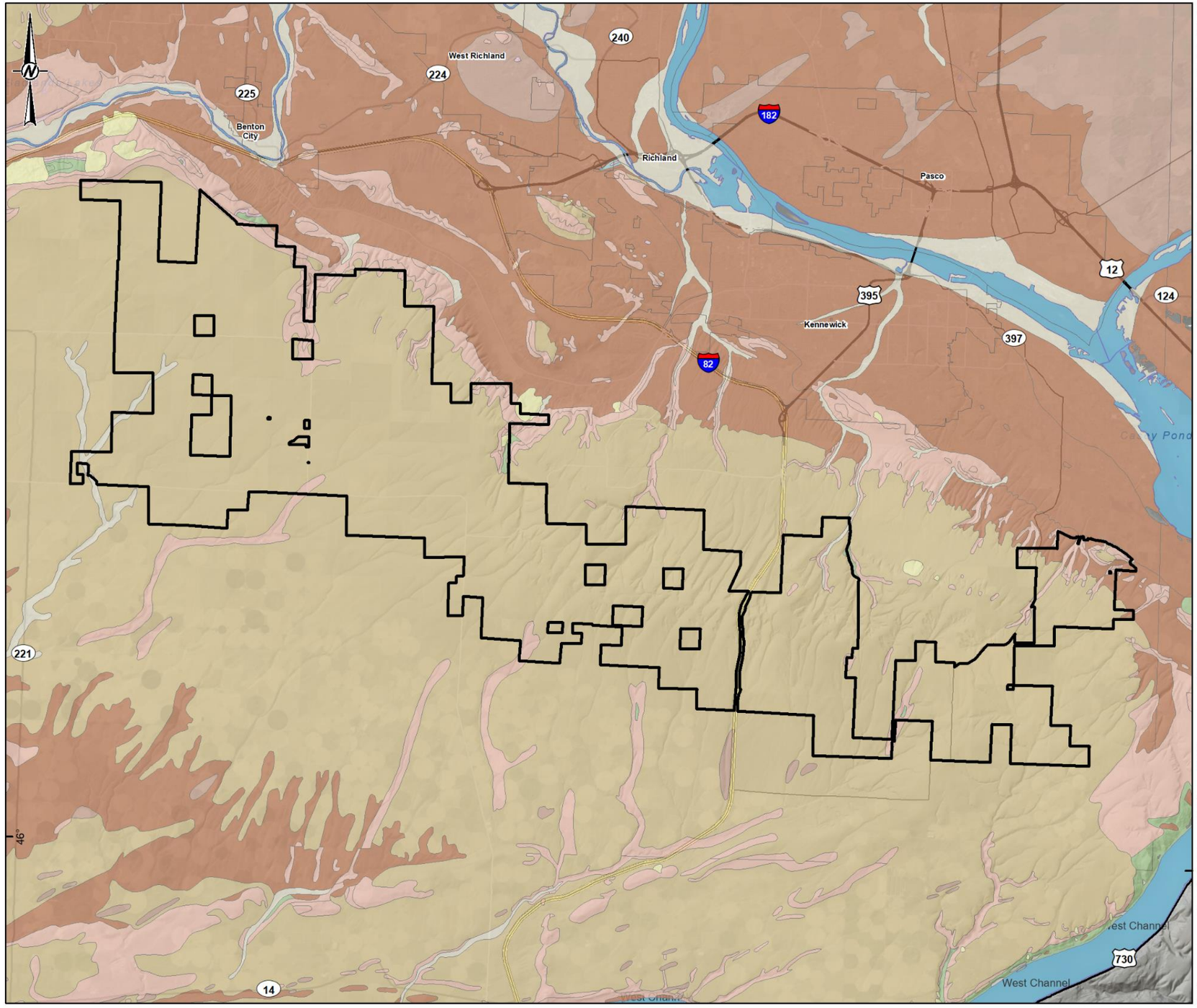

LEGEND

- Project Lease Boundary
- Municipal Boundary

Surficial Geology

- Quaternary alluvium
- Quaternary dune sand
- Quaternary eolian deposits, loess
- Quaternary mass-wasting deposits
- Quaternary-Tertiary sedimentary rocks and deposits
- Miocene Columbia River Basalt Group, Saddle Mountains Basalt
- Miocene Columbia River Basalt Group, Wanapum Basalt
- Tertiary sedimentary rocks and deposits
- Pleistocene Missoula flood deposits

0 3 6
MILES

REFERENCE(S)
1. PROJECT FEATURES PROVIDED BY TETRA TECH, NOV 2021
2. SURFICIAL GEOLOGY: WADNR
3. SERVICE LAYER CREDITS: ESRI
4. COORDINATE SYSTEM: WGS 1984 UTM ZONE 11N

CLIENT
State of Washington Energy Facility Site Evaluation Council

PROJECT
Horse Heaven Wind Farm

TITLE
Surficial Geology of Project Lease Boundary and the Surrounding Area

YYYY-MM-DD	2021-12-10
DESIGNED	HJ
PREPARED	HJ
REVIEWED	AH
APPROVED	JP

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Figure 3.2-2: Project Vicinity and Lease Boundary Geology

Soils

To evaluate potential surface impacts from the Project, it is important to assess the types of soils at the site. The Applicant's preliminary geotechnical investigation report indicates that loess covers most of the Lease Boundary. Based on the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey data, and as shown in **Figure 3.2-3**, the most prominent and widely distributed soil unit mapped within the Project area is Ritzville Silt Loam (USDA n.d.).

The NRCS maps Ritzville Silt Loam within the Lease Boundary as a silt loess (ML). This mapping unit is characteristic of the loessial and glaciolacustrine deposits from the post-glacial Lake Missoula flood events. Less extensive soil units intermixed across the Lease Boundary include silt loams, fine sandy loams, very fine sandy loams, stony fine sandy loams, and very stony silt loams.

The most prevalent natural soil cover across the Lease Boundary is very loose to medium dense silt, with varying amounts of sand (loess). In some places, the soil has been modified by natural and agricultural activities. The Applicant's preliminary geotechnical study presented in the 2022 Application for Site Certification (ASC) describes the soil stratigraphy for the Lease Boundary as follows:

- **Topsoil.** Generally light brown and silty, with low to moderate organic content and active roots. Thicknesses range from non-existent to approximately 4 inches bgs. Topsoil layers are assumed to be thicker in topographic low areas and pastureland.
- **Silt, Silt with Sand, Sandy Silt.** Underlying the topsoil across the Lease Boundary is a wind-blown silt, or loess, with varying amounts of sand. The silty material within the Lease Boundary is light brown to brown, dry to damp, very loose to medium dense, and occasionally lightly cemented. Loess is encountered directly beneath the topsoil and occasionally extends to the underlying basalt, with thicknesses ranging from 5 to greater than 60 feet bgs.
- **Silty Sand.** Silty sand, with varying amounts of gravel, underlies the loess in some places. This soil unit is typically light brown to brown, dry to damp, and medium dense to very dense (Horse Heaven Wind Farm, LLC 2022).

Expansive soils can occur in areas where repeated changes in moisture content such as rainfall, irrigation, perched groundwater, or drought result in the formation of expansive clays. Shrinking and swelling of expansive clay soils can cause changes in foundation conditions that require special engineering. However, the Web Soil Survey data classify the soils within the Lease Boundary as generally having a low potential for soil expansion (USDA n.d.).

On-site Soils Investigation

The Applicant performed laboratory tests on representative soil samples collected from the Lease Boundary to aid in the classification and evaluation of physical properties and engineering characteristics of site materials. The Applicant's preliminary geotechnical investigation for the Lease Boundary describes the geotechnical characteristics of the Lease Boundary's soils as follows:

- The in-situ gravimetric moisture contents of the soils range from approximately 2 to 5 percent, averaging 8 percent. These levels indicate relatively low levels of soil moisture. The in-situ moist unit weight of soil on site is estimated at 80 to 110 pounds per cubic foot for all soil types.

- The friction angle for the silty loess encountered on site is estimated to range from 28 to greater than 40 degrees, indicative of very loose to very dense soil (Horse Heaven Wind Farm, LLC 2022).

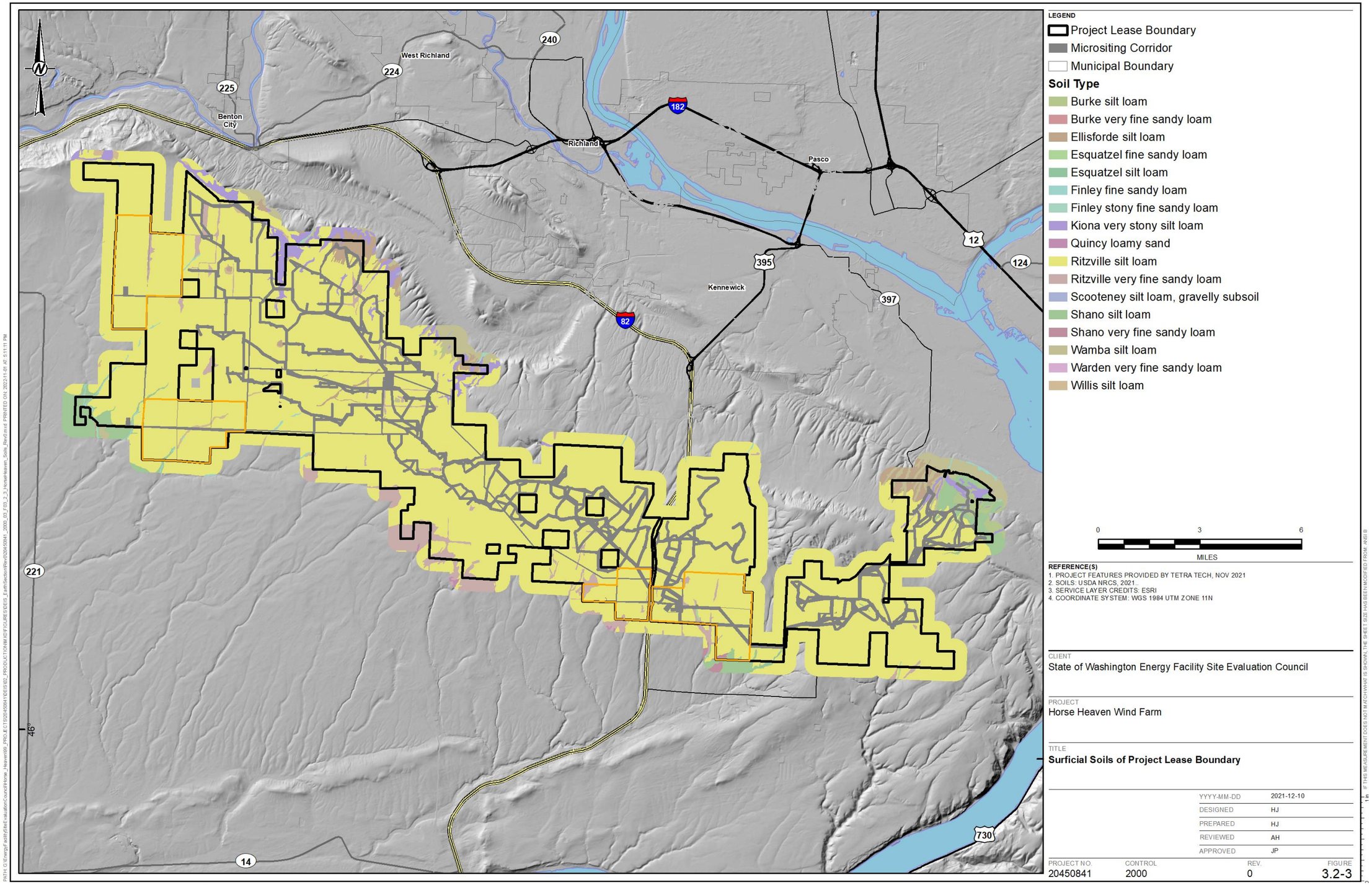

Figure 3.2-3: Lease Boundary Soils Data

The soil borings, descriptions, and laboratory tests indicate that the Lease Boundary is primarily underlain by very loose to medium dense silt. The loose silt layers are considered compressible and could be susceptible to static settlement upon loading. The shallow soil within the Lease Boundary is susceptible to collapse upon wetting. Soil collapse occurs when a relatively loose, dry, low-density material is inundated with water and subjected to a load. The Applicant's preliminary geotechnical investigation report concluded that the collapse potential of soils within the Lease Boundary is moderate to high. Loess silt is particularly prone to collapse because of its depositional mode (i.e., wind) and can result in development of a loose, low-density soil profile.

If fine- to medium-grained granular soils (silt and fine sand) are saturated during earthquake-induced strong ground shaking, they can lose strength through liquefaction. Under high levels of ground shaking, saturated loess silt deposits could become susceptible to soil liquefaction. The dense, coarse-grained sand and gravel layers within the Lease Boundary are, comparatively, much less susceptible to liquefaction (Horse Heaven Wind Farm, LLC 2022). Soil liquefaction processes are described further under General Earthquake Hazards, below.

Topography

The topography of the Columbia Basin Province is characterized by steep river canyons, sharp ridge lines, and broad plateaus. The Horse Heaven Hills ridgeline lies along the northern border of the Lease Boundary. To the south of the ridgeline, the topography is dominated by rolling hills and undulating plains, crossed by meandering canyons, with some ephemeral or intermittent drainage channels. As illustrated in **Figure 3.2-4**, the Lease Boundary is located on the Horse Heaven Hills ridgeline anticline at the eastern edge of the YFTB.

There are no major rivers or other perennial streams within the Lease Boundary. The elevation of the Lease Boundary ranges from 604 to 2,051 feet above mean sea level. The nearest major water bodies are the Columbia and Yakima Rivers. Both rivers are topographically lower than the Lease Boundary. At its nearest location, the Yakima River passes 1.5 miles north of the western part of the Lease Boundary. The Columbia River is located north, east, and south of the Lease Boundary. At its nearest location, the Columbia River is 1.3 miles away from the Lease Boundary's eastern border (Horse Heaven Wind Farm, LLC 2022).

Groundwater

Local water well depths within the Lease Boundary reportedly range between 55 and 1,506 feet bgs (Ecology n.d.). During the Applicant's geotechnical investigation, boreholes were evaluated for the presence and level of any groundwater during and shortly after drilling operations. The boreholes did not display a static groundwater level (Horse Heave Wind Farm, LLC 2022). Section 4.4 evaluates the Project's anticipated impacts on groundwater resources.

3.2.1.3 Geological Hazards

Geologic hazards include earthquakes, landslides, debris flow flooding, problem soils, and rock and volcanic hazards. This section discusses geological hazards that could impact the Project and Lease Boundary.

General Earthquake Hazards

The magnitude of an earthquake is measured by analyzing records from an array of regionally deployed seismometers. The most common magnitude scale now used by seismologists is the moment magnitude, expressed as M_W or M. This scale measures the energy released at the earthquake source. The M_W and most other earthquake magnitude scales are logarithmic, meaning that an earthquake of M_W 6 releases about 30 times more energy at the source than an M_W 5 earthquake. Most people do not feel earthquakes smaller than M_W 3

unless they are within approximately 5 miles of the epicenter and the earthquake is less than about 10 miles deep. The main hazards associated with earthquakes within the Pacific Northwest are:

- Surface fault rupture
- Strong ground shaking
- Soil liquefaction
- Surface fault rupture
- Tsunami and seiche

Earthquake hazards in the Pacific Northwest are primarily related to ongoing activity in the CSZ, with the convergence of the North American and Juan de Fuca tectonic plates. **Figure 3.2-4** presents the tectonic setting of the Pacific-Juan de Fuca-North American plate boundary region in the Pacific Northwest. The major types of earthquakes that occur in the Pacific Northwest region are:

- **Megathrust CSZ Earthquakes:** Also referred to as a subduction interface earthquake, this type results from shallow rupture at the interface or boundary between the Juan de Fuca and the overriding North America plate tectonic plates less than 30 miles from the surface.
- **Deep CSZ Earthquakes:** Also referred to as a subduction in-slab earthquake, this type results from stresses within the subducting Juan de Fuca plate beneath the plate interface during its slow descent beneath the Pacific Northwest.
- **Shallow Crustal Earthquakes:** Also referred to as a background earthquake, this type originates along known and mapped crustal fault zones. These earthquakes are known as crustal fault earthquakes. There are also shallow crustal earthquakes that are not associated with mapped faults and occur within the region between the mapped faults.

Convergence of the Juan de Fuca and the North American plates along the CSZ generates subduction interface earthquakes. The earthquakes are generated by sudden rupture along the upper, brittle part of the Juan de Fuca-North American plate boundary. Subduction interface earthquakes are infrequent, but when they do occur, they can be up to M_W 9+. Subduction interface earthquakes of this magnitude have not been recorded in the Pacific Northwest in written history, but geologic evidence along the Pacific Coast, from Northern California to British Columbia, indicates that multiple CSZ subduction interface earthquakes of M_W 8+ to M_W 9 have occurred during the last 10,000 years (e.g., Atwater et al. 1995; Clague at al. 2000; Atwater et al. 2005; Kelsey et al. 2005; Nelson et al. 2006). The last known subduction interface earthquake in the Pacific Northwest occurred in January 1700, just over 300 years ago, with an estimated M_W of 8.7-9.2 (Cascadia Department of Bioregion n.d.). Geological evidence indicates that such earthquakes with M_W 9.0 or greater have occurred at least seven times in the Pacific Northwest over the last 3,500 years. This represents an average recurrence return interval of 400 to 600 years (PNSN n.d.).

As the Juan de Fuca plate subducts beneath the North American plate, the increase in rock and bending stresses within the plate can lead to subduction in-slab earthquakes. In-slab earthquakes have lower maximum magnitudes and are deeper than megathrust subduction interface earthquakes. Most CSZ in-slab earthquakes have been recorded beneath the Puget Sound region; the largest historical in-slab earthquakes are the 1949

M_W 6.9 Olympia, the 1965 M_W 6.7 Seattle-Tacoma, and the 2001 M_W 6.8 Nisqually earthquakes. The return time of in-slab earthquakes is about every 30 to 50 years (EERI and WMDEMD 2005).

The subduction of the Juan de Fuca plate also compresses and deforms the western edge of the North American plate to form crustal faults and folds. Crustal fault earthquakes are caused by rupture of shallow faults that extend to depths of up to 15 miles. Background earthquakes are generated by unmapped and deeper faults within the shallow crust away from known and mapped faults.

In addition to the major types of earthquakes that occur in the Pacific Northwest, the region's active volcanoes can also cause earthquakes. Volcanic earthquakes are not caused directly by tectonic plate motion, but rather occur during upward migration of molten rock (magma) beneath and within the present-day volcanoes of the Cascade Ranges. These earthquakes are local to the volcanic centers and typically are not felt away from the volcano and its immediate surrounding area. During larger volcanic eruptions, such as Mount St. Helens in 1980, volcanic earthquakes may cause strong shaking several miles from the volcano.

Project-specific Earthquake Hazards

The State of Washington experiences more than 1,000 earthquakes annually. Over the last 125 years, Washington has experienced more than 20 damaging earthquakes. Most of the earthquakes that happen in Washington occur in western Washington, but several have occurred east of the Cascade crest. For instance, the 1872 M_W 6.8 Lake Chelan earthquake occurred in eastern Washington and is one of the state's largest recorded earthquakes (Benton County 2019).

Within central Washington, the Wallula Fault Zone runs through Benton County. The Wallula Fault Zone is an integral feature of the Olympic-Wallowa Lineament and the YFTB. It is a prominent northwest-striking fault zone that extends from near Milton-Freewater, Oregon, to near Kennewick, Washington. Researchers have suggested that the fault zone has the potential to produce an M_W 7.5 earthquake. If an earthquake of this magnitude were to occur, it would generate very strong ground shaking with the potential to cause surface cracking, soil liquefaction, and damage to infrastructure throughout Benton County (Benton County 2019).

Surface Fault Rupture

The initial displacement along a fault, also referred to as a fault rupture, releases energy that moves away from the fault as seismic waves. In larger earthquakes that have a moment magnitude of 6, the fault can rupture to the ground surface. Surface fault rupture results in large differential ground displacements of up to 30 feet. Surface fault ruptures can cause structural damage to buildings, bridges, and other infrastructure located across the fault rupture.

Project-specific Hazard - Surface Fault Rupture

While tectonic plate subduction zones along the Pacific Coast can produce large, devastating earthquakes, the smaller faults within the eastern part of Washington typically produce small to moderate size earthquakes. Benton County and its neighboring counties experienced approximately 4,200 earthquakes between 1969 and 2018. The largest concentrations of earthquakes occurred in the northwest corner of Benton County and the vicinity of Wooded Island in the Columbia River. A swarm of earthquakes near Wooded Island occurred in 2009, and a similar cluster occurred southeast of Prosser in 2000. The largest earthquake to occur as part of the Wooded Island and Prosser events had a magnitude of 3.0 (Benton County 2019).

Figure 3.2-5 shows earthquake epicenters surrounding the Lease Boundary. Earthquake epicenters are not known to have been located within the Lease Boundary. Three earthquakes of M_W 4.3 occurred in 1979 and

1991, with epicenters located outside of Benton County but within 50 miles of the Lease Boundary (USGS n.d.[a]). Larger historical earthquakes greater than M_W 4 are unknown to have occurred in Benton County. Earthquake data obtained from the Pacific Northwest Seismic Network (PNSN) indicate that 48 earthquakes of M_W <4 have had epicenters within about 20 miles of the Lease Boundary, with three epicenters of M_W 3 to 3.7 occurring adjacent to the Lease Boundary (PNSN n.d.).

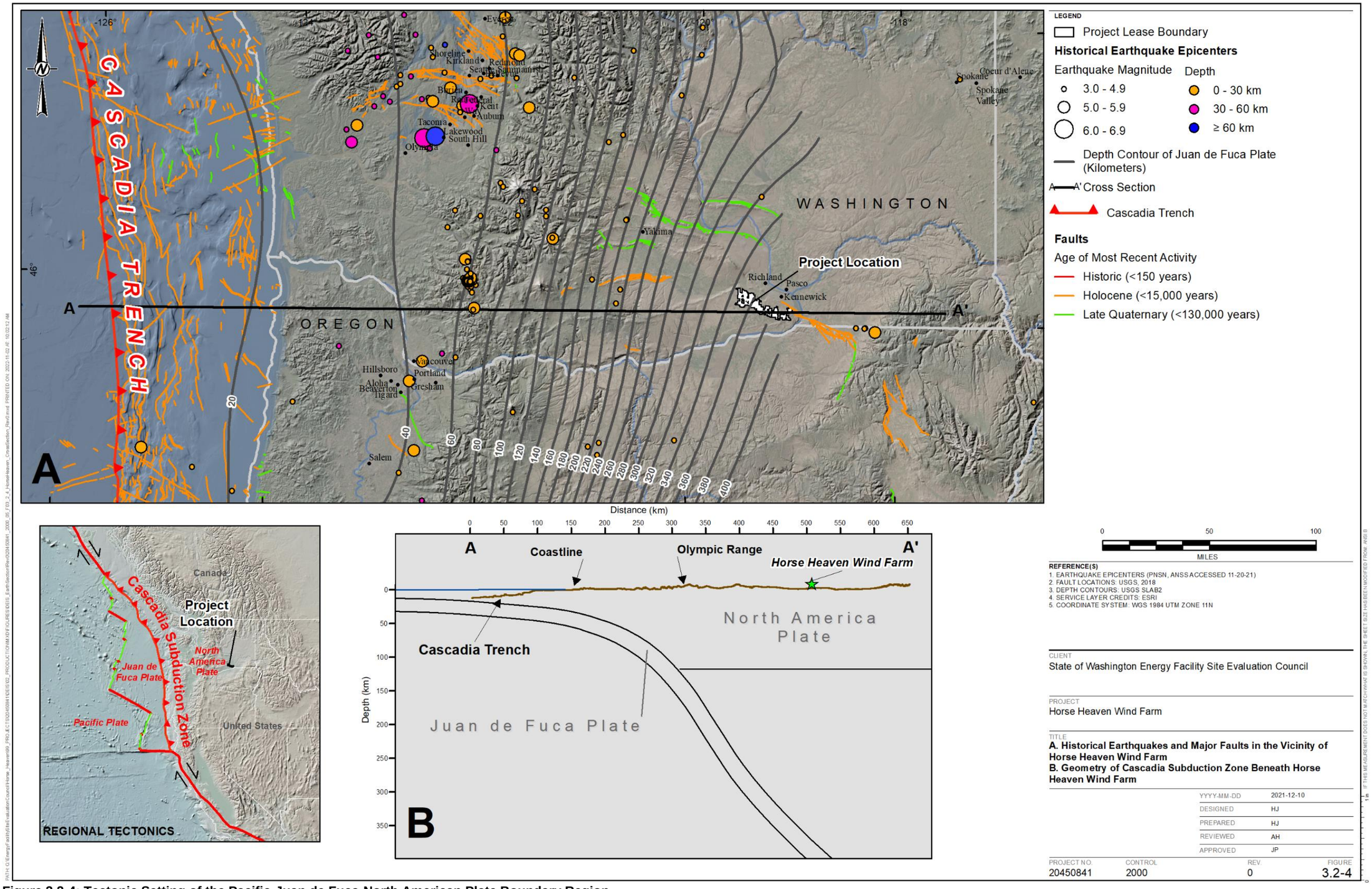

Figure 3.2-4: Tectonic Setting of the Pacific-Juan de Fuca-North American Plate Boundary Region

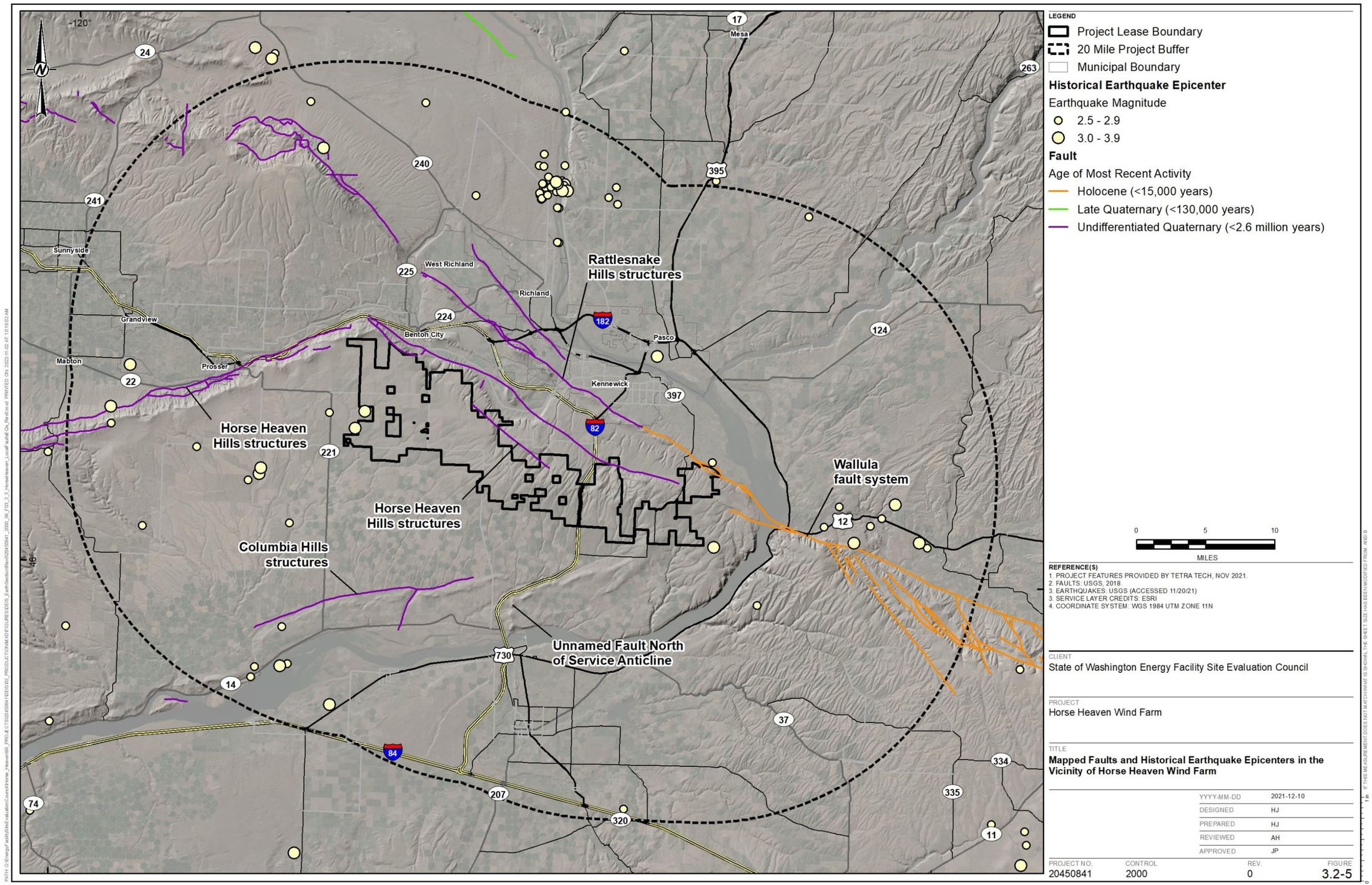

Figure 3.2-5: Earthquake Epicenters within the Project Region

The northeast- and northwest-trending, Quaternary (<2.6 million years old) thrust faults identified beneath the Horse Heaven Hills are present along the northern edge of the Lease Boundary. The northeast-trending faults underlying the Columbia Hills are located south of the Lease Boundary. To the southeast of the Horse Heaven Hills, and east of the Lease Boundary, are the northwest-trending, strike-slip faults of the Wallula fault system. The Wallula fault system is a prominent northwest-striking fault zone that extends from near Milton-Freewater, Oregon to near Kennewick, Washington. These fault locations are inferred, as accurate locations for the faults are not well known. The absence of mapped fault traces and instrumentally recorded earthquakes suggests that surface fault rupture is not a potential hazard within the Lease Boundary.

Strong Ground Shaking

Strong ground shaking from earthquakes is the most widespread hazard in the Pacific Northwest. Strong ground shaking during an earthquake can cause damage to engineered structures. Earthquake damage from shaking at a given location depends on:

- The structure of the earth between the earthquake source and the site (i.e., travel path)
- The properties of the near-surface soil and rock beneath the site
- The type, design, and construction of the structures subjected to the shaking

The intensity of earthquake ground motion is measured by several parameters. The horizontal peak ground acceleration (PGA) is the largest acceleration experienced by the ground at a given location during earthquake shaking. The U.S. Geological Survey (USGS) has developed the Unified Hazard Tool, which can be used to estimate a project-specific PGA and other important information used by engineers in designing facilities to resist earthquake shaking.

Properties that have a high risk of seismicity are in regions that have a 10 percent or greater probability of the maximum PGA equal to or greater than 0.15 gravity at any point in a 50-year period (Fannie Mae 2017). The USGS Unified Hazard Tool indicates that the Lease Boundary maintains a 2 percent probability of experiencing strong ground shaking within a 50-year period (USGS n.d.[b]).

Soil Liquefaction

Soil liquefaction is the temporary change of sandy soil from a solid state to a state with properties more like a liquid than a soil. Seismic liquefaction typically occurs when loose sandy or silty sand soils with poor drainage are saturated and experience strong ground shaking (Youd and Idriss 2001). Soils most prone to liquefaction are saturated, non-cohesive soils in areas that are frequently saturated near the ground surface. Soils susceptible to liquefaction are typically less than 50 feet bgs. Loose to medium dense sands, or soft to medium-stiff, low plasticity silts, are particularly susceptible to liquefaction because earthquake ground shaking can increase the pore pressures in the saturated soil materials.

The potential for liquefaction increases when ground shaking is prolonged. For example, megathrust subduction interface earthquakes tend to have more than 1 minute of strong shaking and are, therefore, more likely to induce liquefaction in susceptible soils. Liquefaction can result in ground settlement and sideways movement into surrounding areas along riverbanks or stream channels. This settlement can contribute to the loss of some bearing capacity for both shallow and deep foundations. Liquefaction-induced dynamic settlement and reduced bearing capacity can adversely affect structures.

Project-specific Hazard – Soil Liquefaction/Slope Failure/Lateral Spread

Soils most prone to liquefaction are saturated non-cohesive soils in areas that are frequently saturated near the ground surface (i.e., less than 50 feet bgs). The Applicant's preliminary geotechnical investigation report finds that the soils within the Lease Boundary are silts with varying amounts of sand extending from 5 to 60 feet bgs with no observable groundwater. The results presented in the 2022 ASC are in alignment with the USDA NRCS Soil Survey, which indicates that the soils within the Lease Boundary are generally well drained and that approximately 98 percent of the soils maintain moderate permeability and moderate runoff potential. Within the Lease Boundary, the Benton County Geologically Hazardous Areas Map shows restricted areas of moderate to high potential for liquefaction (Benton County n.d.). These soils are inferred as soft to stiff, with soil Site Class D to E, as used in the 2018 IBC/ASCE 7-16 building code.

Tsunamis and Seiches

Tsunamis are long-duration (i.e., more than 20 minutes) ocean waves that are usually generated offshore by earthquakes, landslides, and volcanic eruptions that displace the seafloor. Tsunami waves can reach from a few feet to tens of feet in height and can inundate coastal and nearby low-lying inland areas. Tsunami risk is greatest near ocean shorelines and river mouths. Landslides generated on land that enter waterbodies with enough force to displace water can also cause localized tsunami waves. These localized tsunamis can occur along rivers, lakes, or ocean shorelines.

Seiches are oscillating water waves that can occur in any enclosed or partially enclosed waterbodies such as lakes and rivers. Seiches are caused by earthquakes, volcanic activity, landslides, or extreme wind or weather events (USGS n.d.[c]). Seiches are hazardous when their extreme vertical waves approach shallow water or shorelines.

Project-specific Hazards – Tsunamis and Seiches

Coastal tsunamis are generated by earthquakes from the CSZ. They are not a potential hazard within the Lease Boundary as the Project is more than 250 miles from the Pacific Coast and 604 to 2,051 feet above mean sea level. Additionally, there are no major rivers or other perennial streams within the Lease Boundary.

After the 1964 Alaska earthquake, very minor (<1 foot) seiches were reported in the non-free-flowing upper section of the Columbia River system from McNary Reservoir (8 miles south of the site) to Franklin D. Roosevelt Lake (Grand Coulee Dam) (McGarr and Vorhis 1968). As previously noted, the Columbia and Yakima Rivers are topographically lower than the Lease Boundary and not subject to potential river and lake seiche effects.

Landslide Hazards

The USGS defines a landslide as the movement of a mass of rock, debris, or earth down a slope under the direct influence of gravity (USGS n.d.[d]). Landslide-caused disaster events within the State of Washington are a rare occurrence. Landslides are rare, but when they do occur, they have a major impact on the state's transportation systems, communities, and natural resources, causing severe property damage and loss of life. If the right conditions of soil, moisture content, and slope angle exist, landslides can occur on nearly any ground. Heavy rain, rapid snowmelt, flooding, earthquakes, vibrations, and other natural conditions or human-induced events can trigger a landslide (Benton County 2019).

The State of Washington has six landslide provinces: Olympic Mountains, Southwest Washington, Puget Lowland, Cascades, Columbia Plateau, and Okanogan Highlands. Benton County is part of the Columbia Plateau (Basin) landslide province. Landslides in this province include slope failures in bedrock along the soil interbeds

and in the overlying catastrophic flood sediments and loess deposits. These landslides usually move along sediment interbeds within the Columbia River Basalts (Benton County 2019). Benton County experienced only one major landslide between 1984 and 2014. The Prosser landslide occurred in 1986 and 1987 during the construction of Interstate 82 when interstate construction remobilized several very large, prehistoric landslide complexes (DNR 2015).

General Landslide Hazards

Landslides include rockfalls, slides, slumps, and debris flows. Gravity is the dominant force behind landslides, but water, wind, or large-scale disturbances such as earthquakes or volcanic activity can also trigger landslides and slope failures. Steep and/or unstable slopes are at the greatest risk of producing landslides. Other factors that influence the probability of a slide include soil type and thickness, geological structure, vegetative cover, soil conditions and soil saturation, and the amount, rate, and duration of precipitation. Landslide hazard areas are typically defined as areas that, due to a combination of slope inclination, soil type, geological structure, and the presence of water, are susceptible to failure and subsequent downhill movement.

Project-specific Hazards – Landslide Hazards and Ground Instability

As illustrated in **Figure 3.2-6**, the Lease Boundary includes areas identified as susceptible to erosion, landslides, and bluff failures. The Applicant has also identified two Quarternary mass-wasting deposits (i.e., historic landslides) just within the northern edge of the Lease Boundary (Horse Heaven Wind Farm, LLC 2022).

Ground instability can result from underground caves and voids in rocks. This type of instability can be particularly hazardous in places where karst features such as caves develop slowly, and rapid failures can result in several feet of instantaneous subsidence. Karst features generally develop in areas of water-soluble rock that dissolve over time. The USGS map of karst hazard potential in the United States does not show the Lease Boundary as having karst potential (Weary and Doctor 2014).

The basalt underlying the Lease Boundary and wider region is a volcanic rock without karst formations. Volcanic lava rocks can form voids or lava tubes; however, the Applicant's preliminary geotechnical investigation report did not indicate a sudden loss of core fluid that would be indicative of a void in the rock (Horse Heaven Wind Farm, LLC 2022).

Volcanic Hazards

Cascade Range volcanoes have produced more than 100 eruptions in just the past few thousand years. Cascade volcanoes have the potential to cause widespread disasters. As Cascade volcanoes erupt, they can produce the following adverse conditions:

- **Ashfall:** This effect results when ash is forcibly ejected by a volcanic explosion and becomes airborne. Volcanic ash can become suspended in the air and travel great distances from the volcanic vent, entrained by the wind, before falling to the ground.
- **Lahars:** This component of a volcanic eruption occurs when volcanic ash and other debris mix with a water source to form volcanic mudflows. Lahars are typically generated during and after significant eruptions, when large volumes of loose volcanic ash are present along the flanks of a volcano. Lahars may continue to mobilize loose debris for years after the event. Lahars are very fast-moving, capable of destroying bridges, roads, and other infrastructure along drainage paths.

- **Debris flows:** Like lahars, debris flows contain a higher concentration of volcanic debris, but with lower water content. Debris flows are not easily mobilized and are extremely dense, capable of causing significant damage.
- **Lava flows:** Lava flows are streams of molten rock that pour or ooze from an erupting vent. Lava erupts during either nonexplosive activity or explosive lava fountains.
- **Pyroclastic flows:** These flows are chaotic blasts of volcanic ash, hot gases, and rock debris, usually generated from the collapse of an eruption column. Pyroclastic flows can spread out in any direction from a volcanic vent at very high speeds and are not restricted to drainage channels, unlike lahars, debris flows, and lava flows.
- **Other Effects:** Massive landslides can occur if the portions of a volcano collapse during an eruption, as seen in the Mount St. Helens eruption in May 1980. Another hazard is the seismicity associated with volcanic activity, which may trigger earthquake events. Significant volcanic activity is generally preceded by weeks to months of increased seismicity. The Pacific Northwest is extensively monitored by the USGS and the Cascades Volcano Observatory with an advanced seismic network.

For example, Benton County experienced adverse impacts from the disbursement of ash from the May 18, 1980, eruption of Mount St. Helens as it caused major crop losses, interruptions in dairy production, and disruptions to the county's transportation system (Benton County 2019).

Regional Volcanic Hazards

The Cascade Range volcanic centers extend from Lassen Peak in northern California in the south to Mount Baker in Washington near the border with Canada in the north. The Cascade volcanoes are periodically active and can be expected to produce volcanic eruptions in the future (USGS n.d.[e]). The active volcanism is part of the subduction process of the Juan de Fuca plate beneath North America. The volcanoes in the Cascade Range have both effusive and explosive eruption histories with ashfall, lahars, debris flows, lava flows, pyroclastic flows, and landslides.

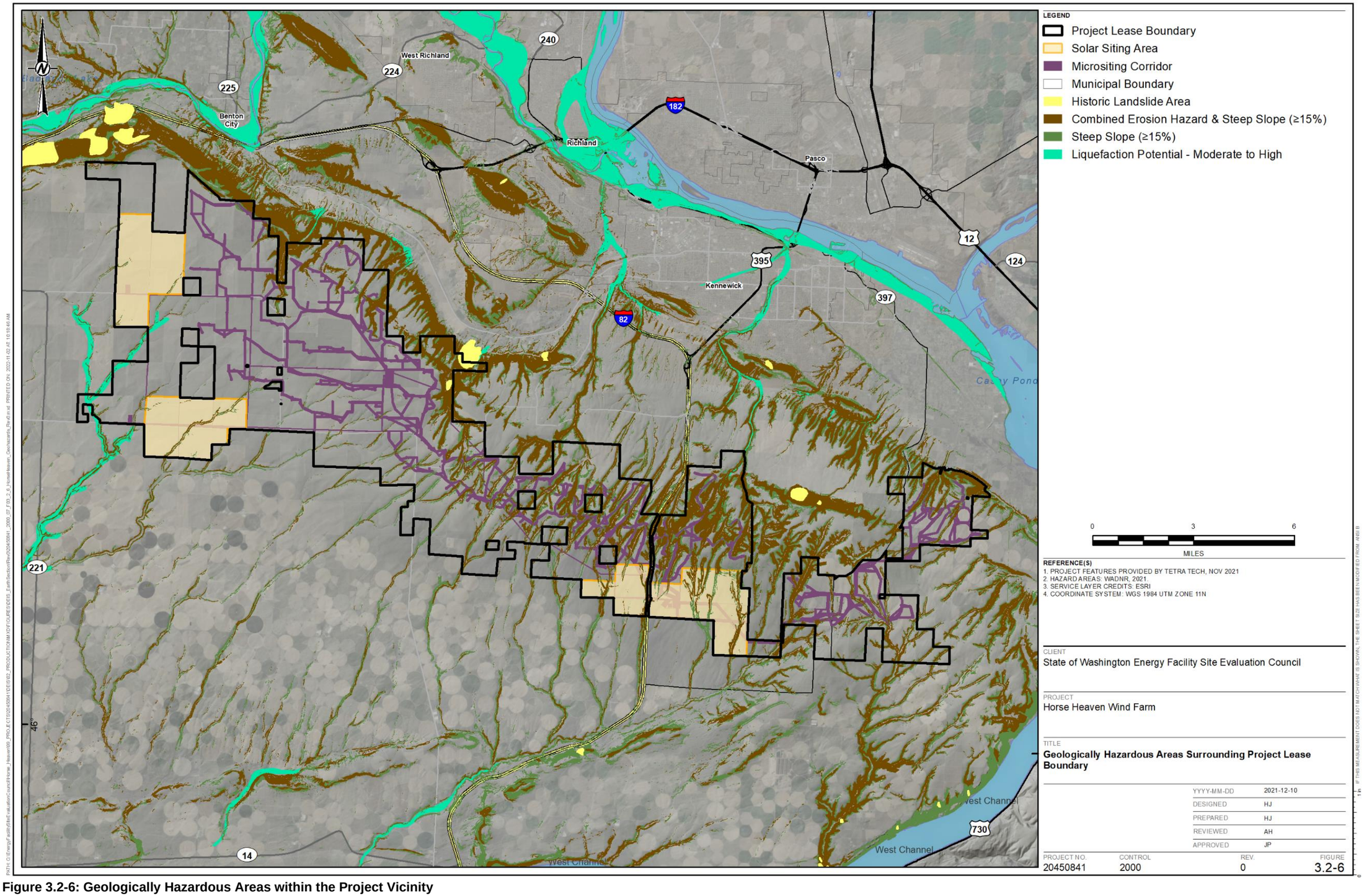

Figure 3.2-6: Geologically Hazardous Areas within the Project Vicinity

Project-specific Volcanic Hazards

The Lease Boundary is underlain by effusive basaltic lava flows, deposited a million years ago under a very different volcanic regime than currently exists. The volcanic vents that produced these lavas are no longer considered capable of generating new eruptions. Washington has five Cascade volcanoes that the USGS has listed as having a high or very high threat potential: Mount Baker, Glacier Peak, Mount Rainier, Mount St. Helens, and Mount Adams. **Figure 3.2-1** illustrates the location of these volcanoes in relation to the Lease Boundary. The two nearest volcanoes to the Lease Boundary are Mount Adams and Mount St. Helens, described below:

- **Mount Adams:** This volcano is approximately 90 miles west of the Lease Boundary. It has not been active in recent history, but it was active from about 520,000 to about 1,000 years ago. Eruptions have occurred from 10 vents since the last period of glaciation about 15,000 years ago.
- **Mount St. Helens:** Mount St. Helens is the closest historically active volcano to the Lease Boundary, at approximately 125 miles west of the Project site. Its most recent major eruption was in 1980, when it erupted and subsequently collapsed. The heaviest ash deposition occurred in a 60-mile-long swath immediately downwind of the volcano. Another area of thick ash deposition occurred near Ritzville in eastern Washington, about 195 miles from Mount St. Helens, where nearly 2 inches of ash blanketed the ground, more than twice as much as at Yakima, which is only about half as far from the volcano (Moen and McLucas 1981).

The Lease Boundary is located more than 80 miles from areas considered subject to volcanic hazards by the USGS (Washington Division of Geology and Earth Resources 2016). The potential hazard to the Lease Boundary from volcanic flow deposits is in part determined by the mapping of existing flows. The distribution of lahar deposits and lava flows associated with Mount Adams and Mount St. Helens has not historically reached the area near the Lease Boundary.

Renewed volcanic activity may trigger earthquakes, and volcanic ash could reach, and cover, the Lease Boundary from an eruption at one of the Cascade Range volcanoes. The main hazard from volcanic activity at the Lease Boundary is the deposition of volcanic ash following large eruptions in the Cascade Range. Prevailing wind directions in the Pacific Northwest blow toward the north and northeast. The USGS estimates a 0.1 to 0.2 percent annual probability of 4 inches or more ash accumulation near the Lease Boundary from an eruption of major Cascade volcanoes (Wolfe and Pierson 1995).

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3.3 Air Quality

This section describes the existing air quality and regulatory setting in the proposed Horse Heaven Wind Farm (Project, or Proposed Action) vicinity. Section 4.3 presents an analysis of the Project's potential impacts on air quality. The Project vicinity includes the areas 4 miles south/southwest of Kennewick, Washington, in Benton County, and the larger Tri-Cities urban area along the Columbia River. The Project's consistency with relevant air quality standards, regulations, goals, and policies is evaluated in Section 4.3.

Regulatory Setting

Federal

The U.S. Environmental Protection Agency (EPA) regulates national air quality under the Clean Air Act (CAA), the primary federal statute governing air quality. The EPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants:

- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Particulate matter
  - less than 10 microns (PM_{10})
  - less than 2.5 microns ($PM_{2.5}$)
- Ozone (O_3)
- Sulfur dioxide (SO_2)
- Lead (Pb)

The NAAQS are designed to protect public health and welfare with an adequate margin of safety. NAAQS are expressed in concentration levels in ambient air, averaged over a specific time interval. Washington ambient air quality standards are identical to the NAAQS (see Washington Administrative Code [WAC] 173-476, Ambient Air Quality Standards). Local air quality is measured relative to these national and state standards. Areas that comply with the NAAQS are designated "attainment areas." Areas that fail to meet the standards are designated "non-attainment" areas.

Under the CAA, the EPA requires each state to prepare, adopt, and administer a State Implementation Plan (SIP) to ensure that air quality in non-attainment areas is gradually brought into compliance with the NAAQS and that good air quality is maintained in areas that already attain the NAAQS. The SIP must consider the impact of both stationary and nonstationary sources of air pollution. In Washington, the Department of Ecology (Ecology) is the agency generally responsible for the SIP and overall air quality management.

State

The Washington Energy Facility Site Evaluation Council (EFSEC) has overarching responsibility for air quality standards compliance for energy facilities pursuant to WAC 463-62-070:

> "Air emissions from energy facilities shall meet the requirements of applicable state air quality laws and regulations promulgated pursuant to the Washington State Clean Air Act, chapter 70.A.15 RCW, and the Federal Clean Air Act (42 U.S.C. 7401 et seq.), and chapter 463-78 WAC."

In addition, 463-78 WAC adopts several provisions from WAC 173-400 regulations including key applicable provisions discussed in Section 3.3.1.2 below.

Local

The Benton County Clean Air Agency (BCAA) has local rules and regulations for potential sources of air pollution which are subsumed under EFSEC review for energy facilities.

Stationary Source Regulations

The SIP developed by Ecology and EFSEC includes both prohibitory rules (e.g., emission limits) for existing stationary sources of air pollution and rules for permitting new stationary sources of air pollution in both attainment and non-attainment areas of the state. Local air authorities, such as the BCAA, may impose additional requirements. EFSEC has EPA-delegated authority for issuance of air permits for energy facilities under its jurisdiction pursuant to WAC 463-78-095.

Any new stationary emissions source that exceeds certain thresholds must generally obtain a preconstruction air quality permit by demonstrating that it would comply with all applicable federal, state, and local air quality requirements, including emissions standards and ambient air quality standards.

New sources of air emissions in non-attainment areas must generally satisfy more rigorous requirements than equivalently sized sources in attainment areas to bring the area back into compliance with air quality standards. The two most common permits associated with regulated air pollutants emitted by stationary industrial activity are Notice of Construction/New Source Review approvals and Prevention of Significant Deterioration permits.

The Project would not be located within a non-attainment area for any criteria pollutants (EPA 2023). The only stationary sources of emissions associated with the Project are a portable concrete batch plant and backup diesel-fired power generators to support construction of the Project. Neither would be permanent sources of air pollution. A Notice of Construction approval would be required from EFSEC, with support from BCAA. A supplemental environmental analysis that includes an air quality impact assessment for these sources has been prepared (Tetra Tech 2023), and the results of the evaluation are included in Section 4.3.

Nonstationary and Fugitive Emission Source Regulation

Although construction emissions are not included in the permitting of stationary sources, mobile sources (such as construction equipment and maintenance pickups) are regulated separately under the federal CAA. Nonstationary emission sources, such as ships, trains, motor vehicles, and on-road and off-road construction equipment, are not generally required to obtain preconstruction air quality permits. Instead, nonstationary emission sources may be required to comply with mobile source emission standards established by the EPA. Mobile source regulations generally apply to mobile source equipment manufacturers prior to sale, who must certify that their equipment complies with applicable standards.

Washington State and the BCAA regulate “fugitive” air emissions not emitted through a chimney, smokestack, or similar facility. A common example of fugitive air emissions is dust blowing from construction sites, unpaved roads, and tilled agricultural fields. Wind and solar energy plants are not included among the facilities for which review and permitting of fugitive emissions are required (WAC 173-400). Nevertheless, WAC 173-400-040(9)(a) requires owners and operators of fugitive dust sources to take reasonable measures to prevent dust from becoming airborne and minimize emissions.

Other Washington State regulations that apply to nuisance emissions, including fugitive dust, and various equipment used during construction, include:

- WAC 173-400-040(3) Fallout. Prohibits emission of particulate matter from any source to be deposited beyond the property line in quantities that would interfere with the use and enjoyment of the impacted property
- WAC 173-400-040(4–4a) Fugitive emissions. Requires reasonable precautions to prevent the release of air contaminants from materials handling, construction, demolition, or other fugitive emissions sources
- WAC 173-400-040(5) Odors. Requires good practice and procedures to minimize odors that may interfere with another property owner's use and enjoyment of their property

In addition to the above, the BCAA requires (prior to commencement of construction):

- Notification of any work that would generate fugitive air emissions (BCAA Regulation 1 Article 4 Section 4.02.C)
- Preparation and implementation of a dust control plan that identifies management practices and operational procedures to control fugitive dust emissions (BCAA Regulation 1 Article 4 Section 4.02.E)

Climate Change – Greenhouse Gas Emissions

Greenhouse gases (GHGs) absorb infrared radiation in the atmosphere. The infrared radiation is selectively absorbed or "trapped" by GHGs, and heat is then reradiated back toward the earth's surface, warming the lower atmosphere and the earth's surface. Atmospheric concentrations of GHGs have risen dramatically since the Industrial Revolution. This has resulted in gradually increasing global temperature, thereby increasing the potential for indirect effects such as:

- Decrease in precipitation as snow
- Gradual melting of polar ice caps
- Increase in severe weather
- Changes to plant and animal species and habitat
- Rise in sea level

Climate impacts are not attributable to any single action but are exacerbated by diverse individual sources of emissions that each make relatively small additions to GHG concentrations.

Both natural processes and human activities emit GHGs. Human activities known to emit GHGs include industrial manufacturing, utilities, transportation, residential activities, and agricultural activities. The GHGs that enter the atmosphere because of human activities are CO_2, methane, nitrous oxide, and fluorinated carbons (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride).

In 2020, the Washington Legislature set new GHG emission limits in order to combat climate change. Under the law, the state is required to reduce emissions levels as follows:

- 2020 – reduce to 1990 levels
- 2030 – reduce to 45 percent below 1990 levels

- 2040 – reduce to 70 percent below 1990 levels
- 2050 – reduce to 95 percent below 1990 levels and achieve net zero emissions (Ecology n.d.)

In 2022, the Washington Legislature set a new rule, Chapter 173-446 WAC, Climate Commitment Act Program**.** The Climate Commitment Act requires Ecology to adopt rules to implement the cap-and-invest program to achieve Washington's goal of net zero greenhouse gas emissions by 2050 (Ecology n.d.).

WAC 173-441 establishes an inventory of GHG emissions through a mandatory GHG reporting rule for certain operations. Because wind and solar power do not emit GHGs during operations, these regulations would not apply to the Project (Horse Heaven Wind Farm, LLC 2022).

3.3.1 Affected Environment

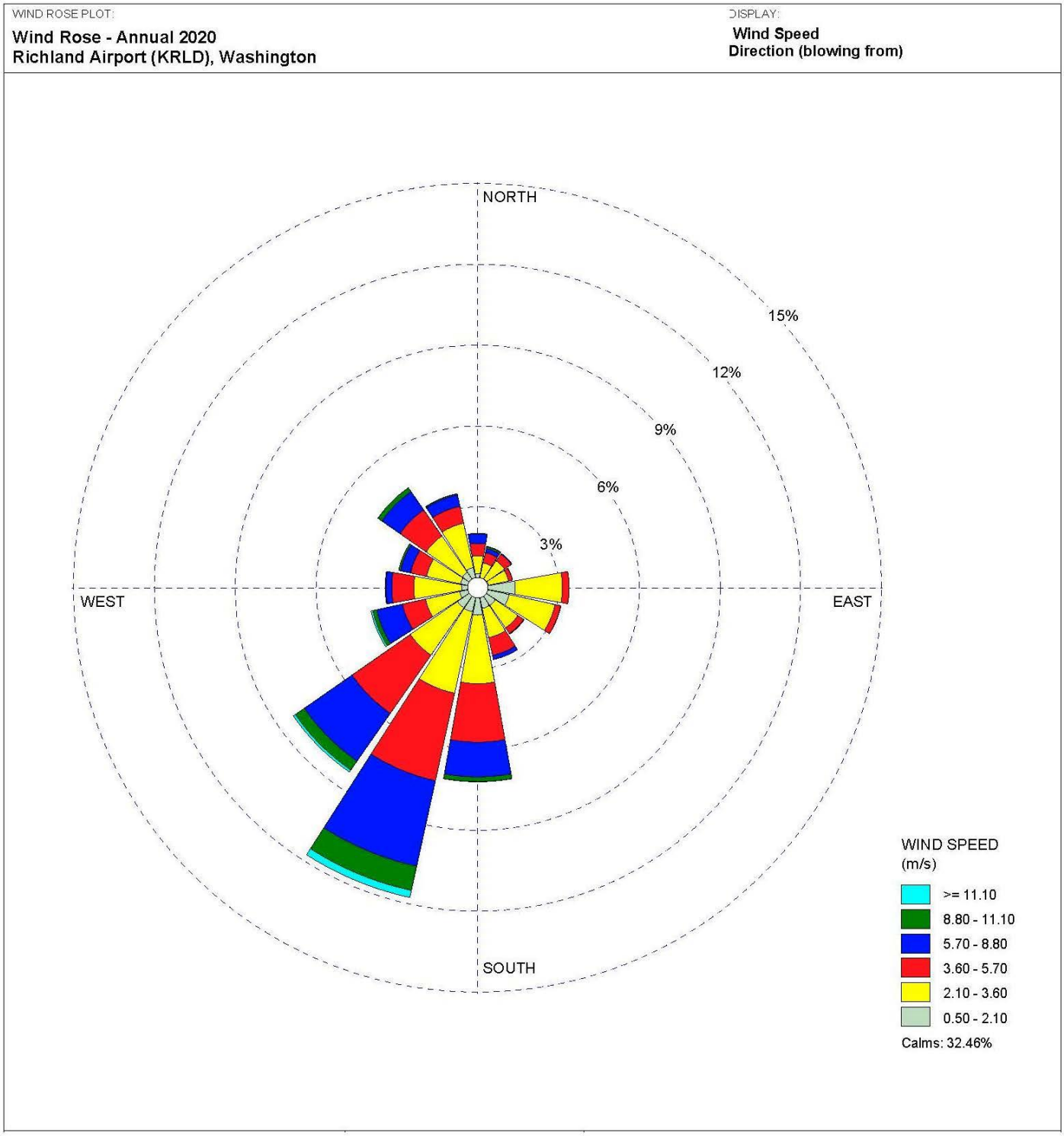
The following subsections discuss regional climate, emission inventory, and air quality conditions in the Project vicinity.

3.3.1.1 Regional Climate

Benton County is located within a rain shadow created by the Cascade Mountains, which causes a decrease in precipitation to the east. In this region of Washington, the summers are hot and mostly clear, winters are cold and partly cloudy, and it is typically dry year-round (on average, there are nearly 200 days of sunshine). The average annual precipitation at Kennewick, one of the cities closest to the Lease Boundary, is 7.7 inches. In winter, temperatures in Kennewick average a high of 43 degrees Fahrenheit (°F) and a low of 29.6°F, with extreme lows below 10°F. In summer, temperatures average a high of 87.1°F and a low of 59.6°F, with extreme highs above 100°F. The average relative humidity is 64 percent (Horse Heaven Wind Farm, LLC 2022).

Wind speed, wind direction, and atmospheric stability strongly influence air quality conditions. Stronger winds improve local ventilation rates, increase atmospheric mixing, and generally improve dispersion of local point source emissions. However, higher winds can also contribute to windblown fugitive dust. **Figure 3.3-1** and **Figure 3.3-2** depict wind speed, wind direction, and stability parameter observations taken from the Richland, Washington meteorological station (KRLD), which is the closest station to the Project (Horse Heaven Wind Farm, LLC 2022). The annual information provided in these figures is based on one full year of data from 2020.

Figure 3.3-1 shows the average annual wind speed and direction for the year 2020 in Richland, in a graphic form known as a “wind rose.” The rings in this figure represent the percentage of the year that the wind blows from each of the 16 compass directions, with color-coded bands depicting wind speed categories within each compass direction. Wind in the Project vicinity blows predominantly from the southwest quadrant, with less frequent winds possible from other directions.

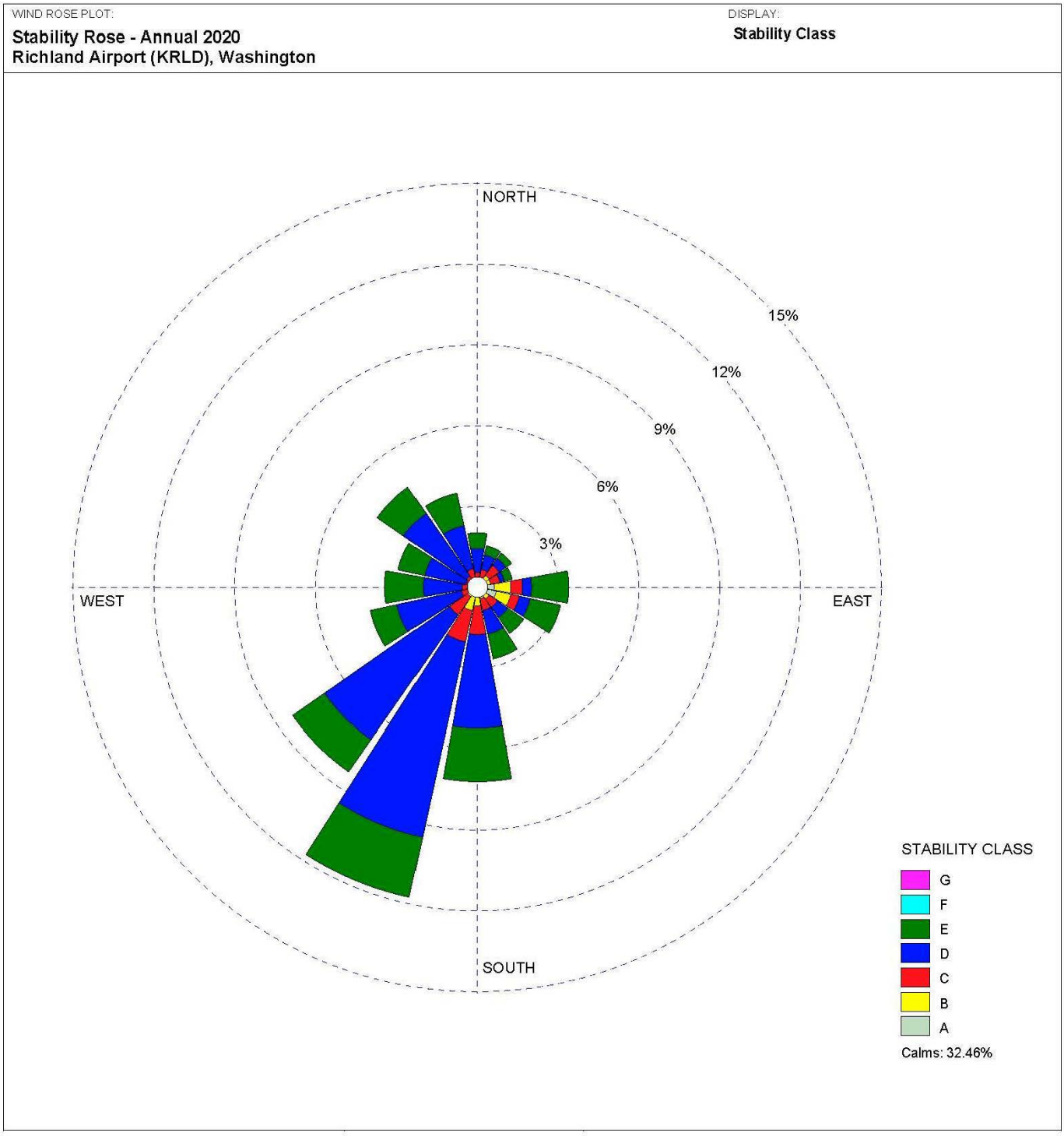


Source: Horse Heaven Wind Farm, LLC 2021

Figure 3.3-1: 2020 Wind for Richland, Washington, Meteorological Station

Wind conditions near the Lease Boundary over a longer period can be characterized by Automated Surface Observing Systems (ASOS), which serve as the nation's primary surface weather observing network. The closest ASOS station to the Lease Boundary is located at the Tri-Cities Airport in Pasco, Washington (KPSC). Based on data collected from January 1, 1990, to December 31, 2019, the prevailing winds most frequently blow from the southwest (approximately 24 percent of the time) and the north-northwest (approximately 24 percent of the time), with calm conditions (less than 2.0 miles per hour) occurring approximately 23 percent of the time. The average wind speed for this period was approximately 6.7 miles per hour (3.0 meters per second) (Horse Heaven Wind Farm, LLC 2022).

Atmospheric stability, which refers to a lack of vertical air movement, plays an important role in air quality because air contaminants are not dispersed as quickly or widely when the atmosphere is stable (Hanna et al. 1982). Atmospheric stability is generally characterized according to the Pasquill-Gifford scheme, which ranges from Class A (most unstable) to Class G (most stable). **Figure 3.3-2** shows the average atmospheric stability in Richland 2020. Similar to the wind rose in **Figure 3.3-1**, in this "stability rose," the spokes in the figure depict wind direction, but here the colors represent the atmospheric stability associated with each wind direction. The figure shows that unstable to neutral (Class A–D) atmospheric conditions, which promote acceptable pollutant dispersion, predominate in all compass directions in the Richland area and that highly stable conditions (Class F and G) with reduced atmospheric mixing are less frequent.

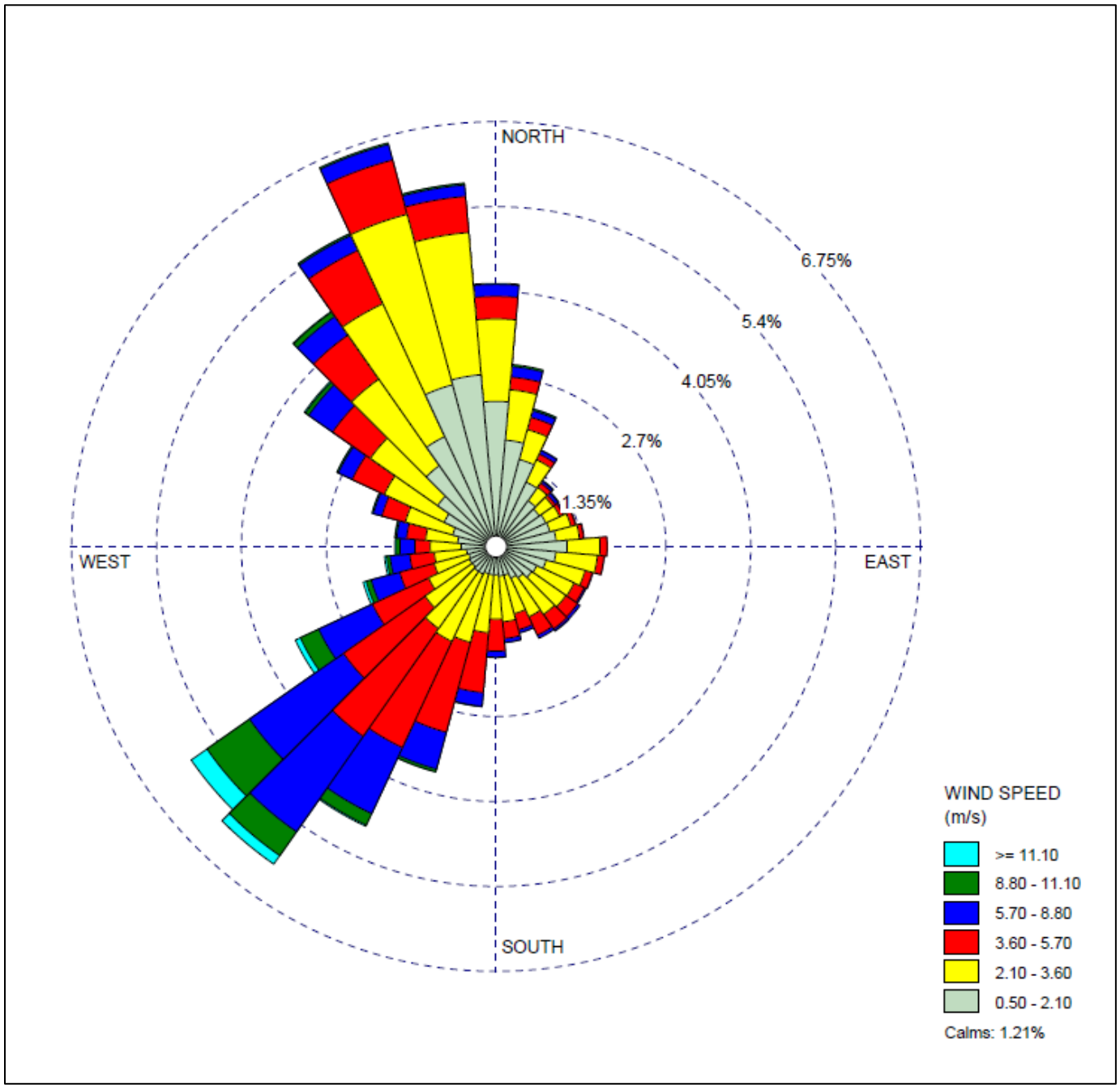


Source: Horse Heaven Wind Farm, LLC 2021

Figure 3.3-2: 2020 Atmospheric Stability for Richland, Washington, Meteorological Station

For purposes of conducting the atmospheric dispersion modeling study to assess the impacts of the stationary sources associated with construction (concrete batch plant and backup diesel-fired generators, Ecology recommended the use of a five-year hourly meteorological data set consisting of hourly surface observations of

wind speed and direction collected at the Tri-Cities Airport in Pasco, Washington, and upper air data collected by the National Weather Service in Spokane, Washington, for the period 2018 through 2022. The meteorological data were collected approximately 15 miles northeast of the Lease Boundary. A wind rose plot depicting the frequencies of wind speed and direction for this meteorological data set is provided in **Figure 3.3-3** (Tetra Tech 2023).



Source: Tetra Tech 2023

Figure 3.3-3: Five-Year Wind Rose (2018–2022) from Tri-Cities Airport, Pasco, Washington

3.3.1.2 Existing Air Quality

Background air quality conditions in the Project vicinity are somewhat difficult to determine because there are no comprehensive air quality monitors near the Lease Boundary. The monitors nearest to the Lease Boundary are located in Kennewick, Washington (with the monitor located approximately 4 miles to the north) and measure ozone and PM_{10}. The nearest $PM_{2.5}$ monitors are in Pendleton, Oregon (approximately 35 miles southeast of the Lease Boundary) and Toppenish, Washington (approximately 40 miles northwest of the Lease Boundary). The nearest SO_2 monitor is in Wenatchee, Washington (approximately 80 miles north of the Lease Boundary). The nearest CO monitor is in Portland, Oregon (approximately 155 miles west-southwest of the Lease Boundary). The nearest NO_2 monitors are in Tacoma, Washington (approximately 157 miles northwest of the Lease Boundary) and Portland, Oregon (approximately 157 miles west-southwest of the Lease Boundary). The nearest lead monitor to the site that collected data for the three-year period 2018–2020 is located in Chico, California (approximately 450 miles south of the Lease Boundary) (EPA 2022). Air quality data for monitors near the Lease Boundary with complete records for 2018–2020 are summarized in **Table 3.3-1** (Horse Heaven Wind Farm, LLC 2022).

Based on the air quality data that have been collected, as well as regional air quality trends, the EPA has not designated Benton County, Washington, as a non-attainment area for any criteria air pollutant.

Table 3.3-1: Background Air Quality Data from Monitoring Stations near the Lease Boundary

Pollutant	Averaging Period	Units	Monitor Site	Measured Concentration[a]				NAAQS
				2018	2019	2020	Avg.	
CO	1-hour	ppm	Portland - SE Lafayette (41-051-0080)	1.9	1.8	15.1	6.3	35[b]
	8-hour	ppm		1.6	1.6	14.1	5.8	9[b]
NO_2	1-hour	ppb	Portland - SE Lafayette (41-051-0080)	35.4	31.5	29.4	32.1	100[c]
	Annual	ppb		8.6	7.7	6.4	7.6	53[d]
Ozone	8-hour	ppm	Kennewick S Clodfelter Road (53-005-0003)	0.073	0.061	0.061	0.065	0.070[e]
$PM_{2.5}$	24-hour	µg/m^3	Toppenish - Ward Rd (Yakama Nation) (53-077-0015)	50.4	34.4	90	58.3	35[f]
	Annual	µg/m^3		11.1	9.8	14.5	11.8	12.0[g]
SO_2	1-hour	ppb	Portland - SE Lafayette (41-051-0080)	2.8	2.5	2.3	2.5	75[h]
	3-hour	ppb		2.4	2.6	2.2	2.4	500[i]
Lead	Rolling 3-month	µg/m^3	Chico, CA - Chico-East Avenue (06-007-0008)	0.0935	0.0033	0.0026	0.0331	0.15[j]
PM_{10}	24-hour	µg/m^3	Kennewick - Metaline (53-005-0002)	65	566	88	240	150[k]

Source: Horse Heaven Wind Farm, LLC 2022 – data compiled from EPA AirData tool, https://www.epa.gov/outdoor-air-quality-data

Notes:

[a] All concentrations are presented in the same statistical form as the corresponding NAAQS standard, as noted below.
[b] Not to be exceeded more than once per year. Values shown are for the maximum second highest value in each year.
[c] 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
[d] Annual mean.
[e] Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
[f] 98th percentile, averaged over 3 years.
[g] Annual mean, averaged over 3 years.
[h] 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
[i] Not to be exceeded more than once per year. Values shown are for the maximum second highest value in each year.

Table 3.3-1 notes, continued
(j) Not to be exceeded. Values shown are for the maximum quarterly average value in each year.
(k) Not to be exceeded more than once a year on average over 3 years. Values shown are for the maximum second highest value in each year. 2019 high concentration and 3-year average are likely influenced by wildfires in the area.
Avg. = average; CO = carbon monoxide; µg/m^3 = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; ppb = parts per billion; ppm = parts per million; SO_2 = sulfur dioxide

For purposes of conducting the atmospheric dispersion modeling study, per guidance from Ecology, data from the NW-AIRQUEST tool were used to determine ambient background concentrations for use in the air quality analysis. The tool was created through a collaboration among Ecology, the Idaho Department of Environmental Quality, and the Oregon Department of Environmental Quality, using model and monitoring data from 2014 through 2017 to estimate background concentrations of criteria air pollutant design values at user-specified locations in Washington, Idaho, and Oregon (IDEQ 2019). A location near the center of the modeled emissions sources was specified and representative criteria pollutant design values were provided. The representative ambient air quality background concentrations are provided in **Table 3.3-2**.

Table 3.3-2: Representative Background Air Quality Data (2014–2017) Used for Dispersion Modeling Study Per Ecology Guidance

Pollutant	Averaging Period	Rank	Background Concentration (µg/m^3)	NAAQS (µg/m^3)	Ambient Background NAAQS
$PM_{2.5}$	24-hour	98th percentile	17.5	35	50%
	Annual	Mean	5.7	12	48%
PM_{10}	24-hour	2nd high	71.6	150	48%
CO	1-hour	2nd high	1,386	40,000	3%
	8-hour	2nd high	962	10,000	10%
NO_2	1-hour	98th percentile	19.0	188	10%
	Annual	Mean	3.8	100	4%
SO_2	1-hour	2nd high	12.8	196	7%
	3-hour	2nd high	17.0	1,300	1%
	24-hour	2nd high	5.8	365	2%
	Annual	Mean	1.0	80	1%

Notes:
NW-AIRQUEST- predicted background air quality levels within the project area for the grid point located at 46.130541°, -119.381191° (approximate center of locations of modeled sources)
Source: https://idahodeq.maps.arcgis.com/apps/MapSeries/index.html?appid=0c8a006e11fe4ec5939804b873098dfe
CO = carbon monoxide; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 2.5 microns in diameter; SO_2 = sulfur dioxide

3.3.1.3 Regional Emissions

Air quality in the Project vicinity is influenced by, and can be correlated to, regional emissions. Accordingly, collection of regional emissions data is a key and necessary component of air quality planning by state and regional agencies responsible for attaining and maintaining ambient air quality standards. Emission sources in Benton County are regularly tabulated and reported by Ecology for five of the six criteria air pollutants (except lead) in 24 source categories that include both natural and man-made sources. The most recently published emission inventory for Benton County (for the year 2017) is provided in **Table 3.3-3**.

Table 3.3-3: 2017 Emissions Inventory for Benton County, tons per year

Source Category	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOCs
Aircraft	122	1	3	2	0	3
Nonroad Equipment and Vehicles - Boats	889	60	4	3	0	259
Dust from Construction	-	-	5,265	526	-	-
Industrial/Commercial/Institutional Fuel Combustion	123	121	57	43	18	7
Residential Non-Wood Fuel	22	52	0	0	1	3
Fertilizer Application	-	-	-	-	-	-
Commercial Cooking	35	-	89	83	-	13
Livestock	-	-	323	67	-	37
Miscellaneous	57	1	12	10	0	104
Natural Emissions from Soil and Vegetation	1,307	111	-	-	-	3,078
Nonroad Equipment and Vehicles	4,049	674	63	61	1	304
Agricultural Burning	946	56	148	141	2	123
Residential Outdoor Burning: Yard Waste, Trash	227	6	40	39	4	25
Silivicultural Burning	15	1	3	3	0	4
On-road Mobile	14,881	2,911	154	86	7	1,658
Nonpoint Gasoline Stations, Storage, and Marketing	-	-	-	-	-	340
Large Point Sources	146	254	51	37	9	49
Dust from Roads	-	-	1,331	222	-	-
Locomotives	256	1,110	28	27	1	47
Residential Wood Combustion	677	10	77	77	2	104
Commercial Marine Vessels	-	-	-	-	-	-
Nonpoint Solvent Use	-	-	-	-	-	4,024
Dust from Agricultural Tilling and Harvesting	-	-	6,207	1,221	-	-
Wildfires	5,711	141	638	540	62	1,365
Total	29,463	5,510	14,493	3,190	106	11,548

Source: Ecology 2020
Notes (general):
1. Emissions inventory for 2017 is the most current year for which published data is available
2. Emissions are reported in whole numbers. Where a value of 0 is reported, emissions are less than 0.5 tons per year.
"-" = no emissions were reported for this pollutant for this source category
NO_X = oxides of nitrogen; PM_{10} = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

As **Table 3.3-3** shows, most emissions of oxides of nitrogen (NO_X) and CO—pollutants that result primarily from combustion—in Benton County come from mobile sources. On- and off-road, boats, aircraft, and locomotives account for about 85 and 70 percent of all NO_X and CO emissions, respectively. Natural sources and wildfires together account for about 6 and 24 percent of countywide NO_X and CO emissions, respectively. Large point sources of air pollution, on the other hand, account for less than 1 percent of countywide CO emissions and less than 5 percent of countywide NO_X emissions.

Volatile organic compounds (VOCs), together with NO_X, are the primary precursors to ozone, which is not emitted directly but rather formed in the atmosphere as a result of sunlight, heat, and complex photochemical

reactions. Natural sources and wildfires together account for nearly 40 percent of countywide VOC emissions. Solvent use accounts for about 35 percent of Benton County VOC emissions, and mobile sources account for about 20 percent.

Fugitive dust from agricultural operations, construction activity, and roadways accounts for the majority of PM_{10} and $PM_{2.5}$ emissions in the county—about 88 and 62 percent, respectively. Wildfires are also an important source of PM_{10} and $PM_{2.5}$ emissions in the county, accounting for about 4 and 17 percent, respectively.

3.4 Water Resources

This section describes existing water resources within the proposed Horse Heaven Wind Farm (Project, or Proposed Action) Lease Boundary. Section 4.4 provides an analysis of the Project's potential impacts on water resources. The following water resources are addressed herein:

- Surface water and wetlands
- Runoff/absorption
- Floodplains
- Groundwater
- Public water supply

Regulatory Setting

The applicable federal, state, and county laws and regulations relevant to water resources are summarized in **Table 3.4-1**.

Table 3.4-1: Laws and Regulations for Water Resources

Regulation, Statute, Guideline[2]	Description
Federal	
Endangered Species Act of 1973	▪ Protects endangered and threatened species (including subspecies, varieties, and subpopulations) listed under the act and protects the ecosystems on which they rely.
Clean Water Act (CWA)	▪ Establishes regulations for discharging pollutants into waters of the United States and regulates water quality standards for surface water. Under the CWA, it is unlawful to release pollutants into navigable waters unless a permit is obtained. Relevant sections of the CWA that may apply to the Project include: o Section 404 of the CWA requires authorization for the discharge of dredge or fill material into waters of the United States, including some wetlands. o Section 401 of the CWA provides states and tribes the authority to issue water quality certifications, which are required for federal discharge permits into waters of the United States. o Section 402 of the CWA regulates point sources of discharge for pollutants to waters of the United States. A National Pollutant Discharge Elimination System permit is required for a facility to discharge a specified amount of pollutant into receiving waters under certain conditions. ▪ The Joint Aquatic Resource Permit Application (JARPA) is used by the Washington State Departments of Fish and Wildlife, Ecology, Natural Resources (for state-owned aquatic land), and Transportation; U.S. Environmental Protection Agency; U.S. Army Corps of Engineers; U.S. Coast Guard; and local governments (for shorelines). The JARPA provides a consolidated permit application process for federal, state, and local permits for construction and development activities near aquatic environments, including the local Shoreline Permit, State 401 Water Quality Certification, State Hydraulic Project Approval, State Aquatic Use Authorization, State Mooring Buoy Applications, Federal Section 404 and Section 10, Federal Private Aids to Navigation, and Federal 401 Water Quality Protection Agency.

[2] For facilities under its jurisdiction, EFSEC's governing statutes and rules pre-empt all aspects of the certification and regulation of energy facilities approved under RCW 80.50. As a result, the EFSEC review process subsumes all state, and local regulatory permits, requirements, and standards in the Site Certification Agreement.

Table 3.4-1: Laws and Regulations for Water Resources

Regulation, Statute, Guideline[2]	Description
State	
Revised Code of Washington (RCW) Chapter 90.48 Water Pollution Control	▪ The policy aims to maintain the highest standard for waters of the state to preserve public health and recreation and to protect wildlife and aquatic species. It prohibits the discharge of pollution to state waters. “Pollution” is defined as any physical, chemical, or biological property that could impact the ecological function. ▪ An Administrative Order under RCW 90.48 could be required to authorize discharges into waters of the state. Mitigation would be required. ▪ A Sand and Gravel General Permit would be required for potential stormwater discharges associated with rock crushing and concrete batch plants if required on site within the Project Lease Boundary.
RCW 77.55 Construction Projects in State Waters	▪ Under the Hydraulics Act, a Hydraulics Project Approval permit submitted to WDFW would be required when stormwater discharges related to a project would change natural flow or bed of state waters.
Washington Administrative Code (WAC) 463-62-060 Construction and Operation Standards for Energy Facilities – Water Quality	The Water Quality standards state: ▪ *Waste water discharges from projects under the council's jurisdiction shall meet the requirements of applicable state water quality standards, chapter 173-201A WAC, state groundwater quality standards, chapter 173-200 WAC, state sediment management standards, chapter 173-204A WAC, requirements of the Federal Water Pollution Control Act as amended (86 Stat 816,33 U.S.C. 1251, et seq.) and regulations promulgated thereunder.*
Washington Administrative Code (WAC) 463-60-332 Natural Environment – Habitat, vegetation, fish and wildlife	Application for site certification will include: ▪ An assessment of the existing habitats and their use, with a description of the habitats and species present on and adjacent to the site, relative cover, distribution, health, and vigor; the identification of any species of local importance, priority species, or endangered, threatened, or candidate species; and a discussion of management recommendations. ▪ Identification of the energy facility impacts, including temporary, permanent, direct, and indirect impacts on water quality, stream hydrology, in-stream flow, habitat, species, and their use of habitat. This shall include impacts due to the impacts on and changes to species communities adjacent to the project site, and an assessment of the potential for impacts from hazardous or toxic material.
State of Washington Priority Habitat and Species List (WDFW 2008)	▪ WDFW maintains a catalog of priority habitat and species that are a priority for conservation and management. Priority species are those that require protection due to population trends, sensitivity to disturbance, and habitat alteration, or are important to communities. Priority habitats are unique habits or features that support biodiversity and include freshwater wetlands.
WDFW Wind Power Guidelines (WDFW 2009)	▪ The purpose of the WDFW Wind Power Guidelines is to provide guidance for the development of wind energy facilities that avoid, minimize, and mitigate impacts on fish and wildlife habitat. WDFW provides review and recommendations to the permitting authority based on environmental expertise. Freshwater wetlands are a priority habitat.
WAC 173-201A Water Quality Standards for Surface Waters of the State of Washington	▪ Establishes surface water quality standards for State of Washington surface waters that are consistent with public health standards, recreational use, and the protection of fish and wildlife. Surface waters include lakes, rivers, streams, ponds, wetlands, inland waters, and saltwater.

Table 3.4-1: Laws and Regulations for Water Resources

Regulation, Statute, Guideline[2]	Description
WAC 170-303 Dangerous Waste Regulations	▪ The purposes of this regulation are to: *(1) Designate those solid wastes which are dangerous or extremely hazardous to the public health and environment;* *(2) Provide for surveillance and monitoring of dangerous and extremely hazardous wastes until they are detoxified, reclaimed, neutralized, or disposed of safely;* *(3) Provide the form and rules necessary to establish a system for manifesting, tracking, reporting, monitoring, recordkeeping, sampling, and labeling dangerous and extremely hazardous wastes;* *(4) Establish the siting, design, operation, closure, post-closure, financial, and monitoring requirements for dangerous and extremely hazardous waste transfer, treatment, storage, and disposal facilities;* *(5) Establish design, operation, and monitoring requirements for managing the state's extremely hazardous waste disposal facility;* *(6) Establish and administer a program for permitting dangerous and extremely hazardous waste management facilities; and* *(7) Encourage recycling, reuse, reclamation, and recovery to the maximum extent possible.* ▪ Dangerous waste would be stored a minimum of 0.25 miles from any surface water intake for domestic water. ▪ Fuels, oils, and any other hazardous substance would be stored within secondary containment. Secondary containment requires placing tanks or containers within an impervious structure that is capable of containing 110 percent of the volume contained in the largest tank within the containment structure.
Growth Management Act (GMA)	▪ Protection of Critical Aquifer Recharge Areas (CARA) is required under the GMA. CARAs are defined as “areas with a critical recharging effect on aquifers used for potable water.” CARAs are established to protect drinking water supply by preventing pollution from entering groundwater and maintaining access to groundwater supply. ▪ The GMA also identifies frequently flooded areas, geological hazardous areas, wetlands, and fish and wildlife habitat such as stream corridors as critical areas.
Local	
Benton County Code (BCC) – Chapter 15.02 General Provisions	▪ BCC 15.02 designates and classifies ecologically sensitive and hazardous areas and provides protection to these areas. ▪ Critical areas include the following: aquifer recharge areas, fish and wildlife conservation areas, frequently flooded areas, geologically hazardous areas, and wetlands.
BCC 15.04 Wetlands	▪ All areas that meet the definition of a wetland in the Federal Wetlands Delineation Manual (i.e., are inundated or saturated with surface or groundwater to support hydrophytic vegetation) are designated critical areas. ▪ Wetlands will be rated according to Ecology’s Washington State Wetland Rating System for Eastern Washington – Revised. Only activities related to conservation and enhancement are allowed in wetlands without submission of a critical area report. ▪ Wetlands are rated in accordance with Ecology’s Washington State Wetland Rating System for Eastern Washington (Hruby 2014), and establish the required buffers. Standard buffer widths for wetlands are as follows: ▪ 75 to 190 feet for Category I wetlands, depending on habitat points and the type of wetland.

Table 3.4-1: Laws and Regulations for Water Resources

Regulation, Statute, Guideline[2]	Description
	▪ 75 to 150 feet for Category II wetlands, depending on habitat points and type of wetland. ▪ 60 to 150 feet for Category III wetlands depending on habitat points. ▪ 40 feet for Category IV wetlands.
BCC 15.06 Aquifer Recharge Areas	▪ CARAs are areas that have a critical recharging effect on aquifers used for potable water. ▪ These include floodplains and floodways, areas of high ground water, areas with Hydrologic A soils, areas with designated wellhead protection, areas within 100 feet of all irrigation district main canals, and areas with alluvial soils.
BCC 15.08 Frequently Flooded Areas	▪ Frequently flooded areas are floodways and associated floodplains that are designated by the Federal Emergency Management Agency flood hazard classification or areas that occur within the 100-year floodplain.
BCC 15.14 Fish and Wildlife Habitat Conservation Areas	The following fish and wildlife habitat conservation areas are relevant to water resources: ▪ Areas where state or federal designated endangered, threatened, and sensitive species have a primary association. ▪ State-listed priority habitats and areas associated with state-listed priority species. ▪ Waters of the state, including lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters or water courses in Washington. ▪ Naturally occurring ponds, including their submerged aquatic beds, that provide fish or wildlife habitat. ▪ Lakes, ponds, streams, and rivers with introduced native fish populations. Development on conservation areas is prohibited unless federal or state permits or approvals are obtained. Riparian buffer requirements for rivers, lakes, ponds, and streams are: ▪ Type S (Shorelines of the State) standard buffer width: Type S waters are protected by the Benton County Shoreline Master Program, and the buffer width is dependent on the environmental designation and stream. Buffer widths for the Columbia and Yakima Rivers range from 0 feet for water-dependent activities (e.g., rural industrial) up to 200 feet in natural areas along the Columbia River and in the Hanford area. For other creeks, buffers are 100 feet for fish-bearing stream or 50 feet for non-fish-bearing, unless interlocal agreements are in place. ▪ Type F (fish) standard buffer width: 75 feet on parcels without streams with adjacent slopes of 10% or greater and 100 feet for parcels that have streams with adjacent slopes of 10% or greater. ▪ Type Np (non-fish perennial) and Ns (non-fish seasonal) standard buffer width: 50 feet on parcels without streams with adjacent slopes of 10% or greater and 100 feet for parcels that have streams with adjacent slopes of 10% or greater. A Hydraulic Project Approval would be required if work occurs within the ordinary high-water level.

Sources: WDFW 2008, 2009; Benton County 2018; Washington State Legislature 2023

Methodology

The spatial boundaries of the water resources affected environment are the same as the Project's Lease Boundary. The description of the affected environment provided in Section 3.4.1 is based on information available in the 2022 Application for Site Certification (ASC) from Horse Heaven Wind Farm, LLC (Applicant) and additional information provided by the Applicant through data requests for preparation of the Draft Environmental Impact Statement, as well as available government and publicly available literature.

3.4.1 Affected Environment

The Lease Boundary is located in Benton County, in eastern Washington. Benton County falls within the rain shadow of the Cascade Mountains, which creates dry conditions year-round. The average annual precipitation for the nearest community, the City of Kennewick, is approximately 7.7 inches (U.S. Climate Data 2021). The average annual snowfall is approximately 1 inch (U.S. Climate Data 2021). Summers are hot and mostly clear, while winters are very cold and partly cloudy (Horse Heaven Wind Farm, LLC 2022). The annual high temperature is 66 degrees Fahrenheit (°F), with annual low temperatures of 44°F (U.S. Climate Data 2021).

The Lease Boundary is located in an upland area dominated by agricultural activity with no irrigated crops (Appendix I, Horse Heaven Wind Farm, LLC 2022). Water resources in the area are limited. The Lease Boundary falls within the Rock–Glad watershed (Water Resource Inventory Area [WRIA] 31) and the Lower Yakima watershed (WRIA 37) (Ecology 2021). Watersheds and water resources are shown in **Figure 3.4-1.** The majority of the Lease Boundary drains toward the Columbia River, with the exception of a small area that drains north toward the Yakima River (Horse Heaven Wind Farm, LLC 2022).

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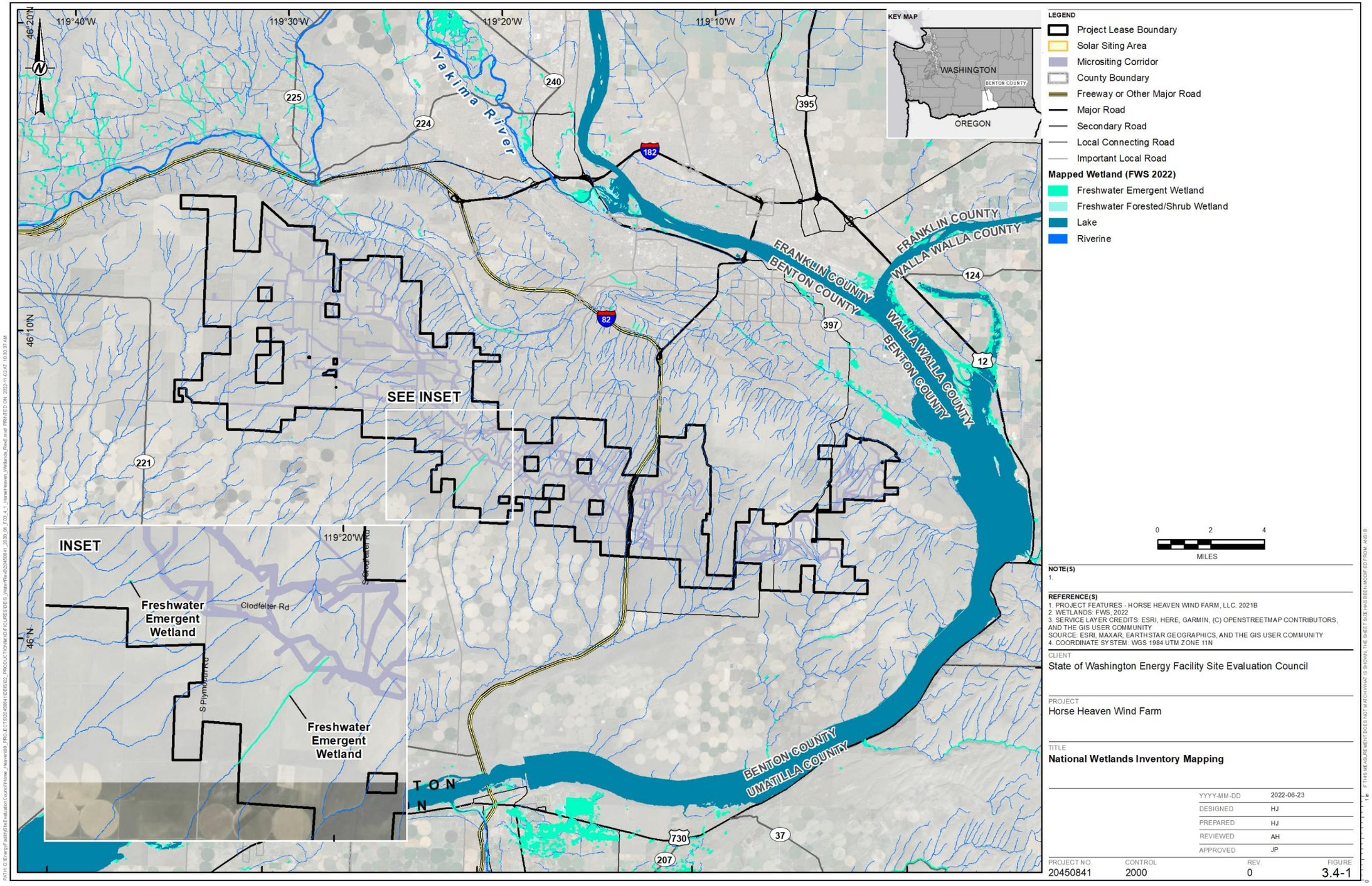

Figure 3.4-1: Watersheds and Water Resources in the Project Lease Boundary

3.4.1.1 Surface Water and Wetlands

The study area used by the Applicant for the background review of water resources comprised an area of approximately 21,680 acres and included the Wind Energy Micrositing Corridor and Solar Siting Areas. The background review completed by the Applicant is summarized below (Horse Heaven Wind Farm, LLC 2022).

- No hydric soils were identified in the Lease Boundary, based on Natural Resource Conservation Service data.
- Desktop review of the Washington Natural Heritage Program for high-quality wetlands did not identify any high-quality wetlands within the Lease Boundary.
- The National Hydrography Dataset and the Benton County Critical Area Ordinance fish and wildlife habitat conservation areas map identified 253 intermittent streams within the Lease Boundary (Ecology 2019; Benton County n.d.). No perennial streams are located within the Lease Boundary.
- No impaired or threatened waterbodies, as defined on the Washington State Department of Ecology 303(d) or 305(b) list, occur within the Lease Boundary (Ecology 2020).
- The Applicant notes that the U.S. Geological Survey Washington Current Water Condition data do not include any water quality conditions within the Lease Boundary. No water quality monitoring stations are located within the Lease Boundary; however, three are located within the downstream environment of the Lease Boundary (USGS 2022). One station is located on the Yakima River (Site 12510500 Yakima River at Kiona), and two are located on the Columbia River (Site 14019220 Columbia River at McNary Dam Lock and Site 14019240 Columbia River below McNary Dam) (USGS 2022).
  - Yearly Freshwater Quality Index (WQI) for the Yakima River at the Kiona site in 2019 was rated moderate concern with a score of 61.[3] Fecal coliform bacteria, oxygen levels, pH, and temperature were all rated as good, indicating that they meet expectations relative to the given conditions, while suspended solid, total persulfate nitrogen, total phosphorus, and turbidity were rated as moderate concern (Ecology 2020, 2022a).[1]
  - Yearly WQI for the Columbia River above the McNary Dam site is not available (Ecology 2022a).
  - Yearly WQI for the Columbia River below the McNary Dam site in 2019 was rated as good, with a score of 89. All yearly parameter scores were rated as good, including levels of fecal coliform bacteria, oxygen, pH, suspended solids, temperature, total persulfate nitrogen, total phosphorus, and turbidity (Ecology 2022a).
- The Lease Boundary includes areas identified as susceptible to erosion, landslides, and bluff failures.
- The Applicant reported no wetlands within the study area. Based on independent review, data available from the National Wetlands Inventory indicate that there are two freshwater emergent wetlands and/or palustrine features within the Lease Boundary, one of which crosses the Wind Energy Micrositing Corridor (USFWS 2022). The two freshwater emergent wetland and/or palustrine features within the Lease Boundary are shown on **Figure 3.4-1**.

[3] Ecology's Freshwater Quality Index (WQI) assigns a score of 1 to 100, with higher numbers indicating better water quality. A WQI of 80 and greater is given a rating of "good," indicating that the combined water quality conditions meet expectations relative to the given conditions and the water quality is of lowest concern. A score of 40 to 80 is rated "moderate concern." A score of 40 and below is rated "poor," indicating that the water quality does not meet expectations and these sites are of highest concern (Ecology 2020, 2022b).

The Applicant conducted wetland delineation surveys and surveys for non-wetland surface water in February, August, October, and November 2020 within the Lease Boundary. Additional surveys were completed in May 2021 within the Lease Boundary. In total, approximately 21,680 acres were surveyed for wetlands and other waters, with an emphasis on areas within the Wind Energy Micrositing Corridor and Solar Siting Areas (Appendix I, Horse Heaven Wind Farm, LLC 2022). Plant species names and associated wetland indicator status ratings are from the State of Washington 2016 Wetland Plant List (Lichvar et al. 2016). Findings from the field surveys are summarized below (Horse Heaven Wind Farm, LLC 2022; Appendix I, Horse Heaven Wind Farm, LLC 2022):

- No wetlands within the Wind Energy Micrositing Corridor and Solar Siting Areas were identified during field surveys.
- One wetland, surveyed in May 2021, was identified within the Lease Boundary approximately 240 feet west of the Wind Energy Micrositing Corridor in Badger Canyon and is approximately 0.03 acres in size (Wetland ID: E10). The location of the wetland relative to the Micrositing Corridor is displayed in **Figure 3.4-2**. The wetland is located downslope from the Micrositing Corridor. It is described as a depressional wetland, and further details from the U.S. States Army Corps of Engineers data sheet are provided below (Appendix I, Horse Heaven Wind Farm, LLC 2022):
  - The wetland is a depressional wetland located in a valley bottom downslope from the Micrositing Corridor. A spring with a well underneath a balsam poplar (*Populus balsamifera*) tree occurs within the site.
  - The wetland is located in the Ritzville Silt Loam soil map unit. Slope gradient on site is approximately 30 to 65 percent.
  - The soil profile on site is a sandy loam texture. Hydric soils and wetland hydrology indicators are present, including a hydrogen sulfide odor. Depth to bedrock is approximately 12 inches.
  - Hydrophytic vegetation is present on site. Dominant species include balsam poplar and common horsetail (*Equisetum arvense*), with some cover of Great Basin ryegrass (*Leymus cinereus*). All species are categorized as facultative species in the Arid West (USACE 2020). “Facultative” describes species that are found in wetland and non-wetland ecosystems (Lichvar et al. 2012).
  - Surface water was not present at the time of the survey, and the water table was not encountered; however, water saturation was present at a depth of 0 inches (i.e., surface).
  - The wetland was rated as a Category IV wetland based on function. Wetlands in Washington are provided a category rank based on their sensitivity to disturbance, rarity, functional value, and whether they are replaceable (Hruby 2014). Wetlands are ranked from Category I, being the most rare, sensitive, undisturbed, or irreplaceable to Category IV wetlands, which have the lowest functional value and are often heavily disturbed (Hruby 2014).
  - Disturbance was identified within the wetland area. The site was previously used as a water trough for cattle, and evidence of cattle grazing was observed at the site.
- Field surveys in the Wind Energy Micrositing Corridor and Solar Siting Areas mapped two intermittent streams and 31 ephemeral stream channels, all of which are considered waters of the state. The ephemeral and intermittent streams mapped by the Applicant are depicted in **Figure 3.4-3**. Stream acreage within the field survey study area was calculated to be 2.58 acres based on the average length and width of streams

(Appendix I, Horse Heaven Wind Farm, LLC 2022). Ephemeral streams flow only during, or immediately following, precipitation events, and stormwater is their main source of water (Nadeau 2015). An intermittent stream contains water for only a portion of the year—typically, seasonally during winter and spring when the channel is below the water table or when snowmelt provides sustained flow (Nadeau 2015).

The location of streams within the Lease Boundary based on field surveys (Appendix I, Horse Heaven Wind Farm, LLC 2022) was compared against the Project infrastructure to better quantify the crossing of streams for each Project component. The number of streams with which each Project component interacts is summarized in **Table 3.4-2,** based on the Applicant's field surveys (Horse Heaven Wind Farm, LLC 2022). Locations of ephemeral and intermittent streams based on the Applicant's surveys are provided in **Figure 3.4-3**.

Ephemeral and intermittent streams are important components of the broader watershed. While no streams within the Lease Boundary are fish bearing, streams within the Lease Boundary drain into the Columbia and Yakima Rivers, which provide important migratory and rearing fish habitat. Streams within the Lease Boundary provide inputs of sediment, nutrients, and organic matter to downstream environments and are hydraulically connected to the larger Yakima and Columbia Rivers (EPA 2008). The Columbia River contains fish, including species listed under the Endangered Species Act (ESA). The Columbia River provides critical habitat for salmonids, including ESA-listed Chinook salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*O. nerka*), steelhead (*O. mykiss*), and bull trout (*Salvelinus confluentus*). The Yakima River provides habitat for ESA-listed steelhead and bull trout (Horse Heaven Wind Farm, LLC 2022).

Table 3.4-2: Interaction of Streams with the Proposed Project

Project Infrastructure	Location	Interactions with Ephemeral Streams	Interactions with Intermittent Streams
Wind Energy Micrositing Corridor	Turbine Option 1	31	2
	Turbine Option 2	31	2
Solar Arrays	East Solar Field	5	0
	County Well Solar Field	0	0
	Sellards Solar Field	2	0
BESS	BESS adjacent to the Bofer Canyon – HH-East Substation	0	0
	BESS adjacent to the Primary HH-West Step-up Substation	0	0
	BESS adjacent to the Alternate HH-West Step-Up Substation	0	0
Substations	HH-East Substation	0	0
	Primary HH-West Intermediate Substation	0	0
	Alternate HH-West Intermediate Substation	0	0
	Primary HH-West Step-Up Substation	0	0
	Alternate HH-West Step-Up Substation	0	0

BESS = battery energy storage system

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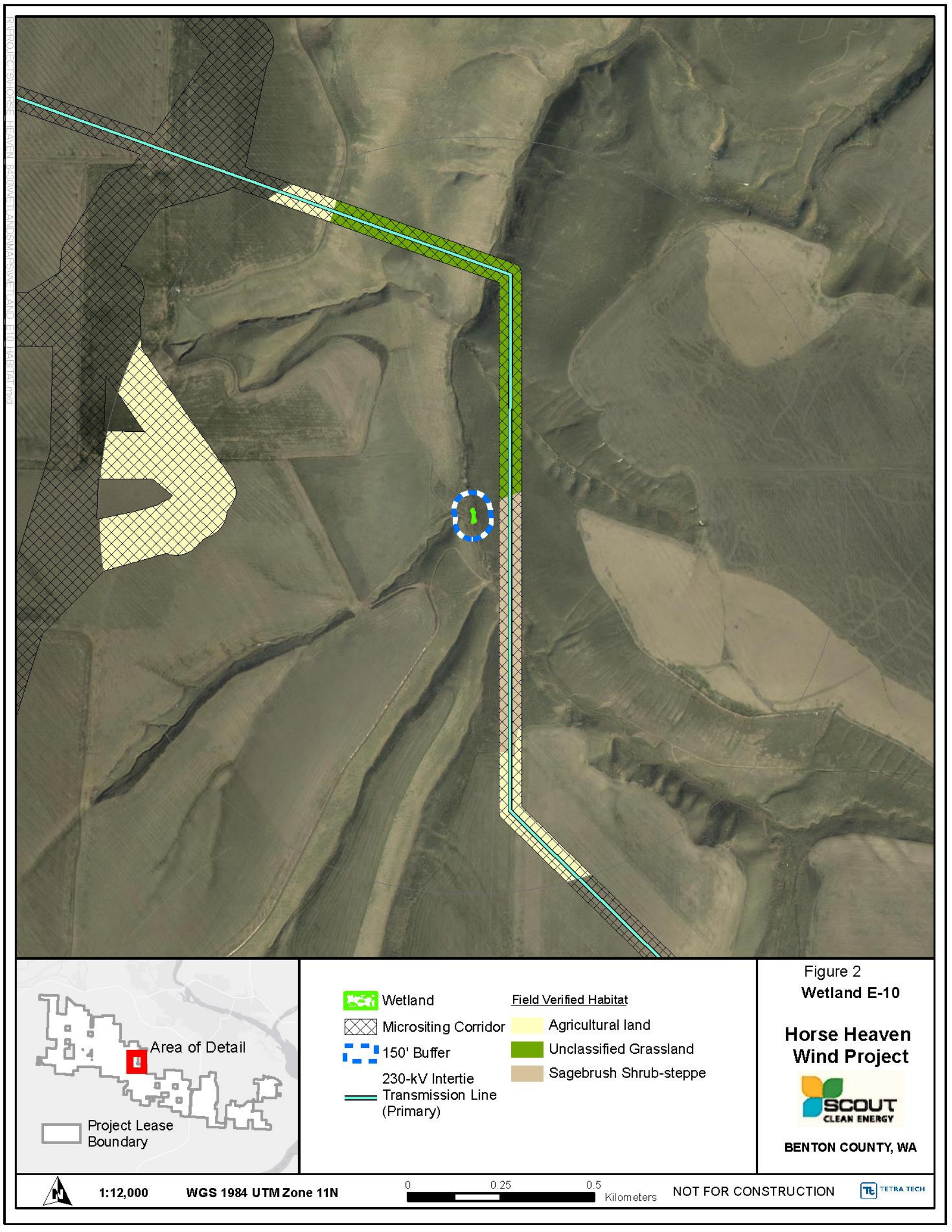
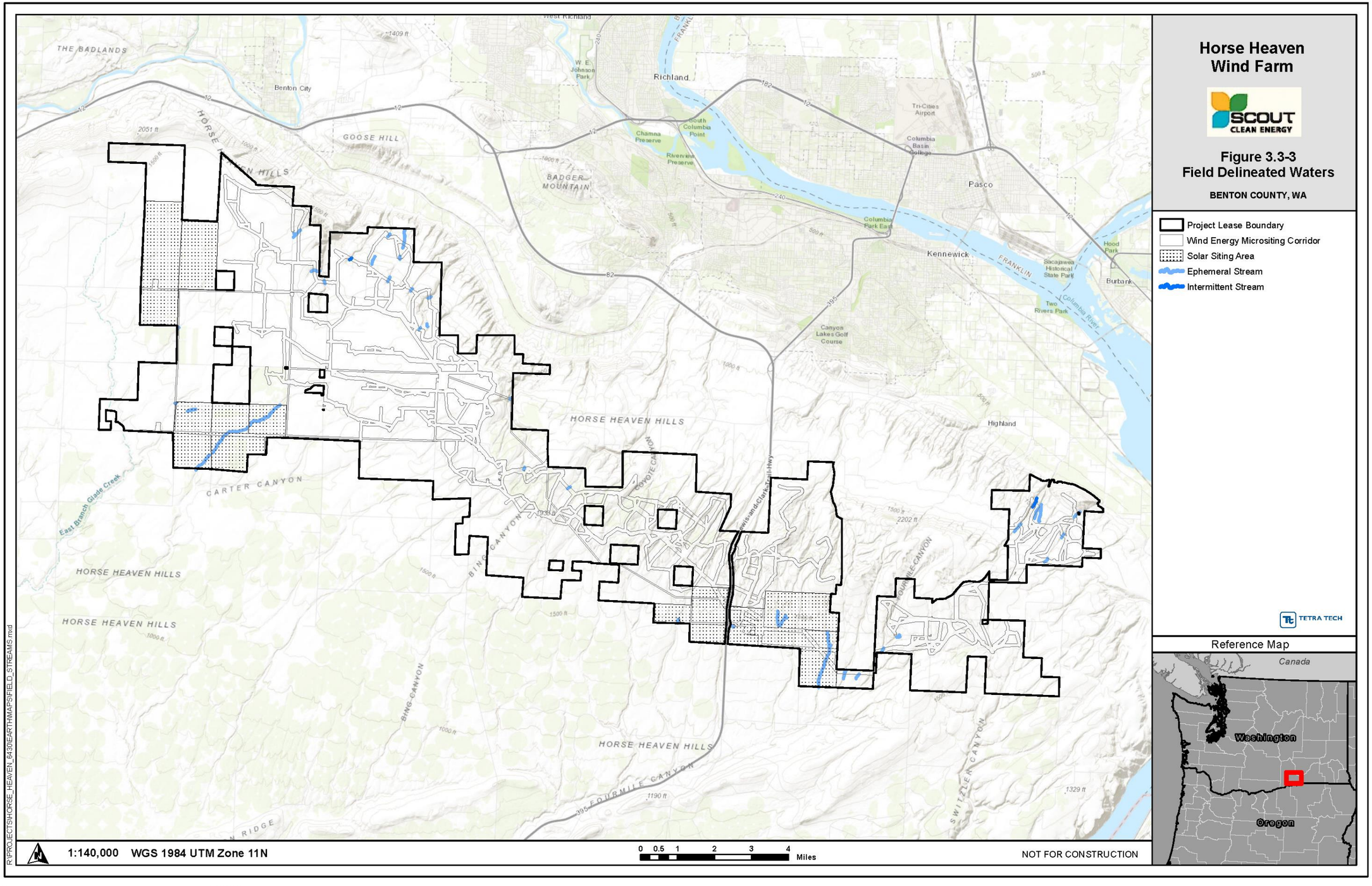


Source: Appendix I, Horse Heaven Wind Farm, LLC 2022

Figure 3.4-2: Wetland Delineated in the Lease Boundary during May 2020 Field Surveys by the Applicant



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.4-3: Waters Delineated in the Lease Boundary from Field Surveys

3.4.1.2 Runoff/Absorption

The Applicant provided the following information to characterize the existing runoff and absorption conditions within the Lease Boundary (Horse Heaven Wind Farm, LLC 2022).

- Surface water is anticipated to infiltrate to the ground, based on the moderate permeability and depth of soils in the Lease Boundary.
- Ultimately, surface water drains to the Yakima River, located north of the Lease Boundary, and the Columbia River, located north, east, and south of the Lease Boundary.
- Construction of the Project is anticipated to increase the total area of impervious surfaces in the Lease Boundary from the gravel access roads; however, the increase is not expected to notably affect the runoff. Assuming that the developed/disturbed habitat category from the Applicant's habitat mapping is all impervious surfaces, there are approximately 836 acres of impervious surface in the Project Lease Boundary (1.2 percent) at present (Horse Heaven Wind Farm, LLC 2022).

3.4.1.3 Floodplains

The Applicant provided the following information to characterize the floodplains within the Lease Boundary (Horse Heaven Wind Farm, LLC 2022).

- Approximately 149 acres of 100-year floodplains, also referred to as Frequently Flooded Areas in the Benton County Code, occur within the Lease Boundary. These areas are visible in **Figure 3.4-4** in the western section of the Lease Boundary and are associated with Critical Aquifer Recharge Areas (CARAs) as defined by Benton County Code Chapter 15.06 (Benton County 2018). CARAs are areas that act to recharge aquifers, which are used for potable water, as defined by Washington Administrative Code 365-190-100 (Washington State 2023).
- Approximately 160 acres of alluvial soils that are associated with CARAs also occur within the Lease Boundary. Alluvial soils are characterized by deposition by running water such as within a stream bed.
- No data on five-year and 50-year floodplains are available within the Lease Boundary.

Based on the present layout, approximately 0.8 acres of 100-year floodplain occur within areas identified as requiring temporary disturbance located within the Micrositing Corridor. The disturbance in the floodplain is associated with construction related to the 230-kilovolt transmission line.

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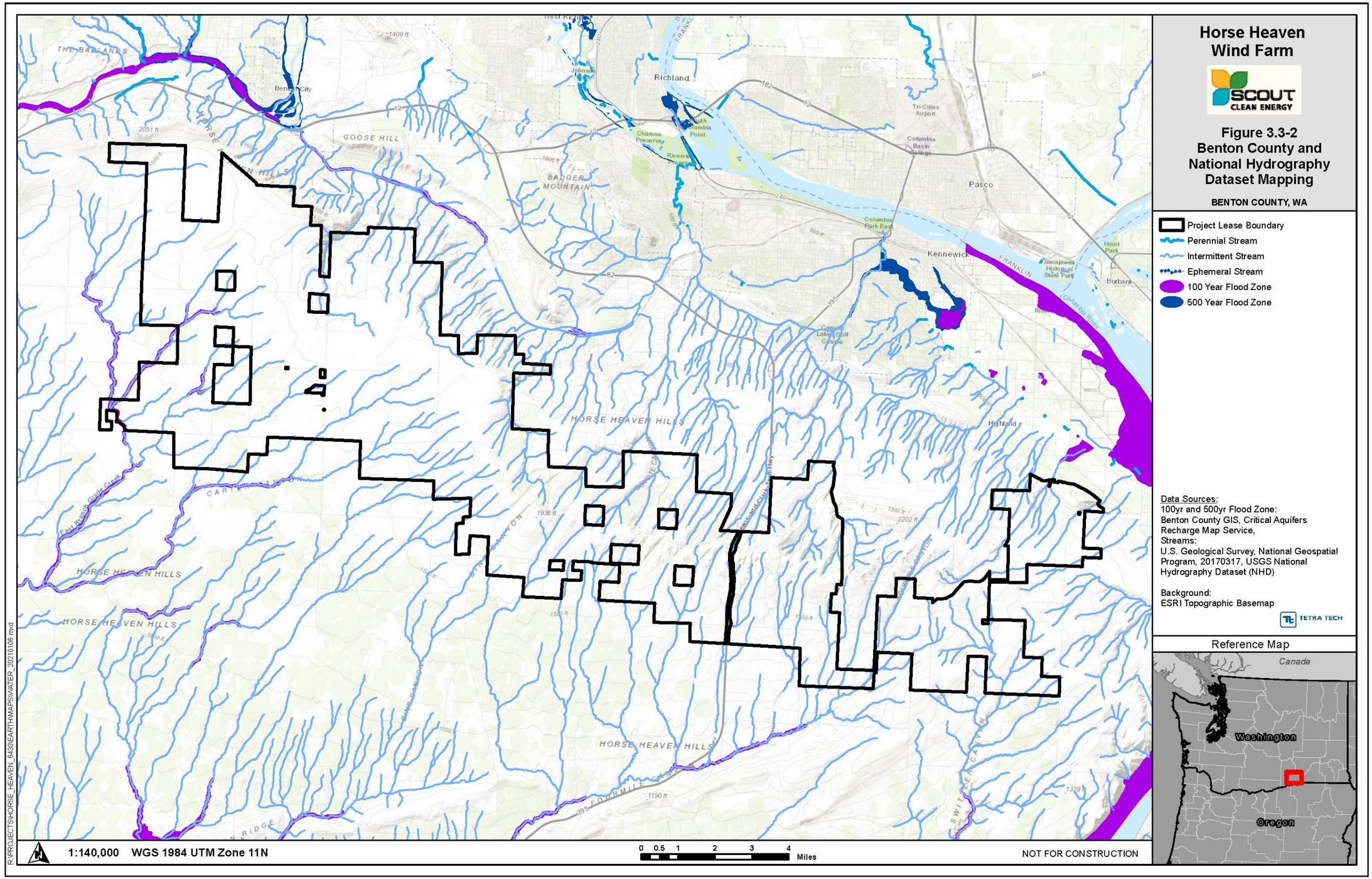

Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.4-4: 100-Year and 500-Year Floodplain in the Project Lease Boundary Vicinity

3.4.1.4 Groundwater

The Applicant provided the following information to characterize the existing groundwater regime within the Lease Boundary (Horse Heaven Wind Farm, LLC 2022).

- Data available from the U.S. Geological Survey Washington Current Water Conditions identify the depth to groundwater as below normal, corresponding to approximately 184 feet below ground surface over most of the Lease Boundary. Data regarding groundwater movement, quality, and quantity within or near the Lease Boundary were not provided in the 2022 ASC for the Project (Horse Heaven Wind Farm, LLC 2022).
- Water well depths within the Lease Boundary range from approximately 55 to 1,506 feet below ground surface and are drilled primarily into the Columbia Plateau basaltic-rock aquifers. These water wells are used for domestic use, livestock, and irrigation (Horse Heaven Wind Farm, LLC 2022).
- As described in Section 3.4.1.3, there are approximately 160 acres of alluvial soils (i.e., soils deposited by surface water) associated with CARAs within the Lease Boundary (Benton County Code 15.06; Benton County 2018). CARAs are areas identified as important for critical recharge of aquifers (Benton County 2018).
- As described in Section 3.2, boreholes were evaluated for the presence and level of any groundwater during and shortly after drilling operations associated with the Applicant's geotechnical investigations. The boreholes did not display a static groundwater level (Horse Heaven Wind Farm, LLC 2022). Groundwater is not anticipated to impact Project design or construction. During the detailed geotechnical investigation, piezometers may be installed for more accurate site groundwater levels (Appendix B, Horse Heaven Wind Farm, LLC 2022).
- Water used by the Project would be sourced from either local off-site public facilities with water sources being the Columbia or Snake River, local private irrigators with collector wells on the banks of the Columbia River, or wells that are fed from regional aquifers (Horse Heaven Wind Farm, LLC 2022).

3.4.1.5 Public Water Supply

The Applicant provided the following information to characterize public water supply sources (Horse Heaven Wind Farm, LLC 2022).[4]

- No public water supply wells are located within the Lease Boundary.
- Water for construction and operation of the Project would be sourced from suppliers located near the Lease Boundary and would likely be sourced from local public utilities. This may include a local off-site public utility with water sources being the Columbia or Snake River, local private irrigators with collector wells on the banks of the Columbia River, or wells that are fed from regional aquifers.
- Appendix J of the 2022 ASC includes a letter from the Port of Walla Walla indicating an Availability of Water for Hire.
- Construction activities are estimated to require 220,000 gallons of water per day, for a total water use of 120 million gallons. This includes the estimated 12.6 million gallons of water that would be required for the on-site concrete batch plant operation. An on-site concrete batch plant is proposed to be located in the east laydown

[4] Characteristics of public water supply for the study area are further discussed in Section 3.15.1, Public Services and Utilities.

area during Phase 1 of construction (approximately four months) and would be located in the west laydown area during Phase 2 of construction (approximately four months).

- Water would be required during operations to wash solar modules in the Solar Siting Areas. Solar modules would be washed once per year during operations and would require an estimated 2,025,000 gallons of water annually should all three solar siting areas be constructed. No additives would be used to wash solar panels. In addition, no more than 5,000 gallons of water a day are estimated to be needed for consumption and domestic use for kitchen and washroom facilities at the operation and maintenance buildings.
- Water is proposed to be trucked to the site from a local supplier and stored in a water storage tank for both construction and operation.

3.5 Vegetation

This section describes the vegetation and supporting habitat in the proposed Horse Heaven Wind Farm (Project, or Proposed Action) vicinity. Section 4.5 presents an analysis of the Project's potential impacts on vegetation. The vegetation analyzed in this section is restricted to upland vegetation. Wetlands are covered under Section 3.4.

Regulatory Setting

Laws and regulations for determining potential impacts on vegetation are summarized in **Table 3.5-1**.

Table 3.5-1: Laws and Regulations for Vegetation Resources

Regulation, Statute, Guideline[5]	Description
Federal	
Endangered Species Act of 1973	Protects endangered and threatened species (including subspecies, varieties, and subpopulations) listed under the act and protects the ecosystems they rely on.
State	
Revised Code of Washington 16-750 Noxious Weeds – Control Boards	The purpose of this code is to minimize the economic loss and adverse effects of noxious weeds on Washington's agriculture, natural areas, and human resources. This code grants jurisdiction, powers, and duties to the county's noxious weed control boards.
Washington State Code 16-750 State Noxious Weed List and Schedule of Monetary Penalties	The purpose of this code is to identify the state's noxious weed list of plants considered highly destructive, competitive, or difficult to control. This code also provides a ranking of noxious weeds as Class A, Class B, or Class C, which indicates the requirements for control.
State of Washington Priority Habitat and Species List (WDFW 2008)	Priority Habitats are unique habitats or features that support biodiversity. Washington Department of Fish and Wildlife (WDFW) maintains a catalog of Priority Habitats and species that are a priority for conservation and management. Priority Species require protection due to population trends, sensitivity to disturbance and habitat alteration, or importance to communities.
WDFW Wind Power Guidelines (WDFW 2009)	The purpose of the WDFW Wind Power Guidelines is to provide guidance for the development of wind energy facilities that avoid, minimize, and mitigate impacts on fish and wildlife habitats. WDFW provides reviews and recommendations to the permitting authority based on environmental expertise.
Local	
Benton County Code Title 15 Chapter 15.04 Wetlands	All areas that meet the definition of a wetland in the Federal Wetlands Delineation Manual (i.e., are inundated or saturated with surface or groundwater to support hydrophilic vegetation) are designated critical areas. Wetlands are rated according to The Washington State Department of Ecology's Washington State Wetland Rating System for Eastern Washington – Revised. Activities allowed in wetlands are conservation and enhancement of the wetland.
Benton County Code – Title 15 Chapter 15.14 Fish and Wildlife Habitat Conservation Areas	Fish and wildlife habitat conservation areas relevant to vegetation resources include: ▪ Areas where state or federal designated endangered, threatened, and sensitive species have a primary association ▪ State Priority Habitats and areas associated with state Priority Habitats ▪ Habitats and species of local importance, which includes shrub-steppe habitat in Benton County. Development on conservation areas is prohibited unless federal or state permits or approval is obtained.

Methodology

The affected environment described in this section has been categorized into four spatial boundaries to assess vegetation. These areas were independently calculated from spatial data provided by Horse Heaven Wind Farm,

[5] For facilities under its jurisdiction, EFSEC's governing statutes and rules preempt all aspects of the certification and regulation of energy facilities approved under RCW 80.50. As a result, the EFSEC review process subsumes all state, and local regulatory permits, requirements, and standards in the Site Certification Agreement.

LLC (Applicant) (Horse Heaven Wind Farm, LLC 2021a). To enable an assessment of each Project component independent of the others, the spatial data were used as the 2022 Application for Site Certification (ASC) did not provide data summaries to a sufficient degree of detail. The four areas used in this analysis are:

- The Lease Boundary, which encompasses approximately 72,428 acres on Horse Heaven Hills.
- The Wind Energy Micrositing Corridor, which encompasses approximately 11,845 acres of predominantly linear features, including the turbines, support infrastructure (i.e., roads, crane paths, laydown yards, operations and maintenance facilities, meteorological towers), collector lines (overhead and underground), transmission lines (230 kilovolt [kV] and 500 kV), the Primary HH-West Intermediate Substation, the Alternate HH-West Intermediate Substation, the Primary HH-West Step-up Substation, and the battery energy storage system (BESS) adjacent to the Alternate HH-West Step-up Substation. The Micrositing Corridor is located mostly within the Lease Boundary, except for three locations where infrastructure crosses Interstate 82.
- Solar Siting Areas, which encompass approximately 10,755 acres. Where information provided by the Applicant allows, the Solar Siting Areas are further divided into the following areas:
  - East Solar Field, which encompasses approximately 4,389 acres, including the HH-East Substation and the BESS adjacent to the Bofer Canyon – HH-East Substation
  - County Well Solar Field, which encompasses approximately 3,343 acres, including the Alternate HH-West Step-up Substation and the BESS adjacent to the Alternate HH-West Step-up Substation
  - Sellards Solar Field, which encompasses approximately 3,023 acres[6]
- The Comprehensive Project, which encompasses approximately 17,090 acres, includes all components associated with the Wind Energy Micrositing Corridor and all Solar Siting Areas. As portions of the Wind Energy Micrositing Corridor overlap with some of the Solar Siting Areas, the area of the Comprehensive Project is less than the sum of individual components.
- The Vegetation Area of Analysis (VAA), which encompasses approximately 202,289 acres and includes the Lease Boundary plus an additional 2-mile buffer.

Some of the area summaries from the independent calculation differ from the area summaries provided in the 2022 ASC due to area overlap. For example, portions of the Micrositing Corridor occur within the Solar Siting Areas and were not accounted for under the Micrositing Corridor in the 2022 ASC. However, to assess this as an individual component all areas associated with it were included.

The VAA is the same area used for analysis of wildlife and habitat in Section 3.6. A 2-mile buffer was selected because this was the distance used for aerial raptor surveys by the Applicant during stick nest surveys (Appendix K, Horse Heaven Wind Farm, LLC 2022), and vegetation is closely associated with wildlife and wildlife use. Where data are available from the Applicant, analyses are provided for each Project component (i.e., Wind Energy Micrositing Corridor, Solar Siting Areas, substations, and BESS). Where data by Project component are unavailable from the Applicant, analyses are summarized for all Project components.

[6] Unlike the East Solar Field and County Well Solar Field, the substation is located outside what is shown as the Solar Siting Area for the Sellards Solar Field.

Field studies were not conducted for this Environmental Impact Statement (EIS); rather, this analysis relies on information provided in the 2022 ASC and associated appendices (Horse Heaven Wind Farm, LLC 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022) and from government and publicly available sources. Habitat summaries provided in Section 3.5.2 for the Lease Boundary, Micrositing Corridor, and Solar Siting Areas were calculated independently, using the spatial data provided by the Applicant (Horse Heaven Wind Farm, LLC 2021a).

Vegetation field studies were completed by the Applicant in 2018, 2020, and 2021. Coarse-scale reconnaissance and mapping of land cover were completed in 2018 for parts of the Project Lease Boundary that were accessible by public roads, following which changes were made to the proposed Project. Surveys in 2020 included a 200-foot buffer around 44 turbine locations and portions of the Micrositing Corridor. Surveys completed in June 2021 focused on characterizing habitat in the unsurveyed portions of the Micrositing Corridors, turbine locations, and Solar Siting Areas not surveyed in 2020 (Horse Heaven Wind Farm, LLC 2022).

3.5.1 Affected Environment

The VAA is in the Columbia Plateau Ecoregion, which is an arid environment dominated by grassland-steppe and shrub-steppe (Clarke and Bryce 1997). The dominant vegetation association in the VAA was historically big sagebrush (*Artemisia tridentata*) and bluebunch wheatgrass (*Pseudoroegneria spicata*) (Franklin and Dyrness 1988). However, much of the land and associated vegetation has been altered by anthropogenic activities, predominantly agriculture and grazing in the Horse Heaven Hills area.

The VAA is located in Benton County, in eastern Washington. Benton County falls within the rain shadow of the Cascade Mountains, which creates dry conditions year-round. Elevation within the Lease Boundary ranges from 604 to 2,051 feet above mean sea level (Horse Heaven Wind Farm, LLC 2022). The average annual precipitation for the nearest city, the city of Kennewick, is approximately 7.7 inches (U.S. Climate Data 2021). Average annual snowfall is approximately 1 inch (U.S. Climate Data 2021). Summers are hot and mostly clear, while winters are cold and partly cloudy (Horse Heaven Wind Farm, LLC 2022). July is the warmest month on average with an average monthly high of 90 degrees Fahrenheit (°F), and monthly low of 62 °F. December is the coldest month on average with an average monthly high of 40 °F and monthly low of 29 °F (U.S. Climate Data 2023).

3.5.2 Habitat

The following sections describe the existing habitat within the Lease Boundary and VAA.

3.5.2.1 Habitat Mapping in the Lease Boundary

Habitat mapping is available from the Applicant for the area within the Lease Boundary and was developed using both aerial imagery and field survey data. The Applicant adapted habitat types and subtypes to describe the existing environment from descriptions in the Washington Department of Fish and Wildlife's (WDFW) Wind Power Guidelines (WDFW 2009) and Johnson and O'Neil (2001), except the description for rabbitbrush shrubland and non-native grassland, which have been described by the Applicant in the 2022 ASC. The Applicant completed field surveys of the Wind Energy Micrositing Corridor and Solar Siting Areas in 2020 and 2021 to characterize the existing conditions. All parts of the Micrositing Corridor and Solar Siting Areas were field surveyed, except for 604 acres that were not accessible within two parcels of land in the Sellards Solar Field (Appendix K, Horse Heaven Wind Farm, LLC 2022). Photos of representative habitat subtypes in the Lease Boundary are provided in **Appendix 3.5-1**. Descriptions of each habitat type and subtype occurring in the Lease Boundary are provided

below. Descriptions are based on information provided in the 2022 ASC and associated appendices (Horse Heaven Wind Farm 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022).

- **Agricultural land (photo 1, Appendix 3.5-1)** is defined as areas used for agricultural purposes. Within the Lease Boundary, this is primarily active wheat fields and fallow wheat fields.
- **Developed/disturbed areas (photo 2, Appendix 3.5-1)** are areas of anthropogenic development such as roads, buildings, and structures associated with human development (e.g., radio towers), which are primarily unvegetated or dominated by weedy species.
- **Grasslands** are graminoid and forb-dominated ecosystems. Grassland subtypes in the Lease Boundary are described below based on the information provided in the 2022 ASC and the 2021 Botany and Habitat Survey Report for Horse Heaven Wind Farm (Horse Heaven Wind Farm, LLC 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022).
  - **Eastside (interior) grassland (photo 3, Appendix 3.5-1)** is dominated by native perennial grasses: bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg's bluegrass (*Poa secunda*), and Great Basin wildrye (*Leymus cinereus*). The forb layer is diverse and includes species such as Carey's balsamroot (*Balsamorhiza careyana*), fiddleneck (*Amsinckia* sp.), and lupine (*Lupinus* sp.). The shrub layer is typically less than 5 percent of total vegetation cover with green rabbitbrush (*Chrysothamnus viscidiflorus*) and rubber rabbitbrush (*Ericameria nauseosa*). The areas identified by the Applicant as Eastside (interior) grassland are considered Eastside Steppe Priority Habitat in Washington State (WDFW 2008).
  - **Non-native grassland (photo 4, Appendix 3.5-1)** includes areas of formerly planted and native grassland that are now dominated by non-native grass and forb species and have transitioned into non-native grassland. Within the Lease Boundary, non-native grasslands are areas dominated by cereal rye (*Secale cereale*), cheatgrass (*Bromus tectorum*), prickly lettuce (*Lactuca serriola*), tall tumblemustard (*Sisymbrium altissimum*), and yellow salsify (*Tragopogon dubius*). Native plants may be present but represent a small percentage of the overall vegetation cover.
  - **Planted grasslands (photo 5, Appendix 3.5-1)** are lands that have been planted with non-native grasses, native grasses, and native shrubs. These lands may or may not be enrolled in the U.S. Department of Agriculture Conservation Reserve Program. Within the Lease Boundary, planted grasslands are typically characterized by perennial crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass, big bluegrass (*Poa secunda* ssp. *juncifolia*), rabbitbrush, and low forb diversity.
  - **Unclassified grasslands** are areas identified as herbaceous (forb or graminoid) land cover, as classified by the National Land Cover Database (NLCD), that were not further classified into one of the above grassland subtypes. This classification is used for the portion of the Lease Boundary that lies outside the Wind Energy Micrositing Corridor and Solar Siting Areas, where field data are limited.
- **Shrublands** are ecosystems that have a conspicuous shrub layer. Shrubland subtypes within the Lease Boundary are described below.
  - **Dwarf shrub-steppe (photo 6, Appendix 3.5-1)** is a shrubland habitat located on lithosol soil. Dwarf shrub-steppe is dominated by the native dwarf shrub rock buckwheat (*Eriogonum sphaerocephalum*) and the native perennial grasses bluebunch wheatgrass and Sandberg's bluegrass. Non-native plants

such as cheatgrass and cereal rye may be present. Dwarf shrub-steppe is part of the Shrub-steppe Priority Habitat in Washington State (WDFW 2008).

- **Rabbitbrush shrubland (photo 7, Appendix 3.5-1)** is characterized by areas dominated by rubber rabbitbrush, which readily colonizes post-fire or post-agricultural development. Within the Lease Boundary, rabbitbrush shrubland occurs in former agriculture land areas that have been planted with native grasses, native shrubs, and/or non-native grasses. Rabbitbrush shrubland is dominated by rabbitbrush, mainly green rabbitbrush and rubber rabbitbrush, with various native and non-native grasses and forbs. These areas may or may not be enrolled in the Conservation Reserve Program.
- **Sagebrush shrub-steppe (photo 8, Appendix 3.5-1)** is dominated by the native shrub big sagebrush (*Artemisia tridentata*), often with spineless horsebrush (*Tetradymia canescens*), rubber rabbitbrush, and green rabbitbrush. Sagebrush shrub-steppe ecosystems within the Lease Boundary typically have greater than 50 percent cover of sagebrush, but cover can range from 10 to 80 percent. Sagebrush shrub-steppe is part of the Shrub-steppe Priority Habitat in Washington State (WDFW 2008).
- **Unclassified shrubland** includes areas mapped as shrub or scrub by the NLCD and areas mapped as shrub-steppe during the 2018 surveys that could not be further differentiated into subtypes. This classification is only used for the area within the Lease Boundary outside the Wind Energy Micrositing Corridor and Solar Siting Areas, where field data are limited.

A summary of areas classified as each habitat type and subtype within the Lease Boundary and within areas of the proposed Project components is provided in **Table 3.5-2**. The location of habitat types identified by the Applicant is provided in **Figure 3.5-1**. The habitat types within each Solar Siting Area are further broken out in **Table 3.5-3**. For each habitat type, the percentage of habitat occurring in areas of the proposed Project components was compared to the total area available in the Lease Boundary (**Table 3.5-2**). All the Eastside (interior) grassland (Eastside Steppe), 89.7 percent of the dwarf shrub-steppe, and 17.9 percent of the sagebrush shrub-steppe habitats within the Lease Boundary occur in the areas of the proposed Project components.

Table 3.5-2: Habitat Types and Subtypes within the Lease Boundary and Project Component Areas[a]

Habitat Type/Subtype	Lease Boundary (acres)	Wind Energy Micrositing Corridor (acres)	Solar Siting Areas (acres)	Substation Areas (acres)	BESS Areas (acres)	Compre-hensive Project (acres)[d]	Percentage of Habitat Type Available known to occur in the Lease Boundary Located within the Comprehensive Project
Agriculture land	53,450.1	9,219.3	8,409.0	36.6	18.1	17,089.5	31.9%
Developed/disturbed	835.7	206.5	128.8	0	0	225.8	27.0%
Grassland							
Eastside (interior) grassland (Eastside Steppe)[b]	173.5	56.8	153.3	0	0	173.5	100%
Non-native grassland	1,635.5	656.5	451.4	1.6	0	1,099.6	67.2%
Planted grassland	4,338.3	934.1	519.4	0	0	1,402.4	32.3%
Unclassified grassland[c]	6,125.2	0	0	0	0	0	0%
Shrubland							
Dwarf shrub-steppe[b]	23.2	20.8	0	0	0	20.8	89.7%
Rabbitbrush shrubland	3,037.7	560.3	1,024.9	0	0	1,481.2	48.8%
Sagebrush shrub-steppe[b]	1,372.0	190.1	67.9	0	0	245.3	17.9%
Unclassified shrubland[c]	1,436.6	0	<0.1	0	0	<0.1	<0.01%
Total	**72,427.9**	**11,844.5**	**10,754.7**	**38.2**	**18.1**	**21,738.1**	

Sources: WDFW 2008; Horse Heaven Wind Farm, LLC 2021b; Appendix K, Horse Heaven Wind Farm, LLC 2022

Notes: The sum of each column may not add to the total due to rounding.

[a] Calculations were completed using the spatial data provided by the Applicant (Horse Heaven Wind Farm, LLC 2022). Areas of overlap may occur between Project components (e.g., the Wind Energy Micrositing Corridor may extend into the Solar Siting Area).

[b] Priority Habitats in the State of Washington (WDFW 2008).

[c] Unclassified grassland and unclassified shrubland habitat subtypes include the areas mapped during surveys conducted in 2018 or using National Land Cover Database data that were not further classified into subtypes (e.g., planted grassland, sagebrush shrub-steppe) during the 2020 and 2021 field surveys or 2020 desktop analysis.

[d] Includes all Project components but accounts for areas of overlap.

BESS = battery energy storage system

Table 3.5-3: Habitat Types and Subtypes in Each of the Solar Siting Areas[a]

Habitat Type	East Solar Field (acres)	County Well Solar Field (acres)	Sellards Solar Field (acres)
Agriculture land	2,471.6	3,223.7	2,713.6
Developed/disturbed	53.8	34.8	40.2
Grassland			
Eastside (Interior) Grassland (Eastside steppe)[b]	153.3	0	0
Non-native grassland	398.5	4.5	48.4
Planted grassland	236.1	79.9	203.3
Unclassified grassland[c]	0	0	0
Shrubland			
Dwarf shrub-steppe[b]	0	0	0
Rabbitbrush shrubland	1,024.9	0	0
Sagebrush shrub-steppe[b]	50.9	0	17.0
Unclassified shrubland[c]	<0.1	0	0
Total	**4,389.2**	**3,342.9**	**3,022.6**

Sources: WDFW 2008; Horse Heaven Wind Farm, LLC 2021b

Notes:

[a] Calculations were completed using the spatial data provided by the Applicant (Horse Heaven Wind Farm, LLC 2021a). Areas of overlap may occur between Project components (e.g., the Wind Energy Micrositing Corridor may extend into the Solar Siting Area).

[c] Priority Habitats in the State of Washington (WDFW 2008).

[b] Unclassified grassland and unclassified shrubland habitat subtypes include those areas mapped during surveys conducted in 2018 or using NLCD data that were not further classified into subtypes (e.g., planted grassland, sagebrush shrub-steppe) during the 2020 and 2021 field surveys or 2020 desktop analysis.

NLCD = National Land Cover Database

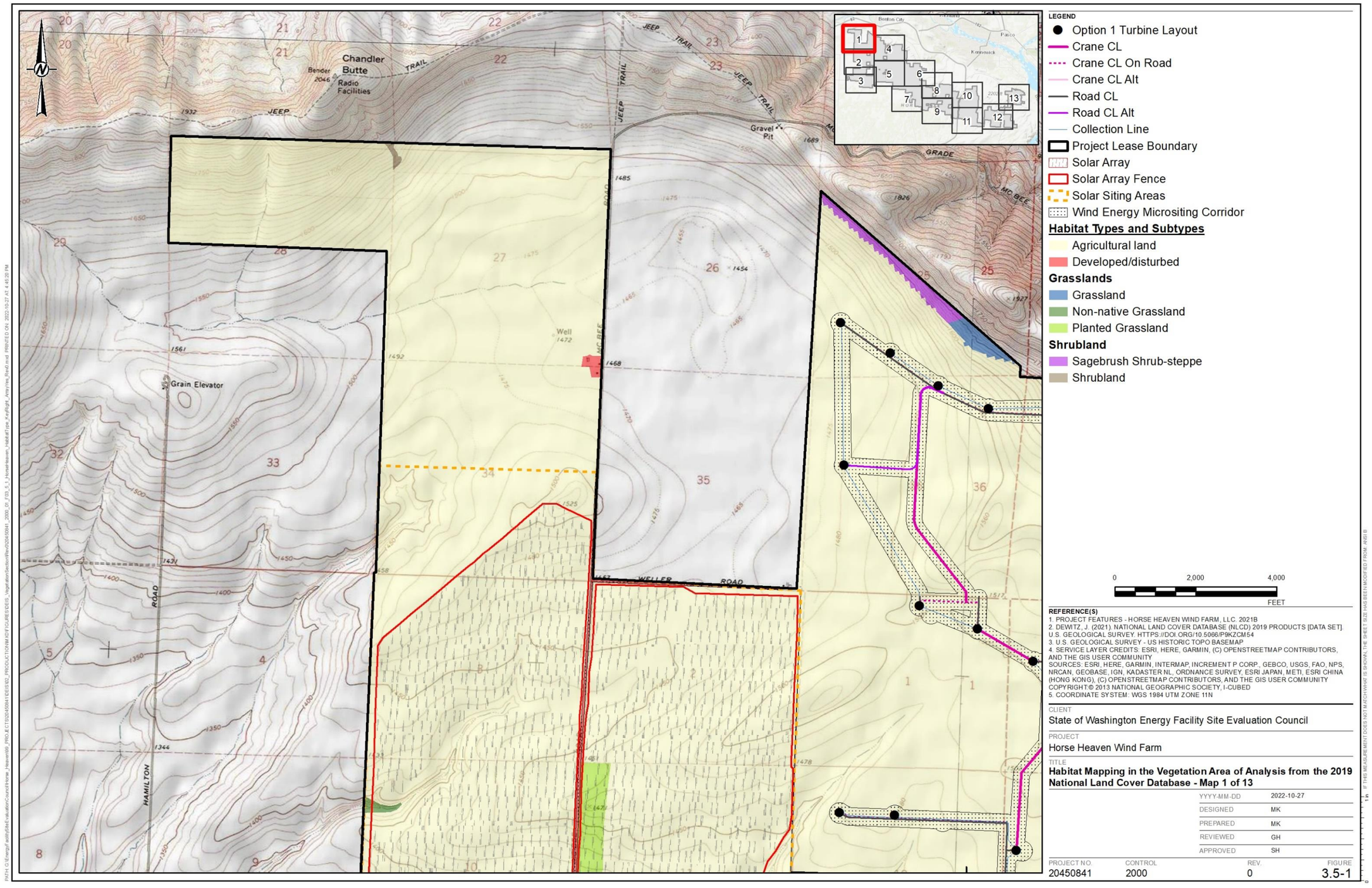

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 1 of 13

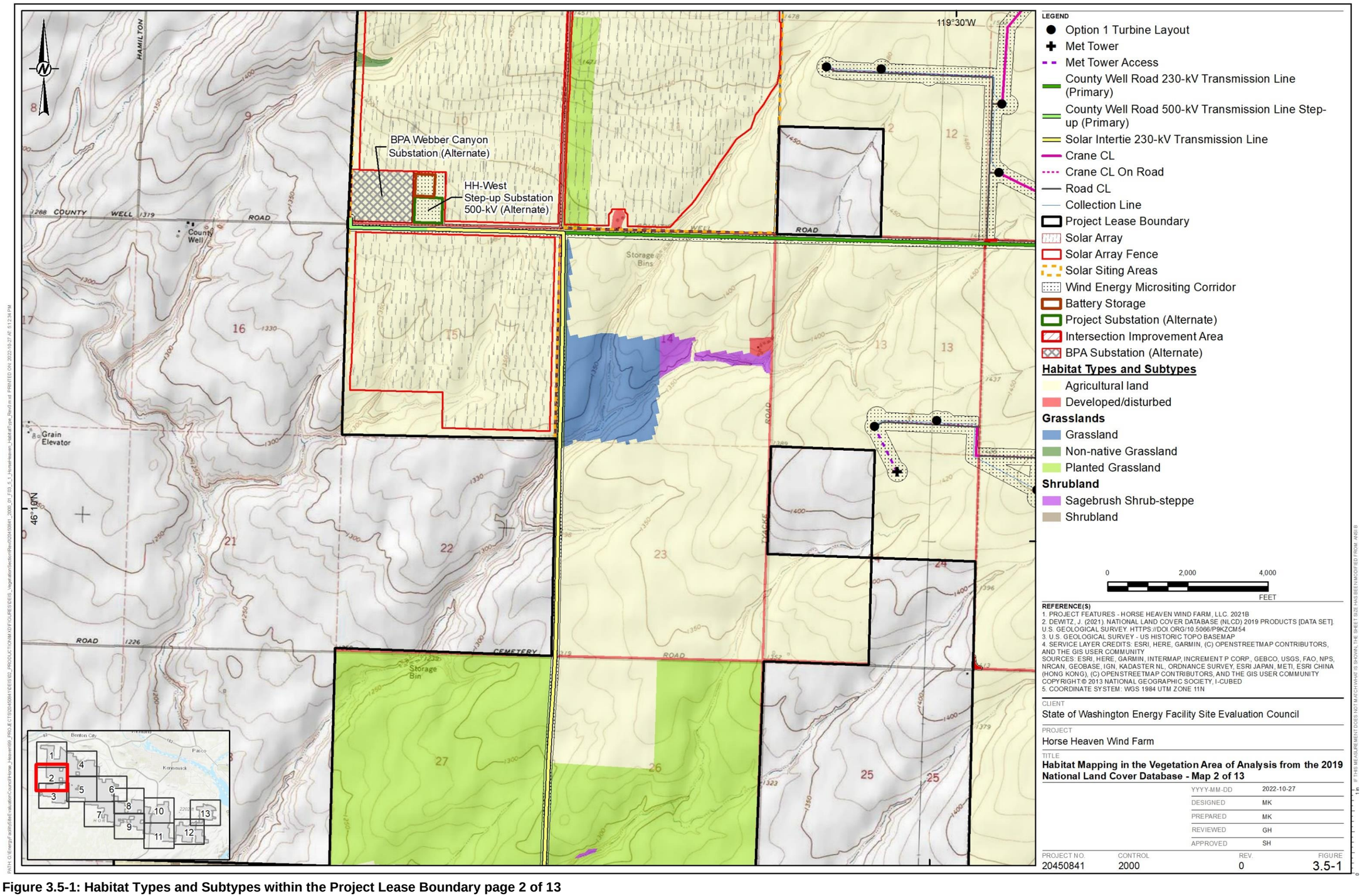

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 2 of 13

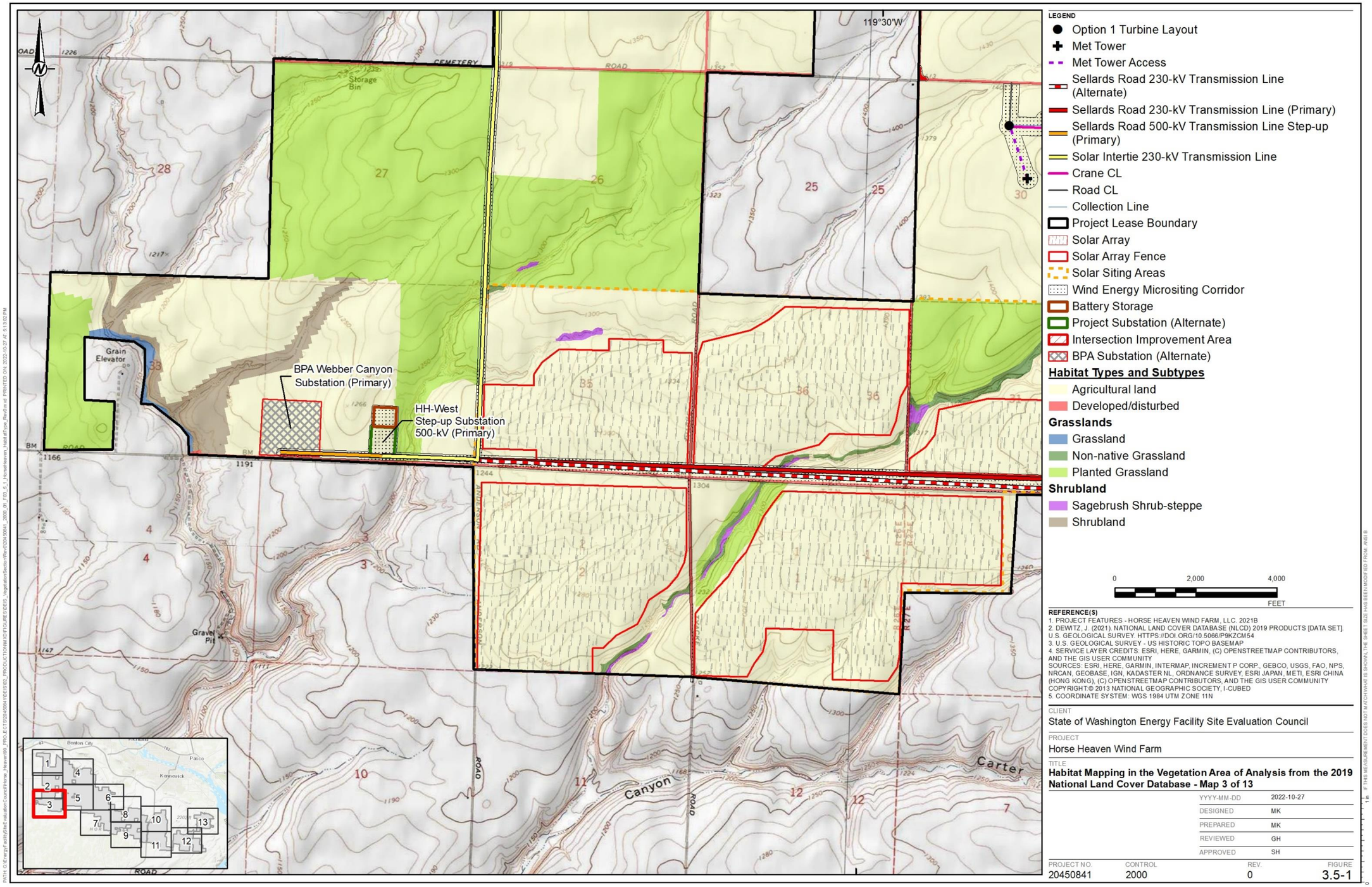

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 3 of 13

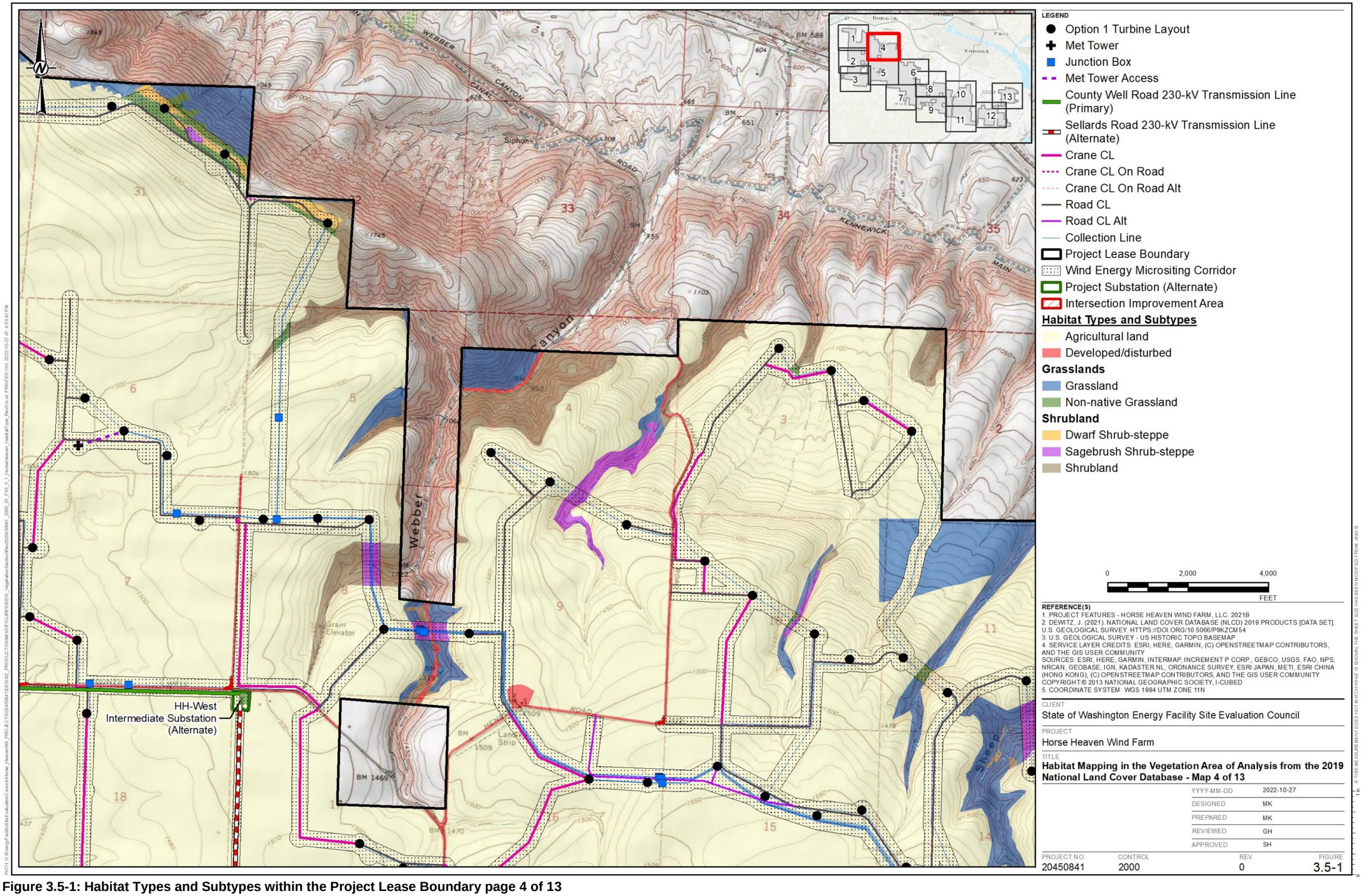

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 4 of 13

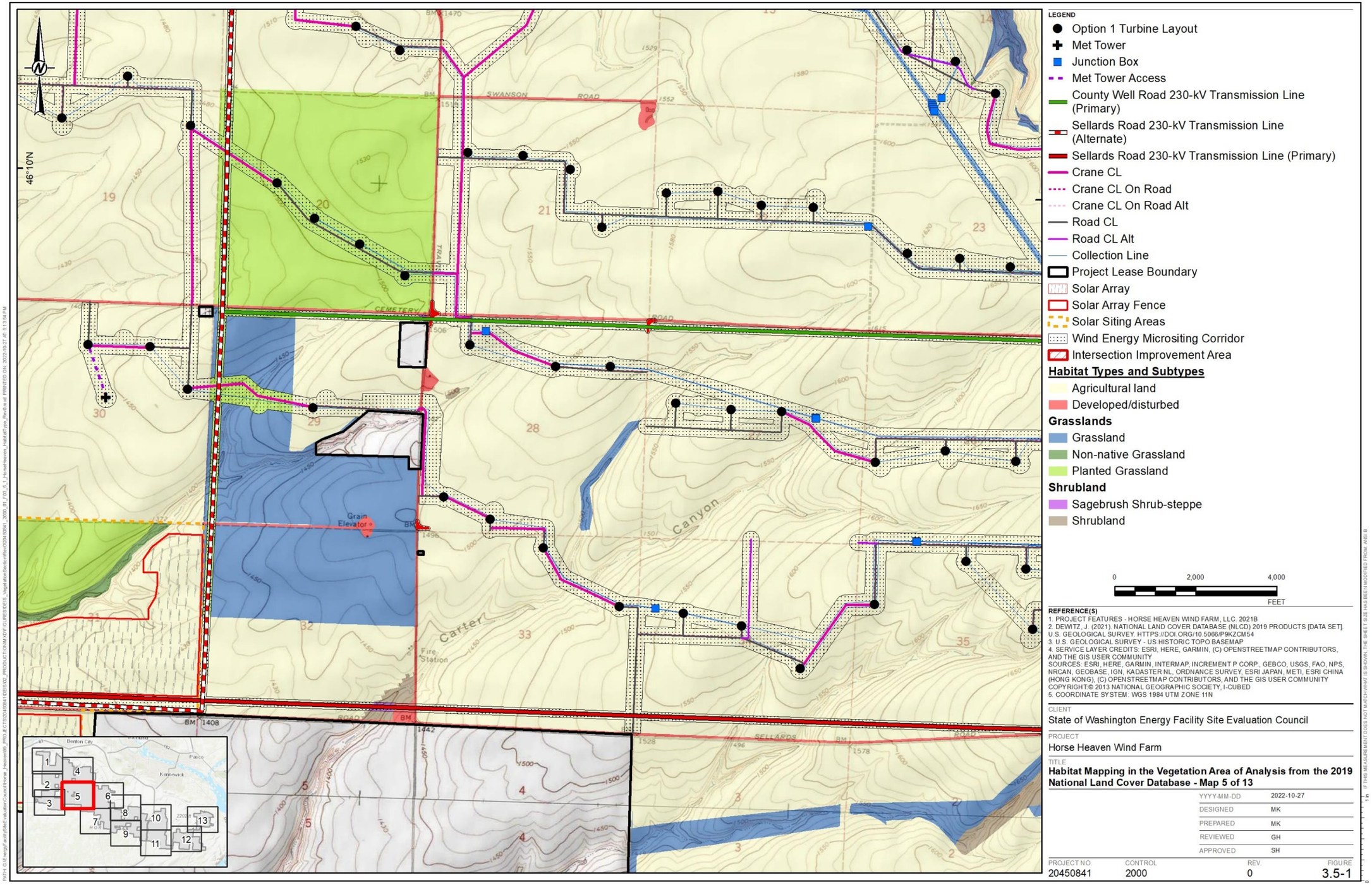

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 5 of 13

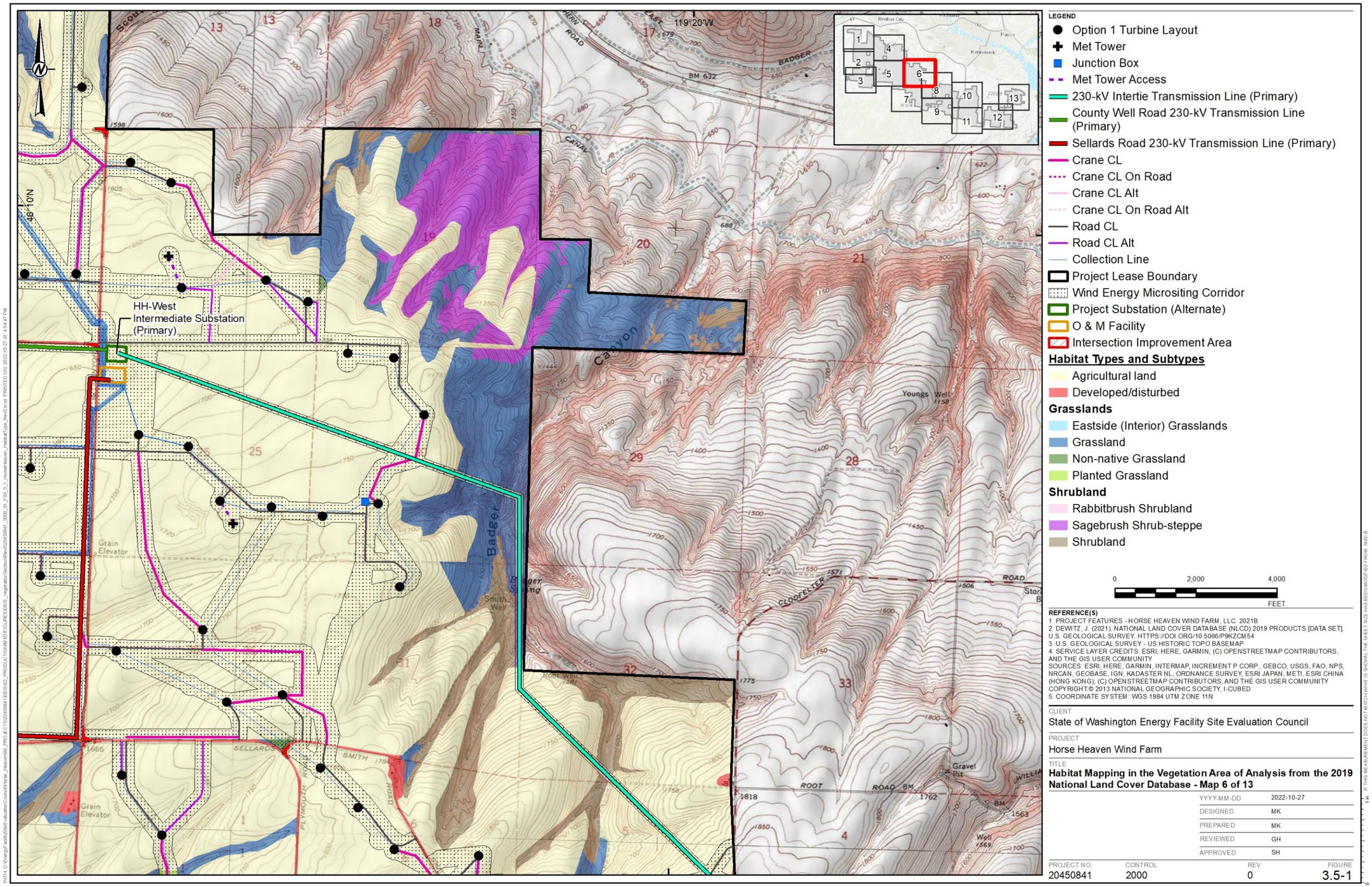

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 6 of 13

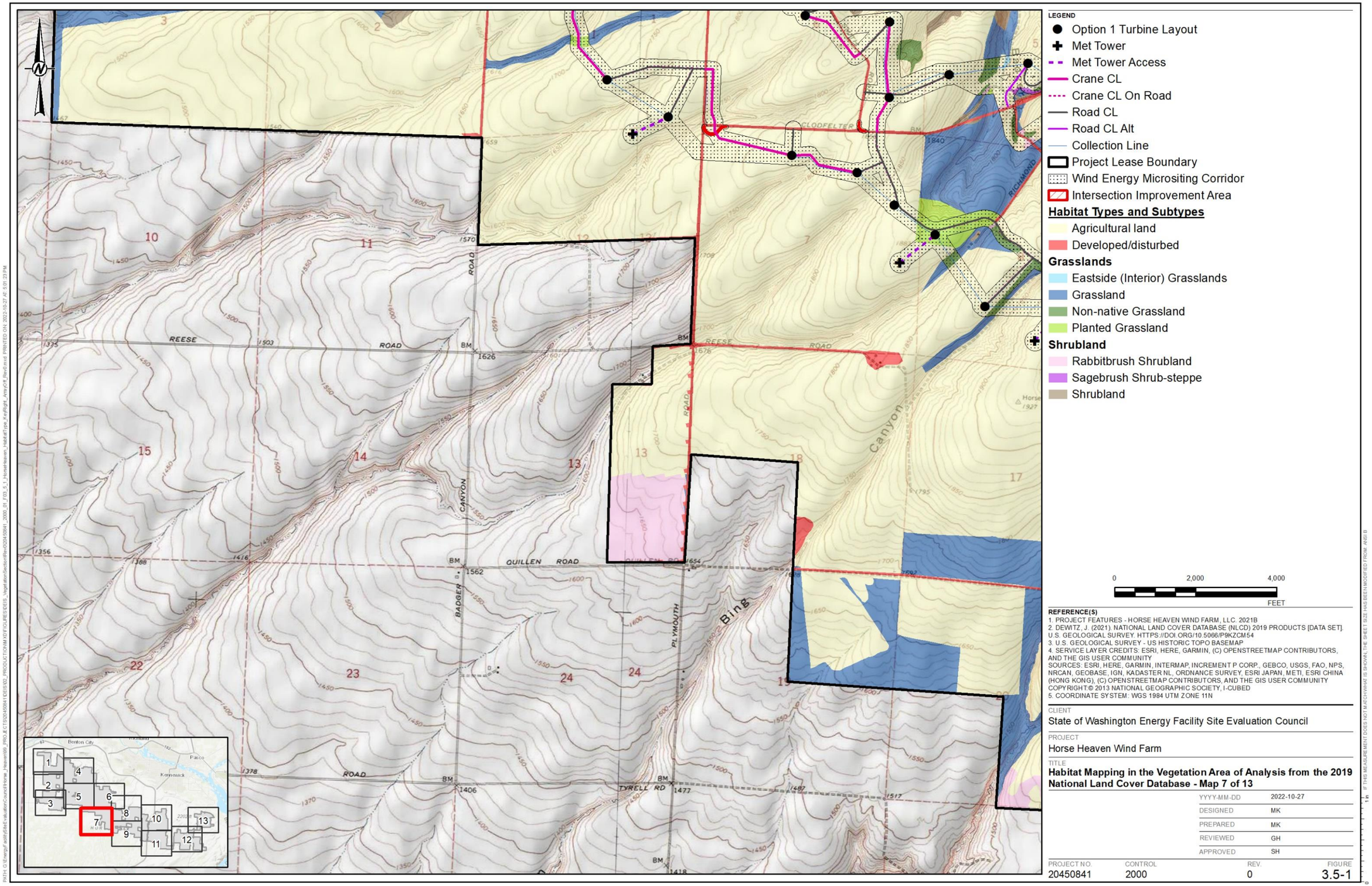

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 7 of 13

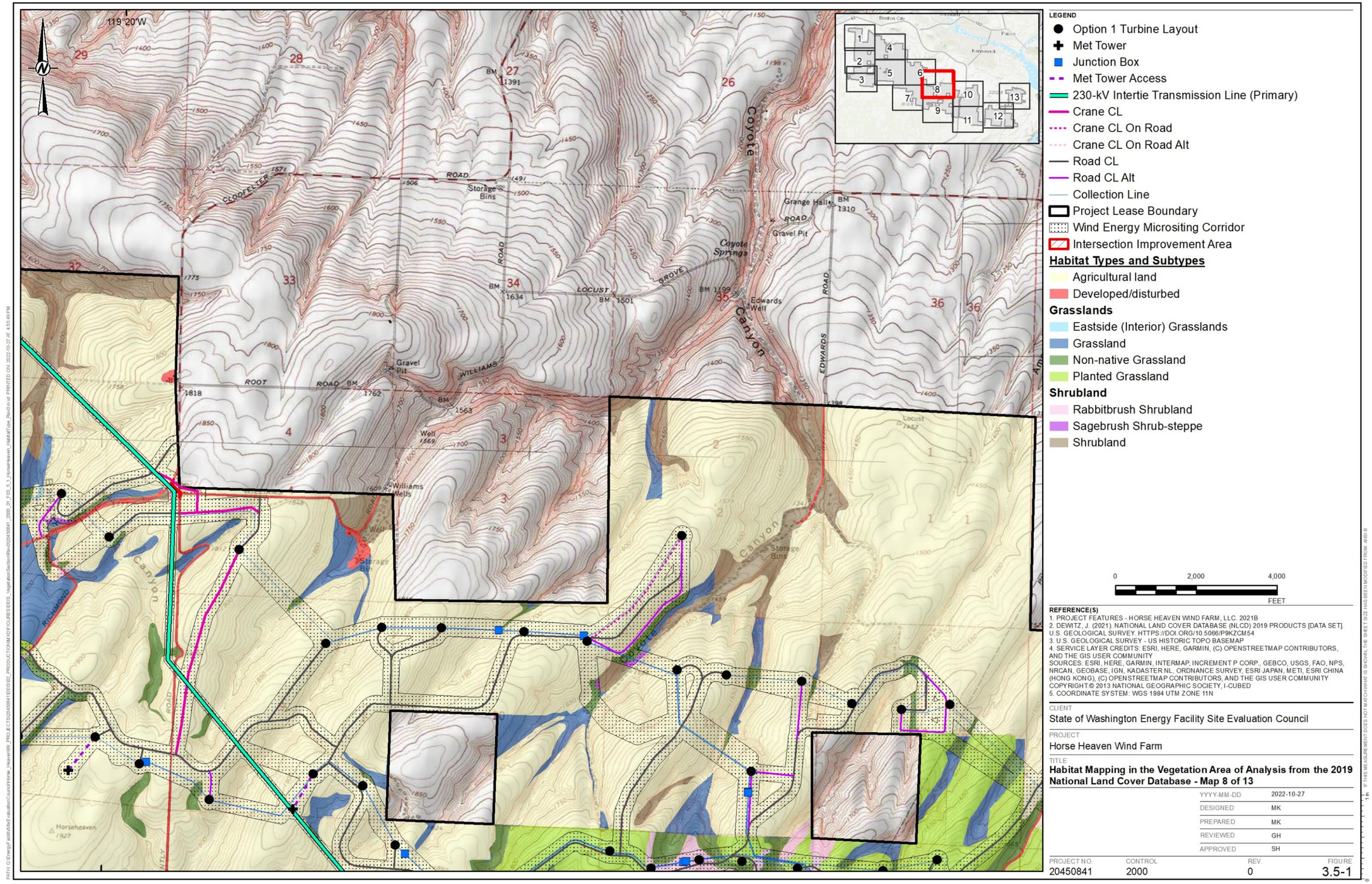

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 8 of 13

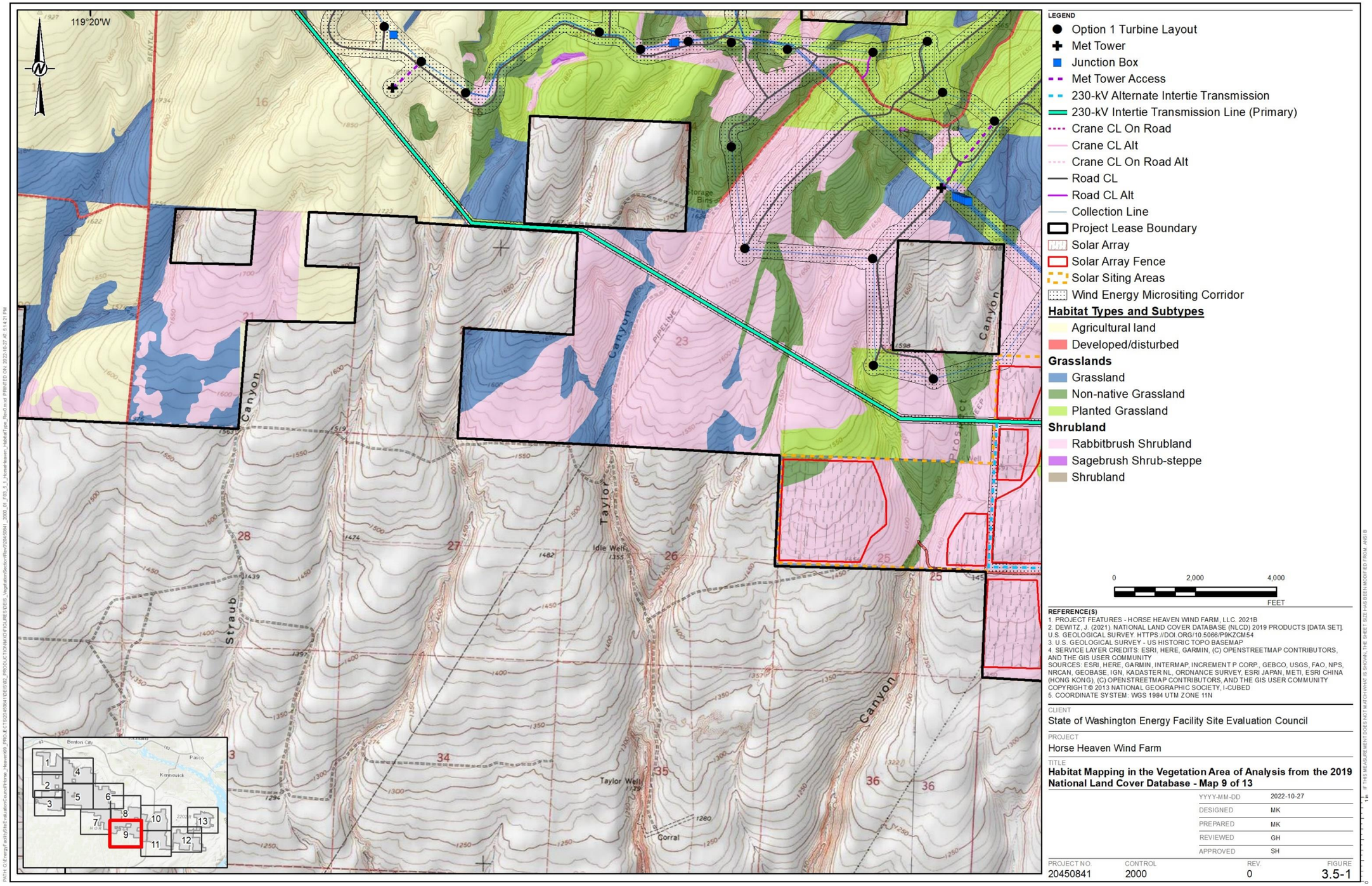

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 9 of 13

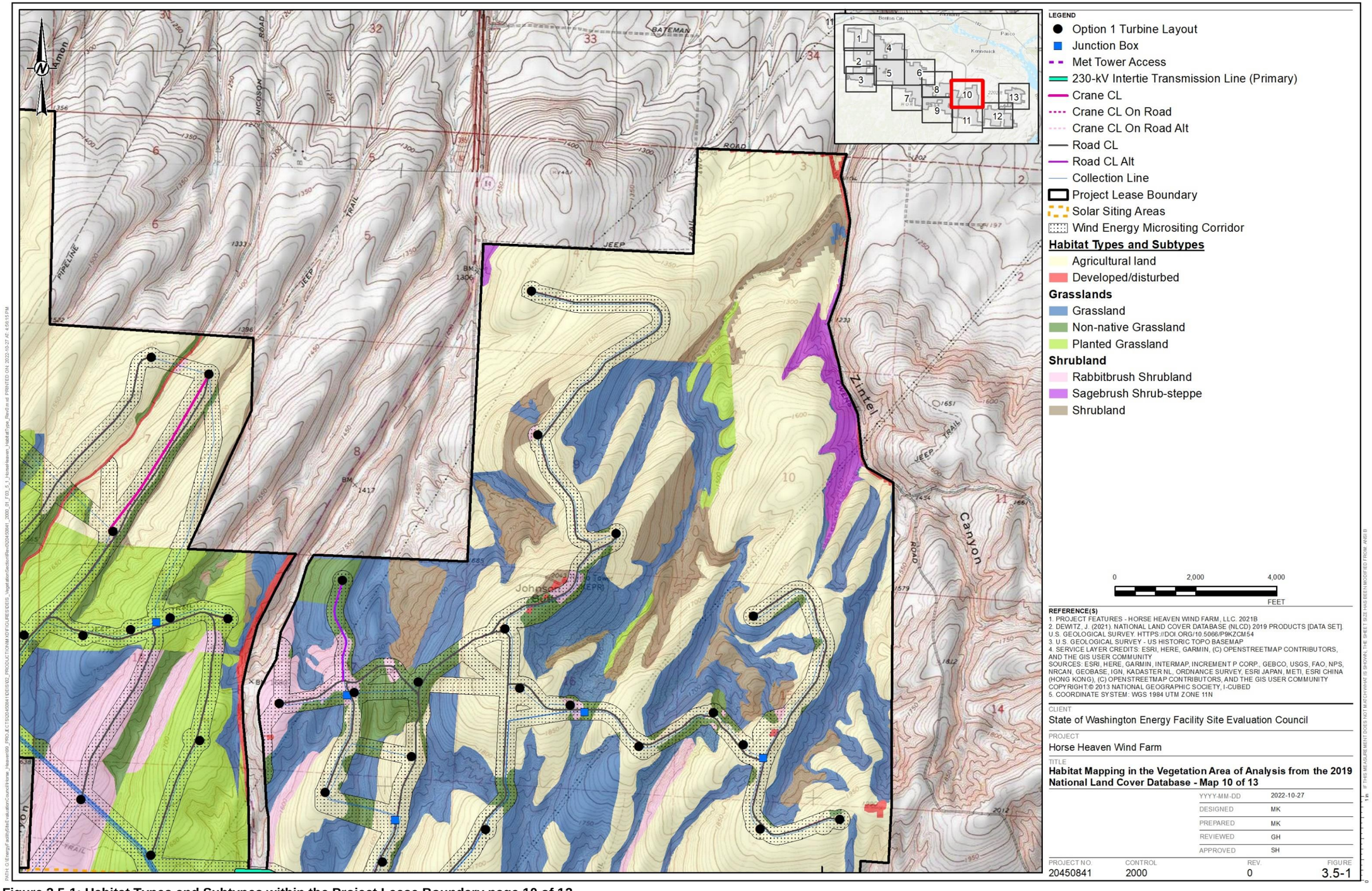

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 10 of 13

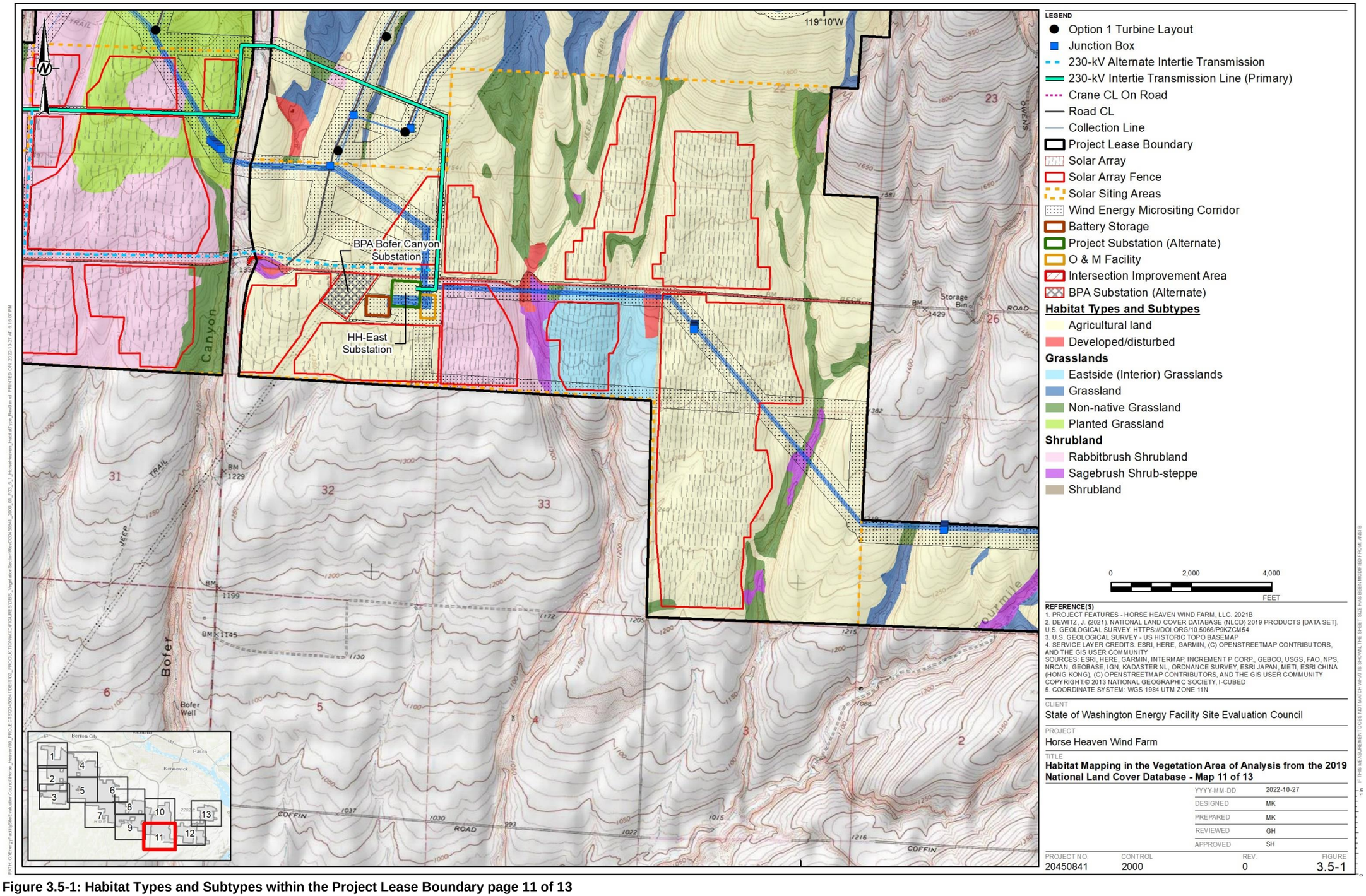

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 11 of 13

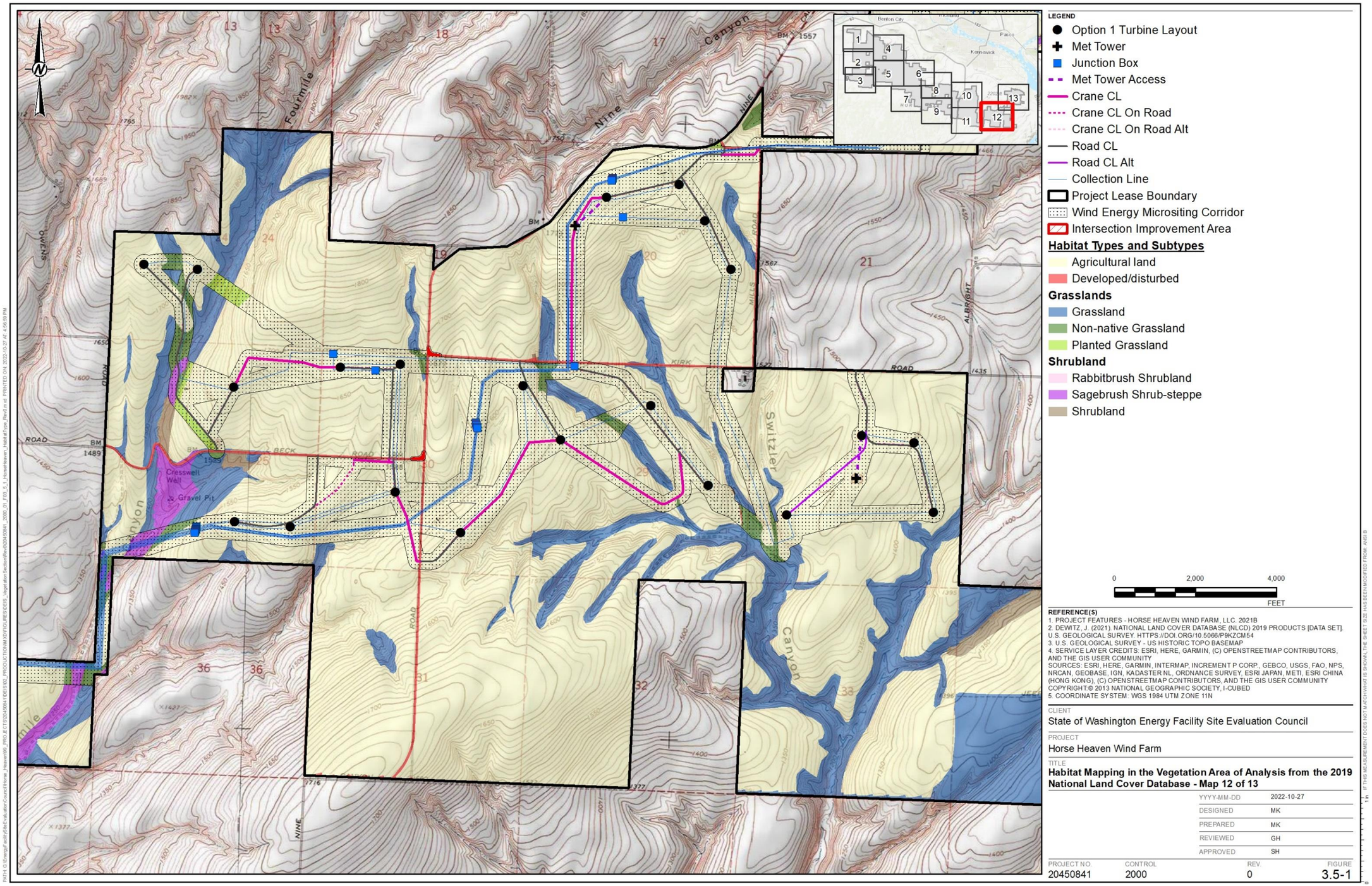

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 12 of 13

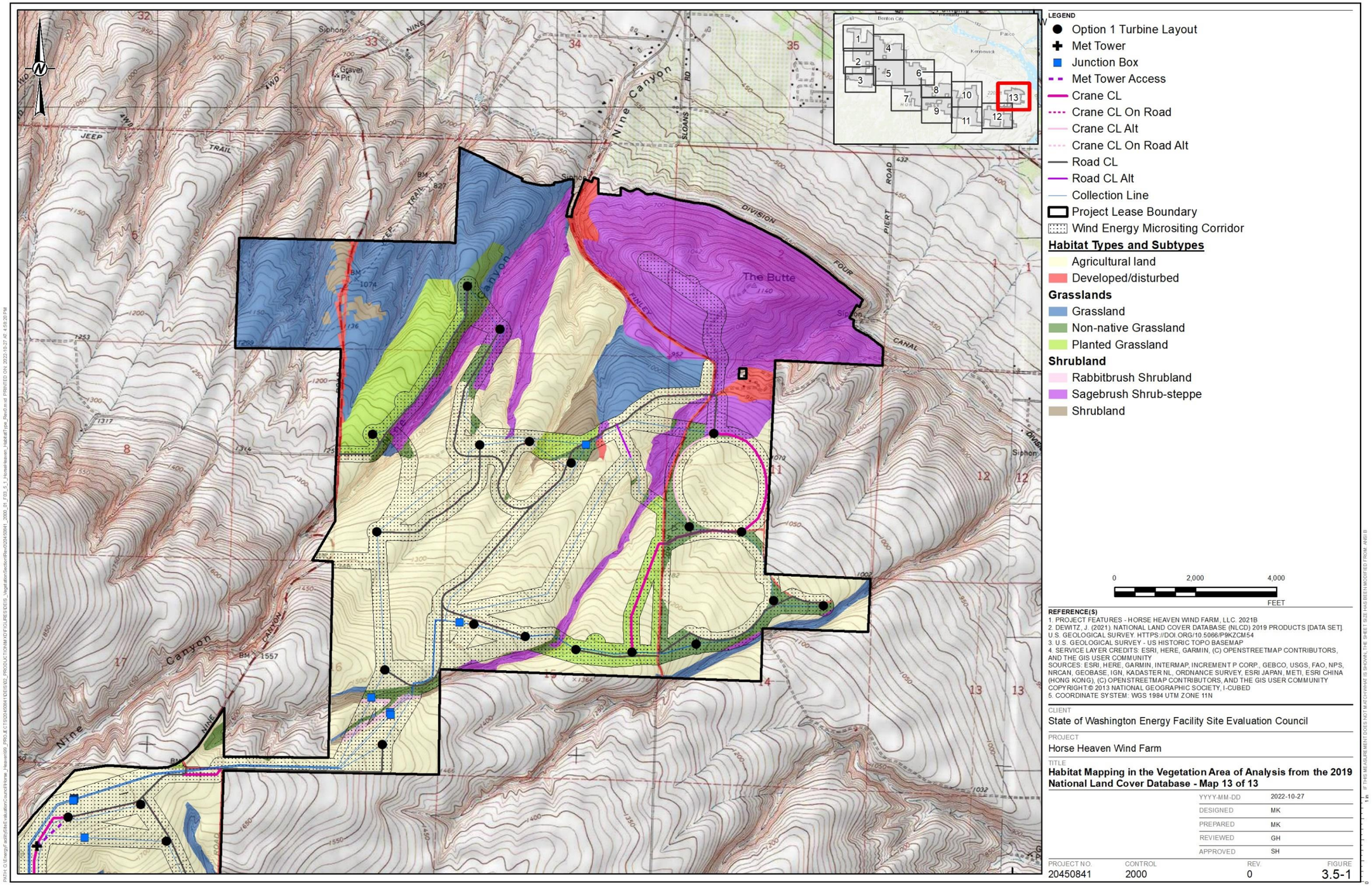

Figure 3.5-1: Habitat Types and Subtypes within the Project Lease Boundary page 13 of 13

3.5.2.2 Habitat Mapping in the Vegetation Area of Analysis

Habitat mapping within the larger VAA, outside the Lease Boundary, was not available from the Applicant. To describe habitat within the VAA, data on habitat types were obtained from 2019 NLCD data (MRLC n.d.). This represents the best available data for the VAA. The data available from the Multi-Resolution Land Characteristics Consortium (MRLC) (n.d.) are low resolution, leading to inaccurate estimates in the total acreage. The data were summarized using a proportional value rather than the total acreage and provided as a percentage of the overall area to adjust for the low resolution. A summary of habitat types within areas of the proposed disturbance, the Lease Boundary, and the greater VAA is provided in **Table 3.5-4**. The habitat mapping in the VAA is provided in **Figure 3.5-2**. While it is understood that these data may overestimate or underestimate the amount of certain habitat types, they are nevertheless useful for understanding habitat types available in the surrounding area and therefore potential impacts on these habitats.

Habitat types within the VAA are described below (MRLC n.d.).

- **Barren Land:** areas of bedrock, desert pavement, scarps, talus, etc., where vegetation accounts for less than 15 percent of total cover
- **Cultivated Crops:** areas used to produce annual crops, including agricultural fields, orchards, and vineyards
- **Deciduous Forest:** areas dominated by trees taller than 5 meters and containing greater than 20 percent total vegetation cover
- **Developed:** developed is divided into four categories based on the estimated cover of impervious surfaces
  - **Developed, Open Space:** areas of mixed use but mostly vegetated with lawn grasses, with impervious surfaces accounting for less than 20 percent of total cover
  - **Developed, Low Intensity:** areas of mixed construction and vegetation, with impervious surfaces accounting for 20 to 40 percent of total cover
  - **Developed, Medium Intensity:** areas of mixed construction and vegetation, with impervious surfaces accounting for 50 to 70 percent of total cover
  - **Developed, High Intensity:** areas of mixed construction and vegetation, with impervious surfaces accounting for 80 to 100 percent of total cover
- **Emergent Herbaceous Wetlands:** areas of perennial herbaceous vegetation accounting for greater than 80 percent of vegetative cover, and with soil or substrate periodically saturated with or covered by water
- **Evergreen Forest:** areas dominated by coniferous trees (75 percent of vegetation cover), where trees are greater than 5 meters and vegetation cover is greater than 20 percent
- **Grasslands/Herbaceous:** areas dominated by graminoid or herbaceous vegetation, generally greater than 80 percent of total vegetation cover
- **Open Water**: areas of open water with less than 25 percent cover of vegetation or soil
- **Pasture/Hay**: areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed and hay crops, typically on a perennial cycle

- **Shrub/Scrub**: areas dominated by shrubs less than 5 meters tall, with shrub canopy typically greater than 20 percent of total vegetation; includes true shrubs, early successional stage trees, and trees stunted due to environmental factors
- **Woody Wetlands**: areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetation cover, with soil or substrate, periodically saturated with or covered by water

A summary of information from the 2019 NLCD (MRLC n.d.) mapping is provided based on the data presented in **Table 3.5-4**.

Vegetation Area of Analysis

- The description of cultivated crops from the 2019 NLCD habitat description is comparable to the Applicant's category of agriculture land. The 2019 NLCD shrub/scrub habitat description is comparable to the Applicant's category of shrubland habitat, which includes the habitat subtypes dwarf shrub-steppe, sagebrush shrub-steppe, rabbitbrush shrubland, and unclassified shrubland. The 2019 NLCD grassland/herbaceous habitat description is comparable to the Applicant's category of grassland habitat, which includes Eastside (interior) grassland (Eastside Steppe), planted grassland, non-native grassland, and unclassified grassland.
- Within the VAA, cultivated crops occupy the greatest proportion of land, covering 58.2 percent. Shrub/scrub makes up the second largest proportion, covering 23.1 percent. Grassland/herbaceous is the third largest proportion, covering 10.8 percent of the total area.

Lease Boundary

- The dominant habitat mapped in the 2019 NLCD (MRLC n.d.) mapping within the Lease Boundary is cultivated crops, covering 71.3 percent of the total area. The proportional area of cultivated crops mapped in the Lease Boundary is greater than that available in the VAA. Within the Lease Boundary, the proportional area of cultivated crops is comparable to the amount of area mapped as agriculture land by the Applicant's field surveys, which covers 73.8 percent of the total area within the Lease Boundary.
- Shrub/scrub habitat makes up the second largest area within the Lease Boundary, based on the 2019 NLCD (MRLC n.d.), covering 18.4 percent of the total area. The proportional area of shrub/scrub in the Lease Boundary is less than the proportional area available within the VAA. Within the Lease Boundary, the proportional area of shrub/scrub habitat is more than double the proportional area identified as shrubland by the Applicant. The Applicant's mapping identifies 8.1 percent of the total area within the Lease Boundary as shrubland habitat.
- Grassland/herbaceous habitat makes up the third largest area within the Lease Boundary, based on the 2019 NLCD (MRLC n.d.), covering 5.0 percent of the total area. The proportional area of grassland/herbaceous in the Lease Boundary is less than the proportional area available within the VAA. The proportional area of grassland/ herbaceous habitat in the Lease Boundary is less than the proportional area identified as grassland by the Applicant. The Applicant's mapping identifies 16.9 percent of the total area within the Lease Boundary as grassland habitat.

Comprehensive Project

- The dominant habitat type mapped in the 2019 NLCD (MRLC n.d.) within the Comprehensive Project is cultivated crops, covering 77.3 percent of the total area. The proportional area of cultivated crops mapped in the Comprehensive Project is greater than that available in the VAA. The proportional area of cultivated

crops is comparable to the area mapped as agricultural land by the Applicant's field surveys, which covers 78.6 percent of the total area within the Comprehensive Project.

- Shrub/scrub habitat makes up the second largest area within the Comprehensive Project, based on the 2019 NLCD (MRLC n.d.), covering 16.6 percent of the total area. The proportional area of shrub/scrub habitat mapped in the Comprehensive Project is less than that available in the VAA. The proportional areas of shrub/scrub are approximately double the proportional area identified as shrubland habitat by the Applicant. The Applicant's mapping indicates 8.0 percent of the total area within the Micrositing Corridor as shrubland habitat.
- Grassland/herbaceous habitat makes up the fourth largest area within the Micrositing Corridor, based on the 2019 NLCD (MRLC n.d.), covering 1.7 percent of the total area. The proportional area of grassland/herbaceous habitat is less than available in the VAA. The proportional area of grassland/herbaceous habitat is less than the proportional area of grassland habitat identified by the Applicant, which makes up 12.3 percent of the total area.

Wind Energy Micrositing Corridor

- The dominant habitat type mapped in the 2019 NLCD (MRLC n.d.) within the Wind Energy Micrositing Corridor is cultivated crops, covering 75.6 percent of the total area. The proportional area of cultivated crops mapped in the Micrositing Corridor is greater than that available in the VAA. The proportional area of cultivated crops is comparable to the area mapped as agricultural land by the Applicant's field surveys, which covers 77.9 percent of the total area within the Micrositing Corridor.
- Shrub/scrub habitat makes up the second largest area within the Micrositing Corridor, based on the 2019 NLCD (MRLC n.d.), covering 14 percent of the total area. The proportional area of shrub/scrub habitat mapped in the Micrositing Corridor is less than that available in the VAA. The proportional areas of shrub/scrub are more than double the proportional area identified as shrubland habitat by the Applicant. The Applicant's mapping indicates 6.5 percent of the total area within the Micrositing Corridor as shrubland habitat.
- Grassland/herbaceous habitat makes up the fourth largest area within the Micrositing Corridor, based on the 2019 NLCD (MRLC n.d.), covering 3 percent of the total area. The proportional area of grassland/herbaceous habitat is less than that available in the VAA. The proportional area of grassland/herbaceous habitat is less than the proportional area of grassland habitat identified by the Applicant, which makes up 13.9 percent of the total area.

Solar Siting Areas

- The dominant habitat type in all three Solar Siting Areas is cultivated crops, based on the 2019 NLCD (MRLC n.d.); however, the proportional area of cultivated crops varies among the Solar Siting Areas.
  - The East Solar Field has the smallest mapped area of cultivated crops, covering 57.3 percent of the total area based on the 2019 NLCD (MRLC n.d.). The proportional area of cultivated crops within the East Solar Field is comparable to the proportional area mapped in the VAA. The proportional area of cultivated crops is comparable to the proportional area of agriculture land identified by the Applicant's field surveys, which classified 56.3 percent of the total area as agriculture land.
  - The County Well Solar Field has 90.5 percent of the total area mapped as cultivated crops based on the 2019 NLCD (MRLC n.d.). The County Well Solar Field occupies a larger proportional area of cultivated

crops than is available in the VAA. The proportional area of cultivated crops is slightly less than the proportional area of agriculture land identified by the Applicant's field surveys, which classified 96.4 percent of the total area as agriculture land.

- The Sellards Solar Field has the highest proportion of cultivated crops, with 93.9 percent based on the 2019 NLCD (MRLC n.d.). The Sellards Solar Field occupies a larger proportional area of cultivated crops than is available in the VAA. The proportional area of cultivated crops is slightly more than the proportional area identified by the Applicant's field surveys, which classified 89.8 percent of the total area as agriculture land.

- Shrub/scrub habitat makes up the second largest area within all three Solar Siting Areas, based on the 2019 NLCD (MRLC n.d.); however, the proportional area varies by Solar Siting Area.
  - The East Solar Field has the largest area mapped as shrub/scrub, covering 41.3 percent of the total area from the 2019 NLCD (MRLC n.d.). The proportional area of shrub/scrub within the East Solar Field is greater than the proportional area mapped in the VAA. The shrub/scrub proportional area is greater than the proportional area of shrubland habitat identified by the Applicant's field surveys, which classified 24.5 percent of the total area as shrubland.
  - The County Well Solar Field has 7.9 percent mapped as shrub/scrub, based on the 2019 NLCD (MRLC n.d.). The County Well Solar Field occupies a smaller proportional area of shrub/scrub than is available in the VAA. The shrub/scrub proportional area is greater than the proportional area of shrubland habitat identified by the Applicant's field surveys, which did not identify any shrubland within the County Well Solar Field.
  - The Sellards Solar Field has the lowest proportional area of shrub/scrub, which covers 5.2 percent based on the 2019 NLCD (MRLC n.d.). The Sellards Solar Field occupies a smaller proportional area of shrub/scrub than is available in the VAA. The proportional area of shrub/scrub is greater than the proportional area of shrubland habitat identified by the Applicant's field surveys, which classified 0.6 percent of the total area as shrubland.
- Grassland/herbaceous habitat within the Solar Siting Areas varies but occupies a relatively small area of the total.
  - The East Solar Field has a proportional area of 0.4 percent grassland/herbaceous habitat, based on the 2019 NLCD (MRLC n.d.). The proportional area of grassland/herbaceous habitat within the East Solar Field is less than the proportional area available in the VAA. The grassland/herbaceous habitat proportional area is less than the proportional area of grassland habitat identified by the Applicant's field surveys, which classified 18 percent of the total area as grassland.
  - The County Well Solar Field has 0.6 percent mapped as grassland/herbaceous based on the 2019 NLCD (MRLC n.d.). The County Well Solar Field occupies a smaller proportional area of grassland/herbaceous habitat than is available in the VAA. The grassland/herbaceous proportional area is less than the proportional area of agriculture land identified by the Applicant's field surveys, which identified 2.5 percent of the total area as grassland.
  - The Sellards Solar Field does not include any grassland/herbaceous habitat, based on the 2019 NLCD (MRLC n.d.). The Sellards Solar Field occupies a smaller proportional area of grassland/herbaceous habitat than is available in the VAA. The proportional area of grassland/herbaceous habitat is less than

the proportional area of grassland habitat identified by the Applicant's field surveys, which classified 8.3 percent of the total area as grassland.

Based on a comparison of the proportional area identified by the 2019 NLCD data (MRLC n.d.) and the field-verified habitat types mapped by the Applicant (**Table 3.5-4**), the 2019 NLCD mapping provided proportional area estimates similar to the Applicant's field-verified mapping for cultivated crops. However, the 2019 NLCD mapping tended to overestimate the amount of shrub/scrub habitat in the Lease Boundary, Wind Energy Micrositing Corridor, and Solar Siting Areas in comparison to the Applicant's field-verified mapping. Furthermore, the 2019 NLCD mapping tended to underestimate the amount of grassland/herbaceous habitat within the Micrositing Corridor and Solar Siting Areas in comparison to the Applicant's field-verified mapping.

From the VAA data, it is apparent the Micrositing Corridor, Sellards Solar Field, and County Well Solar Field have been sited in areas to maximize cultivated crop land cover, as the proportional area of cultivated crops is greater than available in the VAA.

The 2019 NLCD data are too coarse to identify Priority Habitats; however, the Shrub-steppe Priority Habitat would fall within shrub/scrub, and the Eastside Steppe Priority Habitat would fall within the NLCD grasslands/ herbaceous category. Priority Habitat data obtained from WDFW (WDFW 2022) indicate approximately 67,691.5 acres of Priority Habitat within the VAA. This includes approximately 37,175.7 acres of Eastside Steppe and 30,515.8 acres of Shrub-steppe Priority Habitat. Priority Habitat summaries based on the WDFW data are provided for the VAA, Lease Boundary, and Project components below.

- Eastside Steppe covers 18.3 percent of the VAA, and Shrub-steppe covers 15.1 percent of the VAA.
- Eastside Steppe covers 13.3 percent of the Lease Boundary, and the Shrub-steppe covers 10.2 percent of the Lease Boundary.
- Within the Wind Energy Micrositing Corridor, Eastside Steppe covers 8.1 percent of the total area and shrub-steppe covers 6.1 percent.
- Within the Solar Siting Areas, Eastside Steppe covers 13.5 percent of the total area and shrub-steppe covers 7.2 percent.

Table 3.5-4: Proportion of Habitat Types in the Vegetation Assessment Area from the National Land Cover Database and the Applicant's Habitat Mapping

Habitat Type/Subtype	Vegetation Assessment Area (%)	Lease Boundary (%)	Comprehensive Project (%)	Micrositing Corridor (%)	East Solar Field (%)	County Well Solar Field (%)	Sellards Solar Field (%)
National Land Cover Database[(a)]							
Barren Land	<0.1	0	0	0	0	0	0
Cultivated Crops	58.2	71.3	77.3	75.6	57.3	90.5	93.9
Deciduous Forest	<0.1	0	0	0	0	0	0
Developed, High intensity	<0.1	<0.1	<0.1	<0.1	0	0	0
Developed, Low intensity	1.3	0.4	0.4	0.6	<0.1	0.2	0.1
Developed, Medium intensity	0.4	0.1	0.1	0.1	<0.1	<0.1	<0.1
Developed, Open Space	1.8	1.4	1.6	2.4	0.8	0.9	0.7
Emergent Herbaceous Wetlands	0.1	<0.1	0	0	0	0	0
Evergreen Forest	<0.1	0	0	0	0	0	0
Grasslands/Herbaceous	10.8	5.0	1.7	3.0	0.4	0.6	0
Open Water	0.5	<0.1	<0.1	<0.1	0	0	0
Pasture/Hay	3.7	3.6	2.4	4.4	0.1	<0.1	0
Shrub/Scrub	23.1	18.4	16.6	14.0	41.3	7.9	5.2
Woody Wetlands	0.1	0	0	0	0	0	0
Applicant's Habitat Mapping[(b)]							
Agriculture Land	N/A	73.8	78.6	77.9	56.3	96.4	89.8
Developed/Disturbed	N/A	1.2	1.0	1.7	1.2	1.0	1.3
Total Grassland	N/A	16.9	12.3	13.9	18.0	2.5	8.3
Total Shrubland	N/A	8.1	8.0	6.5	24.5	0	0.6

(a) National Land Cover Data (MRLC n.d.)

(b) Calculations were completed using the spatial layers provided by the Applicant and were completed for each Project component independent of the others (Horse Heaven Wind Farm, LLC 2021a). Areas of overlap may occur between Project components (e.g., the Micrositing Corridor may extend into the Solar Siting Area). Total grassland and total shrubland were included rather than the Applicant's habitat subtypes to better align with the NLCD.

N/A = not applicable

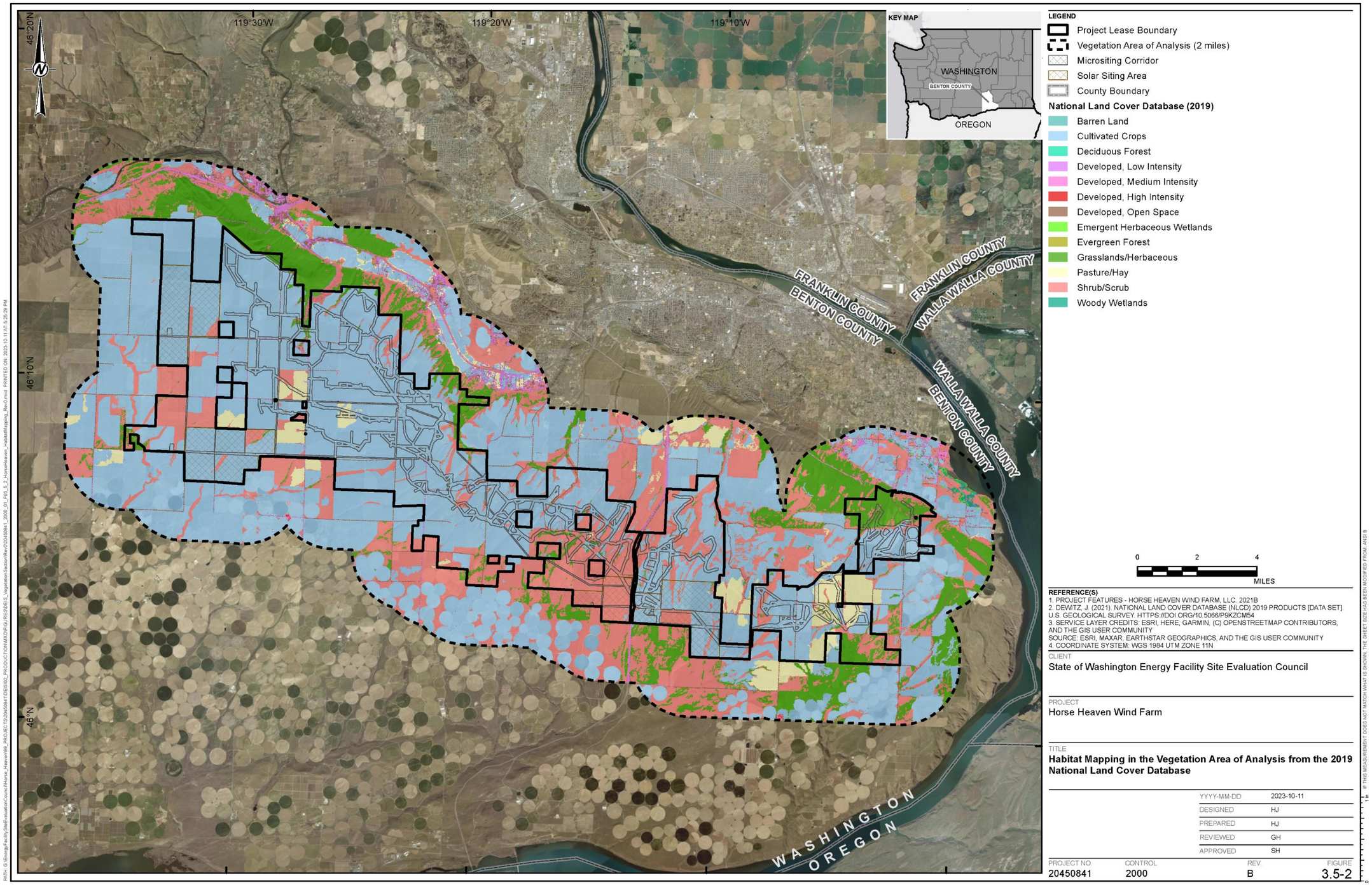

Figure 3.5-2: Habitat Mapping in the Vegetation Assessment Area from the 2019 National Land Cover Database

3.5.2.3 Department of Natural Resources Land

The Lease Boundary is primarily sited on privately owned land; however, the Lease Boundary also overlaps with lands managed by the Washington State Department of Natural Resources (DNR). Five parcels of DNR-managed land overlap the Lease Boundary, which are shown in **Figure 3.5-3**.

Characterization of the five parcels of DNR land were provided by a representative of DNR in communication with the Washington Energy Facility Site Evaluation Council (EFSEC) (Unland 2022). The parcels of DNR land are labeled in **Figure 3.5-3** using the Parcel ID.

- Parcel 13686: The DNR land is located within the western end of the Lease Boundary. The area is predominantly agriculture land and invasive annual grassland. The Sellards Solar Field and Wind Energy Micrositing Corridor would intersect this parcel of DNR land.
- Parcel 13687: The DNR land is located within the western end of the Lease Boundary. The area is predominantly agriculture land. The Micrositing Corridor would intersect this parcel of DNR land.
- Parcel 11679: The DNR land is located within the central portion of the Lease Boundary, east of Interstate 82. The area is high in invasive species and of poor quality. The Micrositing Corridor would intersect this parcel of DNR land.
- Parcel 13679: The DNR land is located in the southeast end of the Lease Boundary. Some shrub-steppe habitat occurs within draws but is unlikely to interact with the Project. The Micrositing Corridor would intersect this parcel of DNR land.
- Parcel 11670: The DNR land is located within the eastern end of the Lease Boundary. High-quality shrub-steppe occurs within the draws of these areas, primarily in the northwest corner. The Micrositing Corridor would intersect this parcel of DNR land.

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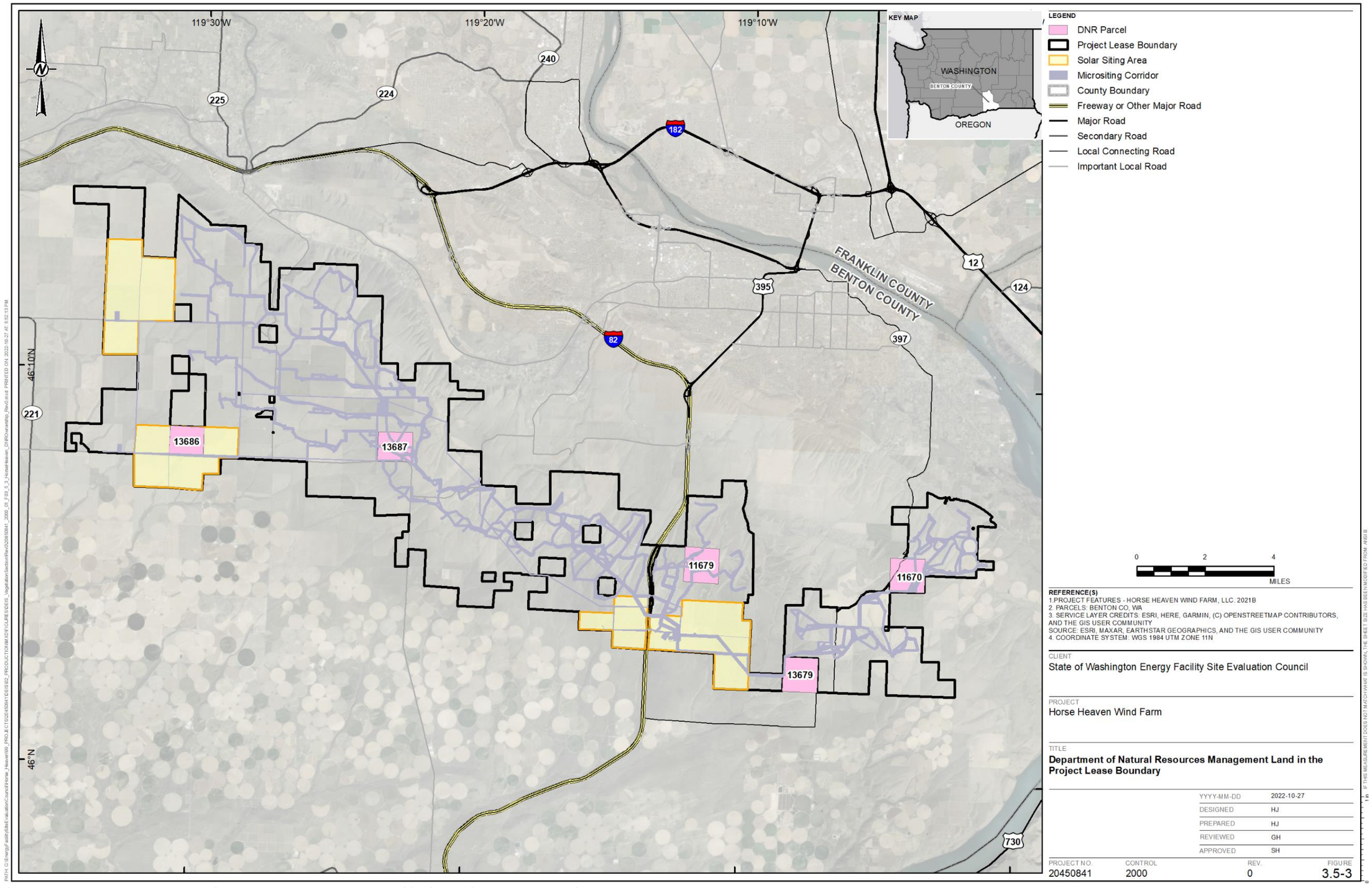

Figure 3.5-3: Department of Natural Resources Management Land in the Project Lease Boundary

3.5.2.4 Priority Habitat

Habitats that are prioritized for conservation and management by WDFW are called Priority Habitats. A Priority Habitat may refer to a unique vegetation association (e.g., shrub-steppe) or a particular habitat feature (e.g., cliffs) (WDFW 2008). Three habitat subtypes identified within the Lease Boundary are considered Priority Habitat. The dwarf shrub-steppe and sagebrush shrub-steppe are both Shrub-steppe Priority Habitat. Shrub-steppe Priority Habitat is a non-forested vegetation type characterized by a conspicuous shrub layer dominated by sagebrush and an understory layer dominated by native perennial bunchgrass (WDFW 2008). The areas classified as Eastside (interior) grassland by Johnson and O'Neil (2001) are synonymous with the Eastside Steppe Priority Habitat (WDFW 2008). Eastside Steppe Priority Habitat is characterized as a non-forested habitat dominated by native perennial bunchgrasses and forbs (WDFW 2008).

Shrub-steppe and Eastside Steppe Priority Habitats are presently limited in the Lease Boundary and surrounding VAA. Most areas suitable for agriculture have been converted to cropland in the vicinity of the Lease Boundary leaving minimal areas as native shrub-steppe or grassland. Native shrub-steppe and grasslands remaining are highly fragmented. Sagebrush shrub-steppe is one of the most at-risk ecosystems in the United States due to fragmentation (USFWS 2014). This trend is consistent for sagebrush shrub-steppe throughout eastern Washington, where sagebrush ecosystems are becoming increasingly fragmented by agriculture, urbanization, energy and natural resource development, and livestock grazing (Knick et al. 2003; USFWS 2014). Smaller areas of remnant ecosystems are less resilient against disturbance. For example, fragmentation that results from development of linear features such as road networks facilitates the introduction and spread of noxious weeds that change vegetation communities (Knick et al. 2003). In addition, the increasing need for energy development has resulted in habitat fragmentation of shrub-steppe. Shrub-steppe naturally has an unequal distribution of resources, and with increased fragmentation, wildlife species dependent on shrub-steppe require increasingly larger areas to obtain necessary food, water, and shelter for survival (USFWS 2014). Further loss of the limited remnant shrub-steppe patches can result in disproportionate impacts on species that require this ecosystem for survival (USFWS 2014).

Tables 3.5-2 and 3.5-3 show the acreage of Priority Habitat within the Lease Boundary and Project Component Areas and in each of the Solar Siting Areas; however, it is also important to understand the quality of the Priority Habitat as measured against reference conditions. Habitat quality is reduced by past and present disturbance but can be improved by activities such as restoration. **Table 3.5-5** provides detailed descriptions of the characteristic vegetation and conditions for Shrub-steppe and Eastside Steppe Priority Habitat types as reference ecosystem conditions, as well as common disturbance indicators, such as invasive plants, which occur in these Priority Habitats (WDFW 2008). This table also provides a detailed description of the Priority Habitats observed within the Lease Boundary, in addition to the disturbance observed on site during field surveys. The location of identified Priority Habitat is provided in **Figure 3.5-1** (Horse Heaven Wind Farm, LLC 2022).

As shown in **Table 3.5-5**, most of the Priority Habitat areas observed in the Wind Energy Micrositing Corridor and Solar Siting Areas, where field surveys were conducted, are already fragmented by agriculture and have undergone some degree of impact from invasive plants. However, these areas are some of the only intact Shrub-steppe and Eastside Steppe ecosystems remaining within the vicinity of the Lease Boundary. Within the Lease Boundary, Priority Habitat is limited to the northern edge, draws and canyons, and areas around the East Solar Field, as shown in **Figure 3.5-1**. Within the VAA, potential Priority Habitat is limited to the northern slope of the Horse Heaven Hills, the central area near the East Solar Field, and small patches in the south, as shown in **Figure 3.5-2**.

Table 3.5-5: WDFW Priority Habitat Description for Reference Ecosystems and Corresponding Habitat Types in the Lease Boundary

WDFW Priority Habitat	Description of WDFW Priority Habitat[(a)]	ASC Priority Habitat Subtype and Location in the Lease Boundary	Description of Habitat Subtype in Lease Boundary Based on Conditions Observed on Site[(b)]	Disturbance Observed during Field Surveys in Priority Habitat on Site[(b)]
Shrub-steppe	▪ Dominated by bunchgrasses and a conspicuous layer of shrubs ▪ **Indicator shrubs:** big sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), threetip sagebrush (*Artemisia tripartita*), scabland sagebrush (*Artemisia rigida*), dwarf sagebrush (*Artemisia arbuscula*) ▪ **Indicator grasses:** bunchgrasses - Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), Thurber's needlegrass (*Achnatherum thurberianum*), needle-and-thread grass (*Hesperostipa comata*) ▪ Forb layer variable depending on precipitation ▪ Disturbed sites have an increase of non-natives such as cheatgrass (*Bromus tectorum*) or	**Dwarf shrub-steppe (rock buckwheat/ Sandberg bluegrass dwarf shrub)** ▪ Mapped within the Micrositing Corridor in the northwest corner of the Lease Boundary	▪ **Shrub layer:** rubber rabbitbrush (*Ericameria nauseosa*), green rabbitbrush (*Chrysothamnus viscidiflorus*), big sagebrush ▪ **Grass layer:** bluebunch wheatgrass and Sandberg bluegrass ▪ **Forb layer:** dominated by the native sub-shrub/dwarf shrub rock buckwheat (*Eriogonum sphaerocephalum*), with common yarrow (*Achillea millefolium*), rosy balsamroot (*Balsamorhiza rosea*), hoary aster *(Dieteria canescens*), Douglas' dustymaidens (*Chaenactis douglasii*), cushion fleabane (*Erigeron poliospermus*), narrowleaf goldenweed (*Nestotus stenophyllus*) ▪ **Lithosol soils** ▪ **Invasive species:** cheatgrass, cereal rye (*Secale cereale*), tall tumblemustard (*Sisymbrium altissimum*), yellow salsify (*Tragopogon dubius*)	▪ Invasive grasses (cheatgrass and cereal rye) indicated as dominant species in the dwarf shrub-steppe.
		Sagebrush shrub-steppe ▪ North-central and northeastern part of the Lease Boundary, mainly restricted to hillslopes and drainages that are too steep for agricultural production	▪ **Shrub layer:** big sagebrush dominant with spineless horsebrush (*Tetradymia canescens*), rubber rabbitbrush, green rabbitbrush ▪ **Grass layer:** bluebunch wheatgrass, Sandberg bluegrass, needle-and-thread grass ▪ **Forb layer:** Carey's balsamroot (*Balsamorhiza careyana*), common yarrow, long-leaf phlox (*Phlox longifolia*), low pussytoes (*Antennaria dimorpha*), shaggy fleabane (*Erigeron pumilus*), woolly plantain (*Plantago patagonica*), woollypod milkvetch (*Astragalus purshii*), sagebrush mariposa lily (*Calochortus macrocarpus* var. *macrocarpus*), wild blue flax (*Linum lewisii*)	▪ Habitat described as fragmented. ▪ Degraded from the high cover of non-native grass and forb species and/or grazing. ▪ Evidence of past wildfires was noted (presence of burned shrubs).

Table 3.5-5: WDFW Priority Habitat Description for Reference Ecosystems and Corresponding Habitat Types in the Lease Boundary

WDFW Priority Habitat	Description of WDFW Priority Habitat[(a)]	ASC Priority Habitat Subtype and Location in the Lease Boundary	Description of Habitat Subtype in Lease Boundary Based on Conditions Observed on Site[(b)]	Disturbance Observed during Field Surveys in Priority Habitat on Site[(b)]
	crested wheatgrass (*Agropyron cristatum*)		▪ **Invasive species:** cheatgrass, redstem stork's bill (*Erodium cicutarium*), prickly lettuce (*Lactuca serriola*), yellow salsify, bulbous bluegrass (*Poa bulbosa*), cereal rye, Russian thistle (*Salsola tragus*), tall tumblemustard	
Eastside Steppe	▪ Dominated by forbs and grasses ▪ Shrubs are absent or scattered ▪ **Indicator grasses:** bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, rough fescue, or needlegrass ▪ Disturbed sites have an increase of cheatgrass, spotted knapweed (*Centaurea stoebe*), yellow starthistle (*Centaurea solstitialis*), or Kentucky bluegrass (*Poa pratensis*)	**Eastside (interior) grassland** (Eastside Steppe) Mapped in three locations: East Solar Field, Badger Canyon, and an ephemeral drainage located along the Micrositing Corridor in the south-central part of the Lease Boundary	▪ **Shrub layer:** rabbitbrush, green rabbitbrush (<5% cover) ▪ **Grass layer:** bluebunch wheatgrass, Great Basin wildrye (*Leymus cinereus*), needle-and-thread, Sandberg bluegrass ▪ **Forb layer:** Carey's balsamroot, lupine (*Lupinus* sp.), common yarrow, Spalding's milkvetch (*Astragalus spaldingii*), shaggy fleabane, fiddleneck (*Amsinckia* sp.), triternate biscuitroot (*Lomatium triternatum*), wild blue flax, common yarrow, woollypod milkvetch, woolly plantain ▪ **Invasive species:** cheatgrass, tall tumblemustard, bulbous bluegrass, cereal rye, prickly lettuce, yellow salsify, common stork's-bill	▪ The ephemeral drainage was degraded due to the high cover of invasive plants. ▪ The habitat quality on the east side of Badger Canyon was higher than the other Eastside (interior) grassland (Eastside Steppe) surveyed due to lower invasive plant cover and fewer evidence of cattle grazing). ▪ No young sagebrush observed in Badger Canyon except trace rubber rabbitbrush.

Sources:
(a) Description of Priority Habitat based on descriptions available from WDFW (2008).
(b) Description of the Priority Habitat subtypes obtained from Horse Heaven Wind Farm, LLC (2022) and Appendix K, Horse Heaven Wind Farm, LLC (2022) based on the observed site conditions.

3.5.3 Special Status Species

The Applicant defined the term “special status plant” to include federally listed endangered, threatened, or candidate vascular plant species and state-listed endangered, threatened, and sensitive vascular plant species as defined by the Washington Natural Heritage Program (WNHP) (Appendix K, Horse Heaven Wind Farm, LLC 2022). In this EIS, the term “special status” is expanded to include federally listed endangered, threatened, or candidate non-vascular plant species and lichen species and state-listed endangered, threatened, and sensitive non-vascular plant species and lichen species as defined by the WNHP (DNR 2021).

The Applicant conducted a background search for special status plant species. Twenty-nine special status plant species and one special status lichen species were identified as having the potential to occur within the Lease Boundary (Appendix K, Horse Heaven Wind Farm, LLC 2022;). Surveys for special status vascular plants were conducted within the Wind Energy Micrositing Corridor and Solar Siting Areas in 2020 and 2021. No special status vascular plants were observed during the field surveys (Horse Heaven Wind Farm, LLC 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022). A complete list of vascular plants observed during field surveys is provided in Appendix K of the 2022 ASC and Attachment B of the 2021 Botany and Habitat Survey Report for Horse Heaven Wind Farm (Appendix K, Horse Heaven Wind Farm, LLC 2022).

The background review identified one special status lichen species, woven spore lichen (*Texosporium sancti-jacobi*), as potentially occurring within the Lease Boundary. Four occurrences of woven spore lichen were documented within 3 miles of the Lease Boundary, with the closest occurrence documented approximately 0.4 miles north of the Lease Boundary (Appendix K, Horse Heaven Wind Farm, LLC 2022). Field surveys conducted by the Applicant focused on identifying vascular special status plants and did not include non-vascular plants or lichens. Woven spore lichen has not been reported on any of the DNR-managed land that overlaps the Lease Boundary (Unland 2022). Tetra Tech assessed the habitat types within the Wind Energy Micrositing Corridor and Solar Siting Areas to identify potentially suitable habitats for woven spore lichen as part of the 2021 Botany and Habitat Survey Report for Horse Heaven Wind Farm (Appendix K, Horse Heaven Wind Farm, LLC 2022). Based on the assessment, approximately 18.9 acres are rated as potentially suitable for woven spore lichen. The area of suitable habitat corresponds to 10.9 acres of dwarf shrub-steppe and 8.0 acres of sagebrush shrub-steppe, located within the Micrositing Corridor.

The WNHP is Washington’s primary source of information about rare and endangered plant species and threatened ecosystems. Data were obtained from the WNHP and queried to identify special status species within the VAA (WNHP 2022).

Based on the habitat characteristics and habitat types available within the Lease Boundary, the special status species with the potential to occur in the Wind Energy Micrositing Corridor and Solar Siting Areas are given a rating for the potential of occurrence. The following ratings and definitions were used to describe the potential for occurrence:

- **Negligible:** No known occurrences in the VAA and no suitable habitat within the Lease Boundary, may also be used to describe species presumed extirpated
- **Unlikely:** No known occurrence in the VAA but suitable habitat within the Lease Boundary
- **Potential:** Known occurrence in the VAA and suitable habitat within the Lease Boundary
- **Likely:** Known occurrence within the Lease Boundary and suitable habitat within the Lease Boundary

- **Confirmed:** Known occurrence in areas associated with the Wind Energy Micrositing Corridor or Solar Siting Areas

Three records of special status species were obtained from the WNHP that occur within the VAA. Two of the species are known only from historical occurrences. Two records of woven spore lichen, documenting four locations in the VAA, are known to occur from extant records. **Table 3.5-6** summarizes the records of special status species, including the state status, description of the habitat requirements, and potential to occur within the Lease Boundary. Distances are provided from the nearest Project component; however, locations of special status species are sometimes imprecise depending on record age or to obscure precise locations to protect the species.

Table 3.5-6: Special Status Plant Species Documented in the Vegetation Assessment Area

Scientific Name	Common Name	State Status[a]	Location[b]	Habitat Characteristics[c]	Potential to Occur within the Lease Boundary
Vascular Plants					
Astragalus kentrophyta var. *douglasii*[d]	thistle milkvetch	X	Record occurs east of the Lease Boundary approximately 0.3 miles from the Micrositing Corridor at the nearest point.	Species grow in sandy substrate, in sand dunes, or along riverbanks. Restricted to low elevations, up to 400 feet.	Negligible: species is presumed extirpated from Washington State and record in the VAA is historical (from 1883), no suitable habitat in the Lease Boundary.
Cryptantha leucophaea[d]	gray cryptantha	T	Record occurs east of the Lease Boundary approximately 0.5 miles from the Micrositing Corridor at the nearest point.	Found in sandy substrate, primarily sand dunes, from 300 to 2,500 feet in elevation. Associated with sagebrush shrub-steppe species. Record occurs near the Columbia River. This species is endemic to the Columbia and lower Yakima Rivers.	Unlikely: record in the VAA is historical (from 1922). Primarily occurs in sand dunes but suitable habitat may occur in sagebrush shrub-steppe.
Lichen					
Texosporium sancti-jacobi	woven spore lichen	T	All locations are located northwest of the Lease Boundary. The closest record is 0.6 miles north of the Micrositing Corridor.	Occurs in relatively undisturbed areas dominated by native plants such as sagebrush (*Artemisia tridentata*), bitterbrush (*Purshia tridentata*), Idaho fescue (*Festuca idahoensis*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Analysis of the habitat on site identified 18.9 acres of potentially suitable habitat for woven sport lichen in dwarf shrub-steppe and sagebrush shrub-steppe habitat.	Potential: known occurrences in the VAA and suitable habitat in the dwarf shrub-steppe and sagebrush shrub-steppe habitats within the Lease Boundary.

[a] State Status obtained from WNHP (2021a) and WNHP (2011). State status definitions are provided below (WNHP 2021a):
X = Presume extirpated. Species have not been successfully relocated since 1978.
E = Endangered. A species, subspecies, or variety in danger of extinction throughout all or a significant portion of its range. Endangered species were not documented within the Assessment Area.
T = Threatened. A species, subspecies, or variety likely to become Endangered in the foreseeable future.
P = Proposed. A species, subspecies, or variety formally proposed for listed as Endangered or Threatened. Species proposed for listing as Endangered or Threatened were not documented within the Assessment Area.

[b] Location information obtained from WDFW (n.d.).

[c] Sources for habitat characteristics: Appendix K (Horse Heaven Wind Farm, LLC 2022); WNHP (2021b, 2022)

[d] Historical record

VAA = Vegetation Area of Analysis

3.5.4 Noxious Weeds

The term “noxious weeds” refers to plants legally designated as such in Washington State and Benton County. Noxious weeds in Washington are categorized into one of three classes based on their distribution within the state and the requirements for treatment. The three classes of noxious weeds are described below.

- Class A noxious weeds are non-native species that have a limited distribution in Washington State. Objectives are to eradicate existing infestations and prevent new ones. Eradication is required by law. There are 38 species of non-native plants that are classified as Class A noxious weeds in Benton County and the State of Washington (BCNWCB n.d.; WSNWCB n.d.).
- Class B noxious weeds are non-native species that occur only in portions of Washington State. Mandatory control is required in regions where these species are not yet widespread, and the prevention of new infestations is the primary goal. There are 66 species of non-native plants that are classified as Class B noxious weeds in Benton County and the State of Washington (BCNWCB n.d.; WSNWCB n.d.).
- Class C noxious weeds are already widespread in Washington or are of special interest to the agricultural industry. A county can enforce control of Class C noxious weeds if it is beneficial to that county. There are 52 species of non-native plants that are classified as Class C noxious weeds in Benton County and the State of Washington (BCNWCB n.d.; WSNWCB n.d.).

Surveys for noxious weeds were completed in 2020 and 2021 within the Micrositing Corridor and Solar Siting Areas, covering approximately 21,076 acres (Horse Heaven Wind Farm, LLC 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022). An additional 604 acres within the Sellards Solar Siting Area have not been surveyed for noxious weeds (Appendix K, Horse Heaven Wind Farm, LLC 2022). A summary of noxious weeds documented during field surveys is provided in **Table 3.5-7**. The locations of noxious weeds observed during field surveys are available in Appendix K-17 of the 2022 ASC (Horse Heaven Wind Farm, LLC 2022) and Figures 4a through 4i in Appendix K (Horse Heaven Wind Farm, LLC 2022).

Three noxious weeds are abundant throughout the Wind Energy Micrositing Corridor and Solar Siting Areas: kochia (*Bassia scoparia*), rush skeletonweed (*Chondrilla juncea*), and cereal rye (*Secale cereale*).

Table 3.5-7: Noxious Weeds Observed during Field Surveys Conducted in 2020 and 2021 in the Wind Energy Micrositing Corridor and Solar Siting Areas

Scientific Name	Common Name	State and County Status[(a)]	Frequency
Bassia (Kochia) scoparia	kochia	B	Abundant. Frequently observed throughout the Micrositing Corridor and Solar Siting Areas.
Centaurea sp.	knapweed	B	Frequently observed in the central portion of the Micrositing Corridor and Solar Siting Areas. Several occurrences in the eastern and western portion of the Micrositing Corridor and Solar Siting Areas.
Centaurea solstitialis	yellow starthistle	B	Observed at two locations in the central portion of the Micrositing Corridor and Solar Siting Areas. Not observed during 2021 surveys.

Table 3.5-7: Noxious Weeds Observed during Field Surveys Conducted in 2020 and 2021 in the Wind Energy Micrositing Corridor and Solar Siting Areas

Scientific Name	Common Name	State and County Status[(a)]	Frequency
Chondrilla juncea	rush skeletonweed	B	Abundant. Frequently observed throughout the Micrositing Corridor and Solar Siting Areas.
Convolvulus arvensis	field bindweed	C	Observed at two locations in the eastern portion of the Micrositing Corridor and Solar Siting Areas. Not observed during 2020 surveys.
Onopordum acanthium	Scotch thistle	B	Observed at seven locations in the Micrositing Corridor and Solar Siting Areas.
Secale cereale	cereal rye	C	Abundant. Frequently observed through the Micrositing Corridor and Solar Siting Areas.

Sources: Horse Heaven Wind Farm, LLC 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022
Notes:
[(a)] Class B noxious weeds: Non-native species presently limited to portions of Washington State. Species are designated for required control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where Class B species are already abundant, control is decided at the local level, with containment as the primary goal (BCNWCB n.d.; WSNWCB n.d.).

Class C noxious weeds: Non-native species that are widespread in Washington State or are of special interest to the state's agricultural industry. The Class C status allows county weed boards to require control if locally desired, or they may choose to provide education or technical consultation (BCNWCB n.d.; WSNWCB n.d.).

Field surveys also identified non-native plants within the Wind Energy Micrositing Corridor and Solar Siting Areas, which are shown in **Table 3.5-8** (Horse Heaven Wind Farm, LLC 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022). A non-native plant is a species of plant that has been introduced to an area or occurs outside its native range. Similar to noxious weeds, non-native plants can exhibit characteristics that make them competitive against native plants; however, the species listed in **Table 3.5-8** are not legally designated.

Table 3.5-8: Non-native Plants Observed during Field surveys in 2020 and 2021 in the Wind Energy Micrositing Corridor and Solar Siting Areas

Scientific Name	Common Name	Lifeform
Agropyron cristatum	crested wheatgrass	Grass
Amaranthus blitoides	matweed, prostrate pigweed	Forb
Bromus arvensis	field brome/Japanese brome	Grass
Bromus hordeaceus	soft brome	Grass
Bromus tectorum	cheatgrass	Grass
Ceratocephala testiculata	burr buttercup	Forb
Chorispora tenella	blue mustard	Forb
Descurainia sophia	flixweed	Forb
Draba verna	spring whitlow-grass	Forb
Erodium cicutarium	redstem, common stork's-bill, crane's-bill	Forb
Holosteum umbellatum	jagged-chickweed	Forb
Hordeum murinum	mouse barley	Grass

Table 3.5-8: Non-native Plants Observed during Field surveys in 2020 and 2021 in the Wind Energy Micrositing Corridor and Solar Siting Areas

Scientific Name	Common Name	Lifeform
Lactuca serriola	prickly lettuce	Forb
Lappula longispina	long-spined stickseed	Forb
Poa bulbosa	bulbous bluegrass	Grass
Polygonum aviculare	prostrate knotweed	Forb
Polypogon monspeliensis	annual rabbit's-foot grass	Forb
Robinia pseudoacacia	black locust	Tree
Salsola tragus	prickly Russian thistle	Forb
Sisymbrium altissimum	tall tumblemustard	Forb
Taraxacum officinale	common dandelion	Forb
Tragopogon dubius	yellow salsify	Forb
Triticum aestivum	wheat	Grass
Vulpia bromoides	brome fescue	Grass

Sources: Horse Heaven Wind Farm, LLC 2022; Appendix K, Horse Heaven Wind Farm, LLC 2022

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3.6 Wildlife and Habitat

This section describes the wildlife and supporting habitat in the proposed Horse Heaven Wind Farm (Project, or Proposed Action) Lease Boundary, including a 2-mile buffer (Wildlife Area of Analysis). Section 4.6 presents an analysis of the Project's potential impacts on wildlife and supporting habitat. The information provided herein is based on the detailed description of vegetation communities and habitat characteristics in Section 3.5 Vegetation.

Regulatory Setting

Regulations protecting wildlife and habitat, including migratory birds, special status species, and energy development guidance, are presented in **Table 3.6-1**.

Regulation, Statute, Guideline	Description
Federal	
Bald and Golden Eagle Protection Act (1940, as amended)	Prohibits taking a bald or golden eagle including their nests, eggs, or parts (e.g., feather) without a permit.
Endangered Species Act (1973)	Provides for the conservation of endangered and threatened species (including subspecies, varieties, and subpopulations) listed under the act and protects the habitats they rely on.
Migratory Bird Treaty Act of 1918	Prohibits taking (killing, capturing, selling, trading, and transporting) migratory bird species.
State	
State and Protected Species (WAC 220-610)	Classifies endangered and state protected species. Provides protection rules for bald eagle.
State of Washington Priority Habitat and Species List (WDFW 2008)	Priority Habitats are unique habitats or features that support biodiversity. Washington Department of Fish and Wildlife (WDFW) maintains a catalog of Priority Habitats and Species that are a priority for conservation and management. Priority species require protection due to population trends, sensitivity to disturbance and habitat alteration, or importance to communities.
RCW 77 Fish and Wildlife	Provides the revised and reorganized game code of Washington State as of 1980; clarifies and improves the administration of the state's game laws.
RCW 77.55 Construction Projects in State Waters	Requires proponents to obtain a permit for works conducted near protected state waters and fish habitat.
WDFW Wind Power Guidelines (WDFW 2009)	Provides guidance for the development of wind energy facilities that avoid, minimize, and mitigate impacts on fish and wildlife habitats. WDFW provides reviews and recommendations to the permitting authority based on environmental expertise.
Local	
Benton County Code – Title 15 Chapter 15.14 Fish and Wildlife Habitat Conservation Areas	Fish and wildlife habitat conservation areas relevant to vegetation resources include: ▪ Areas where state or federal designated endangered, threatened, and sensitive species have a primary association. ▪ State Priority Habitats and areas associated with state Priority Habitats. ▪ Habitats and species of local importance, which includes shrub-steppe habitat in Benton County. Development on conservation areas is prohibited unless federal or state permits or approval is obtained.

RCW = Revised Code of Washington; WAC = Washington Administrative Code; WDFW = Washington Department of Fish and Wildlife

3.6.1 Relevant Data Sources

The description of the affected environment provided in Section 3.6.2 was developed based on information, including general and specific wildlife surveys, provided by Horse Heaven Wind Farm, LLC (Applicant), as well as government and publicly available literature. No field studies were conducted specifically for the development of this Environmental Impact Statement (EIS). The Wildlife Area of Analysis is consistent with the analysis area used in Section 3.5, Vegetation, which encompasses approximately 202,289 acres and includes the Lease Boundary plus an additional 2-mile buffer. Habitat acreages were independently calculated for the EIS from spatial data provided by the Applicant (Horse Heaven Wind Farm, LLC 2021). These spatial data were used to assess each Project component independent of the others. A description of methods used to calculate affected habitats is provided in Section 3.5.

3.6.2 Affected Environment

3.6.2.1 Wildlife Habitat

Wildlife habitat in the Lease Boundary consists of a mix of natural (native shrub-steppe) and anthropogenically altered areas broadly characterized as native shrubland (e.g., dwarf shrub-steppe, sagebrush shrub-steppe, rabbitbrush), grassland that includes native steppe habitat, and agricultural/disturbed land (e.g., developed land). The Applicant mapped habitat types based on habitat descriptions provided in Washington Department of Fish and Wildlife (WDFW) (2009) and Johnson and O'Neil (2001). **Table 3.6-2** summarizes the composition of vegetation communities in the Project Lease Boundary. The distribution of these communities is depicted in **Figure 3.6-1.**

Table 3.6-2: Lease Boundary Habitat Composition

Habitat Type/Subtype	Lease Boundary (acres)	Wind Energy Micrositing Corridor (acres)	Solar Siting Areas (acres)	Substation Areas (acres)	BESS Areas (acres)	Compre-hensive Project (acres)[(d)]	Percentage of Habitat Type Available within Lease Boundary Located within the Comprehensive Project
Agriculture land	53,450.1	9,219.3	8,409.0	36.6	18.1	17,089.5	32.0%
Developed/disturbed	835.7	206.5	128.8	0	0	225.8	27.0%
Grassland							
Eastside (interior) grassland (Eastside Steppe)[(b)]	173.5	56.8	153.3	0	0	173.5	100%
Non-native grassland	1,635.5	656.5	451.4	1.6	0	1,099.6	67.2%
Planted grassland	4,338.3	934.1	519.4	0	0	1,402.4	32.3%
Unclassified grassland[(c)]	6,125.2	0	0	0	0	0	0%
Shrubland							
Dwarf shrub-steppe[(b)]	23.2	20.8	0	0	0	20.8	89.7%
Rabbitbrush shrubland	3,037.7	560.3	1,024.9	0	0	1,481.2	48.8%
Sagebrush shrub-steppe[(b)]	1,372.0	190.1	67.9	0	0	245.3	17.9%
Unclassified shrubland[(c)]	1,436.6	0	<0.1	0	0	<0.1	<0.1%
Total	**72,427.9**	**11,844.5**	**10,754.7**	**38.2**	**18.1**	**17,089.5**	

Sources: WDFW 2008; Horse Heaven Wind Farm, LLC 2021; Appendix K,[7] Horse Heaven Wind Farm, LLC 2022

Notes:

[(a)] Calculations were completed using the spatial data provided by the Applicant (Horse Heaven Wind Farm, LLC 2022). Areas of overlap may occur between Project components (e.g., the Wind Energy Micrositing Corridor may extend into the Solar Siting Area).

[(b)] Priority Habitats in the State of Washington (WDFW 2008).

[(c)] Unclassified grassland and unclassified shrubland habitat subtypes include the areas mapped during surveys conducted in 2018 or using National Land Cover Database data that were not further classified into subtypes (e.g., planted grassland, sagebrush shrub-steppe) during the 2020 and 2021 field surveys or 2020 desktop analysis.

[(d)] Includes all Project components but accounts for areas of overlap.

BESS = battery energy storage system

[7] Tetra Tech. 2021a. 2021 Botany and Habitat Survey Report for Horse Heaven Wind Farm.

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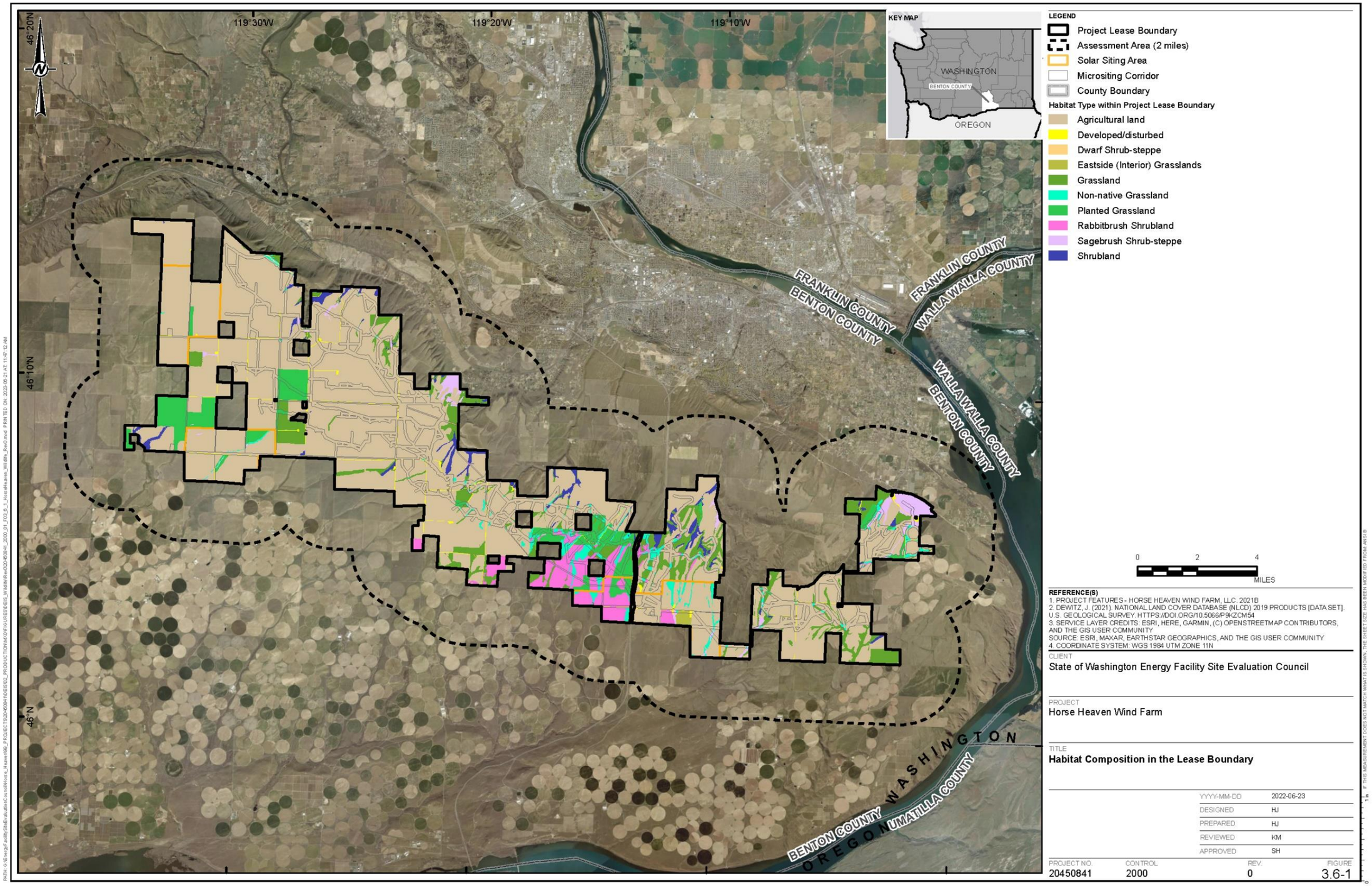

Figure 3.6-1: Habitat Composition in the Lease Boundary

Agricultural land accounts for the majority (approximately 74 percent) of the Lease Boundary and consists primarily of active and fallow wheat fields (Horse Heaven Wind Farm, LLC 2022). Agricultural lands are distributed throughout the Lease Boundary.

Developed and disturbed areas within the Lease Boundary are generally unvegetated and include roads, buildings, gravel pits, and other structures. Developed areas are distributed throughout the Lease Boundary and include linear features (e.g., roadways) or small polygons (developed areas less than 30 acres).

Grassland is the second most common habitat type in the Lease Boundary (approximately 17 percent) and includes Eastside (interior) grassland, non-native grasslands, planted grasslands, and unclassified grasslands. Eastside (interior) grassland is dominated by native perennial grasses, including bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg's bluegrass (*Poa secunda*), and Great Basin wildrye (*Leymus cinereus*), with a diverse herb layer (e.g., forbs such as flowering plants). This habitat type was mapped in small areas within the portion of the Micrositing Corridor that crosses Badger Canyon and within the East Solar Field (Tetra Tech 2021a). Non-native grasslands are areas dominated by non-native grass species, such as cereal rye (*Secale cereale*) and cheatgrass (*Bromus tectorum*), with lesser amounts of native species. This habitat type was more frequently mapped on the hilltop and draws in the Lease Boundary (Horse Heaven Wind Farm, LLC 2022). Planted grasslands are areas that may be included in the U.S. Department of Agriculture Conservation Reserve Program (CRP) and are characterized as planted areas dominated by native or non-native grass species. Some of the planted grassland also included dense areas of rabbitbrush. Planted grasslands were predominantly mapped in the western (north of the proposed Webber Canyon substation) and central (north of the Bofer Canyon substation) portions of the Lease Boundary. Unclassified grasslands are areas mapped as herbaceous land; however, these were not further classified into one of the other grassland subtypes (Horse Heaven Wind Farm, LLC 2021). This classification is used for the portion of the Lease Boundary that lies outside the Wind Energy Micrositing Corridor and Solar Siting Areas, where field data are limited. This habitat type is frequently mapped along hills and draws but also occurs elsewhere in the Lease Boundary.

Shrubland habitat is described as areas where shrubs account for a minimum of 5 percent of vegetation cover. Shrubland is further refined into dwarf shrub-steppe, rabbitbrush shrubland, and sagebrush shrub-steppe, based on background and field data, or unclassified shrubland where further classification was not possible (Horse Heaven Wind Farm, LLC 2022). Dwarf shrub-steppe habitat was mapped in one polygon (23 acres) on a ridgetop in the northwest corner of the Lease Boundary. Rabbitbrush was reported to typically occur in areas understood to be former agricultural lands and could have been, or are, enrolled in the CRP. This habitat type was recorded in the central-eastern portion of the Lease Boundary near Prospect Canyon and Bofer Canyon (3,038 acres). Sagebrush shrub-steppe (1,372 acres) was mapped in the north-central and northeastern portions of the Lease Boundary, often associated with ridges and canyons. Unclassified shrubland (1,437 acres) includes shrublands that could not be further classified from background resources and are mapped as shrub/scrub by the National Land Cover Database.

One wetland, approximately 0.03 acres in size, has been recorded in Badger Canyon within the Lease Boundary. The wetland is in a draw approximately 240 feet west of the Micrositing Corridor. The National Hydrography Dataset and the Benton County Critical Area Ordinance fish and wildlife habitat conservation areas map identified 253 intermittent streams within the Lease Boundary (Ecology 2019; Benton County n.d.). No perennial streams are located within the Lease Boundary. The locations of watercourses in the Lease Boundary are discussed in Section 3.4, Water Resources.

Three of the habitat types documented in the Lease Boundary—sagebrush shrub-steppe, dwarf shrub-steppe,[8] and Eastside (interior) grassland[9]—are considered priority habitat by Washington State. These are described further in Section 3.5.2.

3.6.2.2 Wildlife

Wildlife presence and use of the Lease Boundary was assessed using background resources (e.g., databases maintained by Washington State) and field-based data collected by the Applicant.

General Wildlife

Amphibians

Three amphibian species—Woodhouse's toad (*Anaxyrus woodhousii*), Great Basin spadefoot (*Spea intermontana*), and Pacific treefrog (*Pseudacris regilla*)—have ranges that overlap the Lease Boundary and Wildlife Area of Analysis based on the Gap Analysis[10] Predicted Distribution mapping produced by the Washington NatureMapping Program (NatureMapping n.d.). Woodhouse's toads are associated with sagebrush, riparian areas, and prairie fields along the Snake and Columbia Rivers (NatureMapping n.d.). Woodhouse's toad is considered a species of greatest conservation need under the State Wildlife Action Plan (SWAP) (WDFW 2015). Great Basin spadefoots are associated with natural and anthropogenic permanent and temporary aquatic habitats such as ponds, ditches, dugouts, and vernal pools. Pacific treefrogs occur in most habitats with access to breeding sites, and the Lease Boundary is within the core habitat for this species (NatureMapping n.d.). The Applicant reports that suitable natural or anthropogenic breeding habitats are not available in the Lease Boundary, though wetland habitat has been recorded in Badger Canyon, approximately 790 feet (240 meters) west of the Micrositing Corridor, which may provide breeding habitat if wetted during the breeding season (spring to early summer).

Reptiles

Five snake and three lizard species have ranges that overlap with the Lease Boundary:

- Common garter snake (*Thamnophis sirtalis*)
- Gopher snake (*Pituophis catenifer*)
- Western racer (*Coluber constrictor*)
- Striped whipsnake (*Masticophis taeniatus*)
- Western rattlesnake (*Crotalus oreganus*)
- Sagebrush lizard (*Sceloporus graciosus*)
- Pygmy short-horned lizard (*Phrynosoma douglasii*)
- Side-blotched lizard (*Uta stansburiana*)

[8] Sagebrush shrub-steppe and dwarf shrub-steppe are part of the Shrub-steppe Priority Habitat in Washington State (WDFW 2008).

[9] The areas identified by the Applicant as Eastside (interior) grassland are considered Eastside Steppe Priority Habitat in Washington State (WDFW 2008).

[10] Gap analysis is a process of identifying areas of high conservation priority. It is designed to be a proactive approach to conservation. Gap relies on information from current landcover and terrestrial vertebrates to identify habitat types and species that are poorly represented on reserves (NatureMapping n.d.).

Two of these species, striped whipsnake and sagebrush lizard, are candidates for listing as endangered, threatened, or sensitive in Washington State and are discussed further in subsequent sections (WDFW 2023a). Side-blotched lizard and pygmy short-horned lizard are also listed as species of greatest conservation need under the SWAP (WDFW 2015).

In general, regionally occurring snake and reptile species exhibit a patchy distribution and are associated with shrubland, grassland, and canyons with access to suitable hibernacula (winter shelter used for hibernation) or hibernation habitat (e.g., loose soils for burrowing). In the Lease Boundary, it is expected that suitable reptile living habitat is available in native shrub and grassland areas, as well as planted grasslands. Reptiles may also occur in agricultural areas and along roadways if suitable basking and shelter habitat is available for thermoregulation.

Birds

A total of 66 bird species were reported in the Lease Boundary from field-based studies conducted by the Applicant, including 29 small bird species and 37 large bird species. The Applicant reports that the species recorded during surveys are typical of species occurring in regional arid shrub-steppe, agriculture, and grassland habitats. Horned lark (*Eremophila alpestris*) was the most common small bird species observed (5.3 observations per 100-meter [328-foot] plot per 10-minute survey) in both the eastern and western portions of the Lease Boundary and was most commonly observed in the fall and winter (Horse Heaven Windfarm, LLC 2022).

Snow goose (*Anser caerulescens*) was the most common large bird species observed overall (12.96 observations per 800-meter [2,625-foot] plot per 60-minute survey) and the species most commonly observed in the eastern portion of the Lease Boundary. Snow geese were most frequently observed during the winter. Sandhill crane (*Antigone canadensis*) was the most frequently observed large bird species in the western portion of the Lease Boundary and was most frequently documented during the spring (5.03 birds/800-m [2,625-foot] /60-min).

Thirteen species of raptor were recorded in the Lease Boundary, with the northern harrier (*Circus hudsonius*) most frequently observed and occurring most often in the fall (1.05 birds/800-m [2,625-foot] /60-min)). Golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*) have been recorded in the Lease Boundary. All bald eagle observations were recorded in the winter and spring.

Thirteen special status bird species were recorded in the Lease Boundary and are discussed below. One species, peregrine falcon (*Falco peregrinus*), is listed as a species of greatest conservation need under the SWAP (WDFW 2015) but is not considered a special status species, based on the definition provided below. Eleven special status species were recorded on the western side of the Lease Boundary, and eight in the eastern portion. Raptor nest surveys were completed by the Applicant from 2017 to 2019 and repeated in 2022 and 2023. Sixty-three nests were recorded within 2 miles (3.2 kilometers) of the Lease Boundary over 103 historical and current nest locations (Jansen 2023). Nesting habitat includes trees and areas along cliffs and rock outcrops.

Surveys conducted in 2017 documented 21 nests within 10 miles of the Lease Boundary, including 10 occupied nests within 2 miles of the Lease Boundary: two ferruginous hawk (*Buteo regalis*), four red-tailed hawk (*Buteo jamaicensis*), two great horned owl (*Bubo virginianus*), one Swainson's hawk (*Buteo swainsoni*), and one common raven (*Corvus corax*) (Appendix K,[11] Horse Heaven Windfarm, LLC 2022).

[11] Jansen, E. 2017. 2017 Raptor Nest Survey Report for the proposed Horse Heaven Wind Project, Benton County, Washington. Prepared for Horse Heaven Wind Farm, LLC.

A survey conducted in 2018 documented 36 nests within 10 miles of the Lease Boundary, 24 of which were occupied (Appendix K,[12] Horse Heaven Windfarm, LLC 2022). The 18 occupied nests recorded within 2 miles of the Lease Boundary included eight red-tailed hawk, six Swainson's hawk, three great horned owl, and one ferruginous hawk. Active bald eagle nests were reported beyond 2 miles of the Lease Boundary.

Surveys conducted in 2019[13] for the Four Mile Wind Project recorded 11 occupied nests, including six red-tailed hawk, two Swainson's hawk, two common raven, and one ferruginous hawk, within 2 miles of the Lease Boundary. Three of the nests (two raven and one Swainson's hawk) were located within the Lease Boundary. Six occupied bald eagle nests were recorded between 2 and 10 miles from the Lease Boundary. Surveys conducted for the Badger Canyon Wind Project documented 13 occupied nests, including five Swainson's hawk, three red-tailed hawk, three common raven, and two great horned owl nests (Appendix K,[14] Horse Heaven Windfarm, LLC 2022). Four of these nests are within the Lease Boundary. In addition, two active bald eagle nests were documented within 10 miles of the Lease Boundary.

Surveys conducted by the Applicant in 2022 recorded 61 nests, including active common raven, great horned owl, red-tailed hawk, and Swainson's hawk nests. The increase in the number of nests documented in 2022 is attributed to an increase in study area due to a larger Lease Boundary. The Applicant reports that nest density remained relatively consistent over the survey period (Horse Heaven Wind Farm, LLC 2022).

In 2023 the Applicant resurveyed historical ferruginous hawk nests within 2 miles of the Lease Boundary based on location data obtained from WDFW Priority Habitats and Species (PHS) database as well as nest data obtained during previous project-related raptor surveys (2017-2019, 2022). The survey covered a total of 103 locations, 63 of which contained nests (active and inactive). Fifty-five of the nests surveyed were within the Lease Boundary (Jansen 2023). The 2023 survey recorded 37 occupied/active nests, 1 occupied/inactive nest, 24 unoccupied nests, and 40 locations where the nests were gone (Jansen, 2023). **Table 3.6-3** summarizes raptor stick nests recorded by the 2022 Application for Site Certification (ASC) (Horse Heaven Wind Farm, LLC 2022; Jansen 2023).

Table 3.6-3: Raptor Stick Nest Survey Results[(a)]

Species[(b)]	2017	2018	2019	2022	2023
Common raven *(Corvus corax)*	1	1	5	16	12
Ferruginous hawk (*Buteo regalis*)	2	1	1	0	0
Great horned owl (*Bubo virginianus*)	2	2	3	3	3
Red-tailed hawk (*Buteo jamaicensis*)	4	8	14	11	8

[12] Jansen, E. W., S. R. Brown, and K. B. Hutchison. 2019. Avian Use and Raptor Nest Survey Report for the Horse Heaven Wind Project, Benton County, Washington. Prepared for Horse Heaven Wind Farm, LLC.

[13] Chatfield, A, T. Rintz, and E. Jansen. 2019. Results of the 2019 Raptor Nest Survey for the Four Mile Wind Project, Benton County, Washington.

[14] Chatfield, A., T. Rintz, and E. Jansen. Results of the 2019 Raptor Nest Survey for the Badger Canyon Wind Project, Benton County, Washington.

Table 3.6-3: Raptor Stick Nest Survey Results[(a)]

Species[(b)]	2017	2018	2019	2022	2023
Swainson's hawk (*Buteo swainsoni*)	1	6	7	4	7
Unoccupied	10	14	14	27	25
Total	**20**	**32**	**44**	**61**	**55**

Notes:
[(a)] Nests recorded within 2 miles of the Lease Boundary excluding bald eagle nests
[(b)] Nests were active during surveys except for those identified as "Unoccupied."

Mammals

Most of the habitat in the Lease Boundary has been historically modified by agricultural practices; however, it is expected that portions of the modified habitat and remnant patches of shrub and grassland habitat support small and medium-sized mammals. The Washington NatureMapping Program shows rodent (e.g., mice), insectivore (e.g., shrews), lagomorph (e.g., rabbits), and mustelid (e.g., weasel) species with ranges that overlap the Lease Boundary (NatureMapping n.d.). Medium and large carnivores are not expected to occur regionally, except for species adapted to modified habitat, such as coyotes (*Canis latrans*). Three species of ungulate—mule deer[15] (*Odocoileus hemionus*), white-tailed deer[16] (*O. virginianus*), and pronghorn antelope[17] (*Antilocapra americana*)—have ranges that overlap the Lease Boundary. The Lease Boundary is within the Columbia Plateau Mule Deer Management Zone and is characterized as "limited range" that is occasionally inhabited or supports small, scattered populations of mule deer (Horse Heaven Wind Farm, LLC 2022). The population has remained stable, although it is subject to hunting (Horse Heaven Wind Farm, LLC 2022). The Applicant has reported observations of ground squirrels, coyotes, mule deer, and pronghorn antelope in the Lease Boundary.

Bats

Twelve bat species are reported to occur regionally (NatureMapping n.d.), and the Applicant reported observations of eight species of bats in the Lease Boundary during field base surveys:

- California myotis (bat) (*Myotis californicus*)
- Canyon bat (*Parastrellus hesperus*)
- Little brown bat (*Myotis lucifugus*)
- Long-legged myotis (bat) (*Myotis volans*)
- Western long-eared bat (*Myotis evotis*)
- Big brown bat (*Eptesicus fuscus*)
- Hoary bat (*Lasiurus cinereus*)

[15] Habitat mapped as patches of core breeding habitat (NatureMapping n.d.)

[16] Habitat mapped as marginal habitat (NatureMapping n.d.)

[17] No predictive habitat mapping available (NatureMapping n.d.)

- Silver-haired bat (*Lasionycteris noctivagans*)

Silver-haired bat was the most common species detected, followed by hoary bat and big brown bat. Silver-haired and hoary bats are listed as species of greatest conservation need under Washington's SWAP (WDFW 2015). Bat activity recorded in the Lease Boundary peaked in September, corresponding to fall migration.

Bats were detected at an average activity rate of 0.63 to 1.41 bat passes per detector night (e.g., number of bat passes per detector night), which is lower than the average activity rate for the Rocky Mountain region (Appendix K,[18] Horse Heaven Wind Farm, LLC 2022).

Bats are expected to forage over the Lease Boundary during summer months and migrate over the area in spring and fall. Surveys for hibernacula have not been conducted; however, the Applicant reports that suitable hibernacula sites (e.g., farm outbuildings, caves) are not available in the Lease Boundary. No bat hibernacula, bat concentration areas, cliffs, caves, or talus have been reported in PHS data within 3 miles of the Four Mile Wind Project area or the Badger Canyon Wind Project area (Horse Heaven Wind Farm, LLC 2022). Most bat species recorded during the multi-year acoustic studies conducted in the Lease Boundary are migratory species that would not overwinter in the Lease Boundary.

Migration Routes and Habitat Connectivity

The Project would be located along the Pacific Flyway bird migration route. The Pacific Flyway extends from Alaska to Patagonia and connects summer and winter grounds along the western portion of the continent. In Washington State, the Pacific Flyway extends from the Pacific Ocean to the Rocky Mountain Range. The Applicant reports that cropland, shrubland, and grassland in the Lease Boundary provide suitable stopover habitat for raptors, songbirds, waterfowl, and shorebirds.

Bat migratory routes are poorly understood; however, bat acoustic data collected by the Applicant suggest that bats migrate over the Lease Boundary during spring and fall. Silver-haired bat and hoary bat were the two species most frequently detected during acoustic surveys. Silver-haired bats are recorded in Washington State from April through November, while hoary bats are typically recorded in Washington State from June through October (Cryan 2003).

Disturbance associated with the Project would not overlap big game migration routes (Horse Heaven Wind Farm, LLC 2022), though the Lease Boundary overlaps areas modeled as wildlife movement corridors (WHCWG 2013). The Washington Wildlife Habitat Connectivity Working Group (WHCWG) developed a statewide habitat connectivity tool that models potential wildlife movement corridors in the landscape. Corridors were modeled based on an aggregate of habitat data for selected focal species. The model considers parameters such as habitat (e.g., habitat concentration area [HCA]), landscape integrity (e.g., areas with limited human impact), and existing barriers to wildlife movement. These factors were considered to rate areas that facilitate wildlife movement. These areas are rated as very high (areas characterized as low-cost for wildlife movement) to low (areas characterized as a high-cost for wildlife movement) by the WHCWG (2013). One modeled movement corridor rated as medium to high runs in an east–west orientation along the northern perimeter of the Lease Boundary (shown in yellow and orange in **Figure 3.6-2**), and another rated as medium to high runs in a north–

[18] Hays, Q., S. Brown, and A. Chatfield. 2018. Bat Activity Study for the Badger Canyon Wind Project, Benton County, Washington. Prepared for Four Mile MW LLC

south orientation parallel to Highway 395 (shown in yellow and orange in **Figure 3.6-2**). The north–south corridor connects the Hanford Site and Rattlesnake Hills to an HCA in Oregon.

Pronghorn antelope were reintroduced onto the Yakama Reservation in 2011 and the population has been monitored by the Yakama Nation Wildlife Program and WDFW via aerial and ground surveys, and GPS collars (Fidorra et al 2019, Fidorra et al 2021, Yakama Nation 2023). Results of survey and monitoring program show pronghorn antelope using the Horse Heaven Hills during all seasons. Movements in the Lease Boundary tend to be concentrated along the Horse Heaven foothills south of the Tri-cities, west of I-82, and north of areas of irrigated crops (Horse Heaven Wind Farm, LLC 2023).

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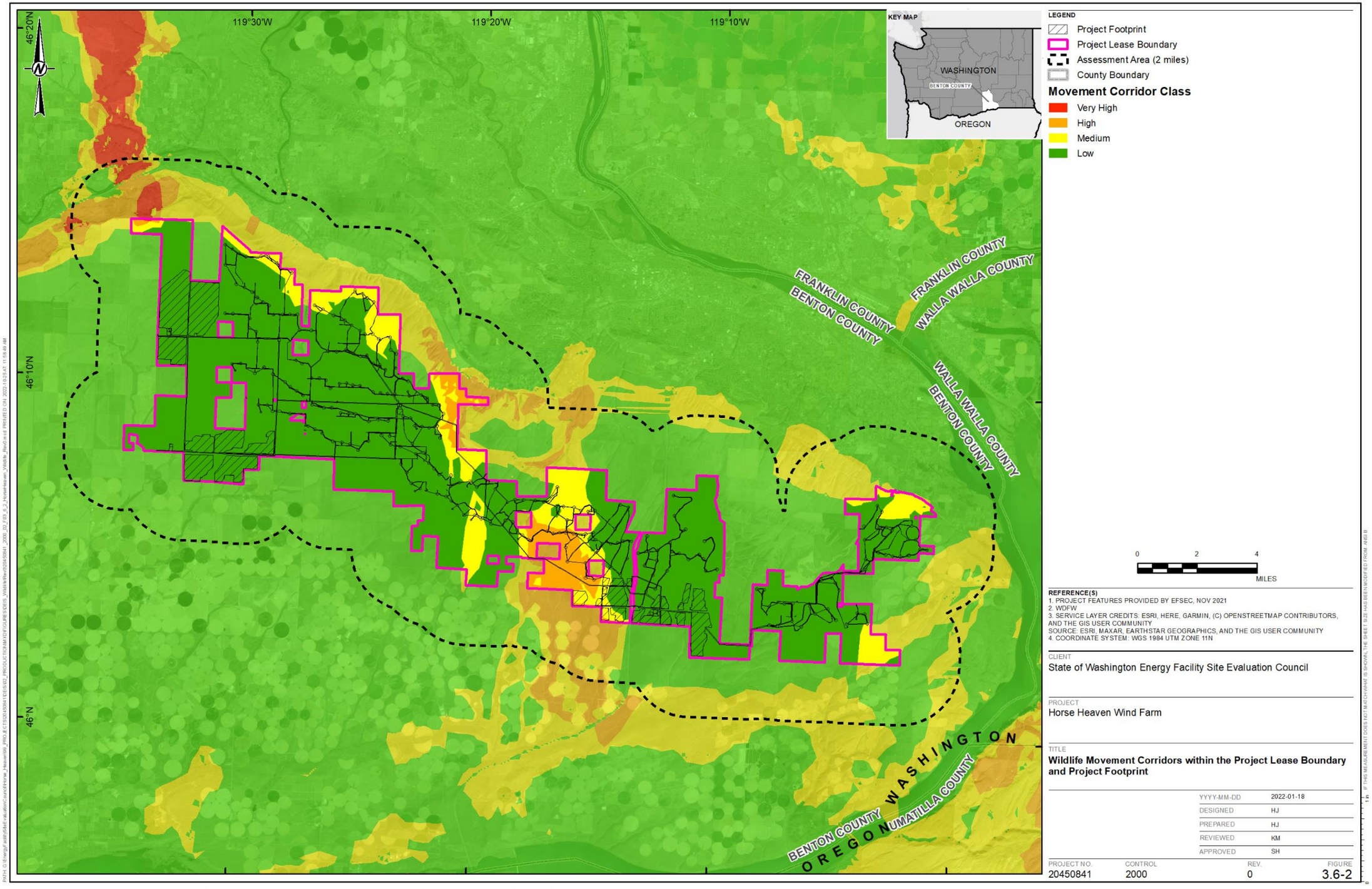

Figure 3.6-2: Wildlife Movement Corridors within the Project Lease Boundary and Project Footprint

Special Status Wildlife Species

For the purpose of this EIS, “special status wildlife species” are defined as in the 2022 ASC—i.e., as one or more of the following:

- Listed under the federal Endangered Species Act
- Listed by Washington State as endangered, threatened, sensitive, or candidate species
- Listed by WDFW as priority species[19]
- An eagle species

In addition to species classified as special status using the definition above, this section also discusses pronghorn antelope, which is understood to be of specific importance to the Yakama Nation and is part of a regional re-introduction program. While discussed in this section, pronghorn antelope is not considered a special status species.

The Applicant has identified 20 special status species with potential to occur in the Lease Boundary. No species listed, or candidates for listing, under the federal Endangered Species Act are predicted to occur in the Lease Boundary. Data on special status species presence were collected from background resources (e.g., WDFW PHS data) and field-based data collected by the Applicant. It is noted that data collected and maintained by WDFW may not include private property; therefore, the lack of PHS data on species presence does not indicate species’ absence. **Table 3.6-4** summarizes the 20 special status species with potential to occur within the Lease Boundary; each is described in the text following **Table 3.6-4**.

[19] WDFW defines Washington priority species as those “that are State listed as Endangered, Threatened, Sensitive, and Candidate Species; vulnerable animal groups; and vulnerable species of recreational, commercial, or tribal importance” (WDFW 2022).

Table 3.6-4: Summary of Special Status Species with Potential to Occur in the Project Lease Boundary

Species	Habitat	Abundance	Abundance in Washington State	Short-term Trends	Long-term Trends	Threats
Sagebrush lizard *Sceloporus graciosus*	▪ Shrublands ▪ Grasslands ▪ Deserts ▪ Open coniferous forests ▪ Sand dunes	100,000 Individuals (globally)	NA	Stable or declining	Unknown	▪ Habitat loss ▪ Fragmentation of habitat ▪ Degradation from non-native plant
Striped whipsnake *Coluber taeniatus*	▪ Shrub-steppe ▪ Hibernacula sites in basalt outcrops	>100,000 Individuals (globally)	NA	Stable or declining	Variable	▪ Habitat loss ▪ Road mortality
American white pelican *Pelecanus erythrorhynchos*	▪ Islands in freshwater ▪ Migration inland, along rivers	>100,000 Individuals, (globally)	NA	Increasing	Declining	▪ Human encroachment on breeding sites ▪ Degradation of aquatic foraging habitat ▪ Pesticide use
Bald eagle *Haliaeetus leucocephalus*	▪ Proximity to foraging habitat (large fresh water and marine systems)	100,000 Individuals (North America)	3,000 to 4,000 Individuals	Stable or increasing	Stable or declining	▪ Disturbance ▪ Habitat loss ▪ Biocide contamination ▪ Food supply ▪ Illegal hunting
Burrowing owl *Athene cunicularia*	▪ Open grassland ▪ Steppe ▪ Desert	>100,000 Individuals (globally)	NA	Declining	Declining	▪ Decline in denning locations ▪ Habitat loss

Table 3.6-4: Summary of Special Status Species with Potential to Occur in the Project Lease Boundary

Species	Habitat	Abundance	Abundance in Washington State	Short-term Trends	Long-term Trends	Threats
Ferruginous hawk *Buteo regalis*	▪ Grassland ▪ Sagebrush ▪ Canyons	<83,000 Individuals (U.S.)	NA	Declining	Declining	▪ Mortalities from collisions with wind turbines, transmission lines roads and highways ▪ Habitat loss ▪ Reduction of prey abundance ▪ Pesticides/contaminants ▪ Climate change ▪ Nest disturbance
Golden eagle *Aquila chrysaetos*	▪ Shrubland ▪ Grassland	<100,000 Individuals (North America)	NA	Stable to declining	Stable	▪ Mortality from collisions with powerlines and wind turbines ▪ Consumption of poisons ▪ Habitat degradation ▪ Disturbance of nest sites
Great blue heron *Ardea herodias*	▪ Lakeshore, coastal water, streams ▪ Pasture, fields, fallow areas	124,500 (*Herodias* subspecies North America)	NA	Stable to increasing	Stable to increasing	▪ Contamination of food sources ▪ Alteration of foraging habitat ▪ Disturbance of nesting sites

Table 3.6-4: Summary of Special Status Species with Potential to Occur in the Project Lease Boundary

Species	Habitat	Abundance	Abundance in Washington State	Short-term Trends	Long-term Trends	Threats
Loggerhead shrike *Lanius ludovicianus*	▪ Shrubland ▪ Grassland	6,000,000 Individuals (globally)	NA	Declining	Declining	▪ Pesticide use ▪ Decline in food availability ▪ Loss and degradation of breeding habitat
Prairie falcon *Falco mexicanus*	▪ Arid environments ▪ Coastal (overwinter)	<9,000 Individuals (North America)	200 Individuals	Stable	NA	▪ Disturbance ▪ Habitat loss and degradation ▪ Collisions with infrastructure
Ring-necked pheasant *Phasianus colchicus*	▪ Open environments ▪ Coastal areas	NA	NA	Stable	Declining	▪ Hunting ▪ Food contamination ▪ Mortality from collision with machinery ▪ Habitat degradation
Sagebrush sparrow *Artemisiospiza nevadensis*	▪ Sagebrush ▪ Bunch grass shrub-steppe	NA	NA	Stable to declining	Stable to declining	▪ Habitat loss and degradation ▪ Changes in fire regimes
Sage thrasher *Oreoscoptes montanus*	▪ Shrub-steppe	>1,000,000 Individuals (globally)	NA	Declining	Declining	▪ Habitat loss and degradation
Sandhill crane *Antigone canadensis*	▪ Sunnyside-Snake River Wildlife Area ▪ Marsh, wetland, and bog habitat ▪ Wet meadows ▪ Grain fields	8,000 Individuals (Central Valley population)	8,000 Individuals (Central Valley population)	Stable	NA	▪ Habitat loss ▪ Collisions with infrastructure ▪ Nest predation

Table 3.6-4: Summary of Special Status Species with Potential to Occur in the Project Lease Boundary

Species	Habitat	Abundance	Abundance in Washington State	Short-term Trends	Long-term Trends	Threats
Tundra swan *Cygnus columbianus*	▪ Freshwater system ▪ Marine systems ▪ Fields	<170,000 Individuals (North America)	NA	Stable	NA	▪ Hunting on winter grounds ▪ Consumption of spent lead shots and fishing leads
Vaux's swift *Chaetura vauxi*	▪ Access to roost sites (trees, snags, chimneys)	<300,000 Individuals (North America)	NA	Declining	Declining	▪ Loss of old trees and snags ▪ Change in chimney availability ▪ Pesticides
Townsend's big-eared bat *Corynorhinus townsendii*	▪ Coniferous forests ▪ Riparian habitat ▪ Shrub-steppe ▪ Open fields	<100,000 Individuals (globally)	NA	Stable to declining	Declining	▪ Disturbance and destruction of hibernacula and maternity colonies ▪ Loss of roosting and foraging habitat
Townsend's ground squirrel *Urocitellus townsendii*	▪ Shrub-steppe ▪ Grasslands ▪ Pastures ▪ Orchards ▪ Highway margin, and canal banks	NA	NA	Stable to Declining	Declining	▪ Habitat loss and degradation
Black-tailed jackrabbit *Lepus californicus*	▪ Sagebrush ▪ Rabbitbrush ▪ Grassland	NA	NA	Declining	Stable	▪ Habitat loss ▪ Mortality from persecution ▪ Disease
White-tailed jackrabbit *Lepus townsendii*	▪ Open bunchgrass habitat ▪ Sagebrush	<1,000,000 Individuals (globally)	NA	NA	NA	▪ Loss and degradation of habitat

Table 3.6-4: Summary of Special Status Species with Potential to Occur in the Project Lease Boundary

Species	Habitat	Abundance	Abundance in Washington State	Short-term Trends	Long-term Trends	Threats
Pronghorn antelope *Antilocapra americana*	▪ Grassland ▪ Shrubland	NA	<300 Individuals	Increasing	NA	▪ Previously extirpated from Washington State

Notes:
Source: Citations for sources of information provided under species-specific sections
NA = Not available

Sagebrush Lizard

Sagebrush lizard (*Sceloporus graciosus*) occurs across the arid areas of the central western United States, extending northward into Washington State. In Washington State, the species occurs in semi-desert and steppe areas throughout the Columbia Basin, including Benton County (NatureMapping n.d.). The species is associated with shrublands, grasslands, deserts, open coniferous forests, and sand dunes where open ground with low-lying shrubs is available. Suitable habitat generally has limited grass and leaf cover. The species has a small home range size of approximately 1.2 acres (0.5 hectares) (NatureServe 2021).

Local population estimates and trends are not available; however, NatureServe (2021) estimates the global population to be approximately 100,000 individuals. Short-term trends may be stable or decreasing, and long-term trends are unknown (WDFW 2023b). Threats to the species include habitat loss and fragmentation (e.g., roadways), as well as habitat degradation from non-native plant species, such as cheatgrass, and loss of sagebrush (WDFW 2023b). The species is a candidate for state listing and is a state priority species.

Shrubland, including sagebrush and rabbitbrush habitat, within the Lease Boundary, is expected to provide suitable habitat for this species. Washington's NatureMapping Program reports suitable core sagebrush lizard habitat along the northern and southern perimeter of the Lease Boundary (NatureMapping n.d.). Sagebrush lizard has not been documented within the Lease Boundary, though it is noted that species-specific surveys have not been conducted (WDFW n.d.[a]; Horse Heaven Wind Farm, LLC 2022).

Striped Whipsnake

Striped whipsnake (*Coluber taeniatus*) occurs across the western and southwestern United States, from Washington State south to California and east to Texas. The desert striped whipsnake subspecies (*C. t. taeniatus*) occurs in Washington State, where it is verified as occurring in two locations in Grant County (WDFW 2023c). The species is a shrub-steppe obligate, occurring in areas where it can access suitable hibernacula sites in basalt outcrops (WDFW 2023c). Movements between hibernacula and summer range are estimated to average 2,950 feet (900 meters) for females and 4,920 feet (1,500 meters) for males (NatureServe 2021).

Local population estimates and trends are not available; however, NatureServe (2021) estimates that the global population exceeds 100,000 individuals. Population trends are expected to be variable across the species' range and are broadly considered to be stable or declining globally (NatureServe 2021). Striped whipsnake has likely always been uncommon in Washington State, which is at the northern end of its range. Striped whipsnake is a candidate for listing in Washington State and is a state priority species in Washington State due to conversion of shrub-steppe habitat to agricultural or land development purposes and destruction of hibernacula sites (WNHP et al. 2009).

Striped whipsnake has historically been recorded in Benton County, and core habitat occurs along the northern perimeter of the Lease Boundary (NatureMapping n.d.). It is expected that shrub-steppe habitat in the Lease Boundary provides suitable summer habitat for the species; however, the Applicant reports that the area does not contain basalt outcrops, which are required for hibernacula. While the species has historically been reported in Benton County, PHS data do not report occurrences of the species within 2 miles (3.2 kilometers) of the Lease Boundary **(Figure 3.6-3**), and striped whipsnake was not recorded within the Lease Boundary during field surveys, though it is noted that species-specific surveys have not been conducted (WDFW 2023c; Horse Heaven Wind Farm, LLC 2022).

American White Pelican

American white pelicans (*Pelecanus erythrorhynchos*) occur across most of North America, breeding in Canada, the north-central United States, and western United States and overwintering in the southern United States and Central America. In Washington State, American white pelicans breed on Badger Island in the Columbia River (WDFW 2023d) and migrate over the eastern portion of the state (Knopf and Evans 2020). Breeding occurs on islands in freshwater systems protected from humans and predation (WDFW 2023d). Migration occurs inland, often along rivers, with access to aquatic stopover areas (Knopf and Evans 2020).

Local population estimates and trends are not available; however, NatureServe (2021) estimates that the global population exceeds 100,000 individuals. WDFW (2015) reports that approximately 1,000 pairs of American white pelican breed at Badger Island in the Columbia River. American white pelicans have undergone historical population declines, but populations appear to have increased since 1980 (Knopf and Evans 2020). The species is vulnerable to human encroachment on breeding sites, changes and degradation of aquatic foraging habitat, and pesticide use and continues to exhibit effects from hunting in the past (Knopf and Evans 2020). The species is state listed as sensitive and is a state priority species.

Suitable nesting and foraging habitat does not occur within the Lease Boundary; however, American white pelicans were recorded during field surveys flying over the Lease Boundary when moving to and from the Badger Island breeding colony and during migration. The Badger Island breeding colony is located approximately 4 miles (6.5 kilometers) east of the Lease Boundary and is one of the largest breeding colonies in the United States. The Applicant recorded 887 birds (76 groups) flying over the Lease Boundary during field surveys (Horse Heaven Wind Farm, LLC 2022). Most of the observations were recorded during the summer (724 individuals), followed by fall (111 individuals) and spring (52 individuals).

Bald Eagle

Bald eagles occur across most of North America and breed in Canada, the western and southeastern United States, and patches of central and east coastal United States and are year-round residents in most of Washington State. Breeding typically occurs in trees within 1.2 miles of water, though breeding locations and substrate can vary. Bald eagles may congregate outside of the breeding period in areas with access to foraging habitat (e.g., large rivers) and roosting sites (Buehler 2020).

Local population estimates and trends are not available; however, Buehler (2020) reports that the North American population may be as high as 100,000 individuals, and WDFW (2015) reports that approximately 3,000 to 4,000 individuals occur in Washington State. Bald eagle populations have increased since 1972 due to bans of dichlorodiphenyltrichloroethane (DDT), and populations in Washington State may be approaching carrying capacity (Buehler 2020). Threats to bald eagle include disturbance, habitat loss, biocide contamination, food supply, and illegal hunting (NatureServe 2021). Bald eagle is protected under the federal Bald and Golden Eagle Protection Act.

Bald eagles are year-round residents in Benton County and nest along the Columbia River (Horse Heaven Wind Farm, LLC 2022). Bald eagles were observed flying over the Lease Boundary during field surveys, including six observations over the western portion of the Lease Boundary and 10 over the eastern portion of the Lease Boundary. In the west, the observations were grouped around Bing and Coyote Canyons. Bald eagles were observed predominantly in the winter and spring months (Horse Heaven Wind Farm, LLC 2022). Nine bald eagle nests were recorded during field surveys, none of which were within the Lease Boundary (**Table 3.6-5**).

Table 3.6-5: Bald Eagle Nests Recorded within 10 Miles of the Lease Boundary

Nest Location	Nest Status[a,b]	Distance to Nearest Proposed Turbine (miles)
Prosser	▪ Not Surveyed 2017 ▪ Not Surveyed 2018 ▪ Occupied/Active 2019 ▪ Occupied/Active 2022 ▪ Occupied/Active 2023	10.7
Yakima River Mouth	▪ Occupied/Active 2017 ▪ Occupied/Active 2018 ▪ Inactive 2019 ▪ Occupied/Active 2022 ▪ Occupied/Active 2023	8.1
Port of Pasco	▪ Not Surveyed 2017 ▪ Not Surveyed 2018 ▪ Occupied/Active 2019 ▪ Occupied/Active 2022 ▪ Occupied/Active 2023	6.5
Peavine Island	▪ Not Surveyed 2017 ▪ Not Surveyed 2018 ▪ Occupied/Active 2019 ▪ Occupied/Active 2022 ▪ Occupied/Active 2023	3.7
Peavine Island North	▪ Occupied/Active 2023	3.9
McNary NWR	▪ Not Surveyed 2017 ▪ Not Surveyed 2018 ▪ Occupied/Active 2019 ▪ Occupied/Active 2022 ▪ Occupied/Active 2023	7.8
Foundation Island[c]	▪ Occupied/Active 2023	4.4
Burbank	▪ Not Surveyed 2017 ▪ Not Surveyed 2018 ▪ Not Located 2019 ▪ Occupied/Inactive 2022 ▪ Occupied/Active 2023	7.2
Sand Station	▪ Not Surveyed 2017 ▪ Not Surveyed 2018 ▪ Occupied/Active 2019 ▪ Unoccupied/Inactive 2022 ▪ Gone 2023	9.2

Source: Horse Heaven Wind Farm, LLC 2022

Notes:

[a] Only includes years the nest location was surveyed

[b] Occupied = Nest contains an egg or chick, or an adult was observed on or near the nest; Unoccupied = eagles (egg, chick, or adult), were not observed at the nest; Active = the nest contained eggs, chicks, or other evidence that it was used for breeding; Inactive = the nest did not contain an egg, chick, or evidence of breeding

[c] New nest identified in 2023

NWR = National Wildlife Refuge

Burrowing Owl

Burrowing owls (*Athene cunicularia*) occur across central and southern United States. In Washington State, burrowing owl breeding habitat occurs in arid areas in the southern-central part of the state. Benton County is located in the center of the mapped core habitat for this species in Washington State (NatureMapping n.d.). Suitable breeding habitat includes open grassland, steppe, and desert ecosystems, where the species typically occurs in gently sloped areas with sparse vegetation (Poulin et al. 2020). Burrowing owls can occur in anthropogenically modified landscapes such as agricultural fields, and roadway rights-of-way. Abandoned mammal burrows are used for nesting and are an important feature in suitable habitat.

National and regional populations are poorly understood, and likely vary across the species' range. In Washington State, populations are estimated to have declined by approximately 1.5 percent annually between 1968 and 2005 (Poulin et al. 2020). The species is considered uncommon outside of Benton, Franklin, Grant, and Adams Counties (WDFW 2023e). Risks to burrowing owls in Washington State are understood to include decline in small mammals, resulting in a reduction of denning locations and loss of habitat from alteration of landscape to agriculture and developed areas (WDFW 2023e). Burrowing owl is a candidate species for state listing and is a state priority species.

The Lease Boundary is classified as core habitat for burrowing owls, and PHS data report 32 burrowing owl nests or burrows within 2 miles of the Lease Boundary (**Figure 3.6-3**), including four within the Lease Boundary (NatureMapping n.d.). Suitable habitat for burrowing owls may exist in grasslands, shrublands, and fallow agricultural fields, and along roadways. Burrowing owls were not recorded in the Lease Boundary during the field surveys conducted by the Applicant; however, species-specific surveys were not conducted.

Ferruginous Hawk

Ferruginous hawk range extends across open portions of western North America, extending into southeastern Washington State. Benton County is located in core habitat for this species in Washington State and, along with Franklin County, supports the majority of nesting territories (Hayes and Watson 2021; NatureMapping n.d.). Habitat generally consists of grassland and sagebrush ecosystems, as well as canyons with cliffs and rock outcrops that provide nesting sites (Ng et al. 2020). In Washington State, nests are typically placed at lower elevations and heights less than 33 feet meter(Ng et al. 2020). Preferred nesting locations include rock outcrops and juniper trees with southern and western exposures (Ng et al. 2020). Additionally, nesting sites require access to prey sources that include small mammals, such as ground squirrels. Ferruginous hawk core habitat is estimated to extend 2 miles (3.2 kilometers) from the nest site, and the home range is estimated to encompass approximately 6 miles (10 kilometers) from the nest site (Ritter 2022; Watson 2022a). These distances were derived from telemetry data collected in south-central and north-central Washington State (Watson 2022a).

Ng et al. (2020) report that the North American population was estimated to be approximately 5,842 to 11,330 individuals in the early 1990s. More recent estimates, based on breeding bird surveys, estimated the North American population to be upwards of approximately 83,000 individuals, but the species has been in decline within Washington State. Statewide ferruginous hawk territory occupancy trends are presented in Hayes and Watson (2021), who report that the breeding population in Washington State has shown sustained declines: "Between 1974 and 2016, there have been significant declines in nesting territory occupancy, nest success, and productivity." Specific to Benton County, which is part of the Washington State core breeding range for this species, Hayes and Watson (2021) report substantial declines in the percentage of nesting territories supporting breeding pairs.

Threats to ferruginous hawk include mortalities from collisions with wind turbines, transmission lines, roads and highways, loss of foraging habitat as native habitats are converted to agricultural land or developed, reduction of prey abundance, indirect mortality from pesticides/contaminants, climate change, and nest disturbance (Ng et al. 2020; Hayes and Watson 2021). It is estimated that more than half of shrub-steppe habitat, which supports ferruginous hawk foraging habitat, in Washington State has been modified by human disturbance (e.g. converted to crops, urban development) with a patchwork of fragmented habitat remaining. Specific to Benton County, recent wildfires have further contributed to the loss of shrub-steppe habitat as newly burnt areas are re-populated with invasive cheatgrass. Ferruginous hawks are state listed as endangered and are a state priority species, partially due to the continued contraction in the number of breeding pairs statewide, as well as the lack of improvement in habitat conditions and primary threats to the species.

Shrub-steppe and grassland habitat in the Lease Boundary where small mammals occur may provide suitable ferruginous hawk foraging habitat, while canyons provide suitable nesting substrate. Portions of the Lease Boundary are classified as core habitat for ferruginous hawk (NatureMapping n.d.). PHS data show 56 ferruginous hawk nests within 2 miles of the Lease Boundary, including 10 within the Lease Boundary. Known ferruginous hawk nest locations (both active and inactive) are generally concentrated northwest of the Lease Boundary, between Interstate 82 and the northwestern edge of the Lease Boundary, near mapped ground squirrel concentration areas. Three nest sites are recorded along the southern edge of the Lease Boundary, and east of Interstate 82.

The Applicant reported that 56 historic and two newly documented ferruginous hawk nests occur within 2 miles of the Lease Boundary. These nest locations were surveyed at least once during surveys conducted between 2017 and 2019, and 2022 and 2023, including two that were occupied at least once by the ferruginous hawk during the study period (Appendix K,[20] Horse Heaven Wind Farm, LLC 2022). Nests were predominantly recorded on the ground, rock outcrops, and cliffs along canyons, including Webber, Sheep, and Badger Canyon (Horse Heaven Wind Farm, LLC 2022) The Applicant reports that the 58 nests represent 18 territories; although the majority of the nests are in sixteen historical ferruginous hawk territories, as defined by WDFW (Ritter 2022; Watson 2022b). Based on field data collected by the Applicant (years 2017 to 2019, 2022, 2023), the Applicant reported that, by 2022, half of the 58 surveyed ferruginous hawk nest (56 from PHS data, 1 from a previous unrelated survey, and 1 found during the Applicant's 2022 survey) were gone (30 nests; 52 percent) while another 22 nests (38 percent) were unoccupied and six (10 percent) were occupied by another species. The Applicant also reports that, of the nests remaining in 2022, 15 (54 percent) were considered poor condition, six (21 percent) were in fair condition, and seven (25 percent) were in good condition. Two of the 58 nesting sites surveyed were occupied during at least one survey, but both sites were no longer occupied by ferruginous hawks by 2022. The Applicant reports that ferruginous hawk nest occupancy, representing the number of nests occupied by ferruginous hawk compared to the numbers of available nests calculated over the 5-year survey period, was approximately 4.4 percent (peak nest occupancy was recorded in 2017 [20 percent] and lowest in 2022 and 2023 [0 percent], Jansen et al. 2023). Territory occupancy has declined statewide by more than 40 percent (Hayes and Watson 2021). Ferruginous hawk observations were recorded four times during point count surveys near the nest, with activity recorded during field surveys, which the Applicant reports as low nest occupancy (Appendix K,[14] Horse Heaven Wind Farm, LLC 2022).

[20] Jansen, E. 2022. Patterns of Ferruginous Hawk (*Buteo regalis*) Nesting in the Horse Heaven Hills, Benton County, Washington, 2017-2019, 2022. Prepared for Horse Heaven Wind Farm, LLC.

Golden Eagle

Golden eagle (*Aquila chrysaetos*) range extends across North America. In Washington State, core breeding habitat is generally in arid environments located in the central portion of the state. Suitable habitat is variable but includes shrubland and grassland. Nesting may occur in trees or on cliffs.

North American populations are estimated at up to 100,000 individuals, with approximately 190 breeding pairs in Washington State (Katzner et al. 2020). Western North American populations appear to be stable or in slight decline. Historically, golden eagles were threatened by eradication campaigns; current threats include mortality from collisions with powerlines and wind turbines; consumption of poisons (e.g., rodenticide); habitat change, including reduction of prey items; and disturbance of nest sites (Katzner et al. 2020). Golden eagle is a candidate species for state listing, a state priority species, and protected under the Bald and Golden Eagle Protection Act.

Open grassland, shrubland, and agricultural areas in the Lease Boundary provide suitable foraging habitat for golden eagles. Six golden eagles were recorded in the western portion of the Lease Boundary, and one was documented in the east during field surveys conducted by the Applicant (Horse Heaven Wind Farm, LLC 2021a). Most observations were documented during the fall. No golden eagle nests were recorded in or within 10 miles of the Lease Boundary, though suitable nesting habitat is available along cliffs associated with the Columbia River (Horse Heaven Wind Farm, LLC 2022).

Great Blue Heron

Great blue heron (*Ardea herodias*) range extends across most of North America and Central America. In Washington State, the species' breeding range generally extends along the coast and the central-eastern part of the state, with the *herodias* subspecies occurring in eastern Washington. Great blue heron is adaptable and uses a variety of habitat for foraging, including aquatic (e.g., lakeshore, coastal water, streams) and upland (e.g., pasture, fields, fallow areas) areas (Vennesland and Butler 2020). Nesting occurs in trees, in bushes, on the ground, or on artificial structures, typically near water (Vennesland and Butler 2020).

The *herodias* subspecies population is estimated at 124,500 individuals, though local population estimates are not available (Vennesland and Butler 2020). Long- and short-term trends suggest that great blue heron populations are stable or increasing; however, the populations were historically impacted by hunting (NatureServe 2021). Threats to the species include contamination of food sources, alteration of foraging habitat (e.g., draining wetlands), and disturbance of nesting sites. Great blue heron is a state priority species.

The Lease Boundary is not expected to provide suitable nesting habitat for great blue heron; however, grassland, agricultural fields, and shrubland may provide foraging habitat (Horse Heaven Wind Farm, LLC 2022). Nesting may occur along adjacent watercourses, such as the Yakima River (Horse Heaven Wind Farm, LLC 2022). The Lease Boundary overlaps areas of core breeding habitat (NatureMapping n.d.). One great blue heron was recorded flying over grassland area of the Lease Boundary during the winter (Horse Heaven Wind Farm, LLC 2022).

Loggerhead Shrike

Loggerhead shrike (*Lanius ludovicianus*) range extends across most of the United States, including portions of southern Canada. In Washington State, core breeding habitat for loggerhead shrike is predominantly located in the central portion of the state along the Columbia Basin (NatureMapping n.d.). Breeding habitat generally consists of undisturbed patches of shrub-steppe and grass areas, though abundance appears to be correlated

with active pasture lands in portions of the species' range, suggesting that access to perches and short grass may be important (Yosef 2020). Loggerhead shrike is a candidate for state listing and is a state priority species.

The global population of loggerhead shrike is estimated to be six million individuals; however, local population estimates are not available (NatureServe 2021). Species declines have been noted in most states, and current population decreases are estimated at 3.5 to 5 percent per year (Yosef 2020). Threats to the species include pesticide use, decline in food (e.g., invertebrate) availability, and loss and degradation of breeding habitat through loss of sagebrush steppe habitat (Yosef 2020; NatureServe 2021).

Shrubland, abandoned homesteads, and hedgerows in the Lease Boundary provide suitable nesting habitat for loggerhead shrike (Horse Heaven Wind Farm, LLC 2022). Shrubland and agricultural fields provide foraging habitat for the species (Horse Heaven Wind Farm, LLC 2022). The Lease Boundary overlaps core loggerhead shrike breeding habitat. PHS data report seven loggerhead shrike occurrences within 2 miles of the Lease Boundary (**Figure 3.6-3**), three of which are nest sites. Five of these occurrences are reported within the Lease Boundary; two of these are nest locations. A loggerhead shrike nest was recorded within the Lease Boundary in 1990, and a second was recorded approximately 350 feet from the Lease Boundary in 1987 (WDFW, n.d.). One loggerhead shrike was recorded during summer field surveys in the eastern portion of the Lease Boundary (Horse Heaven Wind Farm, LLC 2022). The Applicant reports that this bird may have been nesting when observed (Horse Heaven Wind Farm, LLC 2022).

Prairie Falcon

Prairie falcon (*Falco mexicanus*) range extends across most of western United States and northern Mexico. In Washington State, the species is a year-round resident in the central and eastern portions of the state and may overwinter in coastal areas (Steenhof 2020). Core breeding habitat has been identified in central Washington State (NatureMapping n.d.). PHS data report 12 occurrences of prairie falcon within 2 miles of the Lease Boundary (**Figure 3.6-3**), though none within the Lease Boundary. Prairie falcon habitat consists of arid open environments, including steppe, with cliffs, bluffs, and canyons that provide nesting sites (Steenhof 2020). Access to prey species, including horned lark, meadowlark (*Sturnella neglecta*), and ground squirrel, is an important component of prairie falcon habitat (Steenhof 2020).

The breeding population of prairie falcon in North America is estimated at 8,546 individuals, while the population in Washington State was estimated at 200 individuals (circa 1971) (Steenhof 2020). Lack of long-term population data has resulted in imprecise population trends; however, Steenhof (2020) reports that populations in western North America may be declining. Prairie falcon is a state priority species.

In the Lease Boundary, suitable prairie falcon nesting habitat occurs on bluffs and canyons, and foraging habitat occurs in shrubland and grassland habitat (Horse Heaven Wind Farm, LLC 2022). The Lease Boundary may overlap core breeding habitat (NatureMapping n.d.) and the central Columbia Basin, which includes Benton County, supports the largest wintering population of prairie falcon in Washington State (Horse Heaven Wind Farm, LLC 2022). Prairie falcons (30 observations) were recorded in cropland and grassland within the Lease Boundary during all seasons, though observations were reported to be lower in spring and summer (Horse Heaven Wind Farm, LLC 2022).

Ring-necked Pheasant

Ring-necked pheasant (*Phasianus colchicus*) is an introduced gamebird that originated in Asia. The species now occupies habitat across most of northern and central United States and southern Canada. In Washington State, core breeding habitat includes most open habitats in eastern Washington, as well as coastal areas. The species

is adaptable and occupies a variety of habitat types but generally requires areas with cover, such as dried grasses, for nesting and roosting, roosting perch sites (e.g., trees or shrubs), and crowing areas.

Reliable population estimates are not available for North America, and estimates are often variable. Harvest data maintained by WDFW suggest that ring-necked pheasant populations have declined since the early 1980s (WDFW n.d.[b]). In Washington State, WDFW releases pen-raised ring-necked pheasants to supplement wild populations (WDFW 2023f). Local and national population trends are not known, as reliable population data are not available. Giudice and Ratti (2020) report declines in the Rocky Mountain states; however, it is expected that populations are stable given state management of the species. Ring-necked pheasants are hunted, and hunting pressures represent a primary threat to populations. Additional threats may include contamination of food sources from insecticides, mortality from agricultural machinery and road vehicles, and degradation of habitat from increased industrial farming (Giudice and Ratti 2020). Ring-necked pheasant is a state priority species.

Benton County is within a pheasant management zone, and agricultural and grassland habitat in the Lease Boundary is expected to provide habitat for ring-necked pheasant (Horse Heaven Wind Farm, LLC 2022). Ten observations of ring-necked pheasant were recorded during field surveys, primarily in cropland and grassland (Horse Heaven Wind Farm, LLC 2022). PHS data report 10 occurrences of ring-necked pheasants within 2 miles of the Lease Boundary (**Figure 3.6-3**).

Sagebrush Sparrow

Sagebrush sparrow (*Artemisiospiza nevadensis*) range consists of western states from Washington to northern Mexico, where the species is associated with shrub-steppe habitat. In Washington State, it occurs primarily in the sagebrush and bunch grass shrub-steppe ecosystems of the Columbia Basin. Sagebrush sparrows are associated with semi-open habitat with evenly spaced shrubs, and with sagebrush (Martin and Carlson 2020).

Regional population estimates are not available for sagebrush sparrows, although, WDFW (2023g) reports that populations in Washington State are stable. Martin and Carlson (2020) report that breeding bird survey data suggest declines of 1 to 2 percent in western states, including Washington State. Threats to the species are primarily reported to be from habitat loss and degradation. Changes in fire regimes (e.g., suppression and increased frequency of high intensity fires) have changed patterns of plant succession and composition (Martin and Carlson 2020). The species is a candidate for listing in Washington State and is a state priority species.

Sagebrush habitat in the Lease Boundary provides suitable breeding and living habitat for sagebrush sparrow. The Lease Boundary overlaps limited core breeding habitat (NatureMapping n.d.). One sagebrush sparrow was recorded during spring 2018 field-based surveys (Horse Heaven Wind Farm, LLC 2022). PHS data report one occurrence of sagebrush sparrow within 2 miles of the Lease Boundary (**Figure 3.6-3**).

Sage Thrasher

Sage thrasher (*Oreoscoptes montanus*) breeding range includes the western United States, extending into southern Canada, while winter range includes the southern states and northern Mexico. In Washington State, the species' core breeding range extends along the Columbia Basin to Okanogan County (NatureMapping n.d.). Sage thrashers require shrub-steppe habitat in their breeding range, generally using expansive areas of sagebrush, though they may use smaller fragments in agricultural areas (WDFW 2023h).

Washington population estimates are not available but are considered stable (Reynolds et al. 2020; WDFW 2023h). Density estimates for Washington counties published by Dobler et al. (1996, as reported by Reynolds et al. 2020) were between 0.504 and 0.524 birds per acre (0.204 and 0.212 birds per hectare), while Stephens

(1985, as reported by Reynolds et al. 2020) reported densities of 1.79 birds per acre (0.725 birds per hectare). Degradation and loss of habitat are considered the primary threat to sage thrashers. Sage thrasher is a candidate species for state listing and is a state priority species.

Shrub-steppe habitat in the Lease Boundary provides suitable breeding habitat for sage thrashers, and the Lease Boundary overlaps core breeding habitat (NatureMapping n.d.). Three occurrences of sage thrasher were recorded during field surveys—one in spring and two in fall (Horse Heaven Wind Farm, LLC 2022). The individuals were using bushes and fences in grassland areas (Horse Heaven Wind Farm, LLC 2022).

Sandhill Crane

Sandhill crane (*Antigone canadensis*) breeding range extends across most of the northern United States and Canada, with overwintering range in the southern United States. In Benton County, the Sunnyside-Snake River Wildlife Area provides an important stopover area for migrating sandhill cranes. Some nesting of greater sandhill cranes occurs in Yakima County. Breeding occurs in marsh, wetland, and bog habitat, as well as wet meadows (Gerber et al. 2020). Grain fields and aquatic habitat (shallow ponds, sloughs) are used during migration stopovers (Gerber et al. 2020).

The Central Valley population of sandhill crane, which winters in Central Valley, California, is estimated to be 8,000 individuals, while the Pacific Flyway population is estimated at 25,000 (Gerber et al. 2020). More than 35,000 sandhill cranes move along the Columbia Basin annually, making stopovers near Benton County (WDFW 2023i). Approximately 30 pairs of sandhill cranes breed in Washington State (WDFW 2015). In general, short-term trends show that sandhill crane populations appear stable (Gerber et al. 2020). Sandhill cranes are state listed as endangered and are a state priority species.

Transient birds could forage in agricultural fields, shrubland, and grassland habitat in the Lease Boundary; however, the Lease Boundary is not expected to provide nesting or substantial foraging habitat. Important stopover locations do occur in Benton County, though outside of the Lease Boundary. Sandhill crane was the most frequently observed large bird species over the western portion of the Lease Boundary (28 percent of large bird observations) (Horse Heaven Wind Farm, LLC 2022). The Applicant reports 3,050 individuals in 27 groups moving over the Lease Boundary, predominantly in fall (Horse Heaven Wind Farm, LLC 2022). No sandhill cranes were recorded perched or on the ground (Horse Heaven Wind Farm, LLC 2022).

Tundra Swan

In North America, tundra swans (*Cygnus columbianus*) breed in northern Canada and Alaska and overwinter in patches of habitat in the western United States and the east coast. Overwintering habitat includes tidal and freshwater systems and agricultural fields (Limpert et al. 2020).

The North American population of tundra swan is estimated at 169,300 individuals. Western wintering swan populations appear to be decreasing at a rate of 2.3 percent per year from 1980 to 1989 (Limpert et al. 2020). Threats to tundra swan populations include hunting on winter grounds, as well as mortality due to consumption of spent lead shots and fishing leads (Limpert et al. 2020). Tundra swans are a state priority species.

Tundra swans may forage in agricultural areas in the Lease Boundary during migration stopovers. One group of 35 individuals was recorded flying over the Lease Boundary during spring surveys (Horse Heaven Wind Farm, LLC 2022). This group had been incidentally observed in agricultural fields (Horse Heaven Wind Farm, LLC 2022).

Vaux's Swift

Vaux's swift (*Chaetura vauxi*) range extends from the Yukon through the western United States to northern South America (Schwitters et al. 2021). In Washington State, breeding habitat is predominantly in the western and northeastern portions of the state (NatureMapping n.d.). Habitat used during migration includes access to roost locations that may include trees, snags, and industrial and residential chimneys (Schwitters et al. 2021).

The North American Vaux's swift population is estimated between 200,000 and 300,000 individuals (Schwitters et al. 2021); however, local population estimates are not available. Short-term trend estimates suggest declines of 10 to 30 percent (NatureServe 2021), while long-term trends suggest that populations may have decreased by 50 percent from 1970 levels (Schwitters et al. 2021). Vaux's swift is a state priority species.

The Lease Boundary does not provide suitable nesting or roosting habitat for Vaux's swift; however, Vaux's swifts may migrate over the Lease Boundary. Large numbers of Vaux's swifts move through the Walla Walla River Important Bird Area, approximately 2 miles east of the Least Boundary (Horse Heaven Wind Farm, LLC 2022). Vaux's swifts were not recorded during field surveys.

Townsend's Big-eared Bat

Townsend's big-eared bat (*Corynorhinus townsendii*) range extends across most of the western and central United States into southern British Columbia (NatureServe 2021). Most of Washington State provides core habitat for the species, except along the coastal mountain range (NatureMapping n.d.). Habitat is variable and includes coniferous forests, riparian habitat, shrub-steppe, and open fields. Suitable habitat includes access to suitable maternity and hibernation sites, which include caves, mines, buildings, tunnels, and bridges (WDFW 2023j).

The global abundance is estimated between 10,000 and 1,000,000 individuals; however, local estimates are not available (NatureServe 2021). Long-term trends are estimated to be declines of 10 to 50 percent from 1980s levels, while short-term trends may be stable or declining slightly (NatureServe 2021). Threats to the species include disturbance and destruction of hibernacula and maternity colonies, as well as timber harvesting that reduces suitable roosting and foraging habitat (NatureServe 2021). Townsend's big-eared bat is a candidate species for state listing and is a state priority species.

The Lease Boundary overlaps core habitat (NatureMapping n.d.); however, the area lacks microhabitat features, such as roosting or hibernacula sites (Horse Heaven Wind Farm, LLC 2022). Townsend's big-eared bats were not recorded during acoustic bat surveys conducted in the Lease Boundary (Horse Heaven Wind Farm, LLC 2022).

Townsend's Ground Squirrel

Townsend's ground squirrel (*Urocitellus townsendii townsendii*) range is limited to southeastern Washington State, south of the Yakima River, west and north of the Columbia River in Benton, Yakima, and Kittitas Counties (NatureServe 2021; WDFW 2023k). The species occurs in natural habitats such as shrub-steppe and grasslands, as well as modified habitat such as pastures, orchards, highway margin, and canal banks (WDFW 2023k). Townsend's ground squirrels provide an important prey source for predators, including ferruginous hawk, as well as affecting soil structure and providing burrows to other species (WDFW 2023k).

Comprehensive population studies have not been conducted; however, long-term trends estimate declines of more than 70 percent (NatureServe 2021). The dominant threat to the species is habitat loss to agriculture and degradation of shrub-steppe habitat from cheatgrass and other invasive plants (WDFW 2023k). Townsend's ground squirrel is a candidate species for state listing and a state priority species.

Townsend's ground squirrel HCAs have been mapped along the ridge located adjacent to the northern perimeter of the Lease Boundary, extending into the Lease Boundary at a few locations (Appendix K,[21] Horse Heaven Wind Farm, LLC 2022). The Lease Boundary overlaps an HCA on the southern perimeter, west of Highway 395. While mapped HCAs are predominantly adjacent to the Lease Boundary, shrubland, grassland, fallow agricultural areas, and road margins may provide habitat for Townsend's ground squirrel. Data presented by Washington's NatureMapping Program indicate that the Lease Boundary overlaps core Townsend's ground squirrel habitat (NatureMapping n.d.). Two Townsend's ground squirrel colonies occur in the northwest portion of the Lease Boundary, and another colony was documented within 350 feet of the Lease Boundary (Horse Heaven Wind Farm, LLC 2022). However, field surveys were limited to a 25-acre parcel of agricultural private land in the southwestern portion of the Lease Boundary and did not cover shrub-steppe or grassland habitat. PHS data report nine occurrences of Townsend's ground squirrel within 2 miles of the Lease Boundary (**Figure 3.6-4**).

Black-tailed Jackrabbit

Black-tailed jackrabbit (*Lepus californicus*) range extends across most of western United States, with Washington State representing the northern edge of its range. In Washington State, core habitat is associated with arid steppe zones in the Columbia Basin (NatureMapping n.d.). Suitable habitat includes sagebrush- and rabbitbrush-dominated landscapes, as well as mixed shrub and grassland areas, where the species tends to select areas with higher shrub cover to obtain shelter (WDFW 2023l).

Population estimates are not available, and the species is considered common across much of its range in the United States (NatureServe 2021). Long-term trends are suggested to be stable across most of its range; however, localized declines in population are expected due to changes in habitat (NatureServe 2021). Threats to the species include habitat loss and mortality from persecution and disease (NatureServe 2021). Black-tailed jackrabbit is a candidate species for state listing and is a state priority species.

Black-tailed jackrabbits could occur in sagebrush and rabbitbrush habitat in the Lease Boundary. The Lease Boundary overlaps core black-tailed jackrabbit habitat (NatureMapping n.d.), though the Applicant reports that the species is uncommon within the Lease Boundary (Horse Heaven Wind Farm, LLC 2022). Black-tailed jackrabbit was not recorded during field studies; however, it should be noted that species-specific surveys were not conducted (Horse Heaven Wind Farm, LLC 2022). PHS data report five occurrences of black-tailed jackrabbit within 2 miles of the Lease Boundary **(Figure 3.6-3**).

White-tailed Jackrabbit

White-tailed jackrabbit (*Lepus townsendii*) range extends across much of western United States, north into southern Canada. In Washington State, the species' range generally consists of arid habitat within the Columbia plateau (WDFW 2023m). Suitable white-tailed jackrabbit habitat includes open bunchgrass habitat, often on hills and plateaus in summer and lower elevation sagebrush valleys in the winter (WDFW 2023m).

Local population estimates are not available; however, global populations are estimated at 10,000 to 1,000,000 individuals. Population trends are not available. Threats to the species include conversion of natural grassland and shrub habitat to agricultural land. White-tailed jackrabbit is a candidate species for state listing and a state priority species.

[21] Tetra Tech. 2021. Modeled Townsend's Ground Squirrel Habitat Concentration Area Maps Prepared in Response to Data Request 2 submitted on August 6, 2021.

Grassland and shrubland within the Lease Boundary could provide suitable habitat for white-tailed jackrabbit. Washington NatureMapping Program mapping identifies marginal habitat in the Lease Boundary (NatureMapping n.d.). White-tailed jackrabbits have not been recorded in the Lease Boundary, though species-specific surveys have not been conducted.

Pronghorn Antelope

Pronghorn antelope range extends across the western United States into southern Canada and northern Mexico. In Washington State, the species was extirpated in the 20th century; however, it was reintroduced on the Yakama Reservation in 2011. Pronghorn antelope inhabit grasslands and shrublands. In winter, herds occupy areas with less snow cover (WDFW 2023n).

The current pronghorn antelope population around the Lease Boundary is estimated at 248 individuals (Fidorra et al. 2019). The population has increased since introduction in 2011, partially due to introduction of additional adults in 2017 and 2019 (Fidorra et al. 2019). Data provided by the Yakima Nation indicates that 15 collared females were observed in 2017 with fawns (Yakima Nation 2023). Pronghorn were initially released on the Yakama Reservation; however, pronghorn groups visually observed by aircraft in 2019 and 2021 show range expansion eastward off the Yakama Reservation (Fidorra et al. 2019; Fidorra and Peterson 2021). Pronghorn antelopes are not listed in Washington State but have been included in this special status species section because of the species' importance to the Yakama Nation and recent re-introduction to the region.

Shrubland, grassland, and agricultural fields in the Lease Boundary provide suitable habitat for pronghorn antelopes. Winter surveys conducted by Fidorra and Peterson (2021) documented groups of pronghorn antelope (approximately three groups, including one larger group) in the Lease Boundary (Tetra Tech 2021b). Pronghorn antelope were recorded in Yakima, Klickitat, and Benton Counties, with larger groups (13 to 24) recorded in several locations in Benton County (Fidorra and Peterson 2021). Tetra Tech (2021b) reports that the majority of groups observed during the 2015 and 2016 survey conducted by the Yakama Nation were recorded in rangeland, followed by cropland, then CRP land. This is supported by data collected in 2021 provided by Yakama Nation that show pronghorn habitat use between Yakama Reserve and the eastern portion of the Lease Boundary (Yakama Nation 2023). Pronghorn antelopes were reported by the Applicant in the Lease Boundary during field surveys (Horse Heaven Wind Farm, LLC 2022).

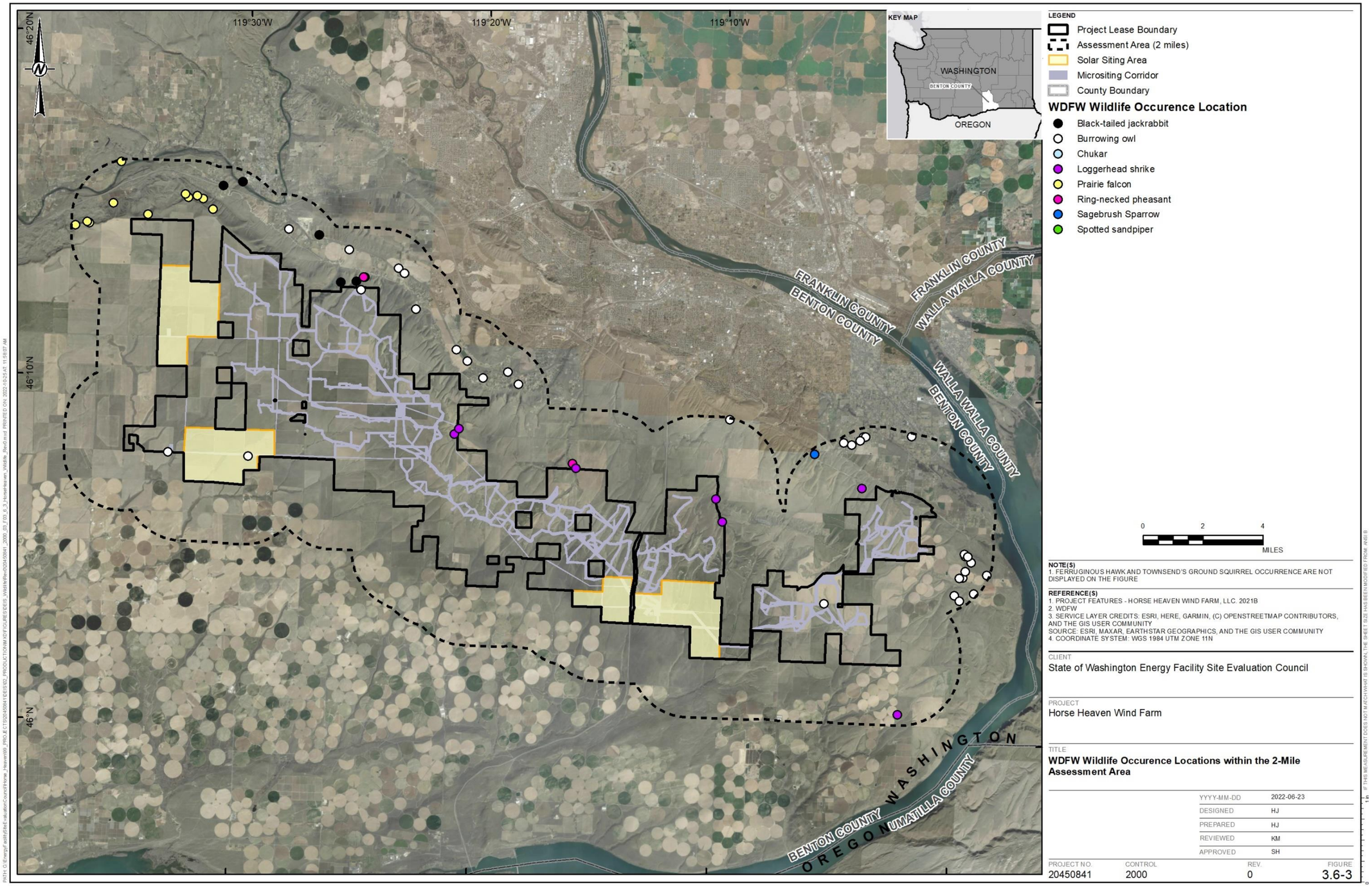

Figure 3.6-3: WDFW Wildlife Occurrence Locations within the 2-Mile Assessment Area

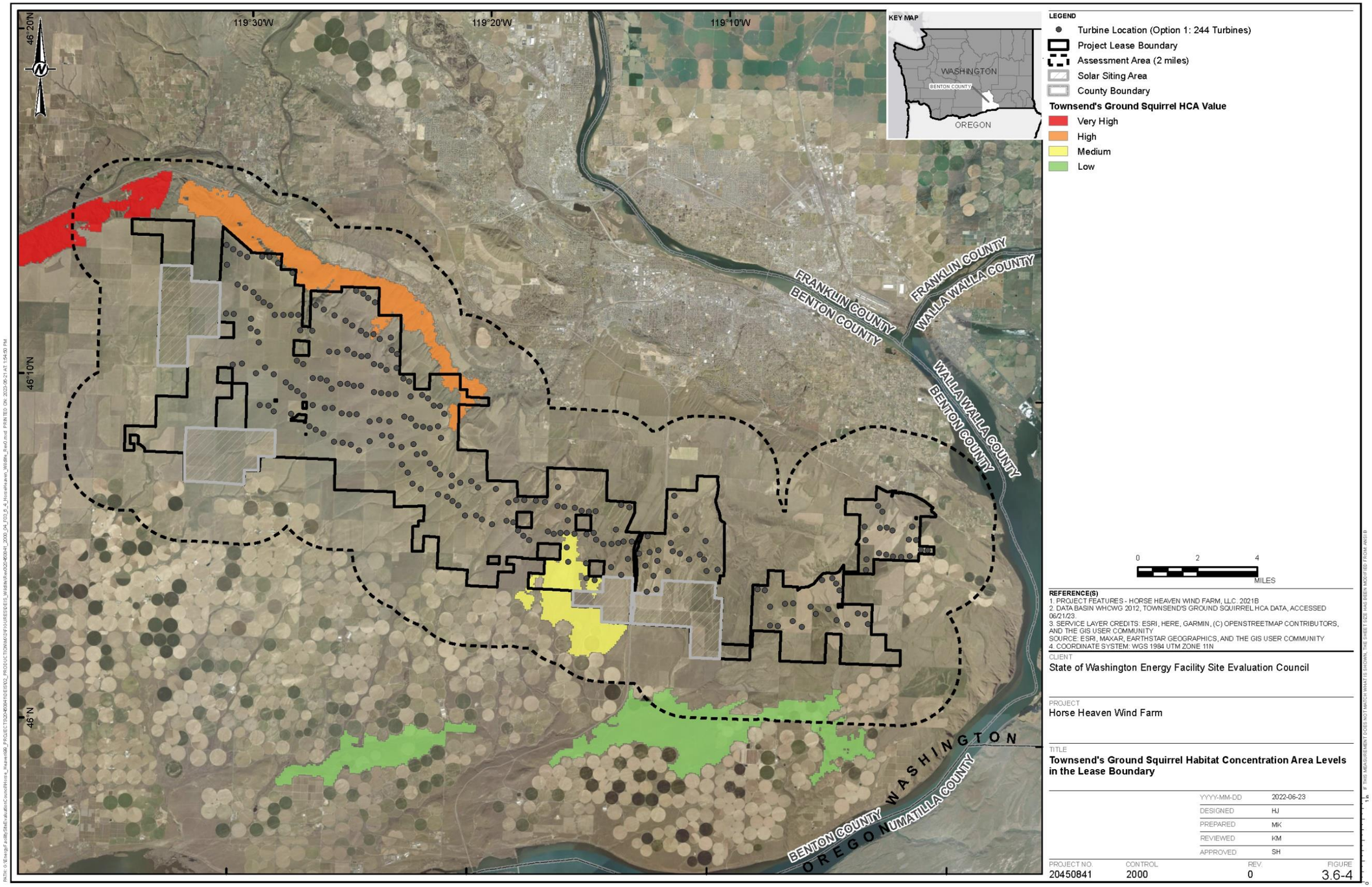

Figure 3.6-4: Townsend's Ground Squirrel Habitat Concentration Area Levels in the Lease Boundary

3.7 Energy and Natural Resources

This section characterizes the availability of existing energy and natural resources within the vicinity of the Lease Boundary for the proposed Horse Heaven Wind Farm (Project, or Proposed Action) and in the State of Washington. Section 4.7 discusses the Project's impact on energy and natural resource availability within the vicinity of the Lease Boundary and in Washington State. This evaluation of energy and natural resources is in accordance with Washington Administrative Code (WAC) 463-60-342 as it considers the impact of the Project's consumption of non-renewable and renewable resources.

Regulatory Setting

WAC 463-60-342 sections (1) through (5) require an applicant for site certification to provide information pertaining to the following:

- Amount required/rate of use and efficiency of consumption of energy and natural resources (WAC 463-60-342[1]).
- Sources of supply, locations of use, types, amounts, and availability of energy or resources to be used or consumed (WAC 463-60-342[2]).
- Non-renewable resources that will be used, made inaccessible or unusable (WAC 463-60-342[3]).
- Conservation measures and/or renewable resources which will or could be used (WAC 463-60-342[4]).
- Scenic resources which may be affected (WAC 463-60-342[5]).

Additional Washington State regulations pertaining to energy and natural resources include:

- Washington State Clean Energy Transformation Act (CETA) (Chapter 19.405 RCW) sets targets for reducing greenhouse gas emissions and establishes energy efficiency standards for buildings and appliances. CETA states that it is the policy of the state to eliminate coal-fired electricity, transition the state's electricity supply to one hundred percent carbon-neutral by 2030, and one hundred percent carbon-free by 2045 (Washington State Legislature 2019).
- Washington State Energy Independence Act (Chapter 19.285 RCW) requires electric utilities serving at least 25,000 retail customers to use renewable energy and energy conservation over a 10-year period and set two-year targets.
- Washington State Growth Management Act (Chapter 36.70A RCW) requires cities and counties to plan for growth while conserving natural resources and protecting critical areas like wetlands and forests.

Additional Washington State regulation pertaining to water resources includes the Revised Code of Washington 90.03, which establishes water rights appropriation standards and procedures. The State of Washington does not require a water rights permit if the water originates from a permitted utility (Ecology n.d.).

Benton County Energy Code (BCC Chapter 3.14) establishes minimum standards for the design and construction of new buildings to promote energy efficiency.

Benton County Public Utility District (Benton PUD) Energy Efficiency Rebate Program offers incentives for commercial and residential customers who develop energy efficiency measures and upgrades to their businesses and homes.

3.7.1 Affected Environment

Benton County is in southeastern Washington State. The Columbia River bounds Benton County to the north, east, and south, while Klickitat and Yakima Counties bound Benton County to the west. The county is predominantly rural and agricultural in nature, with unincorporated areas making up most of the jurisdiction. The Lease Boundary is south of the Tri-Cities: Kennewick, Pasco, and Richland, Washington.

3.7.1.1 Power Generation and Demand

Regional Power Generation

Natural resources that contribute to power generation in Washington State can be broken into two categories: renewable and non-renewable, also referred to as conventional. Non-renewable supplies of energy are limited to the amounts that can be mined or extracted from the earth. Renewable energy, by contrast, is power from sources that are naturally replenishing. There are currently 106 conventional and renewable energy power plants operating in Washington. Washington's energy providers maintain the capacity to produce upwards of 92,366 thousand megawatt (MW) hours per year (DOE n.d.). In addition to its power-generating capacity, the State of Washington also contains five crude oil refineries that can process almost 652,000 barrels of crude oil per day (EIA 2022). This section provides a general summary of Washington's current power generation portfolio.

Non-Renewable Energy

Non-renewable energy sources include petroleum, hydrocarbon gas liquids, natural gas, coal, and nuclear energy. Currently, 21 conventional power plants operate in Washington. The combined "nameplate" generating capacity of Washington's conventional power plants is 6,990 MW (DOE n.d.). Nameplate capacity is the amount of electricity a generator can produce when running at its maximum designed output. Washington's non-renewable electricity-generating portfolio includes the following:

- **Natural Gas:** In 2019, natural gas was the second-largest source of in-state net power generation and was responsible for producing 15 percent of Washington's total electricity. In 2019, electricity produced by natural gas increased 9 percent from 2018. Washington's utilities and energy producers import natural gas because the state maintains no petroleum or natural gas reserves (EIA 2021).
- **Nuclear:** Nuclear power supplied about 8 percent of Washington's net electricity generation in 2019. The Columbia Generating Station nuclear power plant in south-central Washington is the state's fifth-largest power-producing facility by capacity and has been in operation since 1984. By resource, nuclear power represents Washington's third-largest source of energy (EIA 2021).
- **Coal:** Energy produced from coal represents Washington's fourth-largest source of energy. The TransAlta Centralia coal-fired power plant is the state's third-largest electricity-producing facility by capacity. In 2019, the facility produced less than 7 percent of Washington's electricity. In 2020, TransAlta Centralia retired one of its two coal-fired units, and the company plans to retire its last remaining operational unit in 2025. Although Washington has upwards of 700 million tons of recoverable coal reserves, the last coal mine in the state closed in 2006 (EIA 2021).

Renewable Energy

Currently, 85 renewable power plants operate in Washington, with a combined generating nameplate capacity of 23,443 MW. Other than hydroelectric power, renewable resources accounted for almost 8 percent of the state's

electricity generation in 2019 (EIA 2021). The following describes the status of renewable energy production in Washington:

- **Hydroelectric:** Washington is the nation's largest producer of hydroelectric power. Hydroelectric power typically accounts for more than 66 percent of Washington's electricity generation. Eight of the 10 highest electricity-producing facilities in Washington are hydroelectric power plants (EIA 2021).
- **Wind:** In 2019, wind accounted for about 80 percent of the state's nonhydroelectric renewable electricity. Wind has contributed 6 percent or more to the state's electricity production since 2013 (EIA 2021).
- **Solar:** Electricity generation from solar energy in Washington remains small. Almost all of the electricity produced from solar energy comes from rooftop and other small-scale (less than 1 MW) photovoltaic power installations (EIA 2021).
- **Biofuels:** Biofuels are transportation fuels such as ethanol and biomass-based diesel fuel that are made from biomass materials (EIA 2020). Washington has several biogas and biofuel projects, such as:
  - Anaerobic digesters that capture methane from dairy cow waste to fuel electricity generation
  - Production of 114 million gallons of biodiesel fuel per year from two biofuel facilities. This equals about 20 percent of Washington's annual consumption of diesel fuel (EIA 2021)

Energy Infrastructure within the Project Vicinity

The following is a summary of the existing energy infrastructure within the vicinity of the Lease Boundary:

- The Nine Canyon Wind Project is just southeast of Kennewick in south-central Benton County. The Nine Canyon Wind Project is less than 1 mile from the Lease Boundary at its nearest point. The project includes 63 wind turbines constructed in three phases between 2002 and 2008. The wind farm has a nameplate generating capacity of 95.9 MW of electricity (Energy Northwest n.d.).
- Two Bonneville Power Administration high-voltage transmission lines intersect the Lease Boundary. The McNary-Franklin No. 2 Transmission Line runs northeast to southwest through the east-central portion of the Lease Boundary. The McNary-Badger Canyon No. 1 Transmission Line runs north to south, adjacent to the western portion of the Lease Boundary (Horse Heaven Wind Farm, LLC 2022).
- There are numerous existing transmission lines and substations located north of the Lease Boundary that traverse the area south of the Tri-Cities east to west (Horse Heaven Wind Farm, LLC 2022).

Local Energy and Natural Resource Providers

Horse Heaven Wind Farm, LLC (Applicant) has identified the following utilities and suppliers as potential providers of energy and natural resources for the Project:

- **Public Utility District (PUD) No. 1 of Benton County**: Benton PUD's business operations include energy purchases, generation, transmission, distribution, and sale of electricity. Benton PUD's operations cover approximately 939 square miles of Benton County. Benton PUD's properties include 37 substations, approximately 91 miles of 115-kilovolt transmission line, and 1,590 miles of distribution lines (Benton PUD 2021).

- **Benton Rural Electric Association (REA)**: Benton REA is a not-for-profit, consumer-owned electric cooperative. Benton REA currently serves more than 11,000 members in Benton, Yakima, and Lewis Counties in Washington. The Lease Boundary is located within Benton REA District 3 (Benton REA 2022).
- **City of Kennewick Utility Services Division of Public Works**: Kennewick is responsible for providing public water service, utility management, and water system development within its water service boundary. Kennewick provides water service to approximately 80,986 people throughout its water service area boundary, extending beyond its corporate limits (City of Kennewick 2017).

Regional Energy Demand

Washington benefits from access to abundant, low-cost energy originating from renewable energy resources. Washington's net generation often exceeds the state's electricity demand. This allows energy producers to send excess power to the Western Interconnection (EIA 2021). Western Interconnection is a network consisting of approximately 136,000 miles of transmission lines. It spans 1.8 million square miles in all or part of 14 states, the Canadian provinces of British Columbia and Alberta, and the northern part of Baja California in Mexico and serves over 80 million people (Western Electricity Coordinating Council n.d.).

Table 3.7-1 shows the forecast electricity demand for the four states (Washington, Oregon, Idaho, and Montana) that make up the Northwest Power and Conservation Council, compared to 2021's expected use. The Northwest Power Act of 1980 authorized the establishment of the Northwest Power and Conservation Council with the intent of conserving natural resources and assuring reliable access to energy throughout the region. As shown in the table, the region's energy needs in 2041 are anticipated to average 21,532 to 27,304 MW for the entire year (Northwest Power and Conservation Council 2021). This suggests that by 2041, the region could see anything from a reduction in demand for electricity to a 22.5 percent increase in demand.

Table 3.7-1: Pacific Northwest Forecast Range of Electricity Use in Average Megawatts by Sector

Sector	Expect 2021 Use	2041 Forecast (Low Estimate)	2041 Forecast (Medium Estimate)	2041 Forecast (High Estimate)
Residential	8,148	8,674	8,860	9,049
Commercial	5,938	5,833	6,202	6,673
Industrial	6,186	4,147	5,892	7,541
Transportation	67	733	816	904
Street Lighting and Water Services	271	252	280	303
Irrigation	1,016	941	1,164	1,465
Data Centers	657	952	1,179	1,369
Total	22,283	21,532	24,393	27,304

Source: Northwest Power and Conservation Council 2021

3.7.1.2 Water Utilities and Demand

Sections 3.4 and 4.4 evaluate the Project's potential impacts on water resources. There are no public water supply wells within the Lease Boundary (Horse Heaven Wind Farm, LLC 2022). The Applicant has indicated that the City of Kennewick would supply water for the Project's construction stage. The Kennewick Utility Services

Division of Public Works is responsible for the city's water treatment plant, wastewater treatment plant, wastewater collection, and water distribution programs within its jurisdiction.

Since 2007, Kennewick has experienced decreasing per-capita water demand. Between 2007 and 2014, Kennewick's water service area population increased by more than 19 percent, but the volume of water supplied to the system only increased by approximately 5 percent. Kennewick has attributed the decrease in demand to water use efficiency practices and the repair of water system leaks.

Overall, water demand within Kennewick's system is expected to increase by approximately 33 percent by the end of 2035. Kennewick's existing water sources are sufficient to meet the projected demands of the system through 2025. Beyond 2025, additional source capacity will be needed to meet Kennewick's water demands.

Kennewick completed construction of an aquifer storage and recovery (ASR) well in 2014. Ongoing testing of the ASR well and the aquifer's storage capacity has been performed since the well was constructed. If the ASR well becomes fully developed and receives approval from regulatory agencies, it may provide a maximum of 2,080 gallons per minute. Even with the addition of the ASR well, however, Kennewick is projected to have a slight source capacity deficiency by 2035 (City of Kennewick 2017).

3.7.1.3 Construction Aggregate Resources and Demand

Sand, gravel deposits, and bedrock may be mined or quarried to produce raw materials known as aggregates. Aggregates are necessary for making ready-mixed concrete, asphalt, and many other building materials. Aggregates are required to build and maintain infrastructure such as:

- Roads, highways, and bridges
- Homes, buildings, and schools
- Public works projects

Construction aggregate is a non-renewable resource composed of sand and gravel. In 2017, the State of Washington was listed among the top 10 state producers of construction aggregate. Mines within Washington produced 33,300 thousand metric tons of construction sand and gravel from 206 active pits and dredging operations (USGS 2020). In 2020, demand for aggregate in Washington exceeded 500 million tons, and forecasts predict that by 2030, aggregate demand could exceed 1,500 million tons (DNR 2022).

Concrete is also a non-renewable resource that is usually a mixture of aggregates and paste. The aggregates are sand and gravel or crushed stone, and the paste consists of water and cement. Typically, concrete is a mixture of about 10 to 15 percent cement, 60 to 75 percent aggregate, and 15 to 20 percent water. There are several active aggregate mining operations within the vicinity of the Lease Boundary. The nearest quarry to the Lease Boundary is in Kennewick, Washington. Ash Grove in Seattle, Washington, is the only cement plant within the state. Ash Grove makes 33 percent of all the cement used in Washington. In 2015, the State of Washington consumed 1.8 million metric tons of cement (Portland Cement Association 2016, 2023).

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3.8 Land and Shoreline Use

This section describes existing land use and shoreline resources, as well as the regulatory setting, for the proposed Horse Heaven Wind Farm (Project, or Proposed Action) vicinity. The Project vicinity includes the areas 4 miles south/southwest of the City of Kennewick, Washington, and the larger Tri-Cities urban area along the Columbia River. The Project's alignment with relevant land use documents and ordinances and adopted state, county, and local plans, goals, and policies is presented in **Appendix 3.8-1**. An evaluation of proposed changes to existing land use is presented in Section 4.8.

Regulatory Setting

Comprehensive land use plans specify the types of present and future land development that can occur within a specified area. In most cases, the preparation of comprehensive land use plans occurs through a public participation process. Once the plans are finalized, publicly elected officials approve them. The intent of this process is to capture local values and attitudes toward future development. Within the State of Washington, land use regulations and zoning ordinances vary by local government jurisdiction. For instance, Benton County's comprehensive land use plan and zoning ordinances only apply to the unincorporated areas and communities within its geographical boundaries. Similarly, the comprehensive land use plans prepared by the incorporated communities only apply to land use management within their jurisdictional boundaries.

The Washington State Growth Management Act (GMA) (Revised Code of Washington [RCW] 36.70A.040) requires that cities and counties adopt comprehensive, long-term land use plans for physical development within their jurisdictions. The comprehensive land use plans include a land use element that establishes the desired pattern of appropriate land use, as well as policies and guidelines for the development of those uses. The land use element designates the proposed general distribution and general location and extent of the uses of land, where appropriate, for the following purposes:

- Agriculture and timber production
- Housing
- Commerce and industry
- Recreation and open spaces
- General aviation airports
- Public utilities and facilities
- Other land uses

Local governments and their resource managers use local zoning ordinances, specific plans, and maps to implement the land use element within a comprehensive land use plan.

Similar to the State of Washington's requirements for comprehensive land use plans, the Shoreline Management Act (SMA) of 1971 (RCW 90.58) requires all counties and most towns and cities with shorelines in Washington to develop and implement Shoreline Master Programs (SMP). The SMA applies to all 39 Washington counties and about 250 towns and cities with stream, river, lake, or marine shorelines. Under the SMA, SMPs must contain a public access element, including provisions for public access to publicly owned areas. The SMA also requires that applicable communities include an element for preserving and enlarging recreational opportunities. The

Washington State Department of Ecology has adopted the Shoreline Master Program Guidelines (Chapter 173-26 Washington Administrative Code), which require local government reviews and updates of SMPs.

3.8.1 Affected Environment

Benton County is in southeastern Washington State. The Columbia River bounds Benton County to the north, east, and south, while Klickitat and Yakima Counties bound Benton County to the west. Benton County is located at the confluence of the Columbia, Yakima, and Snake Rivers. The Yakima River runs through the middle of the county to its confluence with the Columbia River in Richland, Washington. The county also features several mountains and ridges such as the Horse Heaven Hills, Rattlesnake Mountain, Badger Mountain, and Candy Mountain (Benton County 2020).

Benton County comprises a total of 1,115,673 acres. The U.S. Department of Energy's Hanford Reservation occupies approximately 24 percent of the landmass in Benton County. The unincorporated areas of the county are predominantly rural and agricultural in nature, with unincorporated areas making up most of the county. Unincorporated communities fall under the county government's jurisdiction. The incorporated cities within Benton County include Benton City, Kennewick, Prosser, Richland, and West Richland (Benton County 2022). **Table 3.8-1** illustrates the distribution of land use types in Benton County. Several unincorporated communities fall under the county government's jurisdiction.

Table 3.8-1: Land Use Types and/or Designation and Distribution in Benton County

Land Use Type and/or Designation	Corporation	Acres	Square Miles	Percentage
Cities and Urban Growth Areas	Incorporated	72,245	113	6.58
Hanford Site	Federal Lands (Not Applicable)	266,351	416	24.27
Hanford Reach	Federal Lands (Not Applicable)	12,443	19	1.13
GMA Agriculture	Unincorporated	647,107	1,011	58.96
Open Space Conservation	Unincorporated	2,108	3	0.19
Public	Unincorporated	15,163	24	1.38
Rural Lands 1	Unincorporated	1,182	2	0.11
Rural Lands 1–3	Unincorporated	318	0	0.03
Rural Lands 5	Unincorporated	74,039	116	6.75
Rural Lands 20	Unincorporated	1,813	3	0.17
Community Center	Unincorporated	500	1	0.05
Community Commercial	Unincorporated	26	0	0.00
Interchange Commercial	Unincorporated	325	1	0.03
General Commercial	Unincorporated	202	0	0.02
Light Industrial	Unincorporated	1,333	2	0.12
Heavy Industrial	Unincorporated	2,344	4	0.21
Total Unincorporated Area	Not Applicable	746,460	1,166	68.01
Total County Area	Not Applicable	1,097,499[(a)]	1,715	100

Source: Benton County 2020
Note:
[(a)] An acreage discrepancy exists in Benton County Comprehensive Plan for Total County Area
GMA = Washington State Growth Management Act

Project Geography

The Project would consist of a renewable energy generation facility within the Horse Heaven Hills area of unincorporated Benton County, Washington. The Project's Lease Boundary is located approximately 4 miles south of the Tri-Cities urban area, along the Columbia River. The cities of Kennewick, Pasco, and Richland, Washington, make up the Tri-Cities area. The geographical extent of the Project would be as follows:

- The Lease Boundary encompasses approximately 72,428 acres.
- The Project's Wind Energy Micrositing Corridor encompasses 11,850 acres and consists of the area where the turbines and supporting facilities would be located.
- The Solar Siting Areas encompass 10,755 acres located within the Lease Boundary.
- Approximately 908 acres within the Project's Wind Energy Micrositing Corridor and Solar Siting Areas overlap.
- The elevation of the Lease Boundary ranges from 604 to 2,051 feet above mean sea level (Horse Heaven Wind Farm, LLC 2022).

The topography within the Lease Boundary is dominated by rolling hills bisected by meandering canyons, some of which contain ephemeral (seasonal) or intermittent drainages. There are no major rivers or other perennial streams within the Lease Boundary (Heaven Hills Wind Farm, LLC 2022).

3.8.1.1 Land Ownership within Study Area

The Lease Boundary serves as the primary study area for land ownership; however, land uses adjacent to the Lease Boundary can provide context for consistency evaluations. Existing land use within 1 mile of the Lease Boundary predominantly comprises agricultural lands, agricultural support facilities, and the Nine Canyon Wind Project. In the 2022 Application for Site Certification (ASC) for the Project, Appendix F presents a comprehensive list of Lease Boundary parcels, owners, and acres and a legal description of affected lands. The 72,428-acre Lease Boundary equates to approximately 6.5 percent of Benton County's territory and 11 percent of the land use designation "GMA Agriculture." The 2022 ASC indicates that Turbine Option 1 would involve more land disturbance than Turbine Option 2. The Project's total land disturbance of 6,869 acres under Turbine Option 1 is equal to approximately 1 percent of Benton County's lands designated as GMA Agriculture and 0.6 percent of the county's total territory.

According to the 2022 ASC, most of the Lease Boundary (approximately 69,556 acres) is privately owned and actively managed for dryland agriculture and livestock grazing. Among the private lands that make up the Lease Boundary, multiple parcels have been enrolled in the U.S. Department of Agriculture's Conservation Reserve Program (CRP). The acreage currently enrolled in the CRP within the Lease Boundary is unknown. Additionally, the Lease Boundary includes 2,739 acres in the state trust system managed by the Washington State Department of Natural Resources (DNR). The Lease Boundary includes all or part of five DNR-managed parcels that are state trust lands. The Applicant proposes the following actions on DNR-managed parcels:

- Three of the DNR-managed parcels would include turbines and supporting facilities.
- One DNR-managed parcel would be used for supporting facilities.
- One DNR-managed parcel is a possible site for the Project's County Well Road solar component (Horse Heaven Wind Farm, LLC 2022).

Conservation Reserve Program Lands

The CRP is a federally funded voluntary program that contracts with agricultural producers so that environmentally sensitive agricultural land is not farmed or ranched but instead devoted to conservation benefits. The U.S. Department of Agriculture Farm Service Agency provides participants with rental payments and cost-share assistance. Contract duration is between 10 and 15 years (USDA 2019). The Agricultural Act of 2014 (Public Law 113-79) allows landowners the opportunity to opt out of their CRP contracts unless the land is supporting enhanced wildlife habitat, is protecting sensitive aquatic and environmental resources, or has specifically been contracted in a manner to prevent a landowner from opting out.

State-managed Lands

The Washington Commissioner of Public Lands guides DNR's management of state-owned lands. The DNR's land policies come from numerous sources, such as the federal Enabling Act of 1889, the state constitution, state statutes, and various boards, councils, and commissions. The lands that the DNR manages on behalf of Washington State citizens and beneficiaries fall into three main categories: state trust lands, state-owned aquatic lands, and state natural areas (DNR 2021).

State Trust Lands

State trust lands managed by the DNR are different from other publicly managed lands in that they must be used to generate revenue for their designated beneficiaries, such as public schools, universities, and correctional institutions. The DNR currently manages 3 million acres of these federally granted trust lands. Classes of actions that the DNR approves for revenue-generating activities include:

- Harvesting timber, biomass byproducts, and other forest products
- Leasing lands for agricultural purposes, such as orchards and vineyards, irrigated agriculture, dryland crops, and grazing
- Leasing communications sites, mining and mineral leases, wind farms and energy production, commercial properties, and rights-of-way (DNR 2021)

In addition to earning income, activities on trust lands are managed to protect habitat for native plant and animal species, provide clean and abundant water, and offer diverse public recreation opportunities. **Figure 3.8-1** illustrates the location of DNR-managed state trust lands within the Lease Boundary and Project vicinity, as well as other publicly owned lands within the region.

3.8.1.2 Benton County Comprehensive Plan

Planning in Benton County's unincorporated and urban areas is guided by the Benton County Comprehensive Plan. A discussion on the relevant land use policies and goals from the Benton County Comprehensive Plan that apply to the review of the Project is presented Section 3.8.2. In addition to providing planning guidance for unincorporated areas, the plan addresses regional planning issues and coordinates growth among all jurisdictions. It also coordinates land use, transportation, and capital facilities by focusing on planning, scheduling, financing, and construction provisions to provide the identified levels of service in advance of development or upon demand.

All development regulations in Benton County are required to be consistent with the Benton County Comprehensive Plan. These include, but are not limited to, the zoning code, subdivision code, Critical Areas

Ordinance, SMP, and permit review processes. For instance, all codes related to traffic and utilities implement the comprehensive land use plan's goals and policies.

The Benton County Comprehensive Plan's purpose and intent is to provide for local needs relating to the use of land and infrastructure, including the protection of property and water rights and, in so doing, meet the state's minimum planning law requirements. In accordance with RCW 36.70A.070, the comprehensive land use plan includes the following required elements: land use, rural, housing, transportation, capital facilities, and utilities.

The land use element presents the framework within which future growth and development will occur consistent with community objectives and the requirements of law. Consistent with GMA requirements, the land use element designates the proposed general distribution, location, and extent of land uses for agriculture, timber production, housing, commerce, industry, recreation, open spaces, general aviation airports, public utilities, public facilities, and other functions, as applicable, and describes development densities and projections for future population growth (Benton County 2020).

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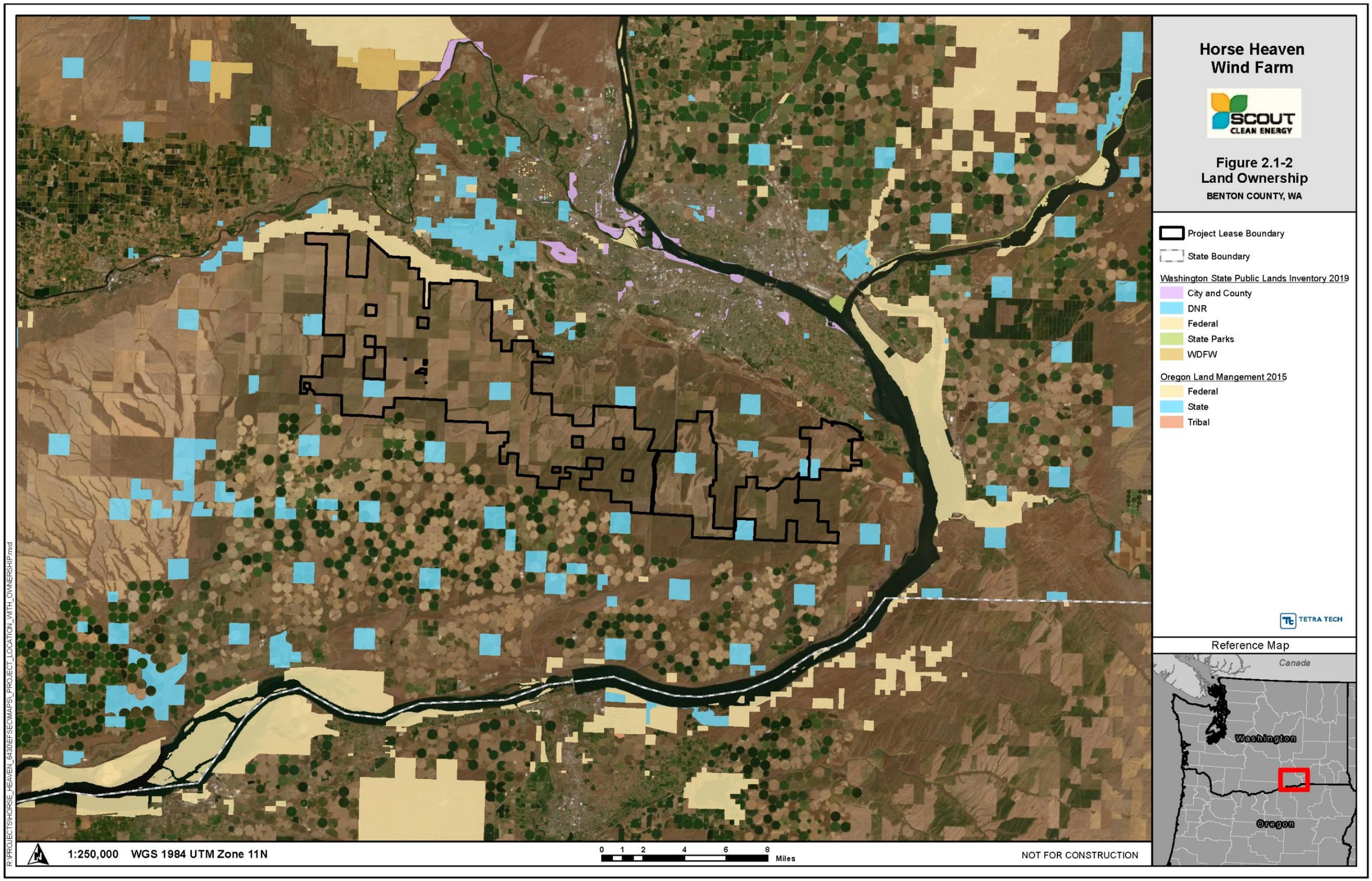

Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.8-1: Land Ownership within Project Vicinity

3.8.1.3 Benton County Shoreline Management Program

Benton County adopted an SMP update in 2021 pursuant to the SMA. Benton County prepared the SMP to align with the goals and policies outlined in the Benton County Comprehensive Plan. The SMP is a set of goals, policies, and regulations pertaining to shoreline development in the county. The SMA encourages reasonable and appropriate development of shorelines, with an emphasis on water-oriented uses that require a shoreline location and support economic development. The SMP's intent is to protect "the natural character of the shorelines, the land, vegetation, wildlife, and shoreline environment" (Benton County 2021a). Finally, the SMP "promotes public access and provides opportunities to enjoy views and recreational activities in shoreline areas" (Benton County 2021a).

Benton County's shoreline jurisdiction encompasses 330 miles of the Columbia and Yakima Rivers. The total acreage of upland shorelands regulated by Benton County's SMP is 14.93 square miles (Benton County 2021a). In accordance with the SMA, the Benton County SMP addresses the following:

- The Yakima and Columbia Rivers
- Land within 200 feet of the ordinary high-water mark of the Yakima and Columbia Rivers
- The Yakima and Columbia River floodways
- The contiguous 100-year floodplain extending up to 200 feet inland of the Yakima and Columbia River floodways
- Wetlands associated with the Yakima and Columbia Rivers (Benton County 2021a)

Fifty-eight percent of Benton County's shorelands occur along the Columbia River, and the remaining 42 percent occur along the Yakima River. Both the Columbia and the Yakima Rivers within Benton County are classified as Shorelines of Statewide Significance. This means that, under Washington State law, Benton County must apply specific shoreline management preferences and priorities to the Yakima and Columbia Rivers. Federal lands make up approximately 35 percent of the area within the county's shoreline jurisdiction (Benton County 2021a).

The Yakima River passes north of the western portion of the Lease Boundary, approximately 1.5 miles away at its closest location to the Project site. The Yakima River flows eastward to its confluence with the Columbia River near Richland, Washington. The Columbia River passes north, east, and south of the eastern portion of the Lease Boundary. At its closest location, the Columbia River is approximately 1.3 miles from the Lease Boundary. The Columbia River bends around the eastern portions of the Lease Boundary and ultimately flows west toward the Pacific Ocean (Horse Heaven Wind Farm, LLC 2022).

3.8.1.4 Specific Land Uses within the Study Area

Land use designations are property-specific and identify the type and intensity of land uses that a comprehensive land use plan allows. The Benton County Comprehensive Plan (2020 update) identifies 13 designations within unincorporated Benton County. Of the 13 land use designations, the entire Lease Boundary occurs within the GMA Agriculture designation and the corresponding zoning ordinance GMA Agriculture. **Table 3.8-2** provides a description of land use designation and corresponding zoning ordinance. **Figure 3.8-2** shows the Lease Boundary and the Benton County Comprehensive Plan land use designations for the Project vicinity.

Benton County has adopted zoning ordinances and maps necessary to bring the county's zoning code into compliance with the goals and policies of the adopted Benton County Comprehensive Plan. Benton County

prepared its zoning ordinances and zoning maps to implement the community vision and future as expressed by the public in the Benton County Comprehensive Plan. **Figure 3.8-3** illustrates the zoning ordinances for the Lease Boundary and Project vicinity. Benton County Code zoning ordinances and maps classify land into "Districts" according to the land use designations in the adopted comprehensive plan. The effect of zoning is to provide stability and certainty for future development by:

- Implementing land use maps by grouping compatible land uses and excluding incompatible land uses
- Identifying areas of investment and assisting economic sector planning
- Enabling government to assess the need for and fund capital and public service projects
- Enabling public utilities to calculate potential demand and plan capital facilities
- Providing assurances to homeowners that their property values will be protected

Table 3.8-2: Lease Boundary Land Use Designations and Corresponding Zoning Ordinance

Land Use Designation	Description	Corresponding Zoning Ordinance	Zoning Ordinance
GMA Agriculture	This land use includes agricultural land such as dryland and irrigated land identified by Benton County based on the criteria established by the GMA. A GMA Agricultural District zone conserves agricultural lands by establishing a 20-acre minimum parcel size and limits the range of other land uses to those dependent on, supportive of, ancillary to, or compatible with agricultural production as the principal land use.	GMA Agriculture District	At the time (February 8, 2021) of 2021 ASC submission to EFSEC, Benton County Code 11.17.030 through 11.17.070 specified wind farms and major solar-generating facilities as land uses that may be permitted for lands zoned GMA Agricultural District with approval of a conditional use permit by the Hearings Examiner.[(a)]

Sources: Benton County 2020, 2021c
Note:
[(a)] Currently, Benton County Code prevents the Benton County Council from issuing a Conditional Use Permit for new wind and solar farms within a GMA Agricultural District. Table 3.8-2A of Appendix 3.8-1 presents the applicable Benton County Code at the time the 2021 ASC was submitted on February 8, 2021.
ASC = Application for Site Certification; EFSEC = Washington Energy Facility Site Evaluation Council; GMA = Washington State Growth Management Act

Agriculture – Benton County

Benton County contains agricultural lands of long-term commercial significance. RCW 36.70A.030(3) characterizes agricultural lands of long-term commercial significance as land with the following characteristics:

- Growing capacity
- Productivity
- Soil composition of the land for long-term commercial production

Washington Administrative Code 365-190-050(3) states that “lands should be considered for designation as agricultural resource lands based on three factors:”

- Land specifically is not characterized by urban growth
- Land is used or is capable of being used for agricultural production
- Land has long-term commercial significance for agriculture

Benton County’s agricultural economy is diverse in crops grown and livestock raised. The largest crop type is wheat and wheat fallow, while other extensive crop types include corn, grapes, potatoes, apples, and onions. Benton County ranks third in Washington State by market value of agricultural products sold (crops and livestock), totaling about $923.2 million in value (Benton County 2017).

Table 3.8-3 shows the breakdown of lands designated as GMA Agriculture in Benton County. Agricultural lands in Benton County are primarily used for dryland agriculture (47 percent), with the remaining areas used for irrigated agriculture (40 percent) and rangelands (13 percent). When considering rural “other,” agricultural land type by percentage changes slightly with the amount of rangeland increasing and dryland agriculture decreasing. The rural “other” land use includes a mix of agricultural and non-agricultural uses (BERK 2016). The following describes the three main agricultural land uses in Benton County:

- **Dryland Agriculture**: Dryland agriculture occurs in geographic areas where biological productivity is normally limited by available soil moisture. Farmers overcome the lack of soil moisture through management techniques such as summer fallow. The widespread practice of summer fallow stores moisture for two years for use by a single crop. Farmers alternate between crop and non-crop years, and control weeds during the non-crop years through either mechanical or chemical methods (WSU 1992).
  - Within Benton County, dryland agriculture primarily occurs in the Horse Heaven and Rattlesnake Hills areas.
  - Economically viable dryland agriculture typically requires thousands of acres (Benton County 2020).
- **Irrigated Agriculture**: The purpose of irrigation is to supplement natural precipitation so that the moisture requirements of crops are met. Limited water resources prevent irrigation development in large areas of Washington State (WSU 1992).
- **Rangeland**: Range and pasture lands are diverse types of land where the primary vegetation produced is herbaceous plants and shrubs. These lands provide forage for beef cattle, dairy cattle, sheep, goats, horses and other types of domestic livestock. Also, many species of wildlife, ranging from big game such as elk to butterflies and nesting song birds such as meadowlarks, depend on these lands for food and cover. Native prairies are also considered part of these landscapes (NRCS n.d.).

Table 3.8-3: GMA Agriculture Type and Designated Acreage in Benton County

GMA Agriculture Land Type	Countywide Total Acres	Percentage of Total[a]
Dryland	304,839	39.65
Irrigated	296,432	38.56
Rangeland	112,190	14.59
Rural "other"	55,275[b]	7.19
Total Agriculture	768,736	

Sources: BERK 2016; Benton County 2020
Notes:
[a] Minor discrepancies in the total sum are due to rounding
[b] Includes agricultural and non-agricultural uses
GMA = Growth Management Act

American Viticultural Areas and Wine Industry in Washington

Washington is the second-largest wine-producing state in the United States, with more than 1,000 wineries making over 17 million cases of wine annually. Wineries in Washington contribute more than $8 billion in annual in-state economic impact. Within Washington State, agricultural land acreage dedicated to wine grape crops increased from approximately 50,000 acres in 2013 to approximately 60,000 acres in 2022. The number of wineries in Washington State increased from more than 600 wineries in 2014 to more than 1,000 wineries in 2022. The Washington State Wine Commission estimates that, on average, four new wineries are opened in Washington State each month (Washington Wine 2023a).

American Viticultural Areas (AVA) are geographically defined wine-grape-growing regions in the United States. The Alcohol and Tobacco Tax and Trade Bureau defines AVA boundaries. AVAs are established at the request of wineries, vineyards, or other petitioners. The State of Washington is home to 20 AVAs, each with distinct characteristics such as size, weather, soil type, and crop variety. This variation is a key factor that contributes to the success of numerous grape varieties in Washington (Washington Wine 2023b).

The Columbia Valley, Yakima Valley, Horse Heaven Hills, Goose Gap, Red Mountain, and Candy Mountain AVAs overlap with Benton County jurisdiction. Of these six AVAs, the Project Lease Boundary overlaps the Columbia Valley (entire Project Lease Boundary), Horse Heaven Hills (almost the entire Lease Boundary), and Yakima Valley (very small areas of the Project Lease Boundary). The AVAs intersected by the Project Lease Boundary are shown in **Figure 3.8-4** (Washington Wine 2023b).

The Columbia Valley AVA, established in 1984 and encompassing 59,234 acres of land under vine, is the largest AVA in Washington State and accounts for almost 99 percent of Washington State's wine grapes. Several other smaller AVAs (including Yakima Valley and Horse Heaven Hills AVAs) are located within Columbia Valley AVA (sub-appellations areas). Wine varieties in Columbia Valley AVA include riesling, merlot, chardonnay, and syrah. The following describes the Horse Heaven Hills and Yakima Valley AVAs:

- The Horse Heaven Hills AVA is among Washington's warmer growing regions. Because of the arid and semi-arid continental climate, irrigation is required in order to grow wine grapes in this AVA. Most vineyards in the Horse Heaven Hills are planted on south-facing slopes, providing extended sun exposure (Washington Wine 2023b). The Horse Heaven Hills AVA was established in 2005 and encompasses 17,082 acres of land

under vine. Wine varieties in this AVA include cabernet sauvignon, merlot, chardonnay, Riesling, and syrah. This AVA produces about 25 percent of the state's grapes.

- The Yakima Valley AVA, the state's first federally recognized AVA, was established in 1983. This AVA encompasses 18,580 acres of land under vine. Because of its diverse climate, soil conditions, and elevations, this region produces variety ranges of grapes suitable for chardonnay, merlot, carbernet sauvignon, Riesling and syrah wines.

There are approximately 25 wineries located north of the Project Lease Boundary that are open to the public. The majority of these wineries are located northeast of Benton City and southeast of West Richland. The closest wineries to the Lease Boundary are Anelare Winery in Benton City, located approximately 1 mile north of the Lease Boundary, followed by Goose Ridge Estate Winery on Dallas Road in Richland, Washington, located approximately 1.8 miles away from the Lease Boundary. The locations of these wineries are illustrated in **Figure 3.8-4**.

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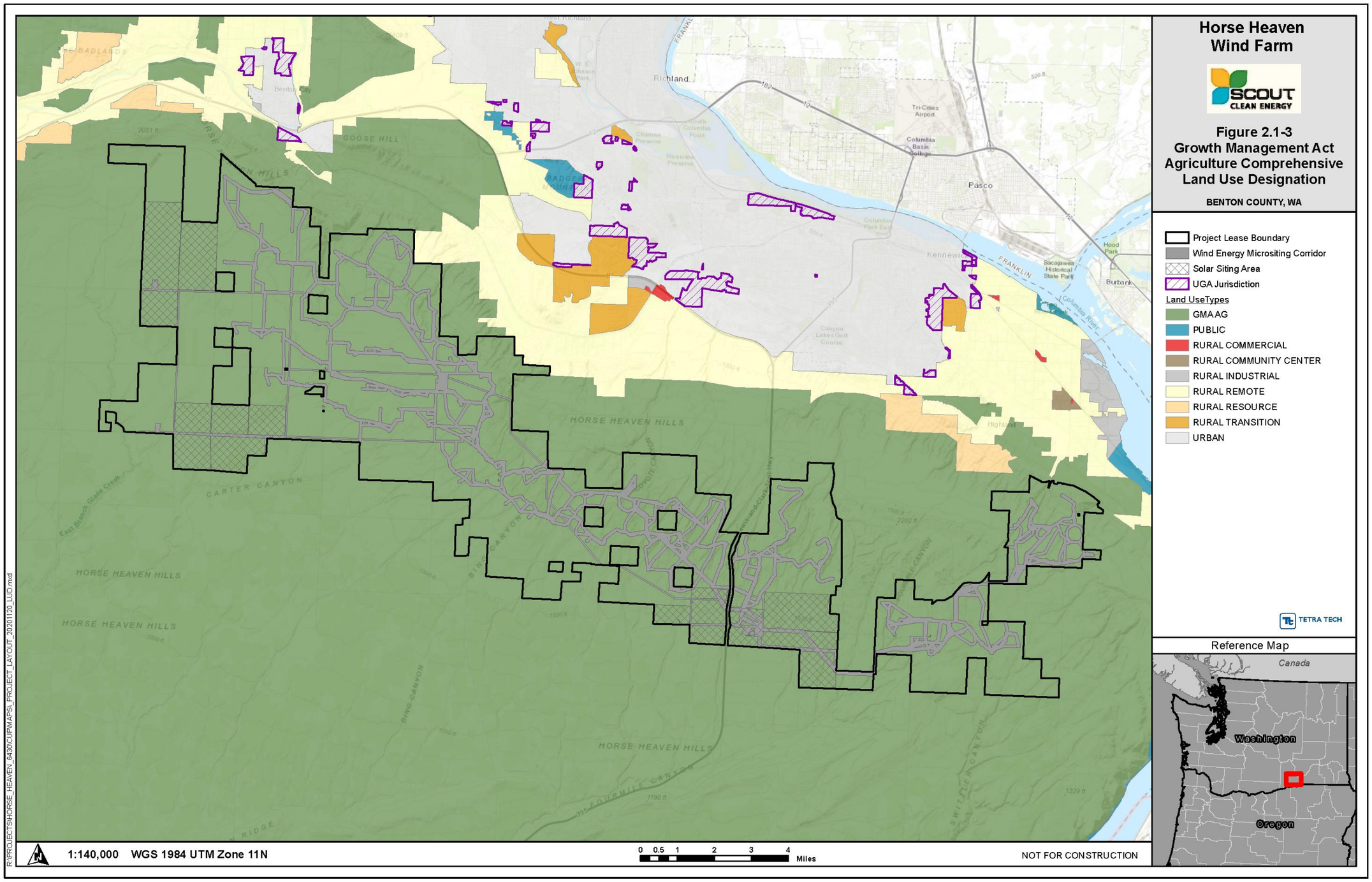
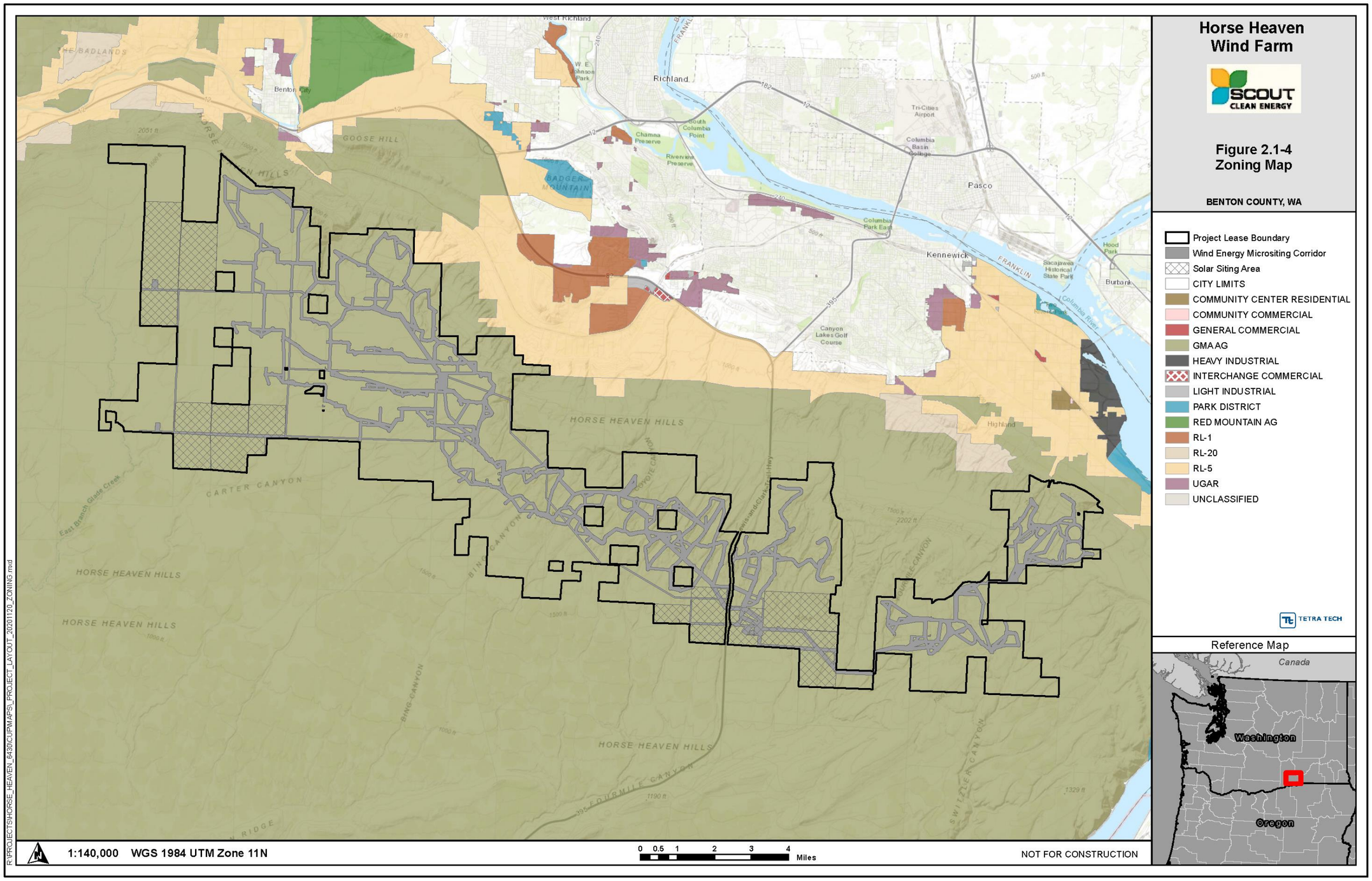


Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.8-2: Benton County, Washington Comprehensive Plan Land Use Designations



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.8-3: Benton County, Washington Project Vicinity Zoning Ordinance Map

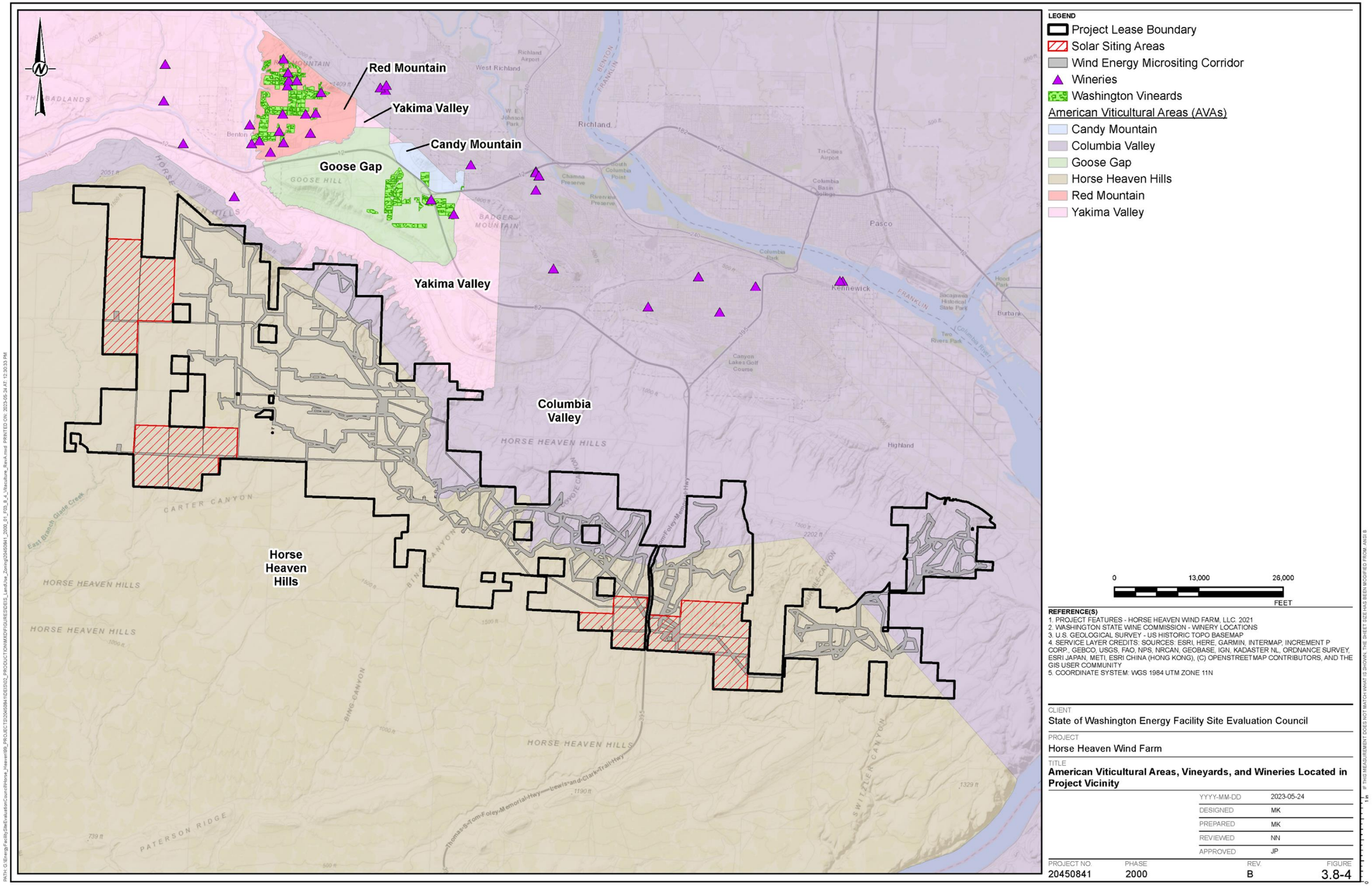


Figure 3.8-4: American Viticultural Areas, Vineyards, and Wineries Located in the Project Vicinity

3.8.2 Land Use Goals and Policies

Goals are broad statements of intent and philosophy expressing countywide values and attitudes. Goals are used as a general guide for action by the county. Policies provide the basis for decision-making and specific courses of action, which move the county toward attaining its adopted goals. Policies have a major influence because decisions, actions, and programs should neither conflict nor be inconsistent with adopted policy. **Table 3.8-4** lists the Benton County Comprehensive Plan goals and policies that are relevant to the Project.

Table 3.8-4: Applicable Benton County Comprehensive Plan Policies and Goals

Comprehensive Plan Element	Goal/Policy
Land Use	Goal 1: Ensure that land uses are compatible with surrounding uses that maintain public health, safety, and general welfare.
Land Use	Goal 1 Policy 1: Maintain a mix of land uses that support the character of each rural community.
Land Use	Goal 1 Policy 3: Maximize the opportunities for compatible development within land use designations to serve a multitude of compatible uses and activities.
Land Use - Rural Lands	Goal 6: Preserve rural lifestyles outside UGAs and incorporated areas while accommodating new population growth consistent with the protection of rural character.
Land Use - Rural Lands	Goal 6 Policy 2: Development in rural areas is typified by large lots and less dense development. Favoring development that is less dense and has larger lots helps maintain the rural character of designated rural areas and supports the protection of ground and surface water.
Land Use - Rural Lands	Goal 6 Policy 3: Designated rural areas will be utilized to reduce the inappropriate conversion of agricultural lands, prevent sprawling low-density development and assure that rural development is compatible with surrounding rural and agricultural areas.
Land Use - Rural Lands	Goal 6 Policy 14: Support and encourage the use of and application of Firewise principles and other fire risk reduction measures consistent with the Benton County Natural Hazard Mitigation Plan and Community Wildfire Protection Plan to reduce fire risk for urban development, urban subdivisions, rural subdivisions and large rural developments susceptible to wildfires. Encourage the implementation of the Firewise principles, or similar best management measures, applicable to individual lots on all lots at risk from wildfires.
Land Use - Rural Lands	Goal 6 Policy 15: Encourage new rural development away from the 100-year floodplain, and as guided by the County’s Flood Damage Prevention Ordinance, CAO, and SMP.
Natural Resources	Goal 1: Conserve and maintain agricultural land of long-term commercial significance as the local natural resource most essential for sustaining the County's agricultural economy.
Natural Resources	Goal 1 Policy 1: Conserve areas designated "GMA Agriculture" in the Comprehensive Plan for a broad range of agricultural uses to the maximum extent possible and protect these areas from the encroachment of incompatible uses.
Natural Resources	Goal 1 Policy 3: Recognize that only uses related or ancillary to, supportive of, complementary to, and/or not in conflict with agricultural activities are appropriate in areas designated GMA Agriculture.
Water Resources	Goal 1: Conserve, maintain, and manage existing ground and surface water resources to meet existing and future water supply needs for cities, farms, industry, and rural growth.
Water Resources	Goal 4: Protect and enhance surface water resources to support rivers, streams, and wetlands that support fish and wildlife species and associated habitats.

Table 3.8-4: Applicable Benton County Comprehensive Plan Policies and Goals

Comprehensive Plan Element	Goal/Policy
Critical Areas	Goal 1: Protect the functions and values of critical areas within the county with land use decision-making and development review.
Critical Areas	Goal 1 Policy 1: Apply standards, regulations, and mitigation strategies to development during the permitting and development approval process that protects critical areas functions and values.
Critical Areas	Goal 2: Protect life and property and avoid or mitigate significant risks to public and private property and to public health and safety that are posed by frequently flooded and geologic hazard areas.
Critical Areas	Goal 2 Policy 1: Limit developments in areas with higher risk for natural disaster or geologic hazard unless it can be demonstrated by the project proponent that the development is sited, designed, and engineered for-long term structural integrity and that life and property on- and off-site are not subject to increased risk as a result of the development.
Critical Areas	Goal 3: Protect the County's natural areas, shorelines, and critical areas as unique assets to the community.
Critical Areas	Goal 3 Policy 1: Use the CAO, SMP, SEPA, and other ordinances, as applicable, to designate and protect critical areas and the natural environment.
Critical Areas	Goal 5: Achieve balance among economic uses of land and critical areas protection.
Critical Areas	Goal 5 Policy 1: Work with state, federal, and local agencies and other County stakeholders regarding the application of environmental protection laws and regulations.
Economic Development	Goal 2: Expand employment opportunities in unincorporated Benton County.
Economic Development	Goal 3: Provide areas for the location of light and environmentally acceptable heavy industrial uses, while minimizing impacts on surrounding rural uses.
Economic Development	Goal 3 Policy 2: Do not locate non-agricultural related industry on "GMA Agriculture" designated land.
Parks, Recreation, Open Space, and Historic Preservation	Goal 3: Conserve visually prominent naturally vegetated steep slopes and elevated ridges that define the Columbia Basin landscape and are uniquely a product of the ice age floods.
Parks, Recreation, Open Space, and Historic Preservation	Goal 3 Policy 1: Identify and preserve historically significant structures and sites whenever feasible.
Parks, Recreation, Open Space, and Historic Preservation	Goal 4: Preserve significant historic structures, districts, and cultural resources that are unique to Benton County.
Parks, Recreation, Open Space, and Historic Preservation	Goal 4 Policy 1: Coordinate with local tribes to protect historic and cultural resources.
Parks, Recreation, Open Space, and Historic Preservation	Goal 4 Policy 2: Preserve archaeologically significant sites by siting and designing development to avoid or mitigate impacts.

Table 3.8-4: Applicable Benton County Comprehensive Plan Policies and Goals

Comprehensive Plan Element	Goal/Policy
Parks, Recreation, Open Space, and Historic Preservation	Goal 5: Identify, preserve, and protect historic, cultural, and archaeological resources found to be significant by recognized local, state, tribal or federal processes.
Parks, Recreation, Open Space, and Historic Preservation	Goal 5 Policy 1: Identify known, recorded archaeological, cultural, and historic resources.
Parks, Recreation, Open Space, and Historic Preservation	Goal 5 Policy 3: Preserve areas that contain valuable historical or archaeological sites of federal, state, tribal, or local significance including those maintained in the Department of Archaeology and Historic Preservation's database, areas known only to tribes and areas of higher risk potential. Maintain and enforce development code provisions that require conditioning of project approval on findings made by a professional archaeologist for development activities on sites of known cultural, historical, or archaeological significance.
Parks, Recreation, Open Space, and Historic Preservation	Goal Policy 4: Prior to demolition, moving, or alteration to any designated historic, cultural, and archaeological landmark, ensure that due consideration is given to its preservation or, at a minimum, documentation of its historic, cultural, or archaeological value.
Utilities Element	Goal 2: Maintain public and private household water and sewer systems that are consistent with the rural character of the County.
Utilities Element	Goal 3: Facilitate efficiency in utility land use and development.
Utilities Element	Goal 3 Policy 2: Encourage multiple uses, including passive recreational use, in utility corridors where practical.
Utilities Element	Goal 3 Policy 3: Facilitate maintenance and rehabilitation of existing utility systems and facilities and encourage the use of existing transmission/distribution corridors.

Source: Benton County 2020
CAO = Critical Areas Ordinance; GMA = Growth Management Act; SMP = Shoreline Management Program; SEPA = Washington State Environmental Protection Act; UGA = Urban Growth Area

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3.9 Historic and Cultural Resources

This section describes identified historic and cultural resources for the proposed Horse Heaven Wind Farm (Project, or Proposed Action) vicinity. Section 4.9 presents an analysis of the Project's potential impacts on historic and cultural resources. The Project Lease Boundary is situated within the Horse Heaven Hills and comprises 72,428 acres of land approximately 4 miles south-southwest of Kennewick and the Tri-Cities urban area, alongside the Columbia River in Benton County, Washington. The Area of Analysis for historic and cultural resources is the proposed Project footprint and comprises the proposed Wind Energy Micrositing Corridor of approximately 11,850 acres (of predominantly linear features, including the turbines, support infrastructure, etc.) and the Solar Siting Areas, which encompass approximately 10,755 acres within the Lease Boundary (Horse Heaven Wind Farm, LLC 2022, p. 2-1). Project information for this EIS was obtained from the Application for Site Certification (ASC), submitted February 2021 (Horse Heaven Wind Farm, LLC 2021) and revised December 2022 (Horse Heaven Wind Farm, LLC 2022). All Project information for this EIS was confirmed based on the September 2023 revised ASC (Horse Heaven Wind Farm, LLC 2023).

Regulatory Setting

State Regulations and Guidance on Historic and Cultural Resources

Historic and cultural resources include locations of past human activities, sites of occupation, and sites of usage that contain tangible materials (archaeological sites or isolated artifacts) or structural components (architectural or above-ground resources). They may also include landscapes used, built, or modified by people and associated with a specific ethnic or tribal group for longstanding cultural purposes, entwined with belief systems that may not continue to the present (traditional cultural properties [TCPs]). The Department of Archaeology and Historic Preservation (DAHP) is the primary state agency for management of historic and cultural resources in Washington (DAHP 2023). For the purposes of this impact assessment, definitions of historic and cultural resources are derived from Washington State regulations and DAHP guidance, as follows:

- Archaeological Resources: According to Washington Administrative Code (WAC) 25-48-020(10), archaeological resources are defined as "any material remains of human life or activities which are of archaeological interest, including all sites, objects, structures, artifacts, implements, and locations of prehistorical or archaeological interest, whether previously recorded or still unrecognized." Archaeological resources include sites and isolates with precontact and/or historic-period components.
  - Precontact period archaeological resources (sites and isolates) include lithics (modified stone artifacts—e.g., bifaces, flake tools, projectile points, cores, and debitage); ground stones produced for grinding food (e.g., pestle and mortar); camps (short-term occupation sites); villages (clusters of dwellings); house pits (dwellings partially dug into the ground); trails associated with significant destinations (routes or pathways); cairns or rock piles that may mark a burial or other feature; and burials containing human remains and funerary objects (DAHP 2003).
  - Historic-period archaeological resources (sites and isolates) include homesteads, debris scatter, townsites, roads, cemeteries, religious property, and agricultural features (DAHP 2003).

- **Historic Archaeological Resources:**[22] These are properties that are listed in or eligible for listing in the Washington State Register of Historic Places (Revised Code of Washington [RCW] 27.34.220) or the National Register of Historic Places (NRHP), per WAC 25-48-020(11). Historic properties are typically 50 years of age or older (Wilkerson et al. 2004). They can include archaeological sites, architectural resources, and TCPs.
- **Architectural Resources:** These include extant elements of the built environment, such as buildings, structures, sites, districts, and objects. Architectural resources are distinct from historic features that are in ruin (DAHP n.d.). For the Lease Boundary, these may include farmsteads and associated structures (e.g., grain towers) and roads, railways, or other historic-period infrastructure (e.g., transmission lines).
- **Traditional Cultural Properties:** TCPs include features of tribal significance and cultural and/or religious importance and may present as natural features entwined with cultural values. A TCP, as broadly defined by DAHP, may be "a distinctive natural site, such as a mountaintop, or a historic environment, such as an ethnic neighborhood, or it may simply be a place with significant historic value to a specific ethnic or cultural group…based upon historic cultural beliefs, customs, or practices which may or may not continue to the present" (Wilkerson et al. 2004). A TCP may also include a viewshed and associated landscape elements. Examples of TCPs (as adapted from the National Register Bulletin 38) include:
  - A significant location associated with the traditional beliefs of a tribe in relation to its origin or cultural belief system
  - A long-term, rural community whose land usage reflects longstanding cultural traditions
  - An urban neighborhood that is the traditional home of a particular cultural group and that reflects its beliefs and practices
  - A location where religious practitioners have historically gone, and are known to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice
  - A place where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity (NPS 1992)

RCW 27.44.040(1) (Indian Graves and Records) states: "Any person who knowingly removes, mutilates, defaces, injures, or destroys any cairn or grave of any native Indian, or any glyptic or painted record of any tribe or peoples is guilty of a class C felony." Further, RCW 27.44.040(1) mandates that inadvertent grave disturbance through construction or other activities requires re-interment under the supervision of the appropriate Indian tribe.

RCW 27.53.060 (Archaeological Sites and Resources) states that a DAHP permit may be required in the event of archaeological resource alteration/disturbance on private or public land. All precontact period sites and multicomponent sites with precontact cultural materials require DAHP-issued permits prior to any disturbance, regardless of their NRHP status. As such, precontact sites are protected by RCW 27.53. A permit is required for any disturbance to historic-era sites that are eligible for listing on national, state, or local registers. WAC 25-48 (Archaeological Excavation and Removal Permit) serves as the implementing rule for RCW 27.53 and outlines the

[22] To avoid confusion between historic-period archaeological resources and historic archaeological resources, this document does not use the latter term. Any NRHP-listed or eligible properties should be understood to be historic archaeological resources, per WAC 25-48-020(11).

procedures for application and review for Archaeological Excavation and Removal Permits. WAC 25-48 also stipulates how the state archaeologist, or the assistant state archaeologist, may impose civil penalties.

RCW 68.60 (Abandoned and Historic Cemeteries and Historic Graves) establishes regulatory definitions for abandoned cemeteries, historical cemeteries, and historic graves and outlines their statutory protections. RCW 68.60.055 mandates that the coroner and local law enforcement must be notified immediately of any discovery of skeletal human remains. Upon discovering skeletal human remains all ground-disturbing activity must stop immediately, and the area must be protected from further disturbance until authorized by the appropriate authorities. Time-sensitive responsibilities for the coroner, DAHP, the state physical anthropologist, and affected tribes are also identified in RCW 68.60.055.

The Washington Energy Facility Site Evaluation Council (EFSEC) is the regulatory authority for the Project and is tasked with evaluating the Project's compliance with the Washington State Environmental Policy Act (SEPA). The cultural resources provisions under SEPA require that historic and cultural resources within or adjacent to a project area should be identified consistent with RCW 27.53, and project-related impacts on those resources must be assessed (WAC 197-11-960). In its SEPA guidance, DAHP states that, "resources on the subject or adjacent property, should be evaluated for their eligibility at the local, state and/or national register level" (DAHP n.d.).

Federal Regulations

The NRHP is authorized by the National Historic Preservation Act of 1966, as amended (Title 36 Code of Federal Regulations [CFR] Part 800). The NRHP serves as a process by which historic and cultural resources are identified, evaluated, and protected (NPS 2022). As codified in 36 CFR 60.4, a historic or cultural resource is eligible for the NRHP if it is significant under one or more of the following criteria:

A. Association with events that have made a significant contribution to the broad patterns of our history;

B. Association with the lives of persons significant in the past;

C. Embodiment of the distinctive characteristics of a type, period, or method of construction, representation of the work of a master, possession of high artistic value, or representation of a significant or distinguishable entity whose components may lack individual distinction; or

D. Has yielded, or is likely to yield, information important in prehistory or history.

In addition to being found significant under at least one of the criteria listed above, a resource also must possess integrity to be eligible for listing in the NRHP (NPS 1997; Hardesty and Little 2000). Integrity is assessed after a property's significance is evaluated and includes seven aspects: location, design, setting, materials, workmanship, feeling, and association (NPS 1997).

Methodology

Horse Heaven Wind Farm, LLC's (the Applicant's) consultant, Historical Research Associates, Inc. (HRA), completed several cultural resources studies for the Project in 2020 and 2021 to identify historic and cultural resources (including cultural landscape elements) (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021; Tuck et al. 2023). The HRA studies contain sensitive and confidential information on cultural resources, and redacted versions of the cultural resource studies were included in the 2022 ASC for public use. The HRA cultural resources studies included archival and records research, archaeological survey (pedestrian field survey), architectural survey, and archaeological investigation (subsurface testing). HRA did not conduct randomized subsurface sampling for the Project.

In addition to archival research and field investigations, HRA conducted tribal outreach, which consisted of requesting information via phone call, letter, and email from affected Tribes (the Confederated Tribes and Bands of the Yakama Nation [Yakama Nation], Confederated Tribes of the Umatilla Indian Reservation [CTUIR], the Nez Perce Tribe [Nez Perce], and the Wanapum Tribe) concerning the Project's Area of Analysis. By definition, formal government-to-government tribal consultation is not within the purview of the Applicant, or its cultural resources consultant, and none of HRA's tribal outreach activities should be considered consultation that fulfills government agency responsibilities to consult under federal or state cultural resource regulations.

Six unpublished, confidential reports detail the results of the studies conducted by HRA on Washington State Department of Natural Resources (DNR) land (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021) and private land (Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021; Tuck et al. 2023). Davis, Jones, et al. (2021) is a finalized report for cultural resources surveys on private land and replaces an earlier draft (Davis, Jones, et al. 2020).

Cultural resources studies, including those conducted by HRA for the Project in 2020, 2021, and 2022, employ a variety of investigative techniques to identify and evaluate historic and cultural resources. Historic architectural methods include archival research, pedestrian survey, and historic structure documentation. Archaeological methods include background research and field investigation, which entails visual surface inspection (pedestrian survey) and/or subsurface testing (shovel testing and test unit excavation). It should be noted that no archaeological field investigation is wholly comprehensive. Archaeological field methods rely on sampling that can produce a bias in results. Systematic pedestrian surveys and subsurface testing are designed to limit bias and increase the amount of area investigated. Randomized subsurface sampling can be used to limit the bias for cultural materials present on highly visible ground surfaces. Nonetheless, biased results can still arise due to differences in how materials are preserved over time, unintentional preferences for the types of cultural resources that are identified, and the ease of access to some cultural resources over others.

Prior to commencement of the pedestrian survey phases, HRA reviewed the Lease Boundary and the available Project description to refine areas to be targeted for pedestrian field surveys (within the Area of Analysis). This included a review of local geomorphological and hydrological conditions; the precontact, ethnographic, and historic contexts of the landscape; previously recorded cultural resources; and the likelihood that recent disturbance has impacted historic and cultural resources (e.g., through agriculture and construction activities). HRA also considered the statewide predictive model developed by DAHP, which uses environmental variables to create areas of high, moderate, and low potential for cultural resources (Kauhi and Markert 2009). DAHP's statewide predictive model maps much of the Lease Boundary as Low Risk. However, there are several limited areas shown as Low to Moderate, Moderate, or High Risk, particularly along the periphery of the Lease Boundary to the northeast and northwest (Davis, Tuck, et al. 2021). High Risk areas are considered the most archaeologically sensitive, with a higher potential for identifying archaeological sites during development (Kauhi and Markert 2009).

It should be noted that the DAHP predictive model is based on several variables, including elevation, level landforms, and proximity to modern water sources. For this reason, the settings for certain cultural resource types, such as rock cairns, talus features, trails, pictographs, lithic scatters, as well as other sites that represent gathering and hunting practices that are found on slopes far from water resources, are not captured as High Risk areas by the predictive model. As with sampling limitations of archaeological methods, discussed above, the DAHP predictive model cannot predict the location or existence of all cultural resource types. Neither the

predictive model nor the archaeological methods should be interpreted as the definitive way to identify the presence of cultural resources within the Project's Area of Analysis.

Informed by the results of the initial archival research and dialogue with the affected Tribes, HRA conducted targeted pedestrian surveys within the Area of Analysis between 2020 and 2021 (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021). These field investigations involved systematic pedestrian survey along transects spaced at 66-foot (20-meter) intervals (Davis, Jones, et al. 2021). Where historic and cultural resources were identified, a more intensive survey and inspection was conducted to delineate the resource boundaries and record artifacts and/or features where present. Approximately 105 acres were not accessible due to steep slopes or restricted access (Horse Heaven Wind Farm, LLC 2023). HRA recommended no cultural resources survey of these locations because either the locations have limited potential for historic or cultural resources, or no Project activities were planned for the un-surveyed locations (Davis, Tuck, et al. 2021, p. i). In 2021 and 2022, HRA conducted archaeological fieldwork to evaluate five historic-period sites for NRHP eligibility under DAHP-issued archaeological excavation permits (2021-74, 2022-21, and 2022-22) (Tuck et al. 2023). The archaeological resources identified and evaluated by HRA are summarized in Section 3.9.2.1.

As of June 2022, HRA reported 41 archaeological resources in the Project Area of Analysis, including 29 sites and 12 isolates. Ten historic-period isolates and seven historic-period sites have been recommended as not eligible for the NRHP (Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021; Tuck et al. 2023). Nineteen historic-period archaeological sites and the historic component of one multicomponent site have not been evaluated for NRHP eligibility. Two precontact archaeological sites and the precontact component of one multicomponent site are protected by RCW 27.53.060. Avoidance or coordination with DAHP and interested Tribes is recommended for two precontact archaeological isolates (Davis, Tuck, et al. 2021, p. ii).

HRA identified and provided NRHP eligibility recommendations for 11 architectural resources in the Area of Analysis between 2020 and 2022 (Davis, Burk-Hise, and Henderson 2020; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021). Davis, Tuck, et al. (2021, p. ii) state that seven architectural resources were identified within the Area of Analysis, including Nicoson Farmstead and 17302 County Well Road. Nicoson Farmstead consists of two architectural resources, and 17302 County Well Road comprises four architectural resources. However, HRA reported Nicoson Farmstead and 17302 County Well Road as single entities. To remain consistent with architectural resource records in the Washington Information System for Architectural and Archaeological Records Data (WISAARD), Section 3.9.2.2 and **Table 3.9-2** describe the 11 architectural resources individually.

DAHP Consultation

EFSEC is in consultation with DAHP regarding historic and cultural resources for the Project. DAHP reviewed the cultural resource survey reports completed for the Project between 2020 and 2021 (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021) in an initial letter (Hanson 2021a) and in a revised letter to EFSEC dated December 10, 2021 (Hanson 2021b). In January 2023, DAHP reviewed the Historic Property Inventory Forms submitted by HRA for the Project (Elenga 2023). DAHP also reviewed the archaeological testing report by Tuck et al. (2023) for five historic-period sites in a letter to EFSEC dated May 18, 2023 (Witt 2023).

The 2021 and 2023 letters state that DAHP concurs with the NRHP eligibility recommendations for all 41 archaeological resources located within the Area of Analysis (Hanson 2021b; Witt 2023). Section 3.9.2 (Historic

and Cultural Resources Identified) describes the archaeological resources and their eligibility status, and **Table 3.9-2** lists the NRHP eligibility and/or status of all historic and cultural resources for the Project.

DAHP's revised letter dated December 10, 2021, states that the Project would not physically impact any identified architectural resources and, therefore, DAHP has no concerns about architectural resources (Hanson 2021b). In addition, DAHP reviewed Historic Property Inventory Forms for six architectural resources in a letter dated January 25, 2023 (Elenga 2023). DAHP's NRHP eligibility determinations are listed in WISAARD for all 11 architectural resources identified in the Area of Analysis (WISAARD 2022a, 2022b, 2022c, 2022d, 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g).

In addition to the consultation with EFSEC, DAHP also engaged in consultation with Benton County regarding historic and cultural resources for the Project. In a letter dated May 26, 2020, DAHP reviewed the cultural resource survey report by Davis, Burk-Hise, and Henderson (2020) and concurred with HRA's recommendations (Hanson 2020).

Tribal Consultation

Consultation between EFSEC and the Yakama Nation began in March 2023. Consultation between EFSEC and CTUIR began in April 2021, when CTUIR requested consultation with EFSEC via letter. EFSEC sent a response letter dated April 29, 2021. CTUIR commented on the scoping for the Project and ultimately worked with Applicant to come to an agreement.

3.9.1 Affected Environment

This section summarizes the historic and cultural context applicable to the Area of Analysis and surrounding Lease Boundary. The cultural chronology of the region is broadly characterized by changing settlement patterns and subsistence strategies, evidenced in material cultural remains from the precontact period through the historic period.

3.9.1.1 Precontact Background

The Project would be located in the Columbia Basin physiographic province, comprising the south-central portion of the larger Columbia Plateau (Plateau) that encompasses much of the Pacific Northwest region. The chronological sequence of precontact history within the Lease Boundary includes the Palaeoarchaic period (pre-11,000 to 8000 before present [B.P.[23]]), Early Archaic period (8000 to 5000 B.P.), Middle Archaic period (5000 to 2000 B.P.), and Late Archaic period (2000 to 250 B.P.). Precontact resources are protected by the RCW (see Section 3.9.1). These chronological sequences are summarized below.

Palaeoarchaic Period

This period is represented by diagnostic lithic tools. In the Columbia Basin region, these are primarily associated with either the Western Clovis Complex (defined as a projectile with a prominent "flute" or flake scar at its base) or the Western Stemmed Tradition (large lanceolate, stemmed, and shouldered bifaces) (Davis, Burk-Hise, and Henderson 2020). The socioeconomic structure of Palaeoarchaic people of the interior Plateau was likely centered around a mobilized subsistence strategy, including fishing, gathering, and hunting of large game.

[23] Before present, with present set at 1950 by convention.

Early Archaic Period

This period is largely represented by a greater variety of projectile point artifacts (including dart points, leaf-shaped or lanceolate Cascade Points, bone needles, harpoons, and awls). Cobble choppers, bola stones, beads, multi-faced burins, milling stones (manos), and knives (including ovate bifaces, crescents, and scrapers) are also associated and reflective of developing technologies in support of highly mobilized (and seasonal) hunter-gatherer groups, exploiting an increasingly wider resource base.

Middle Archaic Period

This period is represented by shell beads, hopper mortars, pestles, and an absence of cores and edge-ground cobbles, reflective of increased sedentism (i.e., living in one place for an extended time) and trading opportunities. During this transitional period, habitation sites become larger, located near locations with dense and reliable subsistence resources, with more intensive food processing and storage mechanisms (Davis, Jones, et al. 2021).

Late Archaic Period

This period is represented by cobble tools, fishing equipment (net weights and composite harpoons), and mortars and pestles, but relatively low frequencies of projectile points. Pithouses provide evidence of widespread sedentism and social stratification, with an increasing reliance on riverine resources observed through the faunal assemblage and land use pattern in the region.

3.9.1.2 Ethnographic Background

As described, the Horse Heaven Hills and surrounding region have long been inhabited, with the hills and watercourses providing natural boundaries between distinctive tribal groups. The exact customary and ancestral boundaries of Indigenous groups, however, are not always clearly defined, with neighboring groups utilizing the landscape within the Project vicinity for hunting, fishing, gathering, and longstanding cultural purposes.

Among the many tribal groups that utilized the Project vicinity historically are the Yakama, Umatilla, Cayuse, Walla Walla, and Nez Perce Tribes, who spoke various dialects of the Sahaptin language-group (Davis, Burk-Hise, and Henderson 2020). Due to their geographic location, the Yakama, Umatilla, Walla Walla, Cayuse, and Nez Perce resided in the center of a great trade network for thousands of years, stretching from the Pacific Ocean to the Great Plains, and south to the Great Basin. Like most Plateau and Columbia Basin groups, the Umatilla, Walla Walla, Cayuse, Yakama, and Nez Perce hunted terrestrial game, fished from the rich waterways, and gathered both edible and medicinal plants on a seasonal round basis. The introduction of the horse transformed the interactions of many Indigenous groups in the Plateau area. As trading grounds became more accessible and trading more regular, the traditional seasonal round was gradually altered (Davis, Jones, et al. 2021).

Ethnographic research has identified several places within the Area of Analysis and its vicinity that have been associated with the Yakama, Umatilla, Cayuse, Walla Walla, and Nez Perce Tribes. These places include riverine village sites, fishing locations, and areas where groups gathered to trade and socialize. Native communities also identified significant places that could be used for grazing horses, resource gathering, and wayfinding by means of prominent landscape features. The names of significant places often describe important past events or communicate information about resources or dangers associated with certain areas (Davis, Jones, et al. 2021).

3.9.1.3 Recent Historic Background

The Horse Heaven range is referenced in William Clark’s journal of 1805, when the Lewis and Clark expedition moved into the region, camping near the confluence of the Snake and Columbia Rivers (Davis, Burk-Hise, and Henderson 2020). Early European settlement in the Washington area was primarily driven by the expansion of the

fur trade, with the first wave of emigrants journeying across the Oregon Trail in the 1840s. In the mid-19th century, nonnative settlements were further developed through the arrival of Presbyterian missionaries, continuing into the 1880s.

The impact of these newly arrived emigrants on the Indigenous population and their settlement of Native American land was a cause of tension, resulting in U.S. government-prepared treaties to provide land for consolidated tribal populations and expand the areas of nonnative settlement. In 1855, the United States government conducted treaty negotiations at Camp Stevens with certain Plateau tribes. The Cayuse, Umatilla, and Walla Walla reserved about 500,000 acres and ceded 6.4 million acres through the Treaty of June 9, 1855 (Davis, Burk-Hise, and Henderson 2020). The Treaty with the Yakama Nation signed June 9, 1855, and ratified March 8, 1859, ceded nearly 11 million acres of land in exchange for 1.2 million acres of reservation land (Columbia River Inter-Tribal Fish Commission 2021). On June 11, 1855, the Nez Perce Tribe signed a treaty that reduced their territory from 13 million acres to a 7-million-acre reservation.

Another treaty with the Nez Perce in 1863 (at Lapwai, Idaho) further reduced the reservation to 757,000 acres. The Lapwai Treaty became known as the “thief” or “steal” treaty, creating animosity that eventually led to armed clashes between the Nez Perce and the U.S. Army in 1877 (NPS 2020). Reserved lands were nevertheless opened for nonnative settlement in 1895, and this, along with other factors, including the discovery of gold, reduced Nez Perce land further to less than 100,000 acres by the late 19th century.

As part of the 19th-century treaty agreements, the tribes agreed to relinquish title to their lands while maintaining their traditional rights on lands outside of reservations. Treaty rights are particular to the individual treaties and variously include hunting, fishing, gathering, and pasturing animals (Davis, Burk-Hise, and Henderson 2020). Tribal access to public lands under treaties is a complex issue; the maintenance of continued safe access to cultural sites (during Project activities) is considered in Chapter 4.9.

Nonnative settlers also had devastating impacts on the local tribal population in the Columbia River valley area through the transmission of new diseases. Spurred by the lack of treaty enforcement (and treaty violations), native groups throughout the Plateau region began to fight against outside intrusion, resulting in the Indian Wars of 1855 to 1858 (Davis, Jones, et al. 2021). Conflicts between native people, settlers, and the U.S. government lasted until the 1870s in the American West and were confined, for the most part, to the years 1855 to 1858 in the area of the Project vicinity (Davis, Burk-Hise, and Henderson 2020).

In the mid-19th century, low cattle stock prices meant that ranching was unprofitable, and tribal conflict was high. The development of the Northern Pacific railroad, however, from the Midwest to the Pacific Ocean in the 1870s, opened the area up to more intensive emigration, and the population increased rapidly through to the end of the century (Davis, Burk-Hise, and Henderson 2020). Agriculture, irrigation, and infrastructure services were developed in support of the growing farming community. A number of related features, including farmsteads, farm equipment, and a grain tower, have been located in the Area of Analysis. In 1937, the Bonneville Power Administration (BPA) was created, and public power was provided to residents in the Pacific Northwest. Two BPA transmission lines built in the mid-20th century cross the Lease Boundary (Davis, Burk-Hise, and Henderson 2020). In the mid- to late 20th century, nonnative settlement increased dramatically in the region, in response to the development of the Hanford nuclear facility. The nuclear production site was built in 1943, comprising nine former plutonium reactors in the vicinity of Hanford, a small farming community. People from all over the United States came to Hanford, forming a 51,000-person workforce (Gerber 1993). The reactors ceased in 1987, with large-scale land remediation ongoing to the present day (Gerber 1993).

Kramer (2012) developed an NRHP Multiple Property Documentation (MPD) for architectural resources related to the BPA Pacific Northwest Transmission System. The MPD defines the period of significance, property types, eligibility requirements, and integrity considerations for resources evaluated as part of the BPA Pacific Northwest Transmission System (Davis, Tuck, et al. 2021).

Lindeman and Holstine (1988) authored an NRHP MPD for architectural resources related to grain production in eastern Washington. The MPD defines the period of significance and the property types and eligibility requirements and integrity considerations for resources evaluated as part of the history of eastern Washington grain production (Davis, Tuck, et al. 2021).

3.9.1.4 Applicant Communications with Tribes and Agencies

As stated above, formal government-to-government tribal consultation is not within the purview of the Applicant or its cultural resources consultant. Communications with tribes by an applicant or consultant cannot be considered consultation that fulfills government agency responsibilities to consult under federal or state cultural resource regulations (54 U.S. Code [U.S.C.] 306108; 54 U.S.C. 302706 [b]; WAC 197-11-960 [B][13]).

Table 1.12-2 in the Final ASC identifies the dates, participants, and topics discussed during the Applicant's outreach to the Tribes and applicable agencies (Horse Heaven Wind Farm, LLC 2023). All communications between the Applicant, Tribes, and agencies pre-date the submission of the ASC, which was submitted in February 2021. Informal staff-to-staff communication began on March 9, 2021, with a notice of public meeting sent to the Tribes.

Applicant outreach to the Tribes began in 2018 by Scout Clean Energy LLC, the indirect owner of 100 percent of Horse Heaven Wind Farm, LLC. Communication with DAHP began in 2019. Tribal outreach and agency communication conducted by the Applicant and its consultants continued through November 2022 (Horse Heaven Wind Farm, LLC 2022, Table 1.12-2).

3.9.1.5 Previous Surveys within the Lease Boundary

Given the large geographic extent of the Lease Boundary, the majority of the area has not been subject to historic and cultural resources survey prior to HRA's investigations in relation to the Project in 2020, 2021, and 2022 (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020; Tuck et al. 2023). Twenty-seven cultural resource studies have been conducted within the Lease Boundary. These surveys were identified through a review of records maintained by DAHP in WISAARD; the resources identified by these previous surveys are summarized in **Table 3.9-1** and include two archaeological resources and eight architectural resources. Five of the previously identified historic and cultural resources are within the Area of Analysis (see **Table 3.9-1**). The five resources located within the Area of Analysis (i.e., proposed Project footprint) are discussed in Section 3.9.2.

Table 3.9-1: Previously Identified Resources within the Project Lease Boundary

ID # or Site #	Resource Type	Within Area of Analysis?
45BN205	Archaeological (Historic-Period Site)	Yes
45BN261	Archaeological (Precontact Site)	Yes
667765 (Nine Canyon Road)	Architectural	Yes
721665 (McNary–Badger Canyon No. 1 Transmission Line)	Architectural	Yes

Table 3.9-1: Previously Identified Resources within the Project Lease Boundary

ID # or Site #	Resource Type	Within Area of Analysis?
721666 (McNary–Franklin No. 2 Transmission Line)	Architectural	Yes
12851 (Edwards Homestead)	Architectural	No
12852 (Bentley Homestead)	Architectural	No
12977 (Horse Heaven Hills Cemetery)	Architectural	No
575328 (Owens Road)	Architectural	No
667226 (Kennewick Main Canal Division IV – Yakima Project)	Architectural	No

Sources: Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021

3.9.2 Historic and Cultural Resources Identified

The pedestrian survey, limited to the proposed Project design (the Area of Analysis), was undertaken by HRA during 2020 and supplemented in 2021 (to cover additional survey areas not previously accessible) (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021). Within the Area of Analysis (including both the private land and land owned by DNR), HRA reported 52 resources, including the four identified from previous studies (Section 3.9.2.5). Forty-one of these resources are archaeological, and 11 are architectural. The historic and cultural resources are summarized below according to their type (archaeological or architectural) and period (precontact or historic) and listed in **Table 3.9-2.**

3.9.2.1 Archaeological Resources

As of 2022, 41 archaeological resources have been identified in the Area of Analysis. The following descriptions are presented alphanumerically by resource number. All archaeological resources are listed in **Table 3.9-2**. NRHP eligibility determinations for historic-period resources and recommendations for precontact period resources in the following summary are based on DAHP concurrence letters (Hanson 2021b; Witt 2023). The Yakama Nation has requested avoidance of archaeological resources (Lewis 2023).

3.9.2.1.1 Precontact Period Archaeological Resources

Five precontact period resources, including three archaeological sites and two isolates, have been identified in the Area of Analysis for the Project. These are discussed below and summarized in **Table 3.9-2**. Precontact sites **45BN261** and **45BN2090** were documented during the pedestrian survey. Precontact isolates **45BN2092** and **45BN2146** were identified through shovel testing. Site **45BN2153** was identified through pedestrian survey and includes both precontact and historic cultural materials (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021).

Precontact Site **45BN261** was originally recorded in 1980 and was revisited in 2007 and 2013 (Davis, Jones, et al. 2021). The location of **45BN261** was verified during HRA's pedestrian survey in 2021. The Yakama Nation indicated that this precontact site is directly associated with a TCP (Davis, Jones, et al. 2021, p. 4). The site has not been evaluated for NRHP eligibility. As a precontact site, it is protected under RCW 27.53, and a DAHP permit is required prior to disturbance.

Precontact Site **45BN2090** was identified through pedestrian survey (Davis, Jones, et al. 2021). As a precontact site, it is protected under RCW 27.53, and a DAHP permit is required prior to disturbance (Davis, Jones, et al. 2021, p. ii). DAHP concurred with HRA's recommendation to avoid the site (Davis, Jones, et al. 2021; Hanson 2021b).

Isolate **45BN2092** is a projectile point that likely predates 2000 B.P. (Davis, Tuck, et al. 2021, p. 56). Radial shovel probes were negative for cultural materials (Davis, Tuck, et al. 2021, p.58). As a precontact isolate, **45BN2092** is not protected by RCW 27.53, and a permit is not required prior to disturbance. Davis, Tuck, et al. (2021) recommend either avoidance of Isolate **45BN2092** or coordination with the interested Tribes and DAHP to determine if the Tribes would like the isolate collected prior to construction (Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021; Hanson 2021b). DAHP concurred with HRA's recommendation (Hanson 2021b).

Isolate **45BN2146** consists of a single projectile point that post-dates 110 B.P. (Davis, Tuck, et al. 2021). Radial shovel probes confirmed the isolated nature of the find, and the resource is not protected by RCW 27.53. Davis, Tuck, et al. (2021) recommend either avoidance of Isolate **45BN2146** or coordination with the interested Tribes and DAHP to determine if the Tribes would like the isolate collected prior to construction. DAHP concurred with HRA's recommendation (Hanson 2021b).

The precontact component of Site **45BN2153** consists of an isolated artifact. The precontact component is protected under RCW 27.53, and a DAHP permit is required prior to disturbance (Davis, Tuck, et al. 2021, p. 51). DAHP concurred with HRA's recommendation to avoid the site (Davis, Tuck, et al. 2021; Hanson 2021b).

3.9.2.1.2 Historic-Period Archaeological Resources

Thirty-seven historic-period archaeological resources have been identified in the Area of Analysis during the pedestrian survey phase, comprising 26 sites, 10 isolates, and the historic component of one multicomponent site (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021). The historic-period archaeological resources are summarized in **Table 3.9-2**.

The majority (n=18) of the historic-period archaeological sites consist of a variety of surface artifacts associated with late 19th- and early 20th-century agricultural activity. Upon locating these sites, HRA mapped their extent and assessed the potential for any subsurface remains while considering the type and density of the surface material and their likely association with any earlier structures (e.g., 19th-century homesteads visible on historic mapping and/or aerial imagery). The historic archaeological sites identified in the Area of Analysis include farmstead remains, field stones, agricultural equipment, historic refuse scatters, and historic infrastructure remains. Where a particularly high density of surface materials was observed by HRA, and where further research or historic mapping identified homesteads or other structures in their vicinity, further archaeological work prior to the evaluation of the site for listing in the NRHP has been recommended (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021).

Single isolates were generally evaluated to have limited significance or potential for further additional information (e.g., isolated pieces of trash, removed from their wider context). Historic-period isolates documented by HRA from 2020 to 2021 within the Area of Analysis were determined not eligible for listing in the NRHP (Hanson 2021b).

Site **45BN205** was documented as a historic-period surface scatter in 2020 (Davis, Tuck, et al. 2021). Previous archaeological work at this site in 1975 identified structural remains. Although large pieces of wagon debris were identified during the 2020 field survey, no structures were observed (Davis, Tuck, et al. 2021, p. 184). Site

45BN205 has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Archaeological resources **45BN2081, 45BN2082**, **45BN2083**, and **45BN2084** are historic-period isolates. All four have been determined not eligible for listing in the NRHP due to a failure to convey significance under any of the criteria, and a lack of integrity (Davis, Jones, et al. 2021; Hanson 2021b).

Site **45BN2085** is a large historic debris scatter dating to the early 20th century. The site has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Jones, et al. 2021; Hanson 2021b).

Davis, Jones, et al. (2021) recorded Site **45BN2086,** a historic-period debris scatter, in 2020. The site was evaluated for NRHP eligibility using archaeological testing under DAHP Permit 2021-74 and recommended not eligible (Tuck et al. 2023). DAHP concurred with the eligibility recommendation in a letter dated May 18, 2023 (Witt 2023).

Site **45BN2087** comprises a historic-period debris scatter located in a fallow wheat field east. A variety of surface artifacts were recorded, including glass, ceramic, brick, and metal, amounting to 63 pieces in total. Historic maps show a building located 0.1 miles (0.16 kilometers [km]) southwest of the site and a more clearly marked building 0.6 miles (1 km) to the southwest (Davis, Jones, et al. 2021, p. 142). It was determined that the historic-period archaeological site cannot be evaluated for listing in the NRHP without further archaeological investigation.

Site **45BN2088** is a historic-period surface scatter of glass, metal, and decorated ceramic artifacts dating to the mid-19th to early 20th century (Davis, Jones, et al. 2021). Tuck et al. (2023) evaluated Site **45BN2088** for NRHP eligibility using archaeological testing under DAHP Permit 2022-22 and recommended the site not eligible (Tuck et al. 2023). DAHP concurred with the eligibility recommendation in a letter dated May 18, 2023 (Witt 2023).

Site **45BN2089** is a surface scatter dating to the early 20th century. Reviews of historic mapping and aerial imagery did not directly associate the site with an earlier farmstead, though a building is 0.2 miles (0.3 km) to the south at the edge of a canyon in 1917 (Davis, Jones, et al. 2021). The site has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Isolate **45BN2091** is a single, fragmented stoneware vessel. Given the isolated nature of the find, its location in a disturbed agricultural field, and the absence of significant historical development in the vicinity, the isolate was determined not eligible for listing in the NRHP (Davis, Jones, et al. 2021; Hanson 2021b).

Site **45BN2093** was documented through pedestrian survey in 2020 and 2021 and consists of historic-period structural remains and artifacts (Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021). The site was evaluated for NRHP eligibility using archaeological testing under DAHP Permit 2021-74 and recommended not eligible (Tuck et al. 2023). DAHP concurred with the eligibility recommendation in a letter dated May 18, 2023 (Witt 2023).

Isolate **45BN2138** appears to represent a single episode of discarded trash associated with agricultural or residential use, possibly in the late 19th or early 20th century. The isolate was determined not eligible for listing in the NRHP (Davis, Tuck, et al. 2021; Hanson 2021b).

Sites **45BN2139** and **45BN2140** are historic-period scatters. Background research indicates that there was limited development in the vicinity of sites **45BN2139** and **45BN2140** in the late 19th and early 20th centuries (Davis,

Tuck, et al. 2021). Site **45BN2139** was determined not eligible for listing in the NRHP (Hanson 2021b). Site **45BN2140** has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2141** consists of a historic-period refuse scatter of fragmented glass vessels (amber, aqua, colorless, green, opaque white, and pink). Site **45BN2142** consists of two historic-period structural remains on a southeast-facing slope adjacent to an artificially flattened area—potentially, a grain elevator and ramp/scale house. Historic maps show two structures approximately 0.3 miles (0.5 km) west of both sites (Davis, Tuck, et al. 2021, p. 169). Neither site has been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the sites should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Sites **45BN2143** and **45BN2145** are historic-period artifact scatters. Historic maps show multiple structures within 1 mile (1.6 km) of Site **45BN2143** in 1915, but nothing in its immediate vicinity (Davis, Tuck, et al. 2021, p. 96). Site **45BN2145** is potentially associated with a homestead dating to 1907. Neither site has been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the sites should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson Di2021b).

Archaeological resource **45BN2144** is a historic-period isolate. It was determined not eligible for listing in the NRHP due to a failure to convey significance under any of the criteria, and a lack of integrity (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2147** comprises a stack of cobblestones, likely removed from surrounding agricultural fields. Historic map analysis showed no development in the vicinity of the site, which has not been evaluated for NRHP eligibility. DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2148** is a historic-period surface scatter identified through pedestrian survey (Davis, Tuck, et al. 2021). The archaeological site is associated with historic-period architectural resources related to the Nicoson Road Farmstead (DAHP Property IDs: 724937, 724938) (discussed in 3.9.2.2 Architectural Resources). The archaeological site includes three water cisterns and a root cellar, reinforced with automotive parts. Reviews of aerial imagery and historic mapping suggest the farmstead was built in approximately 1920, and the archaeological site has not been evaluated for NRHP eligibility. DAHP concurred with HRA's recommendation that Site **45BN2148** should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2149** includes a historic-period surface scatter of ceramic sherds and shotgun casings indicative of a mid- to late-20th-century deposition. A U.S. Geological Survey (USGS) map from 1915 shows a structure in the same location as the site, demolished by 1955 (Davis, Tuck, et al. 2021). Site **45BN2149** has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Archaeological resource **45BN2150** is a historic-period isolate. It was determined not eligible for listing in the NRHP due to a failure to convey significance under any of the criteria, and a lack of integrity (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2151** consists of partly buried foundations. No structures are depicted in this location on historic-period maps (David and Ragsdale 2021). An aerial photograph from 1963, however, shows an intact structure, while another from 1996 shows it demolished (Davis, Tuck, et al. 2021, p. 43). Site **45BN2151** has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2152** comprises a historic-period refuse dump, with artifacts that indicate several depositional events in the mid- to late 20th century. Reviews of historic maps and aerial imagery did not suggest the presence of any structures local to the site. Site **45BN2152** has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

As stated above, Site **45BN2153** includes both precontact and historic cultural materials. The historic component of Site **45BN2153** consists of a debris scatter of vessel glass, ceramic sherds, metal fragments, and ammunition hardware. A 1917 USGS map depicts a structure within the site location that was demolished by 1953 (Davis, Tuck, et al. 2021, p. 53). The historic component of Site **45BN2153** has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the historic component of the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2154** is a historic debris scatter located within an unnamed drainage. The site includes structural remains that likely represent a former grain elevator. Artifacts observed include automotive parts and metal containers for oil, weed killer, and paint. Historic mapping and aerial images show a structure in the vicinity of the site location by the mid-20th century (Davis, Tuck, et al. 2021, p. 176). Site **45BN2154** has not been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the site should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Archaeological resource **45BN2155** is a historic-period isolate. It was determined not eligible for listing in the NRHP due to a failure to convey significance under any of the criteria, and a lack of integrity (Davis, Tuck, et al. 2021; Hanson 2021b).

Site **45BN2156** is a historic-period site consisting of two metal oil drums dating to the mid-20th century. Background research indicates little development in this area in the early to mid-20th century, with no mapped homesteads, plots of cultivated land, or structures in the site vicinity (Davis, Tuck, et al. 2021). Site **45BN2156** has been determined not eligible for the NRHP (Davis, Tuck, et al. 2021; Hanson 2021b).

Sites **45BN2157** and **45BN2158** are historic-period sites documented through pedestrian survey in 2021 (Davis, Tuck, et al. 2021). Both were evaluated for NRHP eligibility using archaeological testing under DAHP Permit 2022-21 and recommended not eligible (Tuck et al. 2023). DAHP concurred with the eligibility recommendations for both sites in a letter dated May 18, 2023 (Witt 2023).

Sites **45BN2159**, **45BN2160**, **45BN2161,** and **45BN2162** are historic-period sites documented through pedestrian survey in 2021. With the exception of Site **45BN2159**, these sites may be associated with structures mapped from the early to mid-20th century (Davis, Tuck, et al. 2021). None of these four sites have been evaluated for NRHP eligibility, and DAHP concurred with HRA's recommendation that the sites should be avoided by construction, if possible, or evaluated for NRHP eligibility (Davis, Tuck, et al. 2021; Hanson 2021b).

Archaeological resource **45BN2163** is a historic-period isolate. The isolate was determined not eligible for listing in the NRHP due to a failure to convey significance under any of the criteria, and a lack of integrity (Davis, Tuck, et al. 2021; Hanson 2021b).

3.9.2.2 Architectural Resources

A total of 11 architectural resources were recorded during the pedestrian surveys across the Area of Analysis (Davis, Burk-Hise, and Henderson 2020; Davis and Ragsdale 2020, 2021; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021). These include three resources identified during previous studies of the area (as listed in Section 3.9.2.5). The following architectural resource descriptions are presented alphanumerically by DAHP property identification number (ID). NRHP eligibility determinations in the following summary are based on information available through WISAARD (2022a, 2022b, 2022c, 2022d, 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g). All architectural resources in the Area of Analysis are listed in **Table 3.9-2**.

Architectural resource Nine Canyon Road (DAHP Property ID **667765**) was previously recorded in 2012. The road was built in approximately 1950 and has been improved multiple times. The architectural resource was determined not eligible for listing in the NRHP in 2014 (WISAARD 2023a). Davis, Jones, et al. (2021, p. 176) surveyed the architectural resource in 2020 and recommended that Nine Canyon Road remain not eligible for listing in the NRHP. DAHP has stated that the Project would not physically impact any identified architectural resources and, therefore, DAHP has no concerns about architectural resources (Hanson 2021b).

Architectural resource McNary–Badger Canyon No. 1 Transmission Line (DAHP Property ID **721665**) represents a rerouted portion of the McNary–Pasco transmission line, which was originally constructed circa 1948. This architectural resource was recommended not eligible for listing in the NRHP in 2007 (Davis, Burk-Hise, and Henderson 2020). HRA surveyed several portions of the architectural resource in 2020 and 2021 and evaluated the resource per the guidelines of the MPD for the BPA Pacific Northwest Transmission System (Davis, Burk-Hise, and Henderson 2020; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021; Kramer 2012).

The McNary–Badger Canyon No. 1 Transmission Line (DAHP Property ID **721665**) was recommended not eligible for the NRHP under the MPD, and it does not appear to be individually eligible for the NRHP (Davis, Burk-Hise, and Henderson 2020, p. 35; Davis, Jones, et al. 2021, p. 149; Davis, Tuck, et al. 2021, p. 193). WISAARD (2022a) shows that DAHP determined the architectural resource not eligible on April 15, 2020.

Architectural resource McNary–Franklin No. 2 Transmission Line (DAHP Property ID **721666**) was originally constructed in 1955 and energized in 1956. This architectural resource was recommended eligible for listing in the NRHP in 2007 (Davis, Burk-Hise, and Henderson 2020). HRA surveyed several portions of the architectural resource in 2020 and 2021 and evaluated it per the guidelines of the MPD for the BPA Pacific Northwest Transmission System (Davis, Burk-Hise, and Henderson 2020; Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021; Kramer 2012).

The McNary–Franklin No. 2 Transmission Line (DAHP Property ID **721666**) was recommended eligible for listing in the NRHP under the MPD guidance for the BPA Transmission System under Criterion A (Davis, Burk-Hise, and Henderson 2020, p.:37-38; Davis, Jones, et al. 2021, p. 151; Davis, Tuck, et al. 2021, p. 197-198). WISAARD (2022b) shows that DAHP determined this architectural resource eligible on April 15, 2020. DAHP has stated the Project would not physically impact any identified architectural resources and, as such, DAHP has no concerns about architectural resources (Hanson 2021b). The introduction of new components to the surrounding landscape will not impact the aspects of integrity of the resource that qualify it for listing in the NRHP. The line will continue to connect the same endpoints within the BPA system and will remain within the original construction corridor.

Architectural resource Grain Elevator (DAHP Property ID **722995**) is a multistorey structure constructed around 1940. HRA surveyed the resource in 2020 (Davis, Jones, et al. 2021). Analysis of historic maps has not associated the elevator with any nearby homestead, and it was recommended not eligible for individual listing in the NRHP (Davis, Jones, et al. 2021, p. 130). DAHP did not concur with this recommendation and determined the grain elevator (DAHP Property ID **722995**) eligible as of November 19, 2021 (Elenga 2023; WISAARD 2022c). DAHP has stated the Project would not physically impact any identified architectural resources and, therefore, DAHP has no concerns about architectural resources (Hanson 2021b). The grain elevator is eligible under Criteria A and C as a representation of the broad Depression-Era shift towards electrification of agricultural facilities and as an example of its type and period of construction. Changes in surrounding use will not impact the aspects of integrity of the resource that qualify it for listing in the NRHP. The structure will continue to represent its period of historic significance and architectural distinction.

Architectural resource Residence (DAHP Property ID: **722996**) is a manufactured house located at 147407 E Beck Road in Kennewick, Washington. HRA surveyed the resource in 2000 and 2021 (Davis, Jones, et al. 2021; Davis, Tuck, et al. 2021). The 147407 E Beck Road residence (DAHP Property ID: **722996**) was recommended not eligible for the NRHP. WISAARD (2022d) shows that DAHP determined the architectural resource not eligible on November 19, 2021.

Architectural resources Nicoson Road Farmstead Barn Storage Building (DAHP Property ID: **724937**) and Nicoson Road Farmstead Cribbed Grain Elevator (DAHP Property ID: **724938**) are early 20th-century structures associated with historic-period archaeological Site **45BN2148** (discussed in 3.9.2.1.2 Historic-Period Archaeological Resources). HRA surveyed the architectural resources in 2021 and evaluated them for the NRHP collectively as the Nicoson Road Farmstead (Davis, Tuck, et al. 2021, p. 79). The Nicoson Road Farmstead was recommended not eligible for the NRHP. HRA also evaluated the individual NRHP eligibility of the Nicoson Road Farmstead Cribbed Grain Elevator (DAHP Property ID: **724938**) under the MPD guidance for eastern Washington grain production properties and recommended the architectural resource not eligible under the MPD (Davis, Tuck, et al. 2021; Lindeman and Holstine 1988). DAHP did not concur with these recommendations (Elenga 2023).

DAHP determined the Nicoson Road Farmstead Barn Storage Building (DAHP Property ID: **724937**), the Nicoson Road Farmstead Cribbed Grain Elevator (DAHP Property ID: **724938**), and associated archaeological Site **45BN2148** eligible as part of a potential historic district (Elenga 2023). DAHP also determined the Cribbed Grain Elevator (DAHP Property ID: **724938**) is individually eligible under the “Grain production Properties in Eastern Washington MPD” as a representation of its type and period of construction (Elenga 2023; WISAARD 2023c). DAHP has stated that the Project would not physically impact any identified architectural resources (Hanson 2021b). The immediate historic setting of the farmstead has been previously compromised by the removal of key buildings, including the farmhouse and additional accessory structures as seen extant in aerial imagery from 1955 and removed by 2009 (NETROnline var.). Therefore, the introduction of new components to the surrounding landscape will not further impact the aspects of integrity of the resource that qualify it for listing in the NRHP. Visual impacts to the Cribbed Grain Elevator (DAHP Property ID: **724938**) are not expected. Although the historic setting of the property may be diminished by the introduction of new components to the surrounding landscape, the historic setting of the property is not critical to its overall ability to convey its historic significance as a representation of its type and period of construction, and the Cribbed Grain Elevator (DAHP Property ID: **724938**) will remain eligible for listing in the NRHP. The Barn Storage Building (DAHP Property ID: **724937**) is not individually eligible for listing in the NRHP; no impacts are expected.

Architectural resources Farmhouse and Garage (DAHP Property ID: **724939**), Shop (DAHP Property ID: **724940**), Machine Shed (DAHP Property ID: **724941**), and Grain Elevator and Grain Storage Silos (DAHP Property ID: **724942**) constitute a farmstead cluster documented by HRA in 2021. These four architectural resources were evaluated for the NRHP both individually and collectively as a farmstead located at 17302 County Well Road in Prosser, Washington (Davis, Tuck, et al. 2021). The Grain Elevator (DAHP Property ID: **724942**) was also evaluated under the MPD guidance for eastern Washington grain production properties (Davis, Tuck, et al. 2021; Lindeman and Holstine 1988). Davis, Tuck, et al. (2021, p. 125) recommended individual and collective resources at 17302 County Well Road not eligible for listing in the NRHP.

WISAARD shows that DAHP determined Farmhouse and Garage (DAHP Property ID: **724939**) not eligible on November 19, 2021 (WISAARD 2023d). The DAHP Architectural Historian determined architectural resources Shop (DAHP Property ID: **724940**), Machine Shed (DAHP Property ID: **724941**), and Grain Elevator and Grain Storage Silos (DAHP Property ID: **724942**) not eligible for the NRHP on January 23, 2023 (WISAARD 2023e, 2023f, 2023g). DAHP has stated the Project would not physically impact any identified architectural resources (Hanson 2021b).

3.9.2.3 Traditional Cultural Properties

TCPs exist within the Area of Analysis and vicinity for the Yakama Nation, CTUIR, Nez Perce, and Wanapum Tribe. Specific cultural sites and geographic locations of cultural interest are considered confidential by the Tribes. They may include places associated with place names, spiritual sites, viewsheds, places of particular historic significance (i.e., a specific event), traditional use sites, and the specific availability of traditional food sources and medicines. The locations of TCPs within the Area of Analysis would likely remain confidential and privileged information solely for the Tribes.

Yakama Nation has shared via public letter and confidential disclosures, that the construction of the Project will irreparably damage numerous Yakama Nation TCPs throughout the Lease Boundary. The Cultural Resources Program (CRP) of the Confederated Tribes and Band of the Yakama Nation has notified both the Applicant and EFSEC that the Project would be located in a highly sensitive and complex landscape of TCPs. They have indicated that, while the entire Project would harm these properties, there are specific turbine strings and solar arrays that would be most impactful to these cultural resources.

In a public comment letter to EFSEC dated February 1, 2023, Yakama Nation Chairman Gerald Lewis states that, “Several TCPs that are imperiled by this Project have been documented by CRP in a formal study commissioned by United States Bureau of Land Management [BLM], and are considered eligible” (Lewis 2023: p. 3). Viewshed and precontact archaeological materials are important components of one of the documented TCPs (Lewis 2023).

The CTUIR traditional use study (TUS) executive summary identifies traditional food sources observed or expected within the Project Lease Boundary (CTUIR 2021). In summary, 21 native place names are associated with ancient use and knowledge of the land and beliefs about culture and the nature of the world (CTUIR 2021). Oral history investigations conducted for the TUS highlighted, in addition, the presence of 21 traditional food sources (“First Foods”) that were either observed or expected within the Area of Analysis. The loss of access to First Foods was raised as a particular concern by elder informants. The TUS executive summary has also highlighted possible burial site locations within the Lease Boundary (CTUIR 2021). Resources of religious and cultural significance are potentially within the viewshed of the Project. The ability to pinpoint specific landmarks was also highlighted as being integral to Tribes’ oral tradition, legend, and storytelling (CTUIR 2021). All TCPs within the Area of Analysis are unevaluated for listing in the NRHP.

3.9.3 Conclusion

In summary, historic and cultural resources have been identified within the Area of Analysis, including 41 archaeological resources and 11 architectural resources (see **Table 3.9-2,** below). TCPs are located within the Area of Analysis and vicinity.

Four architectural resources have been determined eligible for the NRHP. DAHP has stated that the Project would not physically impact any identified architectural resources and, as such, DAHP has no concerns about architectural resources (Hanson 2021b). Direct visual impacts to identified architectural resources are not expected. Seven architectural resources have been determined not eligible for the NRHP.

Archaeological resources identified within the Area of Analysis include five precontact resources, which comprise three archaeological sites and two isolates. None of the precontact archaeological sites are evaluated for the NRHP; however, NRHP evaluation is not appropriate under the applicable regulatory context. Per RCW 27.53, precontact archaeological Sites **45BN261** and **45BN2090** and the precontact component at Site **45BN2153** require a permit issued by DAHP prior to disturbance. Consultation between EFSEC, DAHP, and Tribes would be necessary in the event of unavoidable impacts on precontact sites. Although RCW 27.53.060 does not protect precontact isolates **45BN2146** and **45BN2092**, the Yakama Nation has requested avoidance of these finds. Consultation between EFSEC, DAHP, and the Tribes is recommended in the event of unavoidable impacts to precontact isolates.

Thirty-seven historic-period archaeological resources have been identified in the Area of Analysis, including 20 historic-period archaeological sites that are unevaluated for the NRHP (see **Table 3.9-2**). These resources should be avoided by construction, if possible, or evaluated for NRHP eligibility. Seventeen historic-period archaeological resources have been determined not eligible for the NRHP.

TCPs include, but are not limited to, resources of religious and cultural significance potentially within the viewshed of the Project, as well as possible burial sites and the locations of First Foods. Public comment letters to EFSEC, tribal-led studies for the Project, and confidential discussions with tribes have confirmed that TCPs are located within the Area of Analysis and vicinity. Consultation with regard to TCPs between EFSEC, DAHP, the Tribes, and any other relevant government agencies (such as DNR or BLM) is recommended.

Table 3.9-2: Archaeological and Architectural Resources in the Area of Analysis

ID # or Site #	Resource Type	NRHP Eligibility/Status	DAHP Concurrence Date[(a)]
45BN205	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigations.	December 10, 2021
45BN261	Archaeological (Precontact Site)	As a precontact site, it cannot be disturbed without a permit issued under RCW 27.53.060.	December 10, 2021
45BN2081	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2082	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2083	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021

Table 3.9-2: Archaeological and Architectural Resources in the Area of Analysis

ID # or Site #	Resource Type	NRHP Eligibility/Status	DAHP Concurrence Date[(a)]
45BN2084	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2085	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2086	Archaeological (Historic Site)	Determined not eligible for listing in the NRHP.	May 18, 2023
45BN2087	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigations.	December 10, 2021
45BN2088	Archaeological (Historic Site)	Determined not eligible for listing in the NRHP.	May 18, 2023
45BN2089	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigations.	December 10, 2021
45BN2090	Archaeological (Precontact Site)	As a precontact site, it cannot be disturbed without a permit issued under RCW 27.53.060.	December 10, 2021
45BN2091	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2092	Archaeological (Precontact Isolate)	Not protected by RCW 27.53 (confirmed isolate). Consultation with Tribes is advised.	December 10, 2021
45BN2093	Archaeological (Historic Site)	Determined not eligible for listing in the NRHP.	May 18, 2023
45BN2138	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2139	Archaeological (Historic Site)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2140	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigations.	December 10, 2021
45BN2141	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigations.	December 10, 2021
45BN2142	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigations.	December 10, 2021
45BN2143	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021

Table 3.9-2: Archaeological and Architectural Resources in the Area of Analysis

ID # or Site #	Resource Type	NRHP Eligibility/Status	DAHP Concurrence Date[(a)]
45BN2144	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2145	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2146	Archaeological (Precontact Isolate)	Not protected by RCW 27.53 (confirmed isolate). Consultation with Tribes is advised.	December 10, 2021
45BN2147	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2148	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigations.	December 10, 2021
45BN2149	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2150	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2151	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2152	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2153	Archaeological (Precontact and Historic Site)	Protected by RCW 27.53 (precontact component). Cannot be evaluated for listing in the NRHP without further archaeological investigation (historic component).	December 10, 2021
45BN2154	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2155	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2156	Archaeological (Historic Site)	Determined not eligible for listing in the NRHP.	December 10, 2021
45BN2157	Archaeological (Historic Site)	Determined not eligible for listing in the NRHP.	May 18, 2023
45BN2158	Archaeological (Historic Site)	Determined not eligible for listing in the NRHP.	May 18, 2023

Table 3.9-2: Archaeological and Architectural Resources in the Area of Analysis

ID # or Site #	Resource Type	NRHP Eligibility/Status	DAHP Concurrence Date[(a)]
45BN2159	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2160	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2161	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2162	Archaeological (Historic Site)	Cannot be evaluated for listing in the NRHP without further archaeological investigation.	December 10, 2021
45BN2163	Archaeological (Historic Isolate)	Determined not eligible for listing in the NRHP.	December 10, 2021
667765 (Nine Canyon Road)	Architectural	Determined not eligible for listing in the NRHP.	November 25, 2012
721665 (McNary–Badger Canyon No. 1 Transmission Line)	Architectural	Determined not eligible for listing in the NRHP.	April 15, 2020
721666 (McNary–Franklin No. 2 Transmission Line)	Architectural	Determined eligible for listing in the NRHP.	April 15, 2020
722995 (Grain elevator)	Architectural	Determined eligible for listing in the NRHP.	November 19, 2021
722996 (147407 E Beck Road Residence)	Architectural	Determined not eligible for listing in the NRHP.	November 19, 2021
724937 (Nicoson Road Farmstead Barn Storage Building)	Architectural	Determined eligible for listing in the NRHP.	November 19, 2021
724938 (Nicoson Road Farmstead Cribbed Grain Elevator)	Architectural	Determined eligible for listing in the NRHP.	November 19, 2021
724939 (Farmhouse and Garage)	Architectural	Evaluated individually and collectively as 17302 County Well Road farmstead cluster. Determined not eligible for listing in the NRHP.	November 19, 2021

Table 3.9-2: Archaeological and Architectural Resources in the Area of Analysis

ID # or Site #	Resource Type	NRHP Eligibility/Status	DAHP Concurrence Date[(a)]
724940 (Shop)	Architectural	Evaluated individually and collectively as 17302 County Well Road farmstead cluster. Determined not eligible for listing in the NRHP.	January 23, 2023
724941 (Machine Shed)	Architectural	Evaluated individually and collectively as 17302 County Well Road farmstead cluster. Determined not eligible for listing in the NRHP.	January 23, 2023
724942 (Grain Elevator and Grain Storage Silos)	Architectural	Evaluated individually and collectively as 17302 County Well Road farmstead cluster. Determined not eligible for listing in the NRHP.	January 23, 2023

Notes:
(a) See Hanson (2021b), Witt (2023), or WISAARD (2022a, 2022b, 2022c, 2022d, 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g).
NRHP = National Register of Historic Places; RCW = Revised Code of Washington; Tribes = Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, and Wanapum Tribe

3.10 Visual Aspects, Light and Glare

This section describes metrics and terminology, the applicable regulatory framework (including industry standards), and affected environment for the proposed Horse Heaven Wind Farm (Project, or Proposed Action) vicinity in relation to visual resources. The Project vicinity includes the areas south/southwest of Kennewick, Washington, in Benton County, and the larger Tri-Cities urban area along the Columbia River. The Project's consistency with relevant environmental standards, regulations, goals, and policies, and impacts from the Project and from the No Action Alternative, are evaluated in Section 4.10.

This section focuses on three aspects of visual resources in the Project vicinity—visual aspects, shadow flicker, and light and glare—and describes the metrics and terminology, and the regulatory setting—for each.

Regulatory Setting (Visual Aspects)

Benton County has adopted planning goals and policies in its Comprehensive Plan to conserve areas of potential value to the county and its residents (Benton County 2020). The following planning goals and policies are most applicable to this visual analysis:

- PL[24] Goal 3: Conserve visually prominent naturally vegetated steep slopes and elevated ridges that define the Columbia Basin landscape and are uniquely a product of the ice age floods.
- Policy 3: Pursue a variety of means and mechanisms such as the preparation of specific and area plans, conservation easements, clustered developments, land acquisitions and trades, statutory requirements to protect the natural landform and vegetative cover of the Rattlesnake uplift formation, notably Rattlesnake, Red, Candy, and Badger Mountains and the Horse Heaven Hills.
- Policy 4: Consider the preservation of the ridges and hillside areas through various development regulations.

These county goals and policies provide the intentions and interests of Benton County, rather than specific compliance requirements for this Project.

As part of the Washington Energy Facility Site Evaluation Council site certification process, Washington Administrative Code 463-60-362(3) identifies the following standard for analysis of visual resources (aesthetics):

> *"The application shall describe the aesthetic impact of the proposed energy facility and associated facilities and any alteration of surrounding terrain. The presentation will show the location and design of the facilities relative to the physical features of the site in a way that will show how the installation will appear relative to its surroundings. The applicant shall describe the procedures to be utilized to restore or enhance the landscape disturbed during construction (to include temporary roads)."*

The Washington site certification process does not require use of a particular visual resource analysis method. This section summarizes the location and design elements of the Project that may influence existing aesthetic conditions and the analysis methods used to characterize visual resources. Section 4.10 describes how the Project would appear relative to the surrounding landscape and analysis of visual impacts of the Project.

The Visual Resource Management (VRM) system developed by the Bureau of Land Management (BLM) has become an industry standard to analyze potential visual impacts, particularly in the western United States, and is often applied to projects on non-BLM lands (BLM 1986). The BLM VRM system and other federal agency visual

[24] Parks, Recreation, Open Space, and Historic Preservation

resource methodologies (e.g., U.S. Forest Service scenery management system and U.S. Federal Highway Administration Guidelines for the Visual Impact Assessment of Highway Projects) have three common elements:

- Scenery: continuous units of land with harmonized features that result in and exhibit a particular character
- Views (sensitivity to visual change and visibility): public viewing locations, including recreation areas, travel routes, residences, and lands with special management, where viewers have sensitivity to landscape changes
- Agency visual management requirements: identify allowable levels of change to landscape character and the allowable degree of attention that a project could attract from viewing locations

To build on the BLM VRM methods, this section also considers elements from the Visual Impact Assessment Process for Wind Energy Projects from the Clean Energy States Alliance (CESA), which were developed to address the unique visual characteristics of wind energy projects (CESA 2011).

Regulatory Setting (Shadow Flicker)

Shadow flicker is not regulated in state or federal law applicable to the Project, nor is it addressed by the local county ordinances; therefore, potential shadow flicker impacts were assessed against the industry standard threshold of 30 hours per year (Lampeter 2011).

Regulatory Setting (Light and Glare)

As part of the site certification process, Washington Administrative Code 463-60-362(2) identifies the following requirement for analysis for light and glare analysis in an Application for Site Certification (ASC):

> *"The application shall describe the impact of light and glare from construction and operation and shall describe the measures to be taken in order to eliminate or lessen this impact."*

Lighting conditions are assessed in terms of percentage of brightness above natural dark sky background and classified based on definitions and descriptions from CIE guidelines, which consist of a set of established Environmental Lighting Zones (ELZ) for classifying exterior light levels (CIE 1997, 2003). These zones and related quantitative thresholds are shown in **Table 3.10-1**.

3.10.1 Visual Aspects

Metrics and Terminology

The visual resources inventory focused on three elements:

- Landscape character
- Viewing locations
- Viewer sensitivity

The term "landscape character" is used to describe the overall visual appearance of a given landscape, based on its vegetation, landforms/water, and human-made modifications. Landscape character is often described in terms of landscape character areas, which are portions of a larger landscape that share harmonizing features that result in and exhibit a particular visual character.

The visibility of the Project structures from typical or sensitive viewing locations considers the most critical places from which the public would view the Project. These are commonly referred to as key observation points (KOP) and are used to assess the Project's anticipated visual impacts. KOP locations can be static, such as residential areas, where views would occur from a consistent location, as well as linear, such as travel ways, where views change as viewers move along a road or trail.

Reactions to changes in the landscape by a viewer (also termed "receptor") is called viewer sensitivity and can vary depending on the characteristics and preferences of the viewer group. For example, residential viewers are typically expected to have a high concern regarding changes in views from their residences. These preferences may also vary depending on whether the residential viewer is a Project participant (i.e., a resident with whom the Applicant has a lease agreement) or if views are from a non-participating property. Motorists' concerns generally depend on when and where travel occurs and the type of travel involved (e.g., commuting vs. recreational travel). Recreational users' concerns vary based on the activities occurring and the length of time that receptors experience the landscape (view duration). For example, viewers at a scenic overlook are expected to have a higher concern regarding changes in view because in this case the landscape would be viewed for a long duration and the view is integral to its use, compared to motorists on a non-scenic designated highway, in which the landscape is viewed for a shorter duration and is not necessarily the focus of the viewer's activity.

3.10.2 Shadow Flicker

Metrics and Terminology

A turbine's rotating blades can cast a moving shadow on locations within a certain distance of the turbine. This can create a temporary phenomenon experienced by nearby viewers called "shadow flicker." This phenomenon has the potential to be a nuisance to humans in both outdoor and indoor settings (McGlinchey and Caporossi 2013). The influence area associated with shadow flicker depends on the time of year and day (which determine the angle of the sun in relation to the turbine and the receptor) and the turbine's physical characteristics (e.g., height, rotor diameter, blade width, and orientation of the rotor blades). The effect of shadow flicker on surrounding properties generally occurs during low-angle sunlight conditions, typically during sunrise and sunset. However, when the sun angle is very low (i.e., less than 3 degrees), sunlight passes through more atmosphere and becomes too diffuse to form a coherent shadow.

Shadow flicker does not occur when the sun is obscured by clouds or fog, at night, or when the source turbine(s) are not operating. In addition, shadow flicker occurs only when at least 20 percent of the sun's disc is covered by the turbine blades.

Shadow flicker intensity is calculated as the difference in brightness at a given location in the presence and absence of a shadow. Shadow flicker occurrence and intensity diminish with greater receptor-to-turbine separation distance. In general, shadow flicker may become more noticeable the closer a viewer is to the turbine.

3.10.3 Light and Glare

Metrics and Terminology

Light

Light sources would be introduced as part of the Project operations as security lighting for the substations, battery energy storage systems (BESS), and solar arrays and as aviation lighting for turbine towers and other elevated structures, per Federal Aviation Administration (FAA) requirements. Additionally, it is possible that the Project

would involve nighttime construction and decommissioning activities that require lighting, though these activities would be concentrated during the daylight hours.

Light is part of the electromagnetic spectrum, which ranges from radio waves to gamma rays. Electromagnetic radiation waves are fluctuations of electric and magnetic fields, which can transport energy from one location to another. Visible light is not inherently different from other parts of the electromagnetic spectrum, with the exception that the human eye has evolved to detect visible waves. The human eye responds to light based on its frequency. The frequency of light that is within the visible range establishes the observed color. While response to light varies from person to person, the Commission Internationale de l'Eclairage (CIE) defined standard luminosity coefficients for the human eye in 1931 (CIE 1997).

The FAA outlines wind turbine lighting standards to increase the visibility of lighting systems for pilots in its Advisory Circular No. 70/7460-1L, issued on August 17, 2018. Lighting systems must consist of aviation red obstruction lights that are either flashing, strobe, or pulsed, as outlined in the Advisory Circular as FAA L-864 lighting. This lighting must be synchronized to flash with nearby systems. For wind farms, turbines with a rotor tip height above 499 feet must be lit regardless of the configuration of the larger wind farm or nearby turbines. Wind energy systems above 699 feet must feature lighting on the nacelle—the housing for the generator at the top of a turbine that is connected to the rotor—as well as at a midpoint on the turbine's mast, placed between the nacelle at the top of the turbine and the ground (FAA 2018). Additionally, recent state legislation requires that new windfarms apply with the FAA for Aircraft Detection Lighting Systems (ADLS) that would turn off turbine lights at night when no aircraft are in the area (HB 1173, 2023). This would reduce the amount of light emitted by towers if the application to the FAA is approved.

Light Trespass

Light trespass refers to light or illuminance that strays from its intended purpose and potentially becomes an annoyance to nearby receptors. Some regulators have established programs to reduce light trespass caused by outdoor lighting (NCSL 2022). These programs are based on limiting the amount of light from a light source that is transmitted onto adjoining properties. Similar to noise, light trespass standards vary according to the land uses where the trespass occurs.

Sky Glow

Sky glow is stray light scattering in the atmosphere, brightening the natural sky background level, and reducing star visibility at night. Sky glow impacts are often associated with light pollution, which can have a regional effect on perceived lighting conditions. Sky glow information and comparisons are presented in **Appendix 3.10-1**.

Table 3.10-1: Environmental Lighting Zone Classifications for Sky Glow

ELZ	Description of the ELZ	Sky Glow (% brightness above natural dark sky)	Sky Glow (mag/arcsec^2)
E1	Intrinsically dark natural areas (e.g., national parks or protected sites, roads usually unlit)	0 % < x ≤ 20 %	21.3–23.0
E2	Areas of low district brightness (e.g., agricultural, industrial, or outer urban/rural residential areas)	20 % < x ≤ 100 %	20.4–21.3
E3	Areas of medium district brightness (e.g., industrial, or small-town centers / residential suburbs)	100 % < x ≤ 200 %	18.0–20.4

Table 3.10-1: Environmental Lighting Zone Classifications for Sky Glow

ELZ	Description of the ELZ	Sky Glow (% brightness above natural dark sky)	Sky Glow (mag/arcsec^2)
E4	Areas of high district brightness (e.g., town/city centers and commercial areas urban areas, residential and commercial with high levels of nighttime activity)	x > 200 %	<18.0

Source: CIE 1997
ELZ = Environmental Lighting Zone; mag/arcsec^2 = magnitudes per square arcsecond

Glare

Solar panels may be a source of reflected light during operation of the Project, and there may be temporary light reflection during construction and decommissioning from equipment windshields and glass enclosures, causing glint and glare for some viewers. ForgeSolar (n.d.) defines glint and glare as follows:

> *"Glint is typically defined as a momentary flash of bright light, often caused by a reflection off a moving source. A typical example of glint is a momentary solar reflection from a moving car. Glare is defined as a continuous source of bright light. Glare is generally associated with stationary objects, which, due to the slow relative movement of the sun, reflect sunlight for a longer duration."*

Based on the ForgeSolar definitions of glint and glare and the stationary nature of the Project's solar arrays, the potential reflectance from the Project is referred to as glare.

The FAA developed Technical Guidance for Evaluating Selected Solar Technologies on Airports in 2010, in addition to FAA regulatory guidance under 78 Federal Register (FR) 63276 Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (FAA 2010). The FAA guidance recommends that glare analyses should be performed on a site-specific basis using the Sandia Laboratories Solar Glare Hazard Analysis Tool (FAA 2010). This tool is the standard for measuring potential visual impact as a result of solar facilities. The FAA guidance applies to solar facilities located on federally obligated airport property. It is not mandatory for solar facilities not located on an airport property (for these, a Form 7460-1 is filed with FAA pursuant to Title 14 Code of Federal Regulations [CFR] Part 77.9, as discussed below), but is considered to be an industry best practice for solar facilities in general.

According to 78 FR 63276, the FAA has determined that "glint and glare from solar energy systems could result in an ocular impact on pilots and/or air traffic control facilities and compromise the safety of the air transportation system." The FAA has developed the following criteria for analysis of solar energy projects located on jurisdictional airports:

1) No potential for glint or glare in the existing or planned air traffic control tower cab.

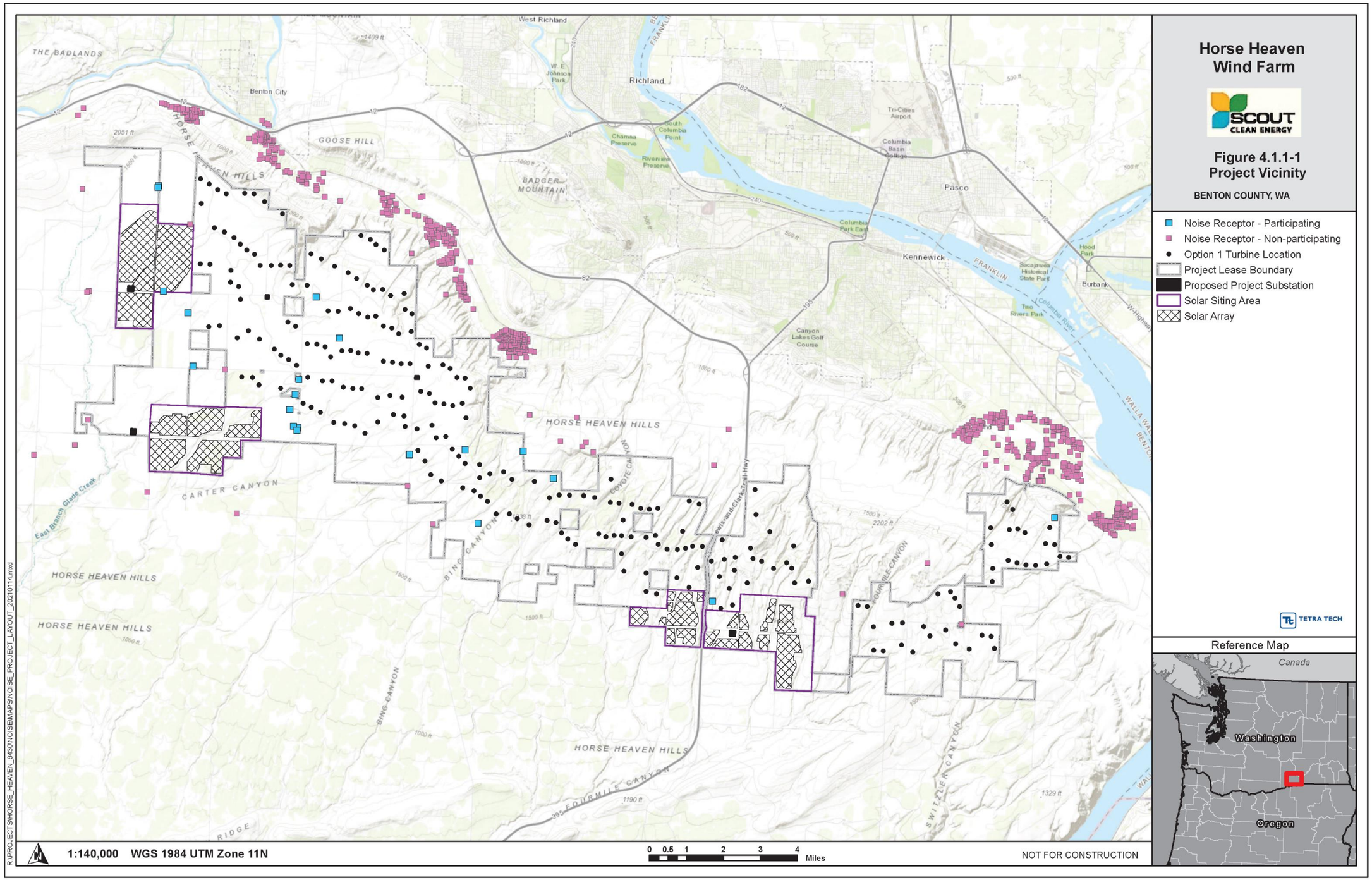
2) No potential for glare, or "low potential for after-image," along the final approach path for any existing or future landing threshold (including any planned interim phases of the landing thresholds), as shown on the current FAA-approved Airport Layout Plan. The final approach path is defined as 2 miles from 50 feet above the landing threshold using a standard 3-degree glidepath.

The online FAA Notice Criteria Tool (NCT) reports whether a proposed structure is near a jurisdictional air navigation facility and if formal submission to the FAA under 14 CFR Part 77.9 (Safe, Efficient Use, and

Preservation of the Navigable Airspace) is recommended (FAA 2020). The NCT also identifies final approach flight paths that may be considered vulnerable to a proposed structure's impact on navigation signal reception. The NCT was utilized to determine if the proposed Project is located within an FAA-identified impact area based on the Project boundaries and height above ground surface. The FAA NCT report stated that the Project does not exceed notice criteria, so a formal filing is not necessary.

3.10.4 Affected Environment

The Project Lease Boundary is dominated by rolling hills bisected by meandering canyons, some of which constitute ephemeral or intermittent drainages. The Horse Heaven Hills ridgeline lies along the northern border of the Lease Boundary. On the southern side of this ridge, the landscape transitions to rolling topography with shallow, meandering canyons that drain southwest into the Columbia River. **Figure 3.10-1** provides an overview of the Project vicinity and shows the locations of nearby residences that are considered KOPs and receptors for light and glare analysis, as well as their visual aspect. These receptors will be used to assess the Project's compliance with identified standards and guidelines as viewers potentially impacted by changes in visual aspect, light and glare in Section 4.10. The residential receptors are a subset of the noise sensitive receptors analyzed for the Project as part of the acoustic assessment (Section 3.11) and retain the associated identification numbers for cross-reference.



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.10-1: Noise Sensitive Receptors in Project Vicinity

3.10.4.1 Visual Aspects

Inventory Methods

The visual resource area of analysis identified in the 2022 ASC was the area within 10 miles of the proposed wind turbines and transmission line and within 5 miles of the proposed solar arrays, substations, and BESS. Based on guidance from both the BLM (Sullivan et al. 2012) and CESA (2011), the area of analysis for the wind turbines in this Environmental Impact Statement (EIS) was extended to 25 miles.

Existing Landscape Character

The Project would be located within the Columbia Plateau U.S. Environmental Protection Agency Level III ecoregion, which is typically characterized by a broad expanse of sagebrush-covered volcanic plains and valleys adjacent to the Columbia River and dotted with isolated mountains (EPA 2010). There are landscape features in the area of analysis associated with a series of cataclysmic floods that occurred at the end of the most recent ice age, when glacially dammed lakes ruptured, and large volumes of water rushed through the northwestern United States (NPS 2014).

The Lease Boundary is primarily characterized by the following features:

- Panoramic landscapes are flat to rolling, comprising arid sagebrush steppe and grasslands that have been partially converted to agricultural lands.
- Topography gently slopes from north to south, with a distinctive ridge located north of the Lease Boundary that connects the elevated sagebrush steppe to the Columbia River Valley.
- There are a series of minor drainageways that dissect the landscape, with some forming small canyon settings.
- Due to the arid climate, there are limited trees within the Lease Boundary. Most trees visible in the Lease Boundary are associated with ornamental landscaping and windbreaks adjacent to residences, with the primary vegetation communities being agricultural lands with areas of remnant sagebrush steppe and grassland.
- Vegetation color in agricultural areas ranges from green to tan and brown, depending on the season and the crop being grown. More vivid colors occur along the Columbia River Valley associated with residential, commercial, and agricultural development that contrasts with the arid, muted colors found within the Lease Boundary.
- A series of linear travel routes including I-82 as well as other paved highways, smaller local gravel roads, and natural surface roadways are visible throughout the Lease Boundary.

The inventory of existing landscape character, based on CESA guidance, also considered the intactness of the landscape. This relates to the extent of modifications present in the existing landscape and their overall effect on natural patterns, which define the landscape. These modifications have the potential to create unintended focal points contrasting with the natural landscape character. There are three main landscape character areas that define the Lease Boundary's landscape character:

- Plateau lands west of Interstate 82 (I-82): The arid, rolling plateau lands west of the interstate are mostly intact with limited existing utility or other industrial uses. An existing transmission line traverses the western edge of the Lease Boundary, influencing the adjacent setting. There are also residences dispersed across

this rural agricultural landscape, introducing geometric structures and additional vegetation in the setting associated with wind breaks and ornamental landscaping. The juxtaposition of residences and agricultural lands, including barns and other structures, creates an agrarian landscape character common to the region.

- Plateau lands east of I-82: The landscape east of the interstate is similar to the western area but includes a series of wind turbine strings associated with the existing Nine Canyon Wind Project. There is also an existing transmission line that crosses the Lease Boundary near the west side of the existing Nine Canyon Wind Project and along the southern edge of the Lease Boundary adjacent to I-82. The influence of the existing landscape modifications extends throughout this landscape, reducing its level of intactness. The tall vertical form of the existing wind turbines and their movement attract attention within the setting, generally dominating the local landscape character.
- Ridgeline: This landscape is most prominent east of I-82 but continues to the west as a connection between the flat lands adjacent to the Columbia River and the elevated steppe lands. Due to the steep terrain, this area is visually prominent as viewed from the communities located north of the Lease Boundary. There are multiple paragliding launch sites along the ridge, including Jump Off Joe butte, M&M Ridge, and Kiona Ridge (see Figure 3.12-5). Additionally, there are two strings of the existing Nine Canyon Wind Project sited along the ridge, as well as a communication tower, which reduce the intactness of the setting east of I-82.

Viewing Locations

To identify the KOP locations used in this analysis, a series of bare earth viewshed analyses were run to depict the visibility of the Project from the surrounding area. The bare earth modeling approach used in the viewshed analysis does not account for screening effects from vegetation or buildings that could block or partially block some views. In this manner, the bare earth viewshed approach results in a conservative assessment of potential Project visibility. The analysis in the 2022 ASC submitted for the Project included six viewsheds to compare visibility of the two turbine layout options, identify visibility of the three solar array siting areas, and assess the visibility of the proposed transmission lines (Horse Heaven Wind Farm, LLC 2022). Based on the expansion of the area of analysis for the wind turbines from 10 miles to 25 miles, the viewsheds associated with the two turbine layout options were updated in the updated Horse Heaven Wind Farm Project Visual Impact Assessment Report (**Appendix 3.10-2**) to include this larger, regional setting (SWCA 2023).

Within Horse Heaven Wind Farm, LLC's (Applicant's) visual resources area of analysis, results of the viewshed analyses and aerial photography were used to identify potential KOPs, including:

- Residential structures
- Travel ways (interstate, highways, and local roads)
- Cultural resources with visual aspects
- Recreation areas (including trails)
- Other areas of interest, including open space areas

These KOPs represent critical viewpoints, typical views in representative landscapes, and views of any special Project features. Additionally, the Applicant sought input from Benton County to identify potential areas of interest to local community members. Benton County noted interest on the part of residents located north of the Project. This area of interest contains a large number of residences, as well as a series of parks and other recreation areas. The resulting list of potential KOPs was visited and photographed, and a series of KOPs were identified for

analysis to represent the range of viewers and locations that would have views of the proposed Project infrastructure. In addition to these Applicant-selected KOP locations, supplementary viewing locations were considered to represent views from dispersed residences located directly adjacent to the proposed wind turbines and views from Horse Heaven Hills, a BLM-managed dispersed recreation area (BLM n.d.).

The types of users in the visual study areas include residents of the adjacent Tri-Cities communities, including Benton City, Burbank, Kennewick, Pasco, Richland, West Richland, Finley, and Prosser; travelers on the various interstates and highways; and recreationists visiting the Rattlesnake, Red, Candy, and Badger Mountains, McNary National Wildlife Refuge, and other recreational facilities in the area. Lands within the Lease Boundary are also of interest to the Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, and Nez Perce Tribe, who may attach cultural significance to natural landscape components.

Distance from the Project is a key factor in determining potential visual impacts, with the amount of perceived contrast generally diminishing as distance between the viewer and the affected area increases (BLM 1986). Contrast is defined as the level of visible change to the existing features of the landscape (including landform/ water, vegetation, and human-made structures) resulting from the introduction of a project or management activity. The BLM VRM system and other visual resource systems establish a series of distance zones to identify visibility thresholds and inventory the existing landscape. For the purposes of this study, the distance to the Project (in miles) was used to identify viewing distance, with a particular focus on the foreground distance zone. This area corresponds to the area within 0.5 miles of the Project, where views of modifications to the landscape would be most prominent, leading to views potentially dominated by Project infrastructure.

The list of viewing locations and KOPs used in this analysis, as well as the associated viewer type, viewer sensitivity, and distance to the Project, are presented in **Table 3.10-2** and depicted in **Figure 3.10-2**. Some of the KOPs have multiple views looking in different directions such as KOP 2 (KOP 2a, 2b, and 2c), which includes potential views of the Project to the southeast, south, and southwest (Horse Heaven Wind Farm, LLC 2022).

Table 3.10-2: Key Observation Point Locations

KOP Number	Viewer Name	Viewer Type	Viewer Sensitivity	Distance to Project	Description
1	McNary National Wildlife Refuge (NWR)	Recreation	Moderate	5.2 miles (wind turbines) Solar arrays, transmission lines, and substations/ BESS would not be visible from this location.	Viewpoint is located along an unpaved road within the McNary NWR, looking southwest across the Columbia River toward the Project Lease Boundary.
2 (2a, 2b, and 2c)	S Clodfelter Road – East, Central, and West	Residential	High	3.0 miles (wind turbines) 3.4 miles (transmission line) Solar arrays and substations/BESS would not be visible from this location.	Viewpoint is located along the south side of Manuel Drive, toward S. Clodfelter Road, looking southeast to southwest.

Table 3.10-2: Key Observation Point Locations

KOP Number	Viewer Name	Viewer Type	Viewer Sensitivity	Distance to Project	Description
3	Chandler Butte	Recreation	High	2.5 miles (wind turbines) 2.1 miles (solar array) 4.2 miles (transmission line) The substations/BESS would be visible from this location but would be outside of the photo frame.	Viewpoint is located along the unpaved road east of the communication towers, looking southeast.
4 (4a and 4b)	I-82 South	Travel route	Moderate	7.0 miles (wind turbines) 6.0 miles (solar array) 6.5 miles (transmission line) The HH-East Substation/ BESS would be visible from this location.	Viewpoint is located along the right shoulder of the highway, looking northwest to northeast.
5	Badger Mountain	Recreation	High	4.7 miles (wind turbines) Solar arrays, transmission lines, and substations/ BESS would not be visible from this location.	Viewpoint is located along the southern side of the top of Badger Mountain looking southwest.
6	Bofer Canyon Road/I-82	Travel route	Moderate	1.7 miles (wind turbines) 0.6 mile (solar array) 1.2 miles (transmission line) The HH-East Substation/ BESS would be visible from this location but would be outside of the photo frame.	Viewpoint is located along the right shoulder of the road, looking north.
7	Highway 221	Travel route, residential	High	5.8 miles (wind turbines) 3.1 miles (solar array) 2.2 miles (transmission line) The HH-West Substation/ BESS would be visible from this location.	Viewpoint is located along the right shoulder of the highway, looking northeast.
8 (8a and 8b)	Kennewick (Canyon Lakes Area) – South and West	Residential	High	3.6 miles (wind turbines) 5.9 miles (solar array) 7.4 miles (transmission line) The substations/BESS would not be visible from this location.	Viewpoint is located on the southwest end of S. Olson Street, looking west to south.
9	Benton City	Residential, travel route, commercial	High	2.7 miles (wind turbines) 3.9 miles (solar array) 5.5 miles (transmission line) The substations/BESS would not be visible from this location.	Viewpoint is located on the east side of Division Street/State Route 225, looking south.

Table 3.10-2: Key Observation Point Locations

KOP Number	Viewer Name	Viewer Type	Viewer Sensitivity	Distance to Project	Description
10	Badger Road	Residential, travel route	High	1.5 miles (wind turbines) 6.4 miles (solar array) 4.3 miles (transmission line) The substations/BESS would not be visible from this location.	Viewpoint is located on the north side of Badger Road, looking southwest.
11	Highland/ Finley Area	Residential	High	2.0 miles (wind turbines) 8.5 miles (solar array) 8.7 miles (transmission line) The substations/BESS would not be visible from this location.	Viewpoint is located on the north side of E. Cougar Road near an entrance driveway to Finley Elementary School, looking southeast.
12	County Well Road	Residential, travel route	High	2.5 miles (wind turbines) 0.2 miles (solar array) 0.2 miles (transmission line) The HH-West (Alternative) Substation/BESS would be visible from this location and located 0.5 miles away.	Viewpoint is located on the left shoulder of County Well Road, looking northeast.
13	Travis Road South of Sellards Road	Residential, travel route	High	1.1 miles (wind turbines) 1.0 mile (solar array located outside of photo frame) 0.1 miles (transmission line) The substations/BESS would not be visible from this location.	Viewpoint is located on the right shoulder of Travis Road, looking north.
14 (14a and 14b)	South of Benton City	Residential, travel route	High	1.7 miles (wind turbines) Solar arrays, transmission lines, and substations/ BESS would not be visible from this location.	Viewpoint is located on E. Jacobs Road near Webber Canyon Road and adjacent residences looking southwest to southeast.
15	Interstate 82	Travel route	Moderate	0.7 miles (wind turbines) 0.1 miles (transmission line) 0.1 miles (solar array located outside photo frame) Substations/BESS would not be visible from this location.	Viewpoint is located along the left shoulder of the frontage road adjacent to the highway, looking northwest to northeast.
16	U.S. Highway 730 – Wallula Gap	Travel route	Moderate	Wind turbines, solar arrays, transmission lines, and substations/ BESS would not be visible from this location.	Viewpoint is located along the right shoulder of the highway, looking west toward the Wallula Gap

Table 3.10-2: Key Observation Point Locations

KOP Number	Viewer Name	Viewer Type	Viewer Sensitivity	Distance to Project	Description
N/A	Dispersed residences located 0.5 miles from proposed turbines (foreground views)	Residential	High	Less than 0.5 miles (wind turbines) The other Project component distances would vary but are more specifically described from other KOP locations.	There are approximately 13 residences located within the foreground distance zone of the proposed wind turbines, less than 0.5 miles, with two of those identified as non-Project participating properties. Additionally, there are numerous residences located within 0.5 to 1 mile of the proposed wind turbines.
N/A	Horse Heaven Hills Recreation Area	Recreation	Moderate	0.8 miles (wind turbines) Solar arrays, transmission lines, and substations/ BESS would not be visible from this location.	Dispersed recreation including opportunities for hiking, nature viewing, and mountain biking with potential views of the Project to the south.

Source: SWCA 2023
BESS = battery energy storage system; KOP = key observation point; N/A = not applicable

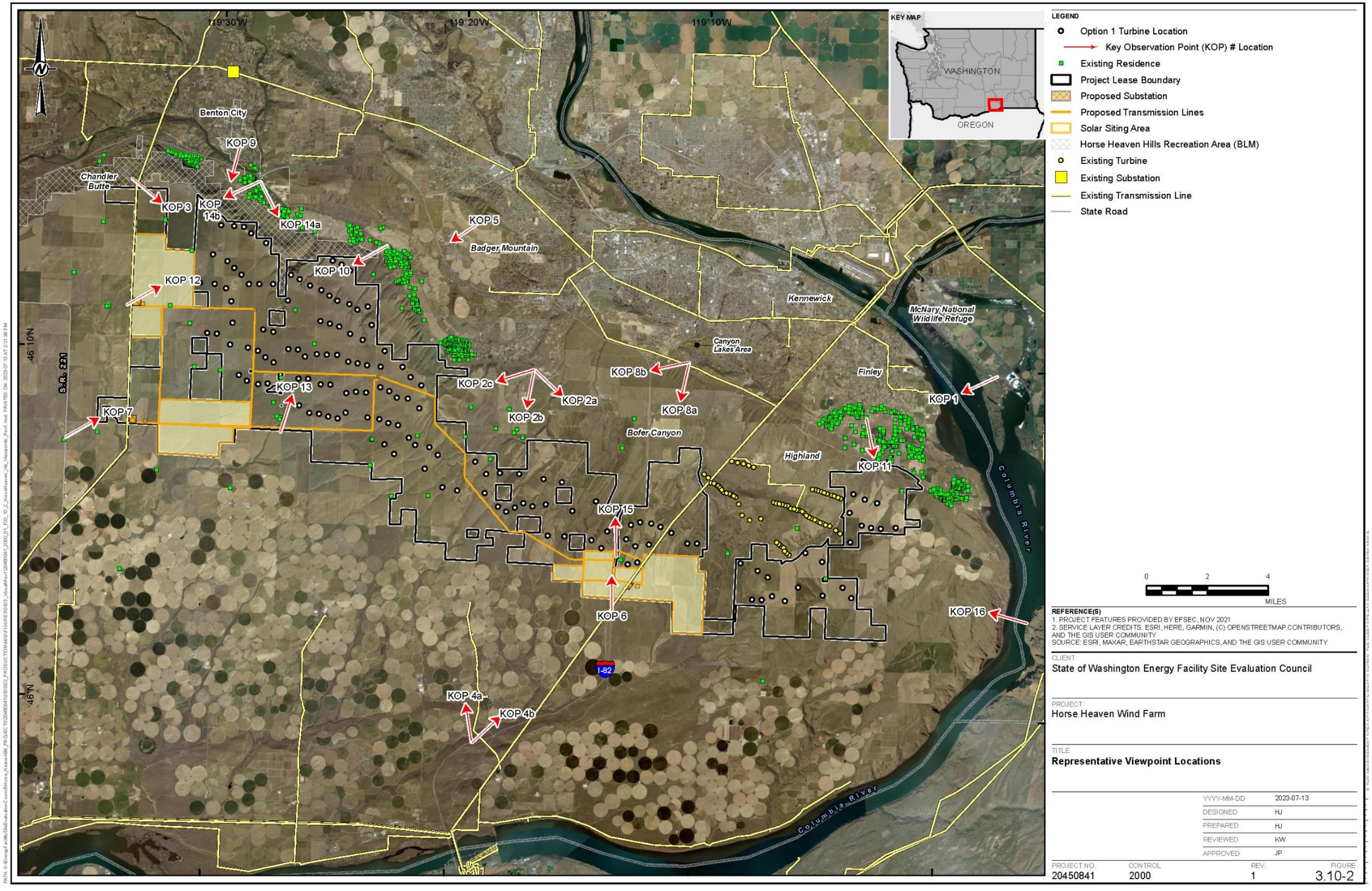


Figure 3.10-2: Representative Viewpoint Locations

A series of visual simulations were prepared from KOPs 1 through 16, with both wind turbine options depicted, and are included in **Appendix 3.10-2**. No simulations were developed from either of the unnumbered KOP viewing locations (e.g., Horse Heaven Hills Recreation Area or dispersed residences within foreground distance zone) as these locations represent distributed views from within the BLM recreation area or from multiple, dispersed residences near proposed turbine locations. Existing condition photographs were taken using standard focal lengths to most closely represent the human field of view. To create photographic simulations, a three-dimensional model of the turbine, solar array, and transmission line layouts were placed in the photographic view, taking into consideration Lease Boundary topography (elevation) and distance from the observation point. Simulated turbines, solar arrays, and transmission lines were aligned to the photographs, and the model was rendered and composited to create the visualizations. Some of the KOP locations have multiple simulations looking in different directions, such as KOP 2, which includes potential views of the Project to both the southeast, south, and southwest (Horse Heaven Wind Farm, LLC 2022). Visual simulations from KOPs 3, 5, 6, and 7, included in the Draft EIS, were updated to reduce the effect of atmospheric conditions to best depict Project visibility under exceptionally clear atmospheric conditions. This included taking new photographs from these viewpoints, as well as digitally dehazing and replacing the sky in the existing photographs. The original and edited photographs are provided for each of the representative viewpoints in **Appendix 3.10-2**. Additionally, three new KOPs (KOPs 14, 15, and 16) with visual simulations were added to the analysis based on public comments on the Project's Draft EIS. The existing photographs and visual simulation of KOP 14 were also updated to reduce the effect of atmospheric conditions and to depict the Project's visibility under exceptionally clear atmospheric conditions.

3.10.4.2 Light and Glare

The landscape surrounding the Project is primarily natural, residential, or agricultural land use and therefore has limited sources of artificial light at night. Existing light or glare could occur from vehicles traveling on local roadways and I-82, nearby rural residential development, the adjacent Nine Canyon Wind Project, and any nearby Bonneville Power Administration substations. No street lighting exists along local roadways. The level of light and glare from these sources is low, and typical for the rural, largely agricultural setting.

The assessment of the existing nighttime lighting is based on the current perceived lighting conditions experienced by viewers at night. To establish a baseline of pre-project lighting conditions, the existing sky glow light levels can be assumed based on receptor locations and their surrounding land uses. The receptor locations are shown in **Figure 3.10-1**.

Based on the ELZ classifications outlined in **Table 3.10-1**, identified receptors inside the Lease Boundary and in the Project vicinity fall into one of the middle two ELZ classifications:

- E2 – Participating residences and receptors adjacent to the Lease Boundary located in rural low density agricultural areas. Light trespass assumed to be indistinguishable from property to property at this ELZ.
- E3 – Receptors adjacent to the Lease Boundary and receptors located in the Project vicinity that are in less rural and more densely populated residential areas, mainly to the north of the Project. Light trespass assumed to be indistinguishable to small from property to property at this ELZ.

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3.11 Noise and Vibration

This section describes the existing noise and vibration environment, as well as the regulatory setting, for the proposed Horse Heaven Wind Farm (Project, or Proposed Action) vicinity. The Project vicinity includes the areas 4 miles south/southwest of Kennewick, Washington, in Benton County, and the larger Tri-Cities urban area along the Columbia River. The Project's potential impacts to noise and vibration including consistency with relevant environmental standards, regulations, goals, and policies is evaluated in Section 4.11.

Acoustic Metrics and Terminology

Acoustic values can be described in terms of noise or sound. Sound is generated by pressure fluctuations in the air. Noise is generally defined as any "unwanted" sound and is therefore based on human perception, but the terms "noise" and "sound" are often used interchangeably. Sound propagation involves three principal components: a sound source, a person or a group of people, and a transmission path. While two of these components, the sound source and the transmission path, are easily quantified (i.e., by direct measurements or through predictive calculations), the effect of noise on humans is hard to determine. It is difficult to predict a response from one individual because there is variation in how people perceive and react to noise.

Level of noise is related to magnitude of sound pressure, which is referred to as sound pressure level (SPL) and is measured in units called decibels (dB). The higher the decibel value, the louder the sound. Decibels are calculated as a logarithmic function of the measured SPL in the air in relation to a reference effective sound level of 0 dB, which is considered the hearing threshold. To account for human response to sound, it is common to use the A-weighted sound level (noted in units of dBA) in evaluating noise sources and their impacts on humans. The A-weighted scale expresses relative loudness as perceived by the human ear, by reducing sound levels mostly at low frequencies to which the human ear is less sensitive. Accordingly, A-weighted decibels will almost always be lower than unweighted decibels.

The following SPL data parameters are typically collected during a typical noise study:

- Leq – The equivalent continuous SPL averaged over the measurement period; this parameter is the continuous steady SPL that would have the same total acoustic energy as the real fluctuating noise over the same time.
- Lmax – The maximum SPL for the sampling period.
- Lmin – The minimum SPL for the sampling period.
- Ldn – The day-night average SPL is calculated with a 10 dBA "penalty" added to nighttime hours (10 p.m. to 7 a.m.). This is done to evaluate potential human response in residential land uses, where humans are more sensitive to nighttime noise impacts.
- Ln – The SPLs that were exceeded n percent of the time during the sampling period. For example, L90 is the level exceeded 90 percent of the time.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Ground-borne noise occurs when vibration radiates through a building interior and creates a low-frequency sound, often described as a rumble, as when a train passes by (FTA 2018). However, in contrast to airborne noise, ground-borne vibration is not a common environmental

problem from wind turbine construction or operation. It is unusual for vibration from sources such as large construction equipment to be perceptible at distances greater than 100 feet. Additionally, commercial wind turbines generate ground vibrations through the wind-structure interaction of the turbine foundation at such low levels that their impacts are negligible (Gonzalez-Hurtado et al. 2017).

In addition to vibration that travels through the ground, vibration can also travel through the air as low-frequency noise (LFN) and/or as infrasound. Sounds with a frequency of 20 hertz (Hz) and lower are called infrasound, and LFN is understood to mean sound with a frequency below 125 Hz. Commercial wind turbines generate noise over a broad spectrum of frequencies, including LFN and infrasound (Møller and Pedersen 2011). LFN, however, is typically accounted for as a noise impact and not a vibration impact. When sound levels are within community standards, then LFN will not be at a level that creates a greater vibration impact.

Regulatory Setting

Federal Regulations

There are no federal noise regulations applicable to the Project.

Washington Administrative Code Statutes

Environmental noise limits have been established by Washington Administrative Code (WAC) 173-60. WAC 173-60 establishes limits on sounds crossing property boundaries based on the Environmental Designation for Noise Abatement (EDNA) of the sound source and the receiving properties.

- Class A EDNA – Lands where people reside and sleep. They typically include residential property; multiple family living accommodations; recreational facilities with overnight accommodations such as camps, parks, camping facilities, and resorts; and community service facilities, including orphanages, homes for the aged, hospitals, and health and correctional facilities.
- Class B EDNA – Lands involving uses requiring protection against noise interference with speech. These typically include commercial living accommodations; commercial dining establishments; motor vehicle services; retail services; banks and office buildings; recreation and entertainment property not used for human habitation such as theaters, stadiums, fairgrounds, and amusement parks; and community service facilities not used for human habitation (e.g., educational, religious, governmental, cultural, and recreational facilities).
- Class C EDNA – Lands involving economic activities that tend to have noise levels higher than those normally experienced in other areas. Typical Class A EDNA uses generally are not permitted in such areas. Typically, Class C EDNA uses include storage, warehouse, and distribution facilities; industrial property used for the production and fabrication of durable and nondurable man-made goods; and agricultural and silvicultural property used for the production of crops, wood products, or livestock.

The noise level limits by EDNA classifications are presented in **Table 3.11-1**. Between the hours of 10:00 p.m. and 7:00 a.m., the noise limitations are reduced by 10 dBA for receiving property within Class A EDNAs. The WAC allows these limits to be exceeded for certain periods of time:

- 5 dBA for no more than 15 minutes in any hour
- 10 dBA for no more than 5 minutes of any hour
- 15 dBA for no more than 1.5 minutes of any hour

WAC 173-60-050 exempts daytime noise generated by blasting and temporary daytime construction noise from the state noise limits.

Table 3.11-1: Washington State Environmental Noise Limits

EDNA of Noise Source Property	EDNA of Receiving Property		
	Class A Day/Night	Class B Land	Class C Land
Class A	55/45	57	60
Class B	57/47	60	65
Class C	60/50	65	70

Source: Washington Administrative Code 173-60-040
EDNA = Environmental Designation for Noise Abatement

Table 3.11-2 shows a maximum noise limit of 60 dBA for a Class C noise source and a Class A receiving property, which is subject to a further reduction of 10 dBA during nighttime hours. The WAC regulatory limits are absolute and independent of the existing acoustic environment; therefore, an ambient sound survey is not required in order to determine conformance. However, based on the requirements under WAC 463-60-352 Built Environment – Environmental Health, and to describe and quantify the background noise environment, an ambient sound survey has been conducted for the Project. The original baseline survey was completed by Tetra Tech, commencing on December 22, 2020, and concluding on January 19, 2021 (Appendix O, Horse Heaven Wind Farm, LLC 2022). A supplemental baseline survey was completed by Tetra Tech to collect additional data, commencing on February 14, 2022, and concluding on March 1, 2022 (Appendix O, Horse Heaven Wind Farm, LLC 2022).

Table 3.11-2: Ln Environmental Noise Limits for Class C Sources

EDNA of Source Property	EDNA of Receiving Property			
	Limit	Ln25	Ln8.3	Ln2.5
Class A Land (day/night)	60/50	65/55	70/60	75/65
Class B Land	65	70	75	80
Class C Land	70	75	80	85

Source: Washington Administrative Code 173-60-040 (b) and (c)
EDNA = Environmental Designation for Noise Abatement; Ln2.5 = SPL exceeded 2.5% of the time; Ln8.3 = SPL exceeded 8.3% of the time ; Ln25 = SPL exceeded 25% of the time; SPL = sound pressure level

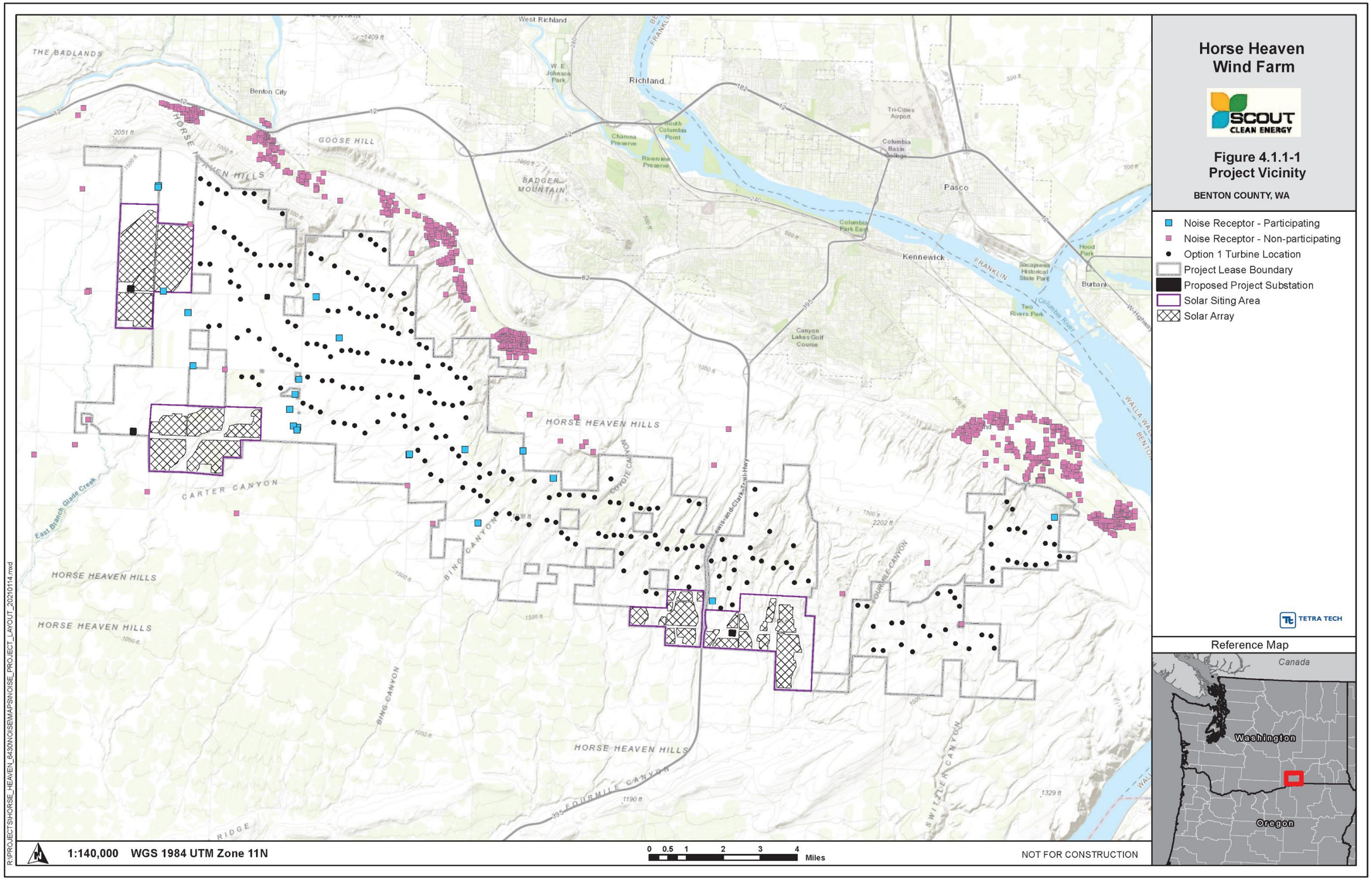
Benton County Code

Chapter 6A.15 of the Benton County Code provides language pertaining to public disturbance and nuisance noise; however, sounds originating from industrial or commercial activities, as well as construction or refuse removal equipment, are exempt (Benton County 2021). The code requires all projects to comply with all noise regulations under WAC 173-60.

3.11.1 Affected Environment

The Project Lease Boundary is dominated by rolling hills bisected by meandering canyons, some of which constitute ephemeral or intermittent drainages. The Horse Heaven Hills ridgeline lies along the northern border of

the Lease Boundary, particularly in the western portion. On the southern side of this ridge, the landscape transitions to relatively rolling topography with shallow, meandering canyons that drain southwest into the Columbia River. **Figure 3.11-1** provides an overview of the Project vicinity and provides the locations of all the nearby residences that are considered noise sensitive receptors (NSR). These receptors are used in Section 4.11 to assess the Project's compliance with WAC standards as a receiving property for noise. Types of NSR typically include residences, hospitals, schools, parks, and churches, and, for the purposes of this study, represent Class A EDNA receiving land uses. The assessment of impacts from the Proposed Action at NSR locations takes into consideration the current acoustic environment at the NSR, applicant commitments presented in 4.11, and future sources of noise.



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.11-1: Noise Sensitive Receptors in Project Vicinity

Variations in acoustic environment and vibration are due in part to:

- Existing land uses
- Population density
- Proximity to transportation corridors

Elevated existing ambient sound levels in the region occur near major transportation corridors such as Interstate 82 (I-82) and in areas with higher population densities such as Benton City or Kennewick (Horse Heaven Wind Farm, LLC 2022). The Lease Boundary is primarily open land or rural in nature and will have comparatively lower ambient sound levels, possibly 30 dBA or less during nighttime, due to the limited number of anthropogenic noise sources. Principal contributors to the existing acoustic environment likely include:

- Motor vehicle traffic
- Mobile farming equipment
- Farming activities such as plowing and irrigation
- All-terrain vehicles
- Local roadways
- Rail movements
- Periodic aircraft flyovers
- Natural sounds such as birds, insects, and leaf or vegetation rustle during elevated wind conditions

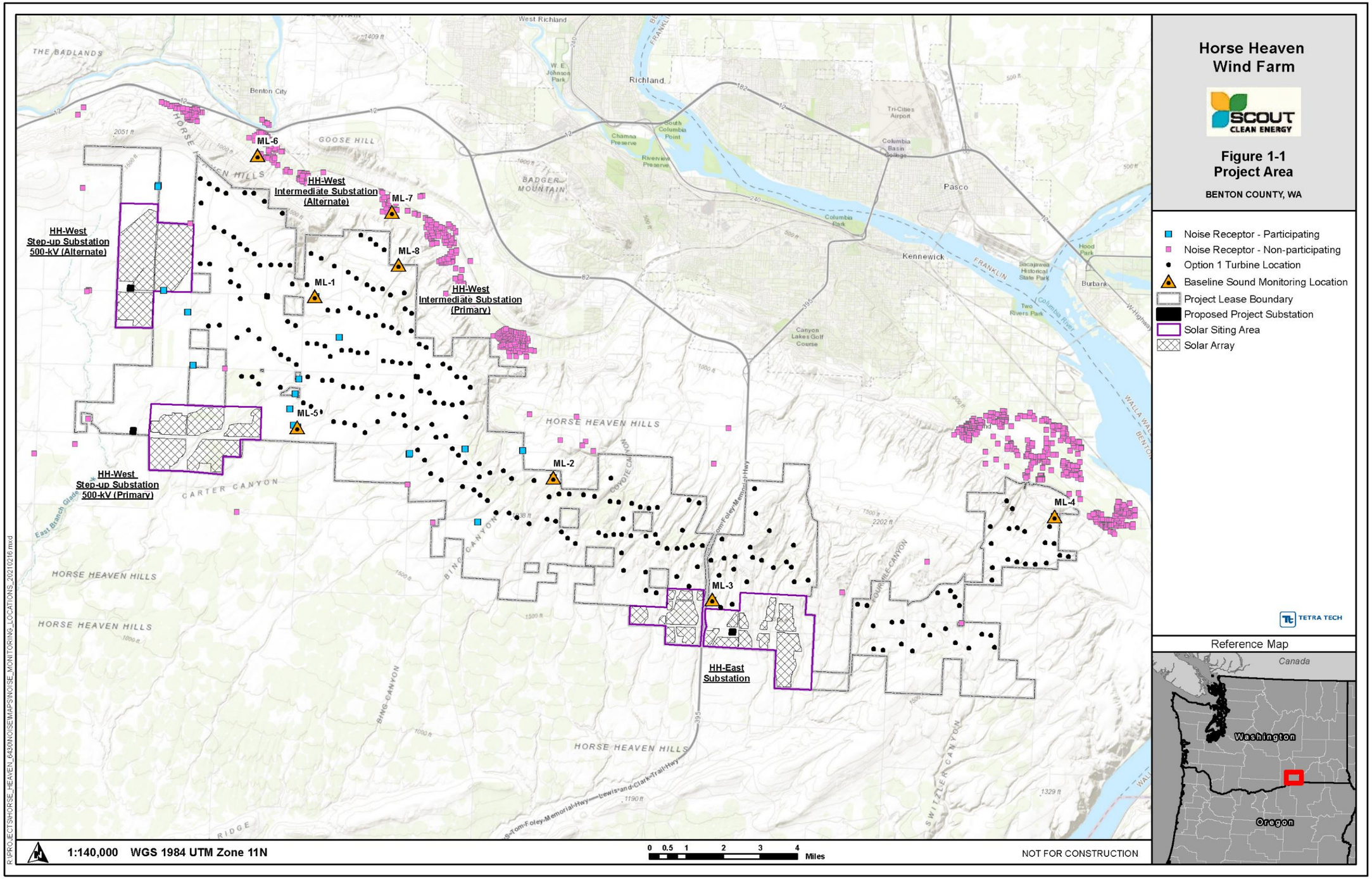
Noise sources are typically louder and more numerous during the daytime than at night—referred to as a “diurnal” pattern. This diurnal pattern typically results in sound levels that are quieter at night than during the daytime, except during periods when evening and nighttime insect noise dominate in warmer seasons.

Ground-borne vibration generated by human activities (e.g., rail and roadway traffic, operation of mechanical equipment and typical construction equipment) typically diminishes rapidly with distance from the vibration source. The Federal Transit Administration uses a screening distance of 100 feet for highly vibration-sensitive buildings (e.g., hospitals with vibration-sensitive equipment) and 50 feet for residential uses and historic buildings (FTA 2018). Vibration-sensitive receptors generally include historic buildings, buildings in poor structural condition, and uses that require precision instruments (e.g., hospital operating rooms or scientific research laboratories). Given the current land uses in the Project vicinity, existing vibrations in the area would be assumed to be at a typical background level and well below the human threshold of perception. No vibration measurements were collected for this study.

3.11.1.1 Ambient Noise Surveys

To document ambient sound levels within the Project Lease Boundary and vicinity, two baseline sound surveys were conducted by Tetra Tech. The original survey was submitted as an addendum to Appendix O of the Application for Site Certification in February 2021 and is included in Appendix O of the updated Application for Site Certification (Horse Heaven Wind Farm, LLC 2022). A supplemental noise survey was conducted to collect data at additional locations and is also included in Appendix O of the updated Application for Site Certification (Horse Heaven Wind Farm, LLC 2022). For these two surveys, seven NSR locations and one boundary location

were selected as monitoring positions for the baseline sound survey. These locations were selected because they are spatially distributed throughout the area and would represent the existing acoustic environment. **Figure 3.11-2** shows the Lease Boundary and vicinity and the location of the eight baseline sound monitoring stations.



Source: Appendix O, Horse Heaven Wind Farm, LLC 2022

Figure 3.11-2: Baseline Sound Monitoring Stations in Project Vicinity

The initial baseline sound survey commenced on December 22, 2020, and concluded on January 19, 2021. Data were collected at monitoring locations ML-1, ML-2, ML-3, ML-4, and ML-5 for a period of approximately 14 days within that window. A follow-up sound survey was conducted between February 14 and March 1, 2022, with data collected at ML-6, ML-7, and ML-8. Long-term baseline surveys are necessary to provide a statistically relevant data set, covering the full range of wind speeds and future operational scenarios. A 10-day monitoring period, weather permitting, provides a representative period to obtain baseline data set. The monitoring locations, dates, and sample type are presented in **Table 3.11-3** and **Figure 3.11-2**.

Table 3.11-3: Monitoring Locations Included in the Baseline Noise Study

Monitoring Location	Geographic Coordinates[(a)]		Location Description	Observations
	Latitude	Longitude		
ML-1	311134E	5117731N	Residence along Henson Road in Prosser	Quiet, with agricultural activities and sporadic noise from animals on site.
ML-2	321518E	5109850N	Residence along C Williams Road in Kennewick	Very quiet, with no roadway noise heard.
ML-3	328433E	5104539N	Residence along S. Bofer Canyon Road in Benton County	Some distant roadway noise from I-82.
ML-4	343329E	5108162N	Residence along Finley Road in Kennewick	Distant farming activity and noise from geese could also be heard.
ML-5	310369E	5112039N	Residence along S. Travis Road in Prosser	Moderate agricultural activity and semi-frequent road traffic along S. Travis Road.
ML-6	308632E	5123877N	Property along N McBee Road in Benton City	Local and distant road traffic.
ML-7	314483E	121403N	Residence along Canyon View Dr Northeast in Benton City	Minor agricultural activity, some construction, local traffic.
ML-8	314766E	119102N	Near Project Lease Boundary east of Dennis Road in Benton City	Infrequent agricultural activity.

Sources: Appendix O, Horse Heaven Wind Farm, LLC 2022
Notes:
[(a)] Universal Transverse Mercator Zone 11T
I-82 = Interstate 82; ML = Monitoring Location

Table 3.11-4 displays the average daytime and nighttime ambient sound levels for each monitoring location for wind speed conditions ranging from calm to maximum rotational wind speed. Ambient sound levels fluctuated constantly during both daytime and nighttime hours, but generally followed a diurnal pattern, and sound levels generally increased with the increase of wind speed. The “Cumulative” levels represent the average of all the monitoring locations at each wind speed condition.

Table 3.11-4: Baseline Sound Survey Results, Leq (Average dBA)

Monitoring Location	Time Period	Wind Speed (m/s)									
		3	4	5	6	7	8	9	10	11	12
ML-1	Day	32	32	33	33	34	35	36	37	38	39
	Night	33	33	34	35	36	37	38	39	40	41
ML-2	Day	33	33	33	32	32	32	33	33	33	33
	Night	31	32	32	32	33	33	34	34	34	34
ML-3	Day	48	48	47	47	47	47	47	47	47	47
	Night	42	43	44	45	46	46	47	48	48	48
ML-4	Day	38	38	39	39	39	40	40	40	40	40
	Night	36	37	37	38	38	38	39	39	39	39
ML-5	Day	45	45	45	45	44	44	44	44	45	45
	Night	39	39	39	39	39	39	40	40	41	41
ML-6	Day	42	42	43	44	44	45	46	47	48	49
	Night	39	40	41	43	44	45	46	47	48	49
ML-7	Day	37	37	38	39	40	41	42	43	44	45
	Night	30	32	34	36	37	39	41	42	44	45
ML-8	Day	32	34	36	38	40	42	44	46	48	50
	Night	25	28	32	34	37	40	42	44	47	49
Cumulative	Day	37	38	39	40	41	41	42	43	43	44
	Night	34	36	37	38	39	40	41	42	43	44

Source: March 2022 Baseline Sound Survey Report, Appendix O, Horse Heaven Wind Farm, LLC 2022
dBA = A-weighted decibels; Leq = the equivalent continuous sound pressure level averaged over the measurement period; ML = Monitoring Location; m/s = meters per second

- Location ML-1 – This location was an exception to the diurnal variation, with daytime noise levels ranging from 32 to 39 dBA and nighttime noise levels ranging from 33 to 41 dBA. Increases in daytime ambient sound levels at ML-1 can be attributed to the agricultural activities occurring on the site.
- Location ML-2 – Ambient sound levels were consistently low and ranged from 32 to 33 dBA during the daytime and 31 dBA to 34 dBA at night. While some sporadic on-site activity and roadway noise contributed to daytime sound levels, the ambient acoustic environment at ML-2 is quiet.
- Location ML-3 – Ambient sound levels were relatively higher due to this location's proximity to I-82 and range from 47 to 48 dBA during the daytime and 42 to 48 dBA at night. The maximum noise level represents noise generated from highway traffic being similar during the day and night. The greater range at night indicates lower frequency of traffic during that specific time period.
- Location ML-4 – Ambient sound levels were slightly higher during the day than at night and ranged from 38 to 40 dBA during the day and 36 to 39 dBA at night. This location best represents the more densely populated land uses in the Lease Boundary as it was located near the community of Finley, to the northeast of the Lease Boundary.
- Location ML-5 – Ambient sound levels exhibited typical diurnal variation but were affected by both nearby agricultural activity and traffic-related noise occurring on S. Travis Road and ranged from 44 to 45 dBA during the daytime and 39 to 41 dBA at night.

- Location ML-6 – Ambient sound levels were relatively higher due to this location's proximity to I-82 (less than 1 mile), local traffic, and proximity to a more densely populated area. The noise levels range from 42 to 49 dBA during the daytime and 39 to 49 dBA at night. The maximum noise level represents noise generated from traffic and higher wind speeds in a high-density vegetation area. This location best represents Benton City.
- Location ML-7 – Ambient sound levels were slightly higher during the day than at night and ranged from 37 to 45 dBA during the day and 30 to 45 dBA at night. The results suggest more anthropogenic noise sources during the daytime, with elevated noise levels coming from higher winds, local traffic, and equipment operations.
- Location ML-8 – Ambient sound levels exhibited typical diurnal variation and were also notably affected by wind speeds with higher noise levels mostly occurring during high wind events. The location is more remote, near the Project Lease Boundary and the noise levels ranged from 32 to 50 dBA during the daytime and 25 to 49 dBA at night. The results suggest that the monitoring area noise environment is less influenced by anthropogenic sources and more affected by wind driven noise.

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3.12 Recreation

This section describes the recreation uses and areas that would be affected by the proposed Horse Heaven Wind Farm (Project, or Proposed Action). Washington Administrative Code (WAC) 463-60-362 states that "the application shall list all recreational sites within the area affected by the construction and operation of the facility and shall then describe how each will be impacted by the construction and operation." Section 4.12 describes impacts on recreation that could result from the construction, operation, and decommissioning of the Proposed Action or No Action Alternative.

Background

Areas devoted to recreation provide people with the opportunity to engage with and enjoy the natural and built environment. Outdoor recreation is an important aspect of life for residents of the Horse Heaven Hills area, and it provides economic benefits to the communities. The Project's study area for recreation includes existing recreation resources and activities within the Project's Lease Boundary and the 25 miles surrounding the Lease Boundary. With the exception of 10 acres that the Washington State Department of Natural Resources (DNR) manages on behalf of the state's citizens, private entities own the entire 72,428 acres within the Lease Boundary.

Regulatory Setting

Laws and regulations used to determine the Project's potential impacts on recreation are summarized in **Table 3.12-1**.

Table 3.12-1: Laws and Regulations for Recreation

Regulation, Statute, Guideline	Description
Local	
Shoreline Management Master Program Regulations as required by RCW 90.58.080	Carries out responsibilities imposed on the respective cities and counties within the Shoreline Management Act of 1971.
County Comprehensive Plans as required by RCW 36.70A.010	Identifies goals, objectives, and policies to protect and maintain resources and preserve land use while promoting development, local coordination, and education.
State	
Washington Growth Management Act; RCW 36.70A	Establishes a series of 13 goals that should act as the basis of all comprehensive plans, including RCW 36.70A.020(9), which guides the use of open space and recreation for the purpose of retaining open space and green space, enhance recreational opportunities, enhance fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreation facilities.
Washington State 2023 Recreation and Conservation Plan	Provides a strategic direction for how local, regional, state, and federal agencies, tribal governments, and private and nonprofit partners can work together to make sure Washington residents' outdoor recreation and conservation needs are met.
WAC 173-60-030	Establishes limits on sounds crossing property boundaries, based on EDNA. Includes Class A EDNA; where people reside and sleep, including residential and recreational areas (e.g., camps parks, camping facilities, and resorts).

Regulation, Statute, Guideline	Description
Fish and Wildlife; WAC 220	Introduces the WDFW and describes regulations promoting conservation of fish and wildlife, while providing fishing, hunting, fish and wildlife viewing, and other outdoor recreation opportunities compatible with healthy, diverse, and sustainable fish and wildlife populations (RCW 77.04.012, 77.04.020, 77.04.055).
RCW 77.04.012	Identifies the responsibility of the WDFW to conserve the wildlife and food fish, game fish, and shellfish resources in a manner that does not impair the resource.

EDNA= Environmental Designation for Noise Abatement; RCW= Revised Code of Washington; WAC = Washington Administrative Code; WDFW = Washington Department of Fish and Wildlife

Recreational facilities, defined by Revised Code of Washington 36.69.010, can include, but are not limited to:

- Parks
- Coliseums for the display of spectator sports
- Playgrounds
- Public campgrounds
- Gymnasiums
- Boat ramps and launching sites
- Swimming pools
- Public hunting and fishing areas
- Field houses
- Arboretums
- Bathing beaches
- Bicycle and bridle paths
- Stadiums
- Senior citizen centers
- Golf courses
- Automobile racetracks and drag strips
- Community centers
- Other recreational facilities

Comprehensive plans contain general goals, policies, and objectives applicable to the recreation resources within the study area. The following comprehensive plans influence recreational activities within the study area:

- Benton County Comprehensive Plan
- Franklin County Comprehensive Plan
- Walla Walla County Comprehensive Plan
- Umatilla County Comprehensive Plan
- Morrow County Comprehensive Plan
- Yakima County Comprehensive Plan
- Kennewick Comprehensive Parks and Recreation Plan
- City of Pasco Parks, Recreation, and Forestry Plan
- City of Richland Parks and Recreation Master Plan
- Benton City Comprehensive Plan
- City of Umatilla Comprehensive Land Use Plan
- City of Boardman Comprehensive Plan
- Hermiston Parks, Recreation and Open Space Master Plan
- City of Prosser Parks and Recreation Plan
- City of Grandview Comprehensive Plan
- City of Grandview Comprehensive Parks, Recreation and Open Space Plan

The county plans all identify goals, objectives, and policies that protect and maintain resources and preservation of land use while promoting development, local coordination, and education. For example, the Benton County Comprehensive Plan encourages the retention of open space and development of recreation opportunities, conservation of fish and wildlife habitat, increased access to natural resource lands and water, and development of parks (Benton County 2022a).

According to the Benton County Comprehensive Plan, Benton County currently owns, or operates under lease, ten park facilities on 2,384 acres providing outdoor recreational opportunities and amenities.

3.12.1 Affected Environment

The study area for recreation resources is in the southeastern portion of Washington and portions of northern Oregon and includes lands within the following counties:

- Benton County, Washington
- Franklin County, Washington
- Yakima County, Washington
- Walla Walla County, Washington
- Klickitat County, Washington
- Morrow County, Oregon
- Umatilla County, Oregon

These lands offer recreational opportunities, including parks and places for camping, hiking, hunting, fishing, boating, swimming, wildlife viewing (including bird watching), and recreational sports (e.g., paragliding). Activities related to each recreation site are discussed in the next sections under each land use administrator. **Figures 3.12-1 through 3.12-4** show the locations of recreation resources within the study area.

The following sections describe existing recreational opportunities and conditions in the study area, separated into three categories: county and private recreational opportunities, state recreational opportunities, and federal recreational opportunities.

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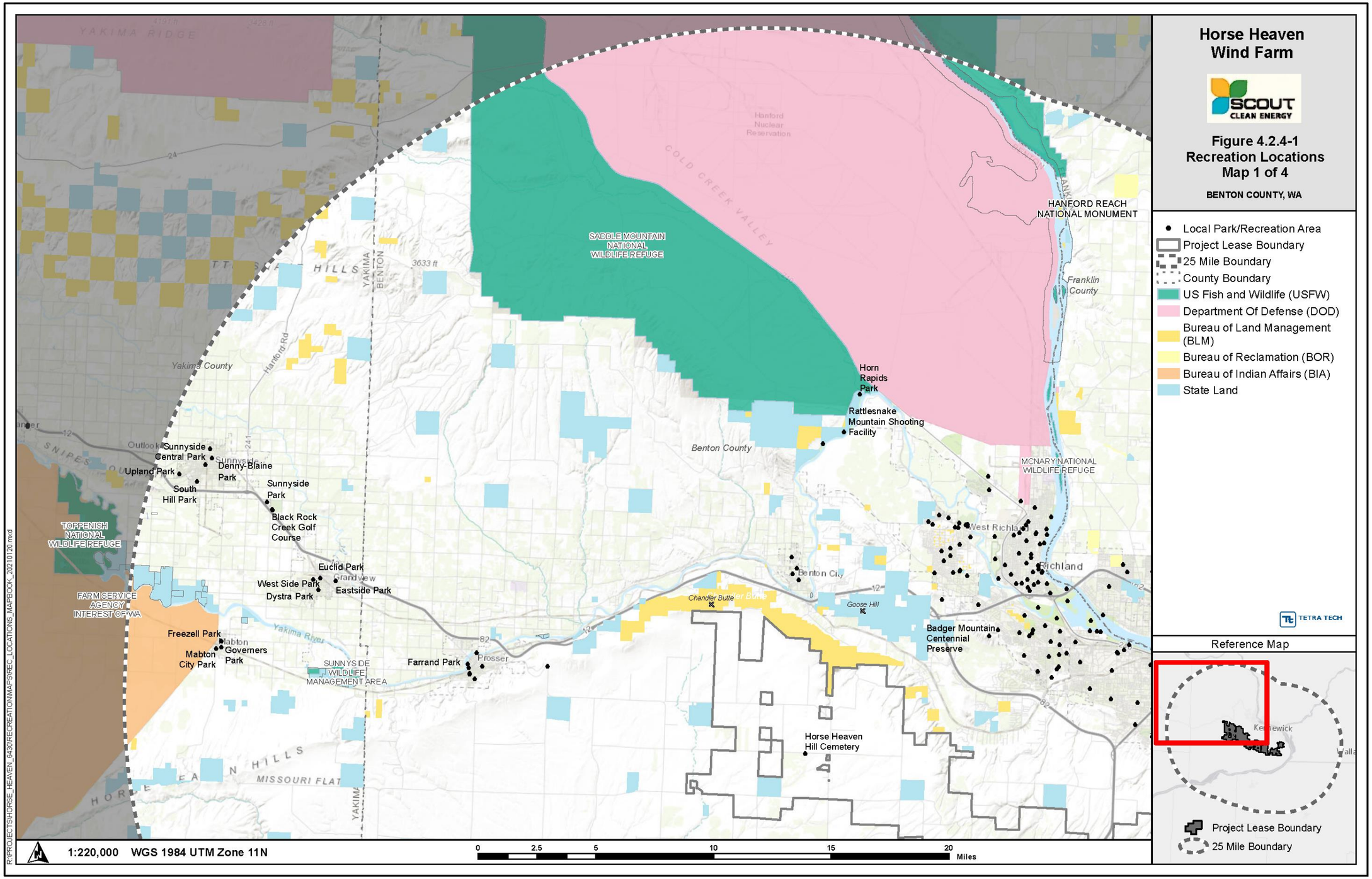
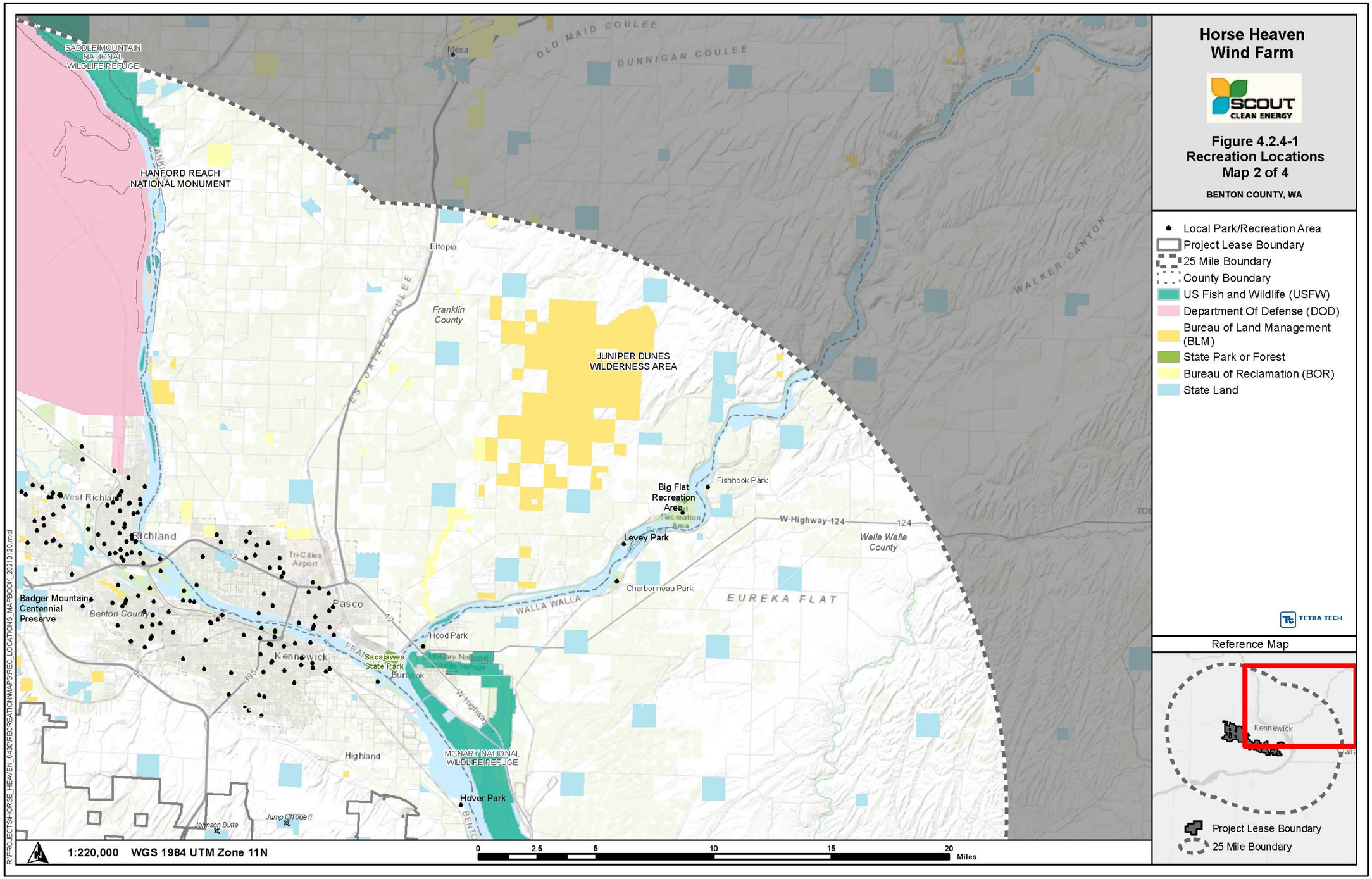


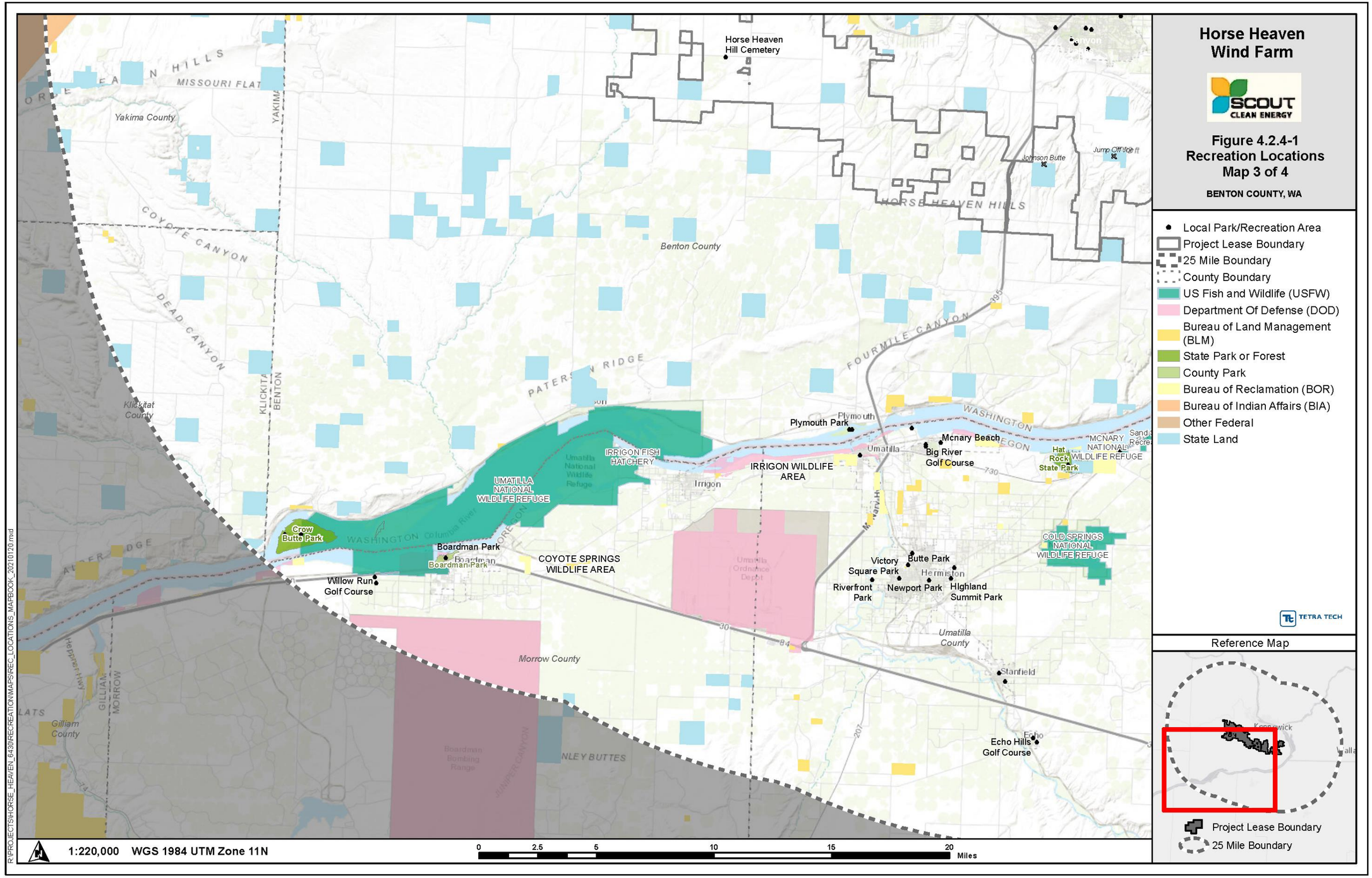
Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.12-1: Recreation Location Map 1 of 4



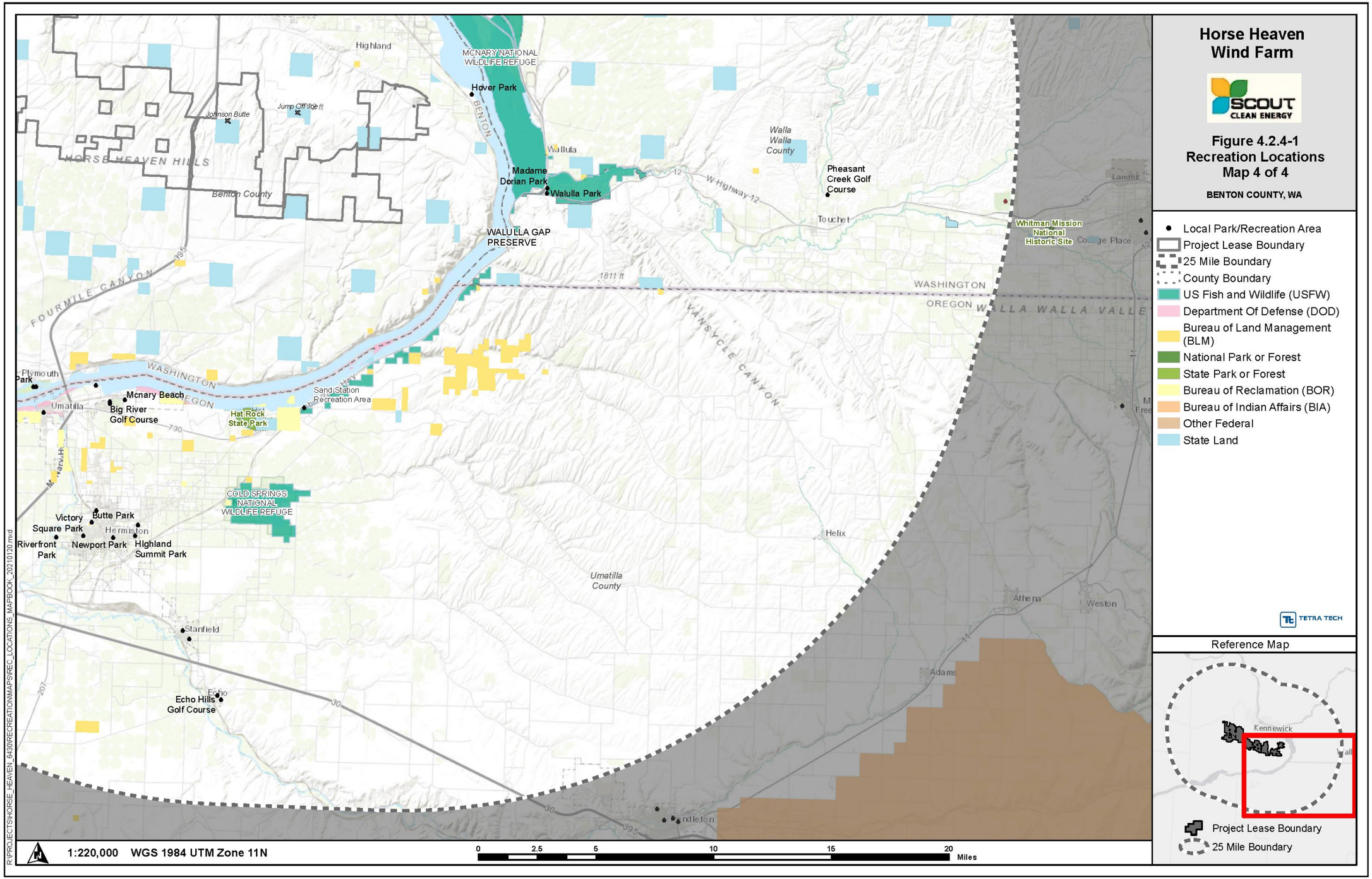
Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.12-2: Recreation Location Map 2 of 4



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.12-3: Recreation Location Map 3 of 4



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.12-4: Recreation Location Map 4 of 4

3.12.1.1 County and Private Resources

County and local lands in the study area that offer recreational activities include areas managed and operated by the counties and private landowners. **Table 3.12-2** summarizes the county and local recreation resources within the study area. While the demand for public recreational opportunities and facilities is increasing, improved public recreational trails are lacking throughout most of the rural County (Benton County 2022b).

Table 3.12-2: County and Regional Resources and Activities within the Recreation Study Area

Recreation Resource Name[(a)]	Management	Distance from Lease Boundary (nearest point of resource)	Description
Horse Heaven Cemetery	Benton County	Within Project Lease Boundary	A 2-acre historical burial ground established in 1893 and formed as a Benton County park in 2012. Offers a small hiking trail and a historic attraction.
Hover Park	Benton County	1.5 miles east	Presently undeveloped, Hover Park is located along the Columbia River on property leased from the U.S. Army Corps of Engineers. A day-use park that offers large areas of undeveloped scenic views, wildlife viewing, fishing, and small multi-use trails. The area also has historical significance. The first wagon train to the area, the Longmire Wagon Train, crossed the Columbia River on rafts near the park in 1853. The first major ferry crossing from Wallula was in the vicinity, and the park is near the original Hover town site, established in 1898.
Wallula Gap Preserve	Benton County	3 miles southeast	This National Natural Landmark is a preservation area that remains undeveloped and generally inaccessible.
Badger Mountain Centennial Preserve	Benton County	4 miles northwest	Offers large areas of undeveloped scenic views, bird watching, multi-use trails, and horseback riding.
Two Rivers Park	Benton County	4.5 miles northeast	Although owned by the U.S. Army Corps of Engineers, this facility is leased to Benton County. Offers playgrounds, open space, swimming, boating, golfing, hiking, bathroom facilities, and parking. Open year round, from 6 a.m. to 10 p.m. in the summer, and during daylight hours in the winter. Two Rivers is home to the last downstream developed boat launch in the Tri-Cities area and is used heavily throughout the year (Benton County 2022b).
Candy Mountain Preserve	Benton County	5 miles northwest	Offers large areas of undeveloped scenic views and small multi-use trails.
Vista Park	Benton County	5 miles northeast	Offers playgrounds, open space, bathroom facilities, and parking. Originally developed by the Vista Junior Women's Club in 1970, Vista is the County's smallest park.
Rattlesnake Mountain Shooting Facility	Benton County	8 miles northwest	Located on land leased by Benton County from Washington State and the BLM; offers various shooting discipline ranges. The Tri-City Shooting Association operates the Rattlesnake Mountain Shooting Facility on behalf of Benton County.

Table 3.12-2: County and Regional Resources and Activities within the Recreation Study Area

Recreation Resource Name[(a)]	Management	Distance from Lease Boundary (nearest point of resource)	Description
Horn Rapids Park	Benton County	9 miles northwest	An 800-acre site owned and operated by Benton County since the 1960s and the only Benton County park where overnight camping is available. In addition to the campground, Horn Rapids Park has a horse camp, model airplane facility, boat launch, and miles of multi-use trails.
Horse Heaven Vista	Benton County	7 miles west	Offers large areas of undeveloped scenic views and small hiking trails or biking.
Boardman Parks and Recreation District	Morrow County	20.1 miles southwest	A recreational area managed by Morrow County, Oregon. The site consists of over 100 acres of land available to the public and includes 5 day-use parks, boating, swimming, walking trails, and areas for RV camping.

Sources: Horse Heaven Wind Farm, LLC 2022; Benton County n.d.
Notes:
(a) There are 208 small local parks within the study area. These various parks are shown in **Figures 3.12-1 through 3.12-4** but are not listed individually in this table.
BLM = Bureau of Land Management; RV = recreational vehicle

The remaining recreation resources within the study area are all local facilities. Three of the 208 facilities are within 5 miles of the Lease Boundary:

- Canyon Lakes Golf Course (3.3 miles north of the Lease Boundary)
- Shark Reef Water Park (3.8 miles north of the Lease Boundary)
- Bombing Range Road Sports Complex (5 miles northeast of the Lease Boundary)

Local facilities provide recreational features, including playgrounds, fields, athletic courts, boat ramps, trails, and restrooms.

Multiple use paths are a popular feature within the study area. Badger Road runs 12 miles in Benton County, effectively connecting the Tri-City metropolitan area to Weber Canyon Road near Benton City, Washington. This route is popular with recreationists, particularly cyclists. Benton County is proposing to add two 6-foot-wide bike lanes along 7 miles of Badger Road, from the City of Kennewick to Dallas Road. Currently, several cycling organizations use this route for events. The road is also listed as a popular route on maps produced by the Benton Franklin Council of Governments. These maps also indicate that the route merits caution in its current form due to the condition of the road (e.g., lack of bike lanes) and amount of traffic (Benton County 2022b).

3.12.1.2 State of Washington and Oregon Resources

State lands that offer recreational activities in the study area include:

- Washington State Department of Natural Resources
- Washington State Parks

- Oregon Parks and Recreation Department
- Oregon Department of Fish and Wildlife

Table 3.12-3 summarizes the state recreation resources within the study area.

Table 3.12-3: State Resources and Activities within the Recreation Study Area

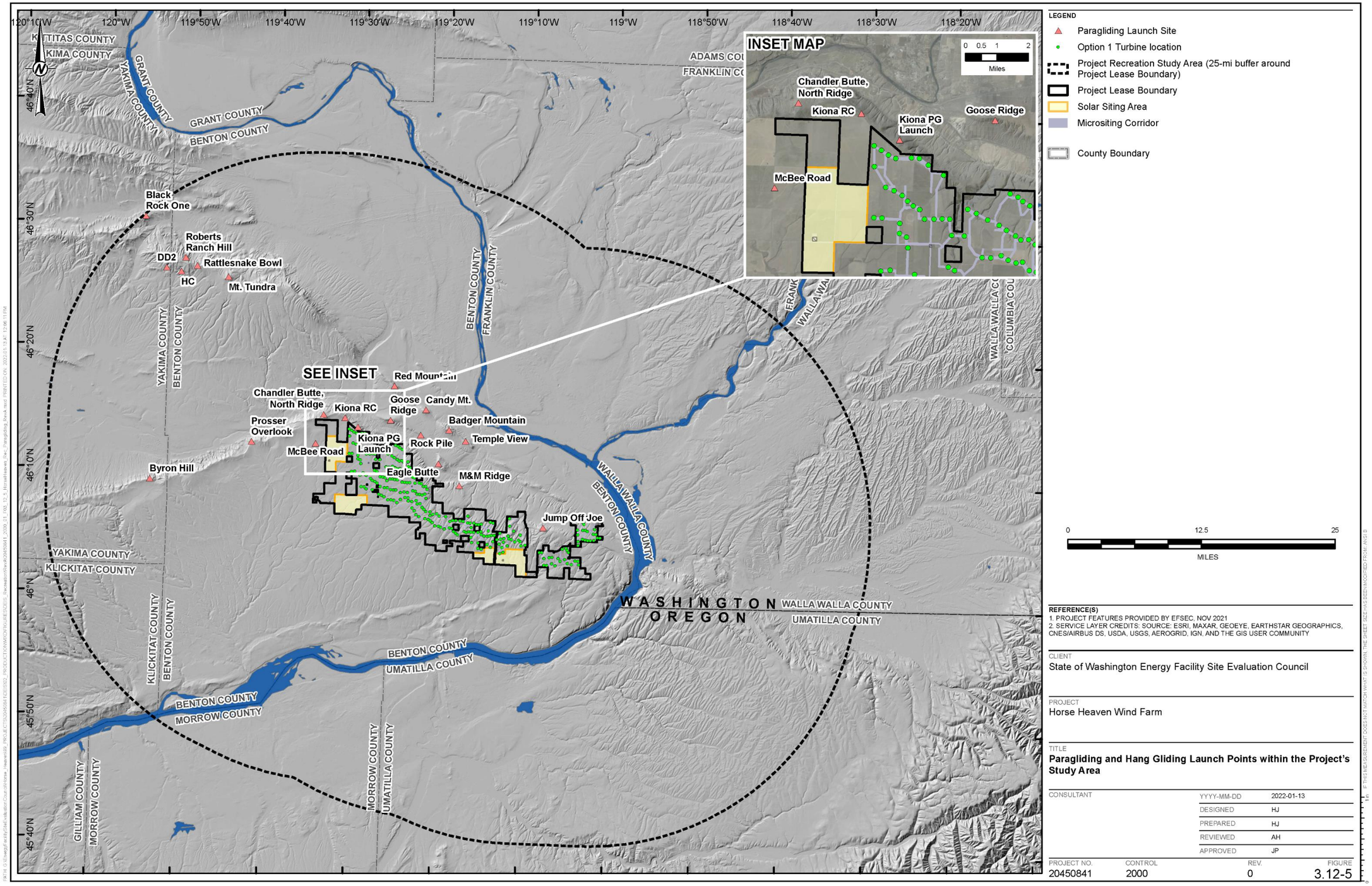
Recreation Resource Name	Management	Distance from Lease Boundary (nearest point of resource)	Description
Johnson Butte	DNR	Within Project Lease Boundary	A low-elevation mountain peak that offers unofficial hiking opportunities, as well as paragliding launch points.
Jump Off Joe Butte	DNR	1.5 miles east	A low-elevation mountain peak that offers unofficial hiking opportunities, as well as paragliding launch points.
Goose Hill Butte	DNR	2 miles northwest	A low-elevation mountain peak that offers unofficial hiking opportunities, as well as paragliding launch points.
Sacajawea Historical State Park	Washington State Parks	5.2 miles north	A 267-acre day-use park with hiking trails, restroom facilities, boating, and camping activities.
Hat Rock State Park	OPRD	8.1 miles south	A day-use area offering picnicking sites, wildlife viewing, fishing, boating, hiking, and restroom facilities on the south shore of Lake Wallula.
Irrigon Wildlife Area	ODFW	11 miles southwest	Part of the greater Columbia Basin Wildlife Area, Irrigon is a 979-acre day-use site for hunting, fishing, wildlife viewing and some accommodations for camping.
Coyote Springs Wildlife Area	ODFW	21 miles southwest	Part of the greater Columbia Basin Wildlife Area, the Coyote Springs Wildlife Area encompasses approximately 160 acres and offers day-use activities, including hunting, with some accommodations for camping.

Sources: ODFW 2008, 2022; DNR 2023 Horse Heaven Wind Farm, LLC 2022; OSP 2022; Washington State Parks n.d.(a), n.d.(b)
Notes:
The DNR also manages lands within the Lease Boundary that are accessible for public hunting. The Washington Department of Fish and Wildlife oversees game management units on DNR-managed lands.
DNR = Washington State Department of Natural Resources; ODFW = Oregon Department of Fish and Wildlife; OPRD = Oregon Parks and Recreation Department

Paragliding and Hang Gliding

Hang gliding, paragliding, and cross-country parasailing occur at approximately 20 locations within the study area on both state and federally managed lands, as shown in **Figure 3.12-5**. Launch sites nearest to the Lease Boundary follow Kiona Ridge (officially known as Chandler Butte), McBee Road, and starting to the west of the Bureau of Land Management (BLM)-administered McBee Trailhead. It is estimated that roughly 100 individuals may launch from Kiona Ridge in a year (Horse Heaven Wind Farm, LLC 2022). Flights from Kiona Ridge are logged voluntarily by pilots using a global flight database, which shows 300 flights since 2010 from Kiona Ridge with a variety of flight paths and landing locations (Paragliding Forum n.d.). Both federal and state agencies are

aware that paragliders and hang gliders launch from lands near the Lease Boundary, and no permit is required so long as it is “casual use” (Smith 2021). From Kiona Ridge, gliders typically launch south and land north of the ridge, although landing sites can cross the Lease Boundary. Depending on wind and weather conditions, cross-country gliders can fly to the Columbia River and across into Oregon.



REFERENCE(S)
1. PROJECT FEATURES PROVIDED BY EFSEC, NOV 2021
2. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY

CLIENT
State of Washington Energy Facility Site Evaluation Council

PROJECT
Horse Heaven Wind Farm

TITLE
Paragliding and Hang Gliding Launch Points within the Project's Study Area

CONSULTANT

YYYY-MM-DD	2022-01-13
DESIGNED	HJ
PREPARED	HJ
REVIEWED	AH
APPROVED	JP

PROJECT NO.	CONTROL	REV.	FIGURE
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Figure 3.12-5: Paragliding and Hang Gliding Launch Points within the Recreation Study Area

3.12.1.3 Federal Resources

This section reviews recreational areas designed, constructed, designated, or used for recreational activities. This assessment does not include protected lands held for potential mining and logging use or restricted lands, although these lands may be used by recreationists (hunters, fishers, etc.). Federal lands that offer recreational activities include the lands administered by the BLM, U.S. Fish and Wildlife Service, National Park Service, and U.S. Army Corps of Engineers. **Table 3.12-4** summarizes the federal recreation resources within the study area. Land within the study area is identified by BLM public data as "an undeveloped watchable wildlife and watchable wildflowers area. Popular with locals, it is primarily used for hiking, nature viewing, photography, and mountain biking" (BLM n.d.).

Table 3.12-4: Federal Resources and Activities Publicly Accessible within the Study Area

Recreation Resource Name	Management	Distance from Lease Boundary (nearest point of resource)	Description
McBee Trailhead (Horse Heaven Hills)	BLM	1.5 miles northwest	A non-designated hiking and biking trail adjacent to the Project's Lease Boundary. Paragliding and hang gliding are known to occur near this location.
Chandler Butte	BLM	1.8 miles northwest	A low-elevation mountain peak that offers unofficial hiking opportunities, as well as paragliding launch points.
Juniper Dunes OHV Area / ACEC Wilderness Area	BLM	15.3 miles northeast	A BLM-administered, 19,600-acre land package that comprises 3,920 acres of loose-sand riding for OHVs.
Ice Age Floods National Geologic Trail	NPS	Varies[(a)]	Details regarding routes and features provided in **Table 3.12-3**.
Hood Park	USACE	6.5 miles northeast	A campground that offers boating, fishing, and swimming activities.
Sand Station Recreation Area (Lake Wallula)	USACE	8 miles south	A day-use facility that offers boating, fishing, and swimming activities.
Charbonneau Park	USACE	12.5 miles northeast	A campground that offers boating, fishing, and swimming activities.
Fishhook Park	USACE	18.5 miles northeast	A campground that offers boating, fishing, and swimming activities.
Crow Butte Park	USACE	22.2 miles southwest	A campground that offers boating, fishing, and swimming activities.
McNary National Wildlife Refuge	USFWS	2.7 miles east	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.

Table 3.12-4: Federal Resources and Activities Publicly Accessible within the Study Area

Recreation Resource Name	Management	Distance from Lease Boundary (nearest point of resource)	Description
Saddle Mountain National Wildlife Refuge	USFWS	8.7 miles north	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.
Cold Springs National Wildlife Refuge	USFWS	11.3 miles south	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.
Umatilla National Wildlife Refuge	USFWS	11.4 miles southwest	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.
Irrigon Fish Hatchery	USFWS	13.9 miles south	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.
Hanford Reach National Monument	USFWS	14.3 miles north	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.
Sunnyside Wildlife Management Area	USFWS	15 miles west	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.
Washington Farm Service Agency Tracts	USFWS	24.7 miles west	A day-use facility, except as modified by fishing and hunting regulations. Recreational activities include fishing, hunting, watching wildlife, and hiking.

Sources: USFWS n.d.(a), n.d.(b), n.d.(c), n.d. (d); Horse Heaven Wind Farm, LLC 2022; BLM n.d.; USACE n.d.(a), n.d.(b), n.d.(c), n.d.(d)
Notes:
(a) Features of the Ice Age Floods National Geologic Trail within the study area are further detailed in **Table 3.12-5.**
ACEC = Area of Critical Environmental Concern; BLM = Bureau of Land Management; OHV = off-highway vehicle; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service

Ice Age Floods National Geologic Trail

The Ice Age Floods National Geologic Trail (IAF-NGT) is a network of geological features left behind by a series of cataclysmic floods that occurred at the end of the most recent Ice Age, when glacially dammed lakes ruptured and large volumes of water rushed through the northwestern United States (NPS 2014; IAFI 2021). Although there are no IAF-NGT routes or features within the Lease Boundary, there are primary and secondary routes and features within the study area. The primary and secondary IAF-NGT routes and features within the study area are shown in **Figures 3.12-6 through 3.12-9.**

The route of the trail, designated by the Omnibus Public Land Management Act of 2009, encompasses several federal and state highways, National Scenic Byways, and multiple loops and spurs across a vast, varied landscape with more than 350 sites and features created by the Ice Age floods (NPS 2014).

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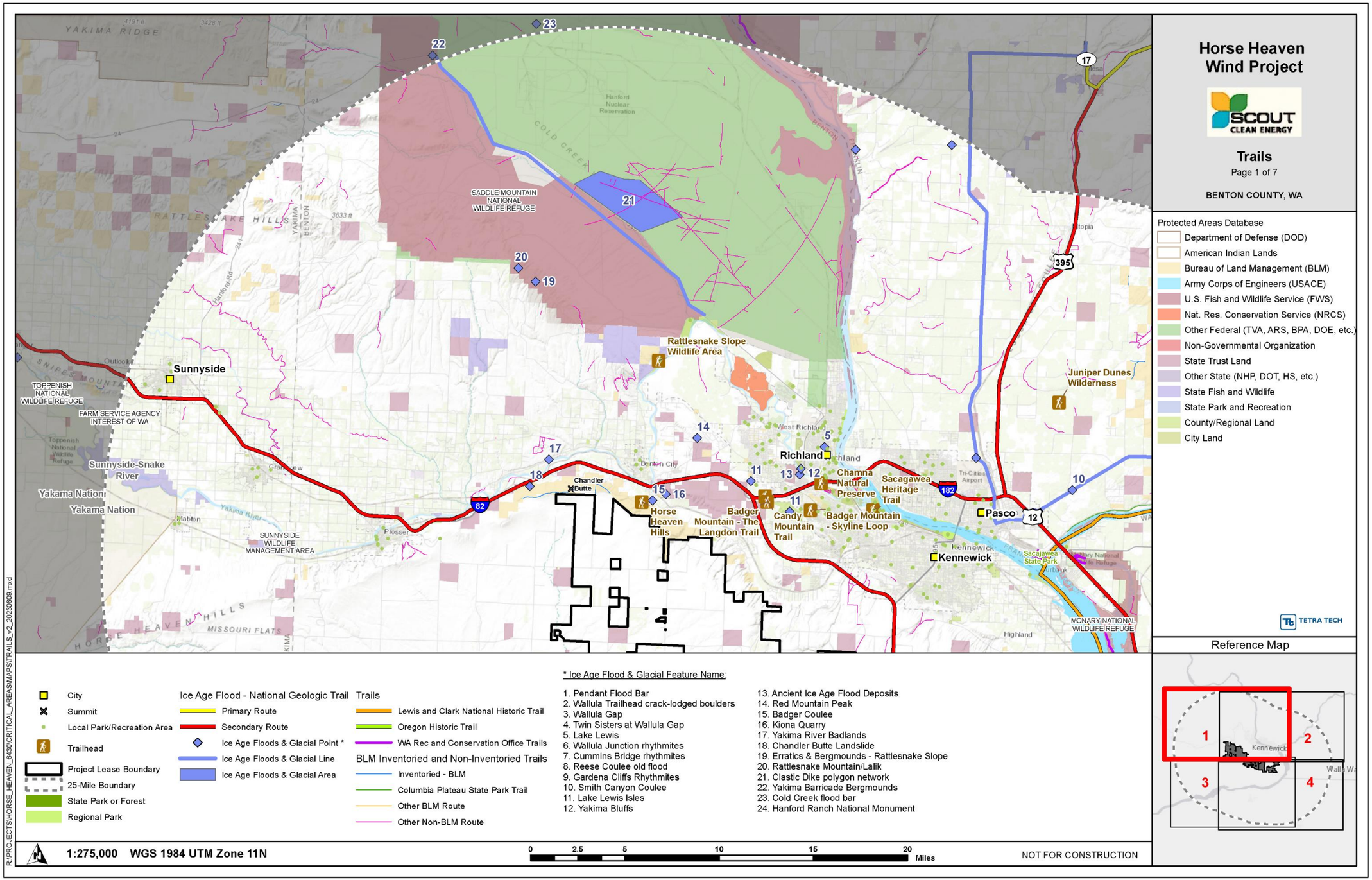
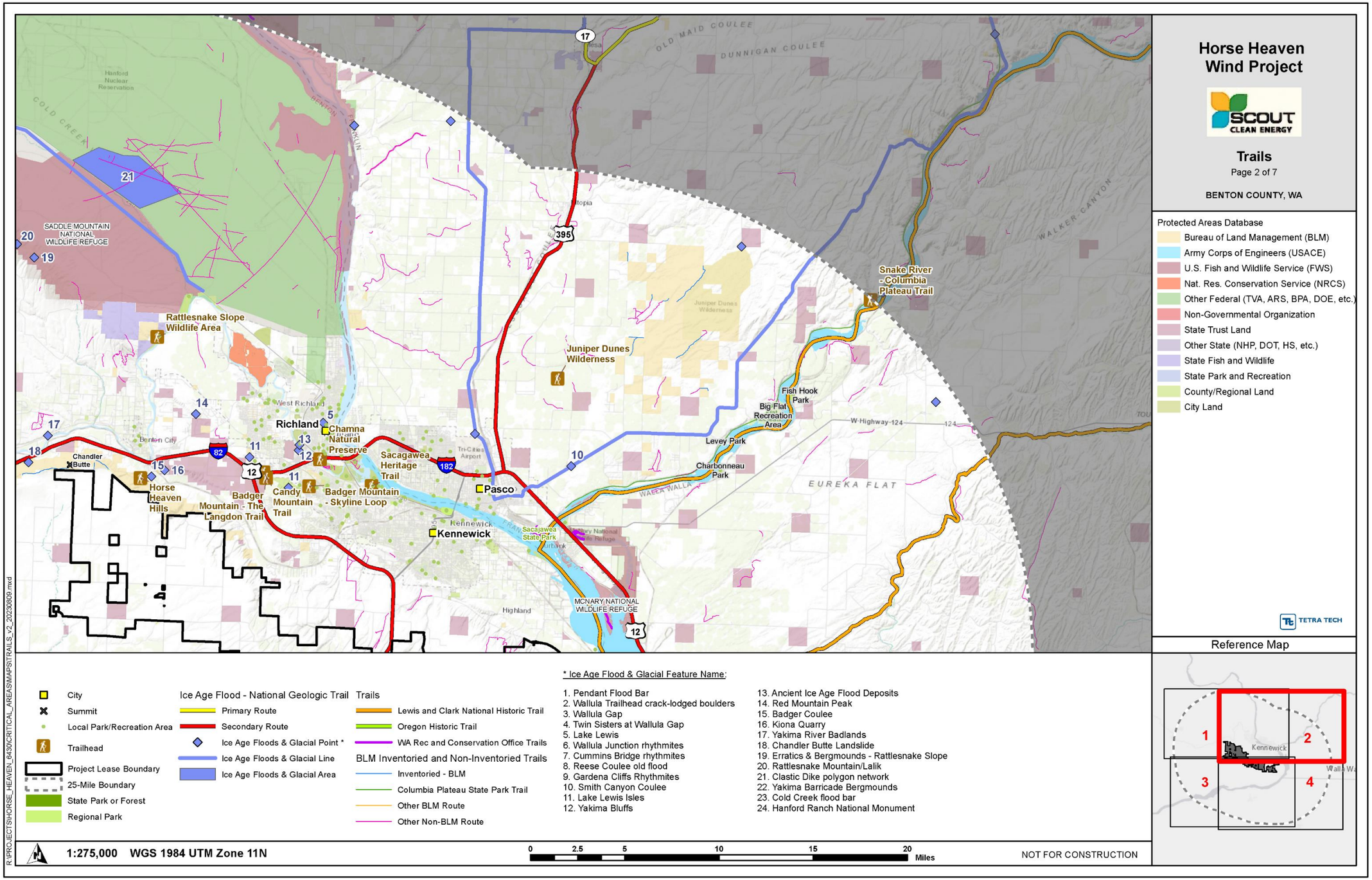


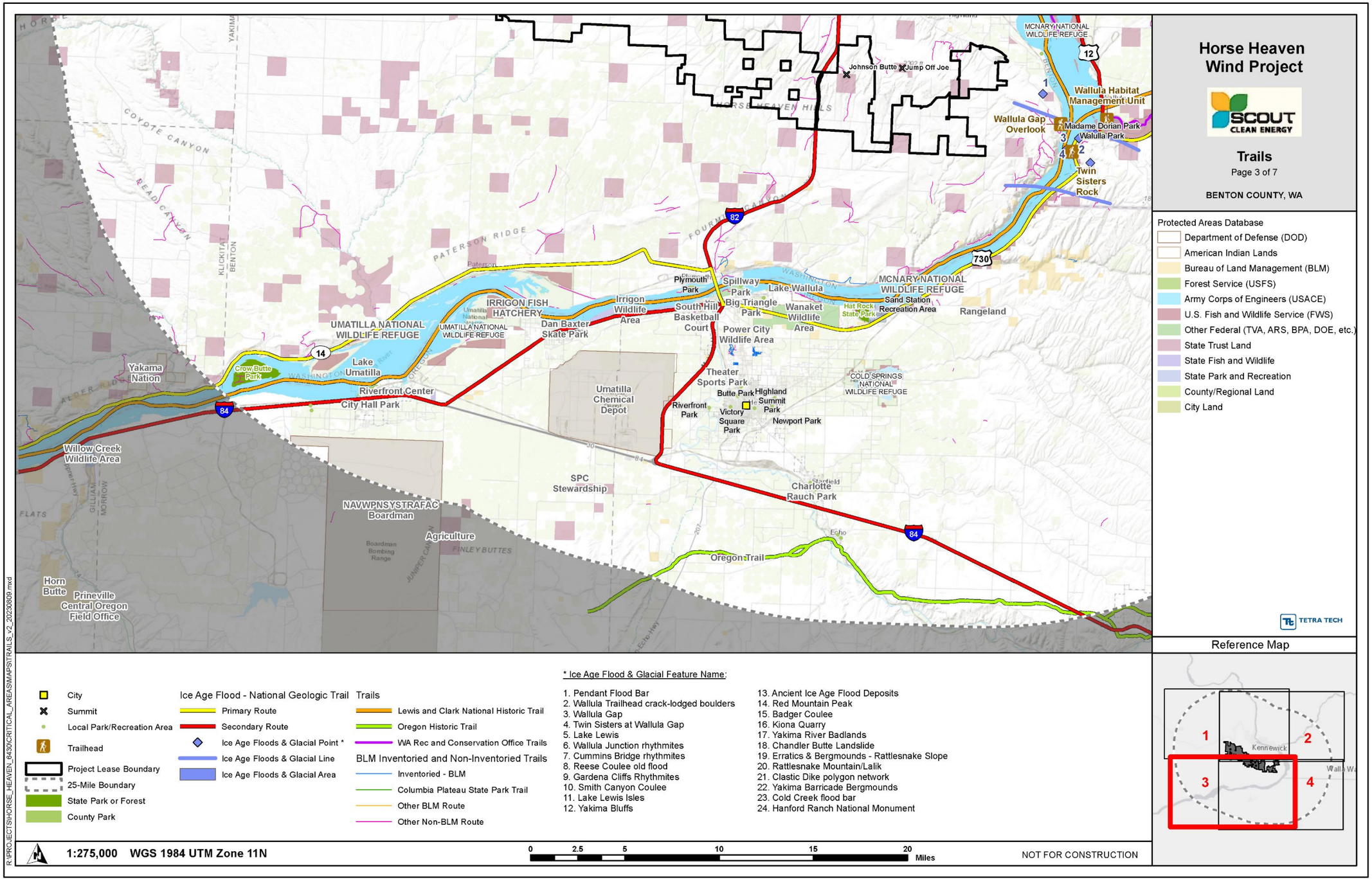
Source: Horse Heaven Wind Farm, LLC 2023

Figure 3.12-6: IAF-NGT Features within the Study Area, Map 1 of 4



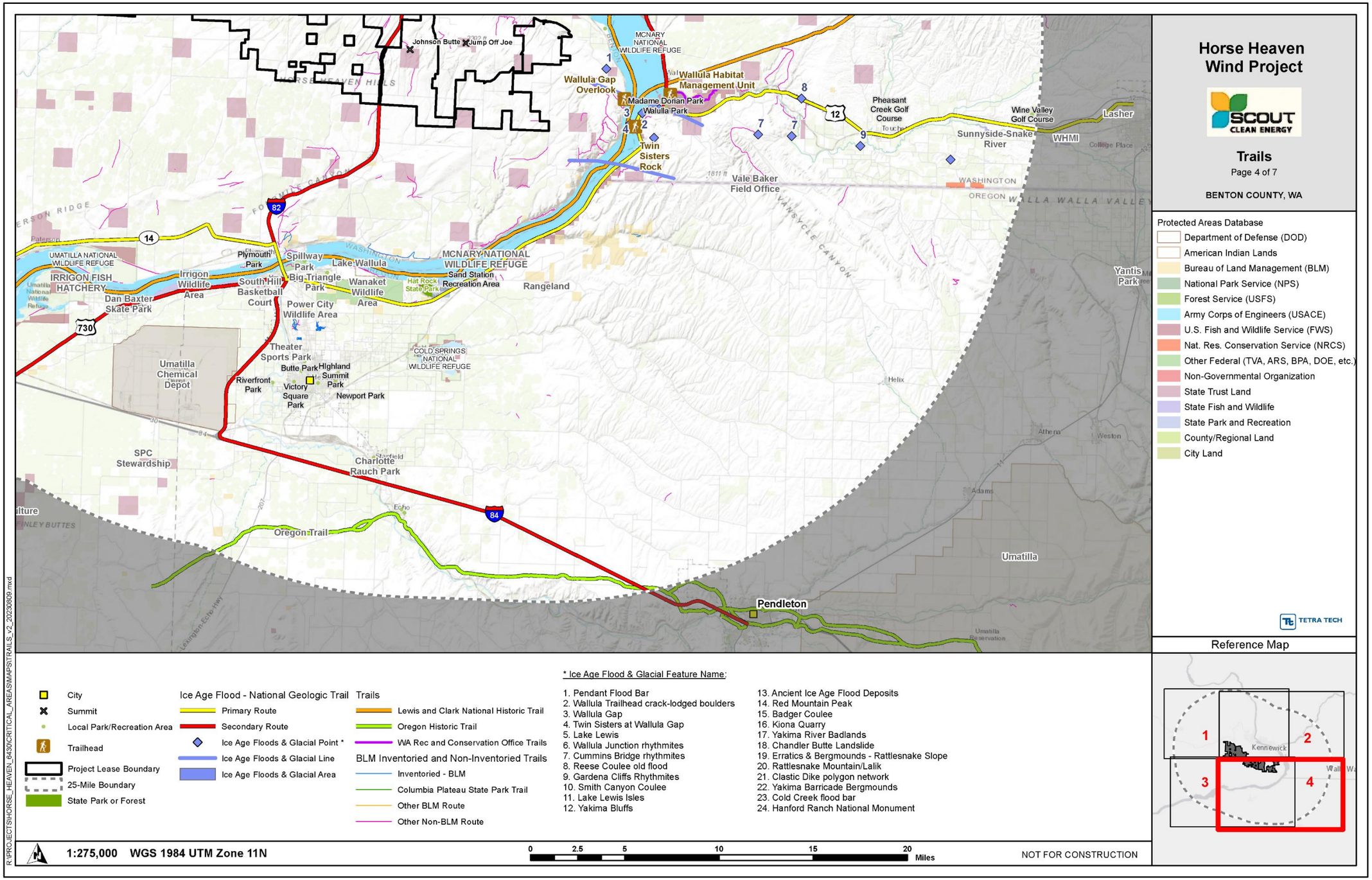
Source: Horse Heaven Wind Farm, LLC 2023

Figure 3.12-7: IAF-NGT Features within the Study Area, Map 2 of 4



Source: Horse Heaven Wind Farm, LLC 2023

Figure 3.12-8: IAF-NGT Features within the Study Area, Map 3 of 4



Source: Horse Heaven Wind Farm, LLC 2023

Figure 3.12-9: IAF-NGT Features within the Study Area, Map 4 of 4

The pathways of these floods extend more than 1,300 linear miles across the region. They begin in the intermountain valleys of western Montana and traverse northern Idaho, central and eastern Washington, and northern Oregon to the coast near Cape Disappointment. The IAF-NGT is one of the few national trails in the United States that focuses on natural, rather than human, history (NPS 2014). The IAF-NGT routes and features and their distances from the Lease Boundary are shown in **Table 3.12-5**.

Table 3.12-5: Ice Age Floods National Geologic Trail Resources within the Recreation Study Area

Feature #[(a)]	IAF-NGT Features within Study Area	Approximate Distance from Lease Boundary (miles)
1	Pendant Flood Bar	1.97
2	Wallula Trailhead crack-lodged boulders	4.73
3	Wallula Gap	4.29
4	Twin Sisters at Wallula Gap	4.61
5	Lake Lewis	7.67
6	Wallula Junction rhythmites	5.37
7	Cummins Bridge rhythmites	10.72
8	Reese Coulee old flood	12.44
9	Gardena Cliffs Rhythmites	16.06
10	Smith Canyon Coulee	9.48
11	Lake Lewis Isles	4.09
12	Yakima Bluffs	5.96
13	Ancient Ice Age Flood Deposits	5.74
14	Red Mountain Peak	4.83
15	Badger Coulee	0.84
16	Kiona Quarry	1.42
17	Yakima River Badlands	1.87
18	Chandler Butte Landslide	1.46
19	Erratics & Bergmounds - Rattlesnake Slope	11.32
20	Rattlesnake Mountain / Lalik	12.15
21	Clastic Dike polygon network	14.17
22	Yakima Barricade Bergmounds	24.17
23	Cold Creek flood bar	24.96
24	Hanford Ranch National Monument	8.52

Source: Horse Heaven Wind Farm, LLC 2022
Notes: (a) As depicted in **Figures 3.12-6 through 3.12-9**
IAF-NGT= Ice Age Flood National Geologic Trail

The IAF-NGT feature nearest to the Lease Boundary is Badger Coulee, located approximately 0.84 miles north. The Badger Coulee feature is a 15-mile-long valley, a former course of the Yakima River before the Ice Age flood deposits. Other features near the Lease Boundary are the Kiona Quarry, Yakima River Badlands, Chandler Butte Landslide, and Pendant Flood Bar. The IAF-NGT secondary route of Interstate 82 bisects the eastern portion of the Lease Boundary.

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3.13 Public Health and Safety

This section describes existing public health and safety resources in the proposed Horse Heaven Wind Farm (Project, or Proposed Action) vicinity. This evaluation of public health and safety resources was prepared in alignment with Washington Administrative Code (WAC) 463-60-352 and focuses on the availability of public service agencies and medical facilities (e.g., law enforcement, fire protection, and medical emergency services) within the vicinity of the Project Lease Boundary. Potential impacts on identified public health and safety resources are evaluated in Section 4.13.

Regulatory Setting

WAC 463-60-352 sections (1) through (6) require an applicant for site certification to provide information pertaining to the following:

- Noise, also required under the Washington State Environmental Policy Act (SEPA) in WAC 197-11-960(7)(b) (WAC 463-60-352[1])
- Risk of fire or explosion, also required under SEPA in WAC 197-11-960(7) (WAC 463-60-352[2])
- Potential releases to the environment affecting public health (such as toxic or hazardous materials), also required under SEPA in WAC 197-11-960(7) (WAC 463-60-352[3])
- Safety standards compliance (WAC 463-60-352[4])
- Radiation levels (WAC 463-60-352[5])
- Emergency plans, also required under SEPA in WAC 197-11-960(7) (WAC 463-60-352[6])

SEPA also requires an applicant to address the potential increased need for public services (WAC 197-11-960[15]).

Additional Washington State regulations pertaining to the health and safety of the public include:

- State Building Code Adoption and Amendment of the 2021 Edition of the International Fire Code (WAC Chapter 51-54A)
- Radiation Protection (WAC 246-220, WAC 246-221)
- Pollution Prevention Plans (WAC 173-307)

The Benton County Code (BCC) provides regulations related to public health and safety, as follows:

- Energy Code (BCC Chapter 3.14)
- Fire Code (BCC Chapter 3.16)
- Public Nuisance - Noise (BCC Chapter 6A.15)

3.13.1 Affected Environment

The Lease Boundary is located in Benton County, which is in southeastern Washington State. The Columbia River bounds Benton County to the north, east, and south, while Klickitat and Yakima Counties bound Benton County to the west. Benton County lands are primarily rural and agricultural, with unincorporated areas making up most of the land. The Lease Boundary lies south of the Tri-Cities—Kennewick, Pasco, and Richland, Washington.

The Project would be situated on vacant land with dryland agricultural vegetation cover and few trees. Limited areas within the Lease Boundary contain historically recognized environmental conditions[25], which have been cleaned up to the satisfaction of applicable agencies (see Appendix C of the 2022 ASC for further details about the cleanup) and would be avoided during construction (Horse Heaven Wind Farm, LLC 2022). The Williams Northwest Pipeline, an underground interstate gas transmission pipeline, traverses the Lease Boundary. Turbines and the solar array would be set back from this pipeline. At a minimum, Project elements would be located outside the pipeline right-of-way, which extends 55 feet to the east and 20 feet to the west of the pipeline. Construction of the Project would not impact the pipeline's operations. Underground collector lines and communications (supervisory control and data acquisition [SCADA]) for the Project would cross above the pipeline. Horse Heaven Wind Farm, LLC (Applicant) would coordinate with Williams (the pipeline owner and operator) on construction specifications and would obtain their approval prior to crossing the pipeline.

The following sections describe the authorities or entities tasked with ensuring public health and safety in the Lease Boundary vicinity within Benton County.

3.13.1.1 Public Services

Emergency Management Services

Benton County Emergency Services is made up of two divisions: the Southeast Communications Center (SECOMM) and Benton County Emergency Management (BCEM). The two divisions assist emergency responders and promote community safety (Benton County n.d.).

- **SECOMM**: SECOMM's responsibilities include providing dispatch services to all law enforcement, fire and emergency management services, and emergency response agencies (including 9-1-1 response) within Benton and Franklin Counties. SECOMM is the 9-1-1 dispatch center for the following emergency service agencies in the vicinity of the Lease Boundary:
  - Kennewick Police and Fire
  - Richland Police and Fire
  - Pasco Police and Fire
  - Benton County Sheriff's Office
  - Benton County Fire Protection Districts 1, 2, 4, 5, and 6
- **BCEM**: The primary responsibility of BCEM is to minimize the impact of disasters on the people, property, economy, and environment of Benton County. BCEM's activities include comprehensive disaster planning, preparedness education, training, and resource coordination. In addition to hazards such as wildfires and floods, BCEM plans and prepares for emergencies at the Hanford decommissioned nuclear production site and the Columbia Generating Station.

[25]A "historically recognized environmental condition" is a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls (for example, activity and use limitations or other property use limitations). A historically recognized environmental condition is not considered a "recognized environmental condition," meaning a condition where a hazardous substance or petroleum product is present or likely to be present in, on, or at the subject property. (ASTM E1527-21)

Law Enforcement

Law enforcement comprises the agencies and employees responsible for enforcing laws, maintaining public order, and managing public safety. The primary duties of law enforcement include the investigation, apprehension, and detention of individuals suspected of criminal offenses. The following state and local agencies have law enforcement service areas covering the Lease Boundary vicinity:

- **Benton County Sheriff's Office**: The Benton County Sheriff's Office Bureau of Law Enforcement is made up of 60 commissioned deputies and 10 non-commissioned employees. The Patrol Division consists of a Patrol Lieutenant overseeing 34 deputies and is responsible for providing an initial response to all requests for service received by the Sheriff's Office. The Patrol Division also performs the following:
  - Conducts the initial investigation of all reported crimes within the agency's jurisdiction
  - Conducts traffic enforcement and traffic accident investigations
  - Provides emergency response to assist with natural and human-caused disasters, often in conjunction with other area law enforcement and fire rescue agencies

The Detective Division handles all major crime investigations within the Sheriff's Office's jurisdiction and internal investigations into the conduct of the Sheriff's deputies. The Civil Division processes and serves court papers, and the Records Division processes the investigative reports prepared by the Patrol Division.

- **Kennewick Police Department**: The Kennewick Police Department has a Patrol Division with four 12-officer squads that provide professional law enforcement services to the community. These services include crimes in progress, investigations, traffic enforcement, and other emergency and non-emergency calls. The Criminal Investigation Division is responsible for investigating felony crimes and high-profile cases (including, but not limited to, homicides, assaults, armed robberies, arsons, burglaries, kidnappings, internet crimes, auto thefts, identity theft, and other felony crimes). The Administrative Services Division is responsible for employment (in conjunction with the City's Human Resources Department), training, internal affairs, and animal control authority, among other administrative services.
- **Washington State Patrol District 3:** District 3 comprises the seven southeastern counties of Washington State (including Yakima, Benton, and Franklin counties), covering over 900 miles of state and interstate highways, and shares borders with Oregon and Idaho. More than 140 employees are assigned, providing an array of law enforcement and investigation services. District 3 operates from four detachment offices across the state, the closest of which is in Kennewick.

Fire Protection

The five incorporated communities and portions of the remaining unincorporated area of Benton County are served by municipal and rural fire departments. Richland and Kennewick municipal fire departments are operated by full-time fire personnel. Prosser, Benton City, and West Richland operate with full and part-time positions, along with volunteer staff. The unincorporated areas of Benton County are served by six fire districts that are primarily staffed by volunteer personnel.

The Lease Boundary primarily falls within the jurisdiction of Fire Districts #1 and #5.

- **Benton County Fire District #1:** Fire District #1 protects an area of approximately 320 square miles south of Kennewick, Richland, and West Richland and serves a population of approximately 17,500 residents,

including the communities of Finley, South Kennewick, El Rancho Reata, and Badger Canyon. Through a Cooperative Agreement with the Bureau of Land Management (BLM) Spokane District, the Fire District also responds with fire suppression forces to 66,742 acres of BLM land in Benton, Franklin, and Yakima Counties. Within District #1 are residential areas, commercial and industrial complexes, educational facilities, agricultural areas, wildland areas, and zones of interfaces between urban and wildland/agriculture uses. District #1 has 13 career staff and 90 dedicated volunteer firefighters, officers, emergency medical technicians, first responders, and support personnel serving out of six fire stations. District #1 averages 1,350 calls for service each year, 55 percent of which are for emergency medical services and the remainder for fire. The potential for District #1 to experience a substantial wildland fire is high.

- **Benton County Fire District #5:** Benton County Fire District #5 covers an area of approximately 400 square miles and is primarily a wildland fire agency, with some urban/suburban interface with neighboring agencies. Fire District #5 also responds to vehicle accidents and provides some non-ambulance emergency medical services but relies on neighboring fire agencies for structure firefighting. District #5 operates out of four main stations with approximately 20 volunteers.

Both districts are part of the Tri-County Master Mutual Aid Agreement, including all fire departments and fire districts within Benton, Franklin, and Walla Walla Counties. Mutual aid agreements allow a jurisdiction to provide resources, facilities, services, and other required support to another jurisdiction during an incident (for example, Franklin County Fire District 3 responds to calls for wildland fires in Franklin County and across the Tri-Cities).

3.13.1.2 Health Services

Benton County residents receive in-patient care at three general hospitals in Kennewick, Prosser, and Richland. The Lease Boundary vicinity falls within the jurisdiction of the Kennewick and Prosser Hospital Districts. A Hospital District directed by elected board members operates each of the Kennewick and Prosser hospitals.

- The Kennewick Hospital District provides healthcare services for its district or service area by contracting these services from RCCH Health Care Partners/Trios (RCCH). RCCH operates two hospitals and several related facilities in Kennewick. The two hospitals are the 74-bed Trios Southridge Hospital, which opened in 2014, and the older 37-bed Trios Women's and Children's Hospital. Classified as a Level III[26] Adult Trauma Center, Trios Southridge Hospital offers 24-hour emergency room services, seven days a week, with 27 emergency treatment rooms. Emergency departments are designated by the resources they have available to treat cases of traumatic injury.
- Prosser Memorial Hospital is a critical access hospital with 25 beds. Classified as a Level IV Adult Trauma Center, Prosser Memorial Hospital offers 24-hour emergency room services seven days a week. A Level IV designation means that the department can provide advanced life support measures to stabilize a trauma patient enough to be transported to another facility, if necessary. Prosser Memorial Hospital's emergency medical services team provides western Benton County with primary 911 emergency treatment and ambulance transportation to local area hospitals.

[26] A Level III designation means that the department can provide prompt assessment, resuscitation, surgery, intensive care, and stabilization of injured patients.

- Kadlec Regional Medical Center, located in Richland, is a regional medical center with 270 beds. Classified as a Level III Adult Trauma Center, the center offers 24-hour emergency room services seven days a week. The Richland hospital is a not-for-profit, private corporation governed by local volunteer trustees.

Benton County is also served by public and private medical clinics that provide treatment for most medical issues. In neighboring Franklin County, Lourdes Medical Center is a critical access hospital with 35 beds. Classified as a Level IV Adult Trauma Center, Lourdes Medical Center offers 24-hour emergency room services seven days a week.

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3.14 Transportation

This section describes the traffic and transportation systems in the study area of the proposed Horse Heaven Wind Farm (Project, or Proposed Action). The study area for the transportation analysis includes roadway intersections, railroad mainlines, and marine terminal facilities in the vicinity of the Project, which is defined as approximately 4 miles south/southwest of the city of Kennewick, Washington, and the larger Tri-Cities urban area along the Columbia River. Conditions of transportation systems beyond the Washington border, including the conditions of Interstate 84, are not included in this assessment. Section 4.14 assesses impacts of the Project or No Action Alternative on transportation systems.

Regulatory Setting

Washington Administrative Code 463-60-372 sections (1) through (6) require that an applicant provide information for site certification pertaining to:

- Transportation systems
- Vehicular traffic
- Waterborne, rail, and air traffic
- Parking
- Movement/circulation of people or goods
- Traffic hazards

3.14.1 Affected Environment

Washington is an economic gateway state, connecting Asian markets to U.S. industries, Alaska to the continental United States, and Canada to the U.S. West Coast. Imports to Washington support U.S. manufacturers and provide goods to consumers, while agricultural exports support family farms throughout the Pacific Northwest and Midwest. Goods coming into Washington by container ship often go to the Midwest and East Coast.

Regional economies in Washington—and their manufacturing, agriculture, construction, and forestry components—depend on an effective and efficient freight transportation system. Businesses in Washington rely on the freight system to ship their products to local customers in the state, U.S. markets in California and on the East Coast, and worldwide. Freight-dependent industries provide 46 percent of all jobs in Washington (WSDOT 2017). These jobs occur in the most heavily freight-dependent industry sectors such as wholesale and retail, manufacturing, construction, agriculture, and transportation. These sectors rely on the multimodal freight network to conduct day-to-day business.

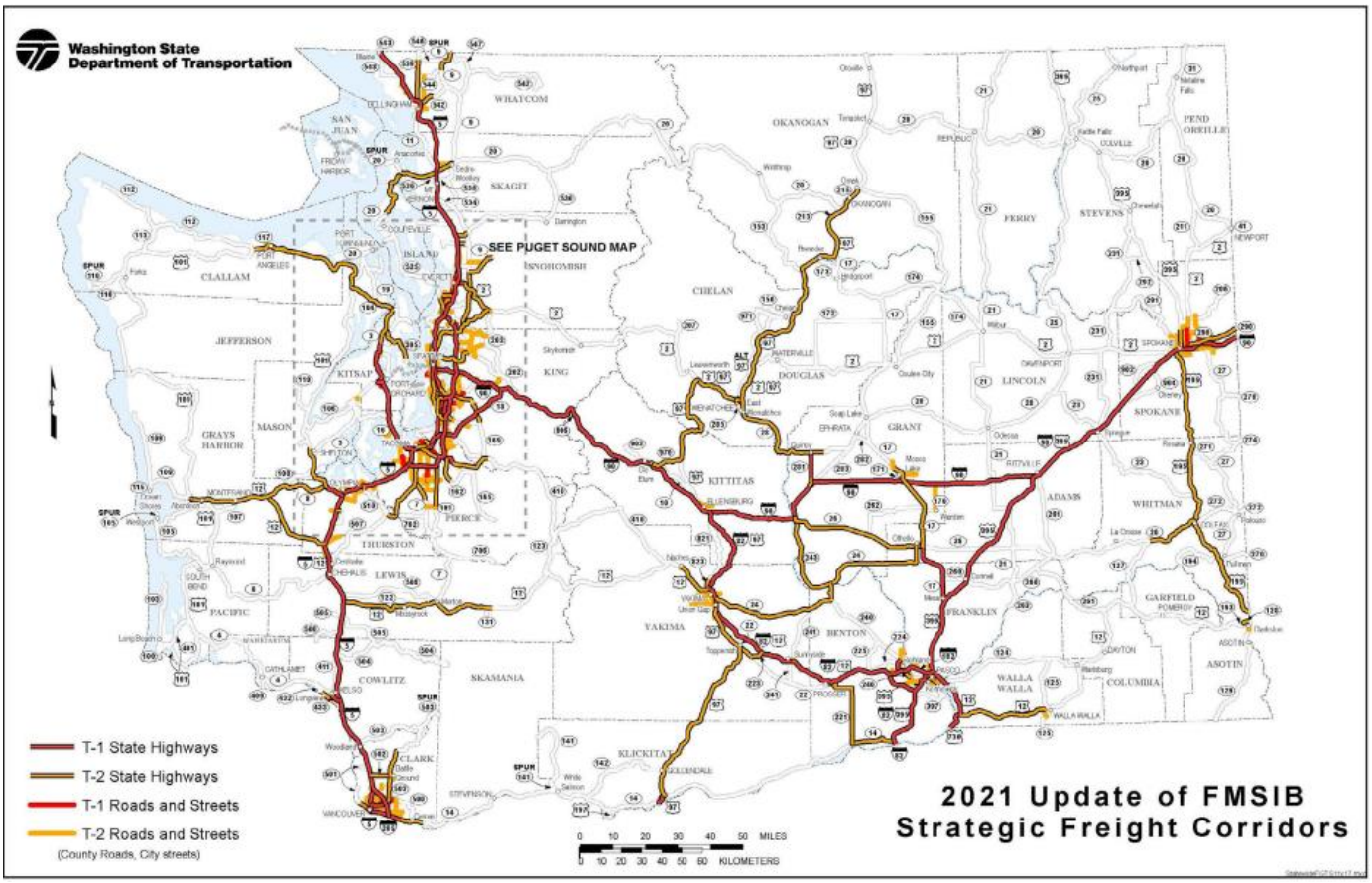
The 2021 Freight and Goods Transportation System (FGTS) classifies freight corridors by modes in Washington State based on annual freight tonnage moved, including truck, rail, and waterway freight corridors (WSDOT 2021a). Each modal network is classified into five tiers, and the specific annual tonnage thresholds for freight moved are described below:

- FGTS truck corridors are categorized as follows:
  - T-1 corridors: more than 10 million tons
  - T-2 corridors: 4 million to 10 million tons

  - T-3 corridors: 300,000 to 4 million tons
  - T-4 corridors: 100,000 to 300,000 tons
  - T-5 corridors: at least 20,000 tons in 60 days and less than 100,000 tons per year

Both T-1 and T-2 corridors are shown in **Figure 3.14-1**.

- FGTS rail corridors are categorized as follows:
  - R-1 corridors: more than 5 million tons
  - R-2 corridors: 1 million to 5 million tons
  - R-3 corridors: 500,000 to 1 million tons
  - R-4 corridors: 100,000 to 500,000 tons
  - R-5 corridors: less than 100,000 tons
- FGTS waterway corridors are categorized as follows:
  - W-1 corridors: more than 25 million tons
  - W-2 corridors: 10 million to 25 million tons
  - W-3 corridors: 5 million to 10 million tons
  - W-4 corridors: 2.5 million to 5 million tons
  - W-5 corridors: 0.9 million to 2.5 million tons



Source: WSDOT 2021b

Figure 3.14-1: Statewide Map of 2021 T-1 and T-2 Truck Freight Corridors

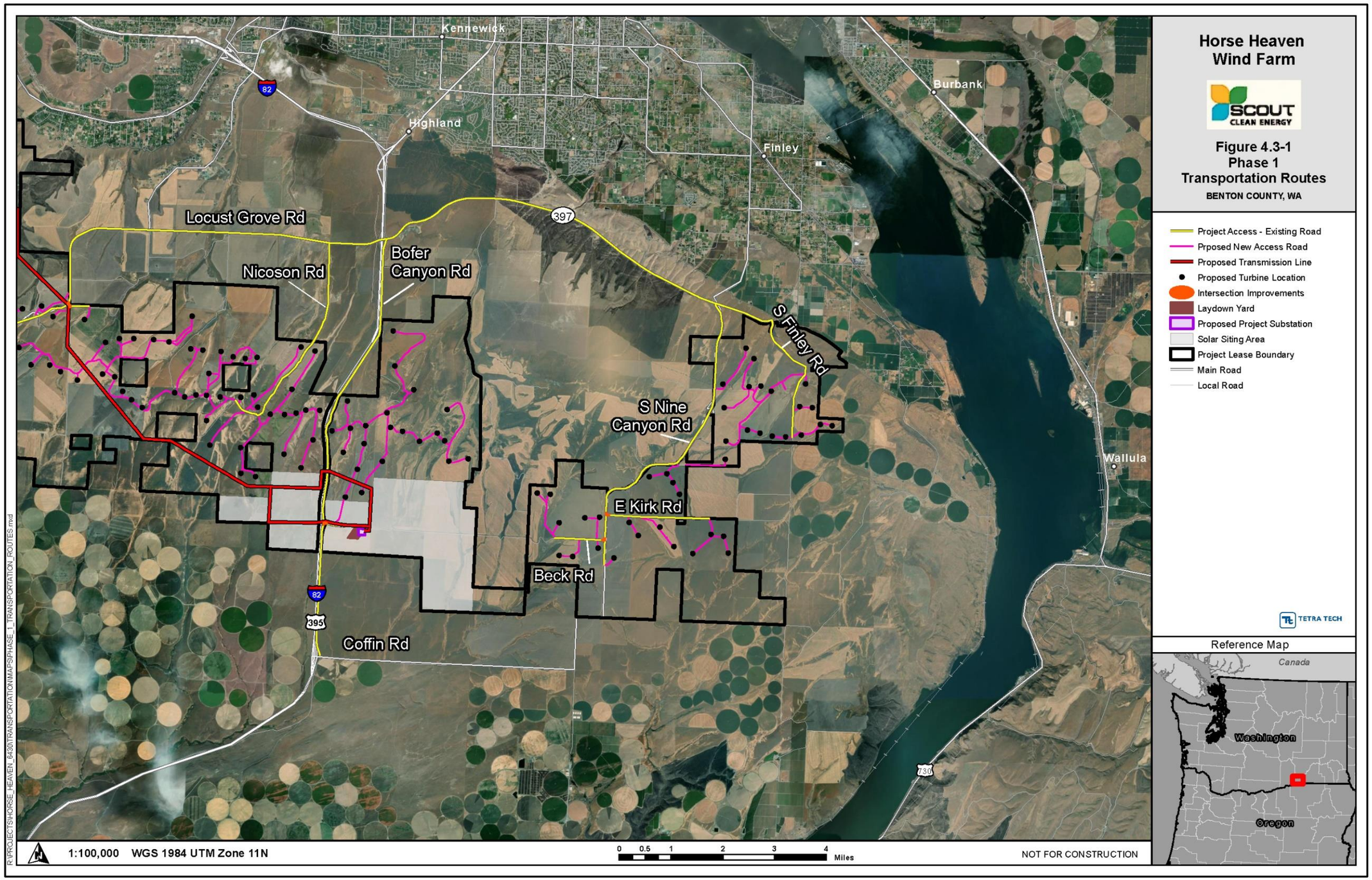
The Project would occupy two non-contiguous areas making up the Project's Lease Boundary, bisected by Interstate 82 (I-82), a T-1 Corridor. Each area would utilize a different set of local roads and constructed access roads for interior access; however, both areas would be served by I-82 as the primary inbound route for materials. All equipment is anticipated to be delivered from the south to the Project location during construction and decommissioning. From I-82, State Route 397—a T-3 Corridor—and county two-lane roads would be used to access the eastern portion of the Lease Boundary. The western portion of the Lease Boundary would be accessed from the south entering from Oregon along I-82, to State Route 221 – a T-2 corridor – and county roads. Impacts of transporting oversize and overweight loads were not evaluated along State Route 221, and therefore State Route 221 would not be considered for oversize and overweight transport during construction of the Project.

Workers would arrive from multiple locations during construction, operation, and decommissioning. The Proposed Action in the context of Horse Heaven Wind Farm, LLC's (the Applicant's) example in the 2022 Application for Site Certification (ASC) is a phased approach to construction, described as follows:

- Phase 1 construction could generate power via wind and solar. Phase 1 could also include a battery energy storage system (BESS) capable of storing energy.

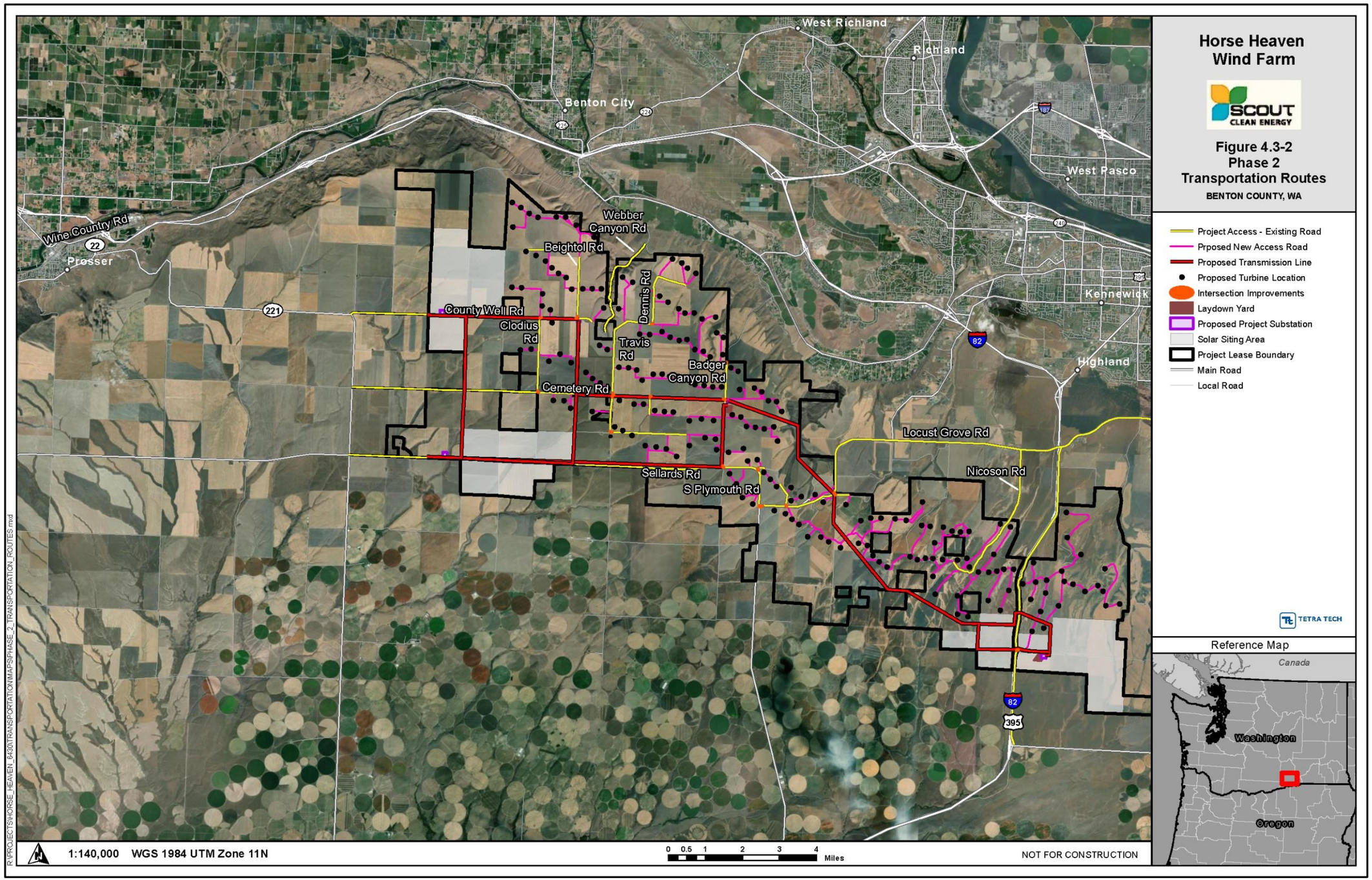
- Phase 2 construction is divided into Phase 2a and Phase 2b, summarized as follows:
  - Phase 2a could consist of the construction of both wind and solar facilities. The Applicant's Phase 2a scenario also includes the construction of a BESS.
  - Phase 2b could increase power generation via the construction of additional wind turbines, but construction would not include a BESS.

Possible transportation routes for the Project during construction are shown in **Figure 3.14-2** for Phase 1 and **Figure 3.14-3** for Phase 2.



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.14-2: Transportation Routes for Phase 1



Source: Horse Heaven Wind Farm, LLC 2022

Figure 3.14-3: Transportation Routes for Phase 2

The Project vicinity is utilized for agricultural activities. Most of the roads that would be utilized by the Project primarily serve local rural residents and the transport of agricultural produce. The agriculture and food-manufacturing sector is a cornerstone of Washington's economy in both rural communities and metropolitan areas. The top four agricultural supply chains in Washington are apples, dairy, wheat, and potatoes, with all supply chains relying on corridors within the study area (WSDOT 2017).

3.14.1.1 Local Infrastructure

The Washington State Department of Transportation (WSDOT) is charged with planning, funding, implementing, constructing, and maintaining the multimodal transportation system in the state. WSDOT is responsible for managing and directing the state's freight and passenger rail capital and operating programs.

WSDOT establishes level of service (LOS) standards for state highways and ferry routes of statewide significance based on Revised Code of Washington (RCW) 47.06.140(2). LOS is a qualitative measure that predicts the quality of experience by motorists using the infrastructure. An LOS analysis evaluates the potential change to the LOS rating of roadways and intersections anticipated to be impacted by Project development. The LOS analysis provides a standardized means of categorizing efficiency and experiential quality by assigning a letter grade to it. LOS ratings range from A to F, with A representing the best conditions and F representing unacceptably high congestion and delays, as shown in **Table 3.14-1**. Regional transportation planning organizations and WSDOT jointly develop and establish LOS standards for regionally significant state highways and ferry routes based on RCW 47.80.030(1)(c).

Table 3.14-1: Definition of Level of Service Ratings for Roadways

LOS	Description[(a)]	Signalized Intersection	Unsignalized Intersection	Highway/ Freeway	Volume-to-Capacity Ratio
		Delay (s/veh)		Density (pcpmpl)	
A	Free-flow	0–10	0–10	0–11	0.00–0.60
B	Reasonably free-flow	10–20	10–15	11–18	0.61–0.70
C	Stable flow	20–35	15–25	18–26	0.71–0.80
D	Approaching unstable flow	35–55	25–35	26–35	0.81–0.90
E	Unstable flow	55–80	35–50	35–45	0.91–1.00
F	Forced or breakdown flow	> 80	> 50	> 45	> 1.00

Source: Horse Heaven Wind Farm, LLC 2022
Notes:
[(a)] Descriptions provided by the summary of data in WSDOT (2021c)
> = greater than; LOS = Level of Service; pcpmpl = passenger cars per mile per lane; s/veh = seconds per vehicle

Procedures based on the Transportation Research Board Highway Capacity Manual guidelines were used to complete an LOS analysis for roads impacted by Project development (TRB 2016). The LOS performance measure of an intersection is based on the delay that an average vehicle will experience after approaching the intersection. Unsignalized intersections include two-way and all-way stop-controlled intersections and roundabouts. Signalized intersections are those that have traffic signals/traffic lights. The LOS for highways and freeways is based on the density of the road in passenger cars per mile per lane. Roadways that are not highways/freeways are only analyzed at their intersections, as the intersections on those roads are the conflicting

zones where delay occurs. Grade-separated interchanges are analyzed as two independent unsignalized/ signalized intersections where the two exit ramps meet the cross street.

The State of Washington's Growth Management Act (RCW 36.70A.070) requires that cities and counties include a transportation element in their comprehensive plans. The transportation element of the Benton County Comprehensive Plan describes the existing transportation network, LOS, planned improvements and financing, and intergovernmental coordination needs, as required under RCW 36.70A.070(6), which helps integrate the transportation planning with land use (Benton County 2022).

After adoption of the comprehensive plan, local jurisdictions must adopt and enforce ordinances that prohibit development approval if the development causes the LOS on a locally owned transportation facility to decline below the standards adopted in the transportation element of the comprehensive plan, unless transportation improvements or strategies to accommodate the impacts of development are made concurrently with the development. These strategies may include increased public transportation service, ride-sharing programs, demand management, and other transportation systems management strategies.

Benton County participates in the Benton-Franklin Regional Transportation Planning Organization and the Tri-Cities Metropolitan Planning Organization. RCW 36.81.121 requires the development of a perpetual, advanced, six-year transportation improvement program (TIP) for coordinated transportation that describes the road maintenance and improvement program. The 2022–2027 six-year TIP was approved on August 10, 2021 (Benton County 2021). Transportation and roadway projects are identified to meet stated performance measures addressing safety, pavement, and bridges, as well as system performance, freight, and congestion mitigation. The planning area covered by these efforts includes the entirety of Benton County, including the study area for the Project.

Twenty road segments, identified in the Benton County 2022-2027 Six-Year Transportation Improvement Plan, are identified for potential improvement ranging from guardrail improvement to paving and intersection improvements (Benton County 2021; Horse Heaven Wind Farm, LLC 2022).

Traffic data were collected at 29 intersections throughout the study area. To capture the weekday morning and evening peak hours, turning movement counts were collected from 5:00 a.m. to 8:00 a.m. and from 4:00 p.m. to 7:00 p.m. on June 13, 2023. In addition to turning movement counts, eight 24-hour bidirectional automated traffic recorders collected data on key roadway segments throughout the study area. These automated traffic recorders collected vehicle speeds, volumes, and classification. All calculations were performed using Synchro 11 and Highway Capacity Software 2022 (Horse Heaven Wind Farm, LLC 2023).

All utilized roads and available traffic count data and jurisdictions are summarized in **Table 3.14-2**. The table also summarizes the physical characteristics and conditions for the local infrastructure. The conditional assessment is a qualitative judgment utilizing 2018 aerial imagery and does not represent a detailed characterization of quality based on in-person inspections of pavement or quantitative metrics such as asphalt/gravel depth, age, or design life.

Table 3.14-2: Utilized Highway and County Roads

Access Road	Jurisdiction	Width (feet)[a]	LOS Standard[b]/ Speed Limit	Number of Lanes[c]	Weekday AM/PM Peak Hour	Weekday Daily	2021 FGTS Class[d]	Condition/Notes[e]
I-82 – North of Coffin Road[f]	FHWA/WSDOT	36/side	C/70 mph	4	1,292/2,193	24,995	T-1	Fair; minor cracking especially on the shoulders; road may have been resurfaced because most cracking does not continue into road.
Coffin Road – East of Bofer Canyon Road[h]	Benton County	30	No data	2	35/21	210	No data	Fair; some minor cracking visible.
Bofer Canyon Road – North of Coffin Road[g]	Benton County	32	No data	2	1/5	39	No data	Good; no cracking or wear visible, appears to have been redone between 2013 and 2015.
Nine Canyon Road – South of Route 397[g]	Benton County	28	No data	2	19/24	253	T-4	Good; appears to have been paved between 2013 and 2015.
Beck Road – East of Bofer Canyon Road[h]	Benton County	20	No data	1.5	8/7	70	T-5	Poor; evidence of rutting all along gravel road.
Kirk Road – East of S. Nine Canyon Road[h]	Benton County	18	No data	1.5	1/2	20	No data	Good; rutting was repaired in 2016, gravel surface appears smooth.
State Route 397 – West of Nine Canyon Road[g]	WSDOT	36	D/60 mph	2	90/105	1,366	T-3	Poor; plentiful filled cracks along the entire road.
S. Finley Road[h]	Benton County	24	No data	2	11/30	300	T-4	Good; appears to be repaved between 2015 and 2016.
State Route 221 – South of Sellards Road[f]	WSDOT	32	C/65 mph	2	212/285	2,657	T-2	Good; no visible wear or cracking.
Webber Canyon Road – South of Badger Road[h]	Benton County	32	C/25 mph	2	77/121	1,210	T-3	Good; provides connectivity to Benton City and appears well maintained.
Travis Road - North of Sellards Road[g]	Benton County	28	C/50 mph	2	48/75	737	T-3	Good; a continuation of Webber Canyon Road.
Locust Grove Road – between Nicosin Road and I-82[g]	Benton County	32	No data	2	48/61	591	T-3	Good; no obvious signs of wear and condition appears unchanged through the available imagery.

Table 3.14-2: Utilized Highway and County Roads

Access Road	Jurisdiction	Width (feet)[a]	LOS Standard[b]/ Speed Limit	Number of Lanes[c]	Weekday AM/PM Peak Hour	Weekday Daily	2021 FGTS Class[d]	Condition/Notes[e]
Nicoson Road[i]	Benton County	20	No data	2	No data	No data	No data	The first 4,600 feet is good condition paved, then it transitions to gravel/two-track road that is very narrow and may be a private road.
S. Plymouth Road – North of State Route 14[g]	Benton County	32	C/50 mph	2	73/115	1,352	T-3	Good; some very occasional minor cracking/wear.
Sellards Road – between State Route 221 and Tyack Road[g]	Benton County	32	C/50 mph	2	68/96	1,048	T-3	Good; is a continuation of S. Plymouth Road.
Badger Canyon Road – North of Sellards Road[g]	Benton County	18	No data	1.5	3/9	68	No data	Good; no visible rutting or washout.
Cemetery Road – West of State Route 221[h]	Benton County	18	No data	1.5	0/1	10	No data	Fair; some evidence of worn tracks, though no apparent ruts.
Clodius Road[i]	Benton County	16	No data	1.5	No data	No data	No data	Fair; narrow and worn looking, but no obvious ruts.
County Well Road – East of State Route 221[h]	Benton County	20	No data	2	2/19	190	T-3	Good; probably very light use with no visible change in conditions throughout available imagery.
Beightol Road[i]	Benton County	16	No data	1.5	No data	No data	No data	Fair; narrow and worn looking.
Dennis Road[i]	Benton County	16	No data	1.5	No data	No data	No data	Fair; some washboarding visible.

Source: Unless otherwise noted, Horse Heaven Wind Farm, LLC 2023 Tables 4.3-1 and 4.3-2

Notes:

(a) Width measured from aerial imagery is approximate edge of shoulder to edge of shoulder. For paved road only; the paved shoulder is included though most have additional gravel.

(b) LOS for state routes (including I-82, SR-307, and SR-221) is the existing standard set by WSDOT. This is the lowest acceptable rating for that road.

(c) The number of lanes is the total number of lanes counting both directions: 1.5 lanes indicates a road that is gravel as gravel roads do not have lane markings and usually have less width than a typical two-lane paved road.

(d) WSDOT 2021a

(e) The conditional assessment is a qualitative judgment utilizing 2018 aerial imagery and does not represent a detailed characterization of quality based on in-person inspections of pavement or quantitative metrics such as asphalt/gravel depth, age, or design life Information will be verified by a third-party engineer during the required traffic analysis described in Section 4.14.2.4.

(f) 2023 AADT data for I-82 – North of Coffin Road and State Route 221 – South of Sellards Road, were collected from the closest permanent traffic recorder maintained by WSDOT.

(g) 2023 ADT data for Benton County roads was collected in June 2023.

(h) Weekday Afternoon Peak Hour Traffic Volumes at these locations were multiplied by a factor 10 to calculate an estimated ADT.

(i) No data collected at these locations.

AADT = average annual daily traffic; ADT = average daily traffic; FGTS = Freight and Goods Transportation System; FHWA = Federal Highway Administration; HCM = Highway Capacity Manual; I-82 = Interstate 82; LOS = level of service; mph = miles per hour; SR = State Route; WSDOT = Washington State Department of Transportation

The existing LOS summaries presented in the Final ASC for roadway segments and unsignalized intersections serve as a baseline to assess the significance and severity of Project impacts. According to the Final ASC, existing traffic conditions are considered good (Horse Heaven Wind Farm, LLC 2023). The intersections are below their capacities, and traffic flows freely throughout the Project vicinity.

3.14.1.2 Waterborne, Rail, and Air Traffic

Waterborne Traffic

A total of 812 miles of waterways are identified as FGTS corridors. Of those, 751 miles were classified as W-1 (more than 25 million tons) through W-4 (2.5 million to 5 million tons) corridors and designated by the Washington State Freight Mobility Strategic Investment Board as part of the Strategic Freight Corridors. Waterways and ports are shown in **Figure 3.14-4**. Washington has the largest locally controlled port system in the world (Washington Ports n.d.). Public ports in Washington were authorized under the Port District Act of 1911. Each of Washington's 75 ports was formed by a vote of the residents and governed by publicly elected, local officials. Washington Port districts are unique, special-purpose districts with the primary mission of promoting economic development. Ports can build and operate commercial and general aviation airports, marine terminals, marinas, railroads, and industrial parks.

Source: WSDOT 2021a, with edits showing Port of Longview and Port of Benton

Figure 3.14-4: Waterway Freight Corridors

The Port of Benton, Port of Kennewick, and Port of Pasco on the Columbia River serve the area by water.

- The Port of Benton was established in 1958 and grew to encompass the existing port facilities following the transfer of ownership of Richland from the U.S. Army Corps of Engineers to the citizens in 1959. Previously, Richland had been the property of the federal government as part of a World War II secret mission called the Manhattan Project. The Port of Benton was designated as a Nuclear Port in 1965 by the U.S. Coast Guard and is one of only a handful of ports in the nation authorized to handle radioactive materials (Port of Benton n.d.).
- The Port of Kennewick provides mixed-use amenities and operates the Clover Island Marina for the launching and/or moorage of boats in Kennewick's Historic Waterfront District (Port of Kennewick 2022).
- The Port of Pasco is considered the largest public marine terminal on the upper Columbia River. The Port of Pasco was originally formed to provide facilities for barge shipments of grain from the area on the Columbia River to the seacoast terminals. The Port of Pasco has a 600-acre industrial center with several miles of

railroad tracks and streets and over 1.7 million square feet of buildings. The Port of Pasco also took over the former World War II U.S. Navy facility, known as the Pasco Airport, and renamed it the Tri-Cities Airport (Port of Pasco 2022).

The Port of Longview, Port of Kalama, and Port of Vancouver are the closest seaports to the Lease Boundary.

- The Port of Longview offers bulk cargo handling and has eight marine terminals and waterfront industrial property spanning 835 acres on the Columbia River, 66 miles from the Pacific Ocean in southwest Washington State (Port of Longview n.d.). Cargo handling at the Port of Longview includes all types of bulk cargo and breakbulk commodities such as fertilizers, grain, heavy-lift cargo, logs, lumber, minerals, paper, pulp, steel, and wind energy components (Port of Longview n.d.).
- The Port of Kalama sits on the Columbia River immediately west of Interstate 5. The Port of Kalama is a marine terminal port that offers "6 miles of riverfront property adjacent to the federally maintained deep draft navigation[27] channel of the Columbia River" and is served by the Burlington Northern/Santa Fe and Union Pacific railroads (Port of Kalama 2022).
- The Port of Vancouver connects Asia and South America to the U.S. midcontinent and Canada and handles more than 7 million tons of cargo each year, including wheat, mineral and liquid bulks, vehicles, and other project cargo (Port of Vancouver USA 2023).

Rail Traffic

Rail is an integral part of Washington's statewide transportation system. Railroads carry a variety of products, including agricultural products, energy products, forest products, chemicals, containerized goods, finished automobiles, and waste products (WSDOT 2020).

Several freight stations are within the Project's study area, including (USDOT n.d.):

- Hedges (Freight Station Accounting Code [FSAC] 07427)
- Kennewick (FSAC 07430 and FSAC 13004)
- Hover (FSAC 12147)
- Finley (FSAC 12151)
- Cushman (FSAC 12153)
- Yellepit (FSAC 12159)
- Plymouth (FSAC 12183)
- Vista (FSAC 13007)
- Badger (FSAC 13017)
- Kiona (FSAC 13024)
- Gibbon (FSAC 13034)
- Prosser (FSAC 13040)
- Whitstran (FSAC 5003)

[27] Deep draft means a channel depth greater than 15 feet (USACE n.d.)

Source: WSDOT 2021a

Figure 3.14-5: Rail Freight Corridors in Washington State

Planning and investment in the state's rail system is guided by WSDOT's vision for a safe, sustainable, and integrated multimodal transportation system. The State Rail Plan is consistent with the Transportation System Policy Goals adopted by the state legislature and with statewide and metropolitan planning. Burlington Northern Santa Fe (BNSF), Union Pacific Railroad, and Tri-City and Olympia Railroad Company provide commercial rail service to the area. Amtrak provides passenger rail service to the area. Freight and passenger services share much of the same infrastructure and operate as an integrated rail system (WSDOT 2020). WSDOT sponsors Amtrak Cascades intercity passenger rail service in conjunction with the Oregon Department of Transportation.

The LOS grades and descriptions for rail correspond generally to the LOS grades used in the Federal Highway Administration's Highway Performance Monitoring System. The capacity analysis results are expressed as LOS grades by comparing combined freight and passenger train volume to the practical capacities of each segment. The volume/capacity ratios and the corresponding LOS grades are listed in **Table 3.14-3**.

Table 3.14-3: Definition of Level of Service Grades for Rail

LOS Grade	WSDOT Definition	Volume/Capacity Ratio
A	Below Capacity - Low to moderate train flows with capacity to accommodate maintenance and recover from incidents	0.0 to 0.2
B	Below Capacity - Low to moderate train flows with capacity to accommodate maintenance and recover from incidents	0.2 to 0.4
C	Below Capacity - Low to moderate train flows with capacity to accommodate maintenance and recover from incidents	0.4 to 0.7
D	Near Capacity - Heavy train flow with moderate capacity to accommodate maintenance and recover from incidents	0.7 to 0.8
E	At Capacity - Very heavy train flow with limited capacity to accommodate maintenance and recover from incidents	0.8 to 1.0
F	Above Capacity - Unstable flows; service breakdown conditions	>1.00

Source: WSDOT 2020
LOS = level of service; WSDOT = Washington State Department of Transportation

Three future scenarios were evaluated by WSDOT for system capacity analysis in 2019:

- Low growth scenario: combines the low growth scenario established for freight rail volume forecast, and for Cascades rail ridership forecast
- Moderate growth scenario: combines the corresponding moderate scenarios established for freight rail volume forecast and for Cascades passenger rail ridership forecast
- High growth scenario: combines the corresponding high growth scenarios established for freight rail volume forecast and for Cascades passenger rail ridership forecast

These three scenarios included existing long-distance and commuter services for capacity analysis but did not account for additional Amtrak long-distance trains or Sounder commuter rail trains.

The results of the LOS analysis are summarized in **Table 3.14-4**.

Table 3.14-4: Rail Level of Service Estimation for Base and Forecast Year Scenarios

Name of Corridor	2019 State Rail Plan Update LOS[(a)]			
	2016 Base Year	2040 Low Growth	2040 Moderate Growth	2040 High Growth
Auburn-Pasco	B	A	B	B
Everett-Vancouver, B.C., Canada	C	C	E	F
Hinkle, OR-Lakeside	C	B	E	F
Pasco-Lakeside	C	C	E	F
Vancouver-Pasco	E	D	F	F
Seattle-Tacoma (BNSF)	C	C	D	E
Seattle-Tacoma (UP)	A	A	B	B
Tacoma-Vancouver (BNSF/UP Shared Use Segment)	C	C	E	F
Seattle-Everett	C	C	E	F
Everett-Spokane	C	C	F	F
Lakeside-Spokane (BNSF/UP Shared Use Segment)	E	D	F	F
Spokane-Sandpoint, ID (BNSF)	C	C	F	F
Spokane-Sandpoint, ID (UP)	C	B	E	F
Portland, OR-Vancouver (BNSF/UP Shared Use Segment)	B	C	C	E
Fallbridge-Chemult, OR	A	A	A	A

Source: WSDOT 2020
Notes:
(a) LOS grades for rail are defined in **Table 3.14-3**.
B.C. = British Columbia; BNSF = Burlington Northern-Santa Fe; ID = Idaho; LOS = level of service; OR = Oregon; UP = Union Pacific

This analysis provides an indication of current and future demands for capacity and resulting congestion, absent any operational change and investments to increase capacity. The capacity analysis results identified multiple segments where capacity would be insufficient to handle Project-related traffic without changes.

Air Traffic

The Tri-Cities Airport and the smaller airports, Port of Benton Airport and Richland Airport, serve the area surrounding the Lease Boundary. The Tri-Cities Airport, which is associated with the Port of Pasco, is the largest airport in the southeastern Washington/northeastern Oregon region, with connections to 11 major hubs (Port of Pasco 2022). Both the Port of Benton Airport and the Richland Airport were acquired by the Port of Benton in 1961. The Port of Benton Airport, formerly the Prosser Airport or the George O. Beardsley Field, was transferred by the City of Prosser to the Port of Benton, and the federal government transferred the Richland Airport, formerly the Atomic Energy Field, to the Port of Benton (Port of Benton n.d.).

3.14.1.3 Parking

The Project Lease Boundary is located in rural agricultural land with no major existing public parking facilities. Parking along roads within the Lease Boundary occurs for two recreational opportunities—the Horse Heaven Hill Cemetery and Johnson Butte.

3.14.1.4 Movement/Circulation of People or Goods

State and interstate highways are designed and constructed to handle legal loads of 105,500 pounds (gross weight). Some trucks that deliver large and heavy equipment (typically the base, lower middle, and top tower sections, nacelles, drive train, and hub) would be required to obtain oversize/overweight permits. These permits allow travel on all unrestricted roads. I-82 and State Route 397 are constructed to standards that will safely allow legally oversized/overweight trucks to pass with no adverse impact on the road surface. None of the state roads currently have size or weight restrictions. The condition of the existing Benton County roads that would be used by the Project varies from improved gravel two-lane roads to two-track roads with minimal aggregate surfacing.

3.14.1.5 Traffic Hazards

Existing traffic hazards consist of current truck transport (including hazardous materials, such as fuel), agricultural equipment, and vehicle accidents. Approximately 66 collisions that resulted in an injury occurred from January 1, 2020, through January 31, 2021 in the study area, including several that occurred within the Lease Boundary (County of Benton n.d.). Three fatalities were reported in the study area in 2021 (County of Benton n.d.). Work zone traffic control, or maintenance of traffic, can be used to decrease fatalities related to the transportation of oversized materials for the construction of projects.

The primary function of work zone traffic control is to allow all modes of traffic, including motor vehicles, bicyclists, and pedestrians, to move safely and easily through or around work areas while still allowing safe and efficient work operations to be conducted. Effective temporary traffic control enhances traffic safety and efficiency. The Federal Highway Administration's Manual on Uniform Traffic Control Devices is adopted by WSDOT as the legal standard. Traffic Control Plans are used for projects to communicate work duration, personal protective wear requirements, traffic control devices and equipment, required flagging, and other special considerations, including other roadway users or traffic concerns such as school zones and/or rail crossings.

Speed zones (limits) are established based on the concept of reasonable speed. Roads with no posted speed are subject to the Basic Speed Rule. Under Washington State law, the maximum speed limit in urban areas is 50 miles per hour (mph). All other speed limits are called "prima facie limits," which are considered by law to be safe and prudent under normal conditions. Certain prima facie limits are established by state law and include 25 mph in business and residential districts and 20 mph in school zones.

The following schools and school zones are located in the study area:

- Cottonwood Elementary near East Badger Road
- Prosser Heights Elementary near State Route 22
- Housel Middle School near State Route 22
- Prosser High School near State Route 22
- Keene Riverview Elementary near State Route 22

School zones are areas near marked crosswalks installed adjacent to school grounds. Washington State Law RCW 46.61.440, in regard to driving speed in a designated school zone, specifies "Speed 20 miles per hour when children are present." This reduced speed is in effect 24 hours per day, not just during crossing hours. In some cases, the school crossing area may have speed beacons (flashers). At these crossings, the 20 mph school zone is in effect any time these beacons are flashing (Kennewick Washington n.d.).

Rail Safety

The Washington Utilities and Transportation Commission (UTC) is the state agency responsible for regulating railroad safety in Washington. The UTC's Rail Safety program protects the public and railroad employees by ensuring that railroad companies meet established state and federal safety standards and by educating the public about the dangers of traveling on or near railroad tracks.

The UTC inspects railroad crossings in the state every three years and railroad crossings located on crude oil routes every 18 months, monitors railroad grade crossing inventory information, and documents trespassing and incident data.

The UTC, through Title 49, Code of Federal Regulations Part 212, is the designated state agency that partners with the Federal Railroad Administration (FRA) to inspect rail shipments of hazardous materials. There are more than 300 inspection points throughout the state, including shippers' facilities, railroad yards, and terminals. In addition to these hazardous materials inspections, the UTC's FRA-certified inspectors perform inspections on signal and train control equipment, track, motive power and equipment, railroad operating practices, and grade crossings.

In addition, the UTC has regulatory authority over safety at public highway-rail grade crossings. The UTC monitors all accidents and incidents at public and private crossings, including investigating fatalities and injuries. Private crossings are those that cross the tracks into residential driveways or service roads, or on industrial properties and along railroad rights-of-way.

The UTC funds projects to improve public safety at crossings and to limit pedestrian access to railroad rights-of-way through the Grade Crossing Protection Fund. The UTC also partners with Operation Lifesaver, Inc., and coordinates activities with Washington Operation Lifesaver, a public service education program dedicated to preventing collisions, injuries, and fatalities on and around railroad tracks and highway-rail grade crossings.

The UTC recorded 33 accidents and incidents at Washington State grade crossings in 2021. One of these occurred in Benton County (UTC 2022).

Crossings that are in the vicinity of the Project and could intersect the assumed transport routes of materials for the Project include:

- Crossing 927487A, where train tracks cross over Webber Canyon Road
- Crossing 928191E, where train tracks cross under I-82 near West Clearwater Avenue
- Crossing 928192L. where train tracks cross Dallas Road at grade
- Crossing 966466M, where train tracks cross under eastbound I-82 near the Lewis and Clark Trail Highway
- Crossing 966467U, where train tracks cross under westbound I-82 near the Lewis and Clark Trail Highway

All crossings except Crossing 928192L are located above (via an overpass) or under (via an underpass) the transport route. Crossing 928192L, where train tracks cross Dallas Road is a grade crossing, meaning that the crossing occurs at the same grade as other traffic. Two BNSF trains use this crossing each 24-hour period, at a maximum speed of 40 miles per hour. UTC has recorded two accidents at this crossing, one occurring in 1992 and the other in 2008. In both cases, the vehicle driver did not heed the warning signals at the crossing. Neither accident resulted in an injury or fatality. The crossing is equipped with automatic crossing signals and gates,

which means when a train is approaching, the gates go down to block access to the track until the train passes through. To circumvent the gates, a driver must be fully aware of the downed gates and consciously choose to drive around the gates and over the tracks.

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3.15 Public Services and Utilities

This section describes the public services and utilities and the regulatory setting in the proposed Horse Heaven Wind Farm (Project, or Proposed Action) and Project vicinity. Public services such as law enforcement, fire protection, emergency management services, and hospitals are discussed in Section 3.13, Public Health and Safety. Similarly, schools are discussed as part of Section 3.16, Socioeconomics. The Project vicinity includes the areas 4 miles south/southwest of the City of Kennewick, Washington, and the larger Tri-Cities urban area along the Columbia River. A public utility is an organization that maintains the infrastructure for a public service. A reduction in the reliability of a public utility service affects all areas of daily life. Section 4.15 discusses the Project's anticipated impact on the availability of public services and utilities within Benton County and surrounding communities.

Utilities, as described in the Benton County Comprehensive Plan, include the following:

- Supply, treatment, and distribution of domestic and irrigation water
- Collection and treatment of sewage
- Collection and conveyance of stormwater
- Supply and distribution of natural gas
- Supply and distribution of electricity
- Telecommunications, including broadband internet services, cable television (TV), and microwave transmissions
- Collection and disposal of solid waste
- Construction, operation, and maintenance of streets (Benton County 2022)

Sections 3.4 and 4.4, Water Resources, analyze the collection and conveyance of stormwater within the Lease Boundary and Project vicinity. Sections 3.7 and 4.7, Energy and Natural Resources, evaluate the supply and demand for electricity and water within the Project vicinity, Benton County, and the State of Washington. Sections 3.14 and 4.14, Transportation, evaluate the Project's impact on streets and highways.

Regulatory Setting

Washington Administrative Code (WAC) 463-60-535(4) requires a review of a proposed facility's impact on utilities. The primary regulatory agency for most utilities in the State of Washington is the Washington Utilities and Transportation Commission (UTC). The UTC ensures that safe and reliable service is provided to customers at reasonable rates. The State of Washington's Growth Management Act (Revised Code of Washington [RCW] 36.70A.070) requires that cities and counties include a utilities element in their comprehensive plans that describes the general location, proposed location, and capacity of all existing and proposed utilities, including, but not limited to, electrical lines, telecommunication lines, and natural gas lines. The relevant goals and policies of the Benton County Comprehensive Plan's utilities element (UE) include the following:

- UE Goal 1: Ensure utilities support the land use and economic development goals of the County.
- UE Goal 2: Maintain public and private household water and sewer systems that are consistent with the rural character of the County.

- UE Goal 3: Facilitate efficiency in utility land use and development.
  - Policy 2: Encourage multiple uses, including passive recreational use, in utility corridors where practical.
  - Policy 3: Facilitate maintenance and rehabilitation of existing utility systems and facilities and encourage the use of existing transmission/distribution corridors.
- UE Goal 4: Develop and adopt provisions as necessary that support future demand for alternative energy vehicles.
  - Policy 1: Permit electric vehicle charging stations equipped with slow and medium speed charging equipment as an accessory or ancillary use to any principal use in all zoning districts.
  - Policy 2: Allow electric vehicle “rapid charging stations” designation in commercial, industrial, and agricultural zones as regulated in the zoning code and exclude in areas identified as critical resource areas (Benton County 2022).
- All water systems within the State of Washington are regulated by the Washington State Department of Health, Office of Drinking Water.
  - A domestic use is a water supply used for domestic purposes, as defined by WAC 173-518-030.
  - Typically, a domestic water supply comes from a well that is exempt from permitting under RCW 90.44.050 and the Washington State Department of Health’s public water system requirements.
- Irrigation districts in the State of Washington are created under RCW 87.03.
- The State of Washington, in accordance with WAC 246-272A, requires that all wastewater receive treatment to protect human health and aquatic life.
- For large on-site sewage systems with design flows above 3,500 gallons per day, WAC 246-272B requires the operator to obtain approval from the Washington State Department of Health.
- Solid waste landfills in the State of Washington are regulated by local health departments and the Washington State Department of Ecology through the Criteria for Municipal Solid Waste Landfills WAC Chapter 173-351.

3.15.1 Affected Environment

Benton County is predominantly rural and agricultural in nature, with unincorporated areas making up most of the county’s territory. Benton County consists of several unincorporated communities, as well as the incorporated cities of Benton City, Kennewick, Prosser, Richland, and West Richland. The county is bordered on the west by Klickitat and Yakima Counties, on the north by Grant County, on the east by Franklin and Walla Walla Counties, and on the south by Umatilla County, Oregon. The county is located at the confluence of three rivers: the Columbia, Yakima, and Snake Rivers. The Yakima River runs through the middle of the county, to its confluence with the Columbia River in Richland.

Domestic and Irrigation Water

While more than 85 percent of the state's population gets their drinking water from public water systems, 15 percent obtain their water from domestic supplies. The use and development of a surface water or spring for a domestic water supply typically requires water right permitting from the Washington State Department of Ecology.

The irrigation districts of Roza, Sunnyside Valley, Benton, Kennewick, Kiona, Columbia, and Badger Mountain serve Benton County (Benton County 2022). The City of Kennewick's Municipal Water System obtains water from the Kennewick and Columbia Irrigation Districts (City of Kennewick 2017). The Lease Boundary is not located within any of the seven irrigation districts; however, the Kennewick Irrigation District is located just north of the Lease Boundary.

Wastewater

Although the State of Washington has more than 600 wastewater treatment plants, most rural residents in Benton County rely on on-site septic tanks and drain fields for their wastewater system needs. The Benton-Franklin Health District is responsible for permitting, overseeing the design and installation of, and inspecting small on-site septic systems with wastewater flows of less than 3,500 gallons per day (Benton-Franklin Health District 2021).

Water and Stormwater

Except for the Cities of Kennewick and Richland, the source of the water supply for Benton County and its municipalities is groundwater. In addition to withdrawing groundwater as their primary source of water, the Cities of Kennewick and Richland withdraw water from the Columbia River to assist in meeting their communities' demands. There are no public water supply wells located within the Lease Boundary. Sections 3.4 and 4.4, Water Resources, evaluate groundwater and stormwater resources within the Lease Boundary and Project vicinity.

Sections 3.7 and 4.7, Energy and Natural Resources, evaluate the supply and demand for water. As discussed in Section 3.7, the Application for Site Certification indicates that the Project would be supplied with water through a haul agreement with a private vendor (Horse Heaven Wind Farm, LLC 2022). The Applicant's water source documentation states that the vendor would likely acquire the water from the Kennewick Utility Services Division of Public Works. This division is responsible for the city's water treatment plant, wastewater treatment plant, wastewater collection, and water distribution programs.

Natural Gas

Cascade Natural Gas Corporation builds, operates, and maintains natural gas facilities serving Benton County. Cascade Natural Gas is an investor-owned utility serving customers in 16 counties in Washington State. The Pacific Northwest receives its natural gas from the southwest United States and Canada. Natural gas is supplied to the entire region via two interstate pipeline systems. The Northwest Pipeline Corporation owns and operates the network that supplies natural gas to Benton County. Natural gas is stored in a facility in Plymouth. A network of small-diameter distribution mains and service lines transports the gas to end-users (Benton County 2022). Sections 3.7 and 4.7, Energy and Natural Resources, evaluate the supply and demand for energy.

Electricity

The Bonneville Power Administration (BPA) is an agency of the U.S. Department of Energy. It wholesales electric power produced at 29 federal dams located in the Columbia-Snake River Basin, and one non-federal nuclear plant. Electricity is purchased from the BPA and supplied to areas in Benton County by either the Benton County Public Utility District (Benton PUD) or the Benton Rural Electric Association (Benton REA). The Lease Boundary includes areas that fall under the management of the Benton PUD and Benton REA. The service areas of each provider are as follows:

- **Benton PUD**: The Benton PUD's service area is entirely within Benton County and includes the cities of Kennewick, Benton City, Prosser, and portions of West Richland. The Benton PUD serves Benton County

except for the City of Richland, the U.S. Department of Energy's operations on the Hanford Reservation, and rural areas of the county that are served by the Benton REA (Benton County 2022).

- **Benton REA**: The Benton REA is a consumer-owned rural cooperative that serves portions of Benton, Lewis, and Yakima Counties. The Benton REA's 1,300-square-mile territory extends from the Columbia River at Paterson, north to the Hanford Reservation, and west to White Pass in the Cascade Mountains. The Benton REA serves the rural areas of Benton County and some urban areas (Benton County 2022).

Sections 3.7 and 4.7, Energy and Natural Resources evaluate the supply and demand for electricity within the Lease Boundary and Benton County.

Telecommunications and Cable Television

Several companies supply local, long-distance, and cellular telecommunications services in Benton County (Benton County 2022). Spectrum is the primary cable internet service provider in Benton County and is available to approximately 91 percent of its residents. In addition to Spectrum, several additional TV and internet service providers provide cable TV and internet access to the county's homes and businesses.

Solid Waste

Within Benton County, the UTC, Benton County, and municipalities regulate solid waste collection. The Benton County solid waste program is managed by the Benton County Road Department and operated in accordance with the Benton County Solid Waste Plan and Moderate Risk Waste Plan 2013 Update and with the advice of the Benton County Solid Waste Advisory Committee. Representatives from each of the cities in Benton County, the Washington State Department of Ecology, the Benton-Franklin Health District, and local refuse and recycling companies make up the Benton County Solid Waste Advisory Committee.

The generation of solid waste within Benton County and the cities of Benton City, Kennewick, Prosser, Richland, and West Richland is managed in alignment with the Benton County Solid Waste and Moderate Risk Waste Plan 2013 Update (Benton County 2014). The plan is intended to provide citizens and decision makers in Benton County with a guide to implement, monitor, and evaluate future activities related to solid waste for a 20-year period. As shown in **Table 3.15-1**, the county and its incorporated municipalities generated 263,603 tons of solid waste in 2010.

Table 3.15-1: Benton County Solid Waste Projections

Year	2010 (Actual)	2025 (Projected)	2030 (Projected)	2032 (Projected)
Waste Generated (tons)	263,603	326,505	346,517	350,206

Source: Benton County 2014

By 2032, Benton County anticipates that it may need to dispose of approximately 86,500 more tons of solid waste annually than in 2010. Benton County attributes the additional solid waste to projected population growth (Benton County 2014).

Columbia Ridge Landfill in Arlington, Oregon, receives most of the waste disposed of by Benton County. Other major landfills used for disposal of waste from Benton County include Horn Rapids Landfill in the City of Richland and Finley Buttes Regional Landfill in Morrow County, Oregon (Benton County 2014).

The following describes each of the three landfills that local vendors use for permanent solid waste disposal:

- **Columbia Ridge Landfill**: Columbia Ridge Landfill and Green Energy Plant (Columbia Ridge) provides disposal services for communities, businesses, and industries, primarily from Oregon and Washington. Columbia Ridge is a modern Subtitle D landfill that accepts primarily municipal solid waste (MSW) and industrial and special wastes. Columbia Ridge is permitted by the Oregon Department of Environmental Quality (DEQ) and is in full compliance with DEQ rules and regulations. Columbia Ridge Landfill was opened in 1990 and has a life expectancy of approximately 143 years and a permitted remaining capacity of 329 million tons. The landfill's recycling services include electronic waste and white goods. The landfill does not accept appliances, batteries, discarded vehicles, hazardous wastes, loose sharps, tires, or used oil (Waste Management 2019).
- **Horn Rapids Landfill**: Horn Rapids Landfill is owned and operated by the City of Richland Public Works Department. The landfill began receiving waste in 1974 and receives municipal garbage and yard waste. Horn Rapids Landfill receives the following waste streams as part of its waste disposal program: used motor oil (5-gallon limit per visit), antifreeze, cooking oil, automotive batteries, rechargeable batteries, and propane tanks and canisters. The landfill has an existing permitted footprint of 46 acres (City of Richland, Washington 2017).
- **Finley Buttes Landfill**: Finley Buttes Landfill is a modern MSW disposal facility permitted by the DEQ and is in full compliance with DEQ rules and regulations. The site accepts MSW, construction and demolition wastes, and special wastes (including liquids) with proper approval. The landfill does not accept old paints, chemicals, and cleaning supplies. The landfill began operations in 1991 and receives over 500,000 tons of MSW annually. Finley Buttes Landfill is 1,800 acres and is the second largest landfill in Oregon. As of 2015, its estimated available fill capacity was approximately 132 million tons of MSW. Currently, the site receives around 500,000 tons of MSW each year. The permitted life span of the landfill is approximately 300 years (Clark County, Washington 2015).

Currently, there are four certified waste haulers operating in Benton County. Solid waste collection in unincorporated Benton County is provided under certificates granted by the UTC. The following describes the four waste haulers whose service areas intersect the Lease Boundary and their waste transportation procedures:

- **Basin Disposal, Inc. (BDI)**: This waste hauler serves eastern Benton County. BDI first transports waste to the BDI transfer station in Pasco, Washington, and then hauls the waste to Finley Buttes Landfill in Boardman, Oregon, for disposal.
- **Ed's Disposal, Inc.**: This waste hauler serves central Benton County. Like BDI, Ed's Disposal, Inc., first transports waste to the BDI transfer station in Pasco and then hauls the waste to Finley Buttes Landfill in Boardman, Oregon, for disposal.
- **Sanitary Disposal, Inc.**: Sanitary Disposal, Inc., serves southwestern Benton County. Waste collected by Sanitary Disposal is transported to a transfer station in Umatilla County, Oregon, prior to disposal at Finley Buttes Landfill.
- **Waste Management of Kennewick (Waste Management)**: Waste Management serves areas throughout unincorporated Benton County. Waste collected by Waste Management is transported to its transfer station in Kennewick and then hauled to Columbia Ridge Landfill in Arlington, Oregon, for disposal (Benton County 2014).

Recycling Options

Within Benton County, Ray Poland and Sons, Inc. receives recyclable construction debris and waste including recyclable paper, plastic bottles, and metal cans and containers at their waste transfer station at 2627 S. Ely Street, Kennewick, Washington. E-Cycle Washington is a free program that makes it easy for Washington residents to recycle their broken, obsolete, or worn-out electronics. The following locations in Benton County participate in the E-Cycle Washington program and guarantee free recycling:

- Clayton Ward Recycling Center, 119 Albany Ave, Kennewick
- Clayton Ward Recycling Center, 1936 Saint St, Richland
- Goodwill Donation Centers

LightRecycle Washington is a program that accepts compact fluorescent light bulbs, as well as fluorescent tubes and high intensity discharge lights. The following locations within Benton County participate in the LightRecycle Washington program:

- Ace Hardware & Sporting Goods, 2831 W Kennewick Ave, Kennewick
- Batteries Plus Bulbs, 321 N Columbia Center Blvd, Kennewick
- Ace Hardware & Sporting Goods, 103 Keene Road, Richland
- Grigg's Department Store Ace Hardware, 1415 George Washington Way, Richland
- Patnode’s True Value, 600 9th St, Benton City (City of Richland, Washington 2022)

Streets

The roadway transportation system in Benton County consists of interstate highways, state highways, collectors, and local access routes. Benton County’s principal road concerns in rural areas are “all weather” access for agricultural product transport and more direct “farm to market” routes for agricultural products. As noted, Sections 3.14 and 4.14, Transportation, evaluate the Project’s impact on streets.

3.16 Socioeconomics

This section describes existing socioeconomic conditions in the proposed Horse Heaven Wind Farm (Project or Proposed Action) vicinity. The Project vicinity includes the areas 4 miles south/southwest of the City of Kennewick, Washington, and the larger Tri-Cities urban area along the Columbia River. This evaluation of socioeconomics was prepared in alignment with Washington Administrative Code (WAC) 463-60-535 and describes existing demographics, labor market, and economic conditions, and public services related to socioeconomic conditions within the study area (defined below). Section 4.16 provides an evaluation of potential impacts of the Proposed Action and the No Action Alternative on socioeconomics.

Sections 3.13 and 4.13, Public Health and Safety, focus on the availability of public service agencies and medical facilities (e.g., law enforcement, fire protection, and medical emergency services) within the vicinity of the Lease Boundary. Sections 3.15 and 4.15, Public Services and Utilities, focus on utilities that serve the Project vicinity.

Regulatory Setting

WAC 463-60-535 states that an Application for Site Certification:

> *…shall include a detailed socioeconomic impact analysis which identifies primary, secondary, positive as well as negative impacts on the socioeconomic environment in the area potentially affected by the project, with particular attention to the impact of the proposed facility on population, work force, property values, housing, health facilities and services, education facilities, governmental services, and local economy.*

WAC 463-60-535 requires that an evaluation of socioeconomics include the area that employment related to a proposed action may affect within a 1-hour commute distance of the project site. WAC 463-60-535 states that an analysis of socioeconomics shall use the most recent data as published by the U.S. Census Bureau or State of Washington sources. The study area for socioeconomics, therefore, includes the area within the Lease Boundary and the populations of Benton, Franklin, Walla Walla, and Yakima Counties. Although the Oregon counties of Morrow and Umatilla are within a 1-hour commute of the Lease Boundary, this discussion of socioeconomics focuses solely on populations governed under the State of Washington's constitution.

WAC 197-11-448 identifies general welfare, social, and economic standing as conditions that contribute to an area's quality of life. WAC 197-11-448 states that agencies have the option to combine a review of socioeconomics with the preparation of an environmental impact statement.

Washington State Clean Energy Transformation Act (CETA) (Chapter 19.405 RCW) sets targets for reducing greenhouse gas emissions and establishes energy efficiency standards for buildings and appliances. CETA states that it is the policy of the state to eliminate coal-fired electricity, transition the state's electricity supply to one hundred percent carbon-neutral by 2030, and one hundred percent carbon-free by 2045. Included in CETA, is the following commitment from the State of Washington Legislature as included in RCW 19.405.010(6):

> *The legislature recognizes and finds that the public interest includes, but is not limited to: The equitable distribution of energy benefits and reduction of burdens to vulnerable populations and highly impacted communities; long-term and short-term public health, economic, and environmental benefits and the reduction of costs and risks; and energy security and resiliency. It is the intent of the legislature that in achieving this policy for Washington, there should not be an increase in environmental health impacts to highly impacted communities (RCW 19.045.010(6)).*

In 2021, the State of Washington legislature passed Revised Code of Washington (RCW) 70A.02 to reduce environmental and health disparities in the state and improve the health of all Washington State residents. RCW 70A.02 codified the state's approach to environmental justice (EJ) into law. The code requires that all covered agencies comply with all provisions of the statute, while all other state agencies should strive to apply the laws of the State of Washington, and the rules and policies of the agency, in accordance with the policies of RCW 70A.02, to the extent feasible.

The State of Washington's Growth Management Act (GMA) is a series of state statutes that require counties and cities whose population growth exceeds stated thresholds to develop a comprehensive plan that assists in managing their population growth. Due to the impact of population growth on housing affordability and availability and economic conditions, the following are additional provisions associated with the GMA under Chapter 36.70A RCW that are applicable to a review of socioeconomics:

- RCW 36.70A.010 states that the legislature finds that uncoordinated and unplanned growth, together with a lack of common goals expressing the public's interest in the conservation and the wise use of Washington's lands, pose a threat to the environment; sustainable economic development; and the health, safety, and high quality of life enjoyed by the State of Washington's residents.
- RCW 36.70A.010 states that it is in the public interest that citizens, communities, local governments, and the private sector cooperate and coordinate with one another in comprehensive land use planning.
- RCW 36.70A.010 states that it is in the public interest that economic development programs be shared with communities experiencing insufficient economic growth.
- RCW 36.70A 115 states that counties and cities that are required or choose to plan under RCW 36.70A.040 shall ensure that, taken collectively, adoption of and amendments to their comprehensive plans and/or development regulations provide sufficient capacity of land suitable for development within their jurisdictions to accommodate their allocated housing and employment growth, including the accommodation of, as appropriate, the medical, governmental, educational, institutional, commercial, and industrial facilities related to such growth, as adopted in the applicable countywide planning policies and consistent with the 20-year population forecast from the Washington State Office of Financial Management (OFM).
- RCW 43.62.030 states that the OFM shall annually determine the populations of all cities and towns of the state as of April 1. State agencies should use OFM population estimates for cities and towns in state program administration and in the allocation of selected state revenues.

The U.S. Environmental Protection Agency (EPA) defines EJ as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (EPA 2016).

The EPA defines the term "fair treatment" to mean that "no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies." The term "disproportionate impacts" refer to differences in impacts or risks that are extensive enough that they may merit action. (EPA 2016)

In accordance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, each federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or

environmental effects of its programs, policies, and activities on minority populations and low-income populations." The Executive Order makes clear that its provisions apply fully to programs involving Native Americans" (CEQ 1997). According to RCW 70A.02.010, EJ means:

> "*The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, rules, and policies. Environmental justice includes addressing disproportionate environmental and health impacts in all laws, rules, and policies with environmental impacts by prioritizing vulnerable populations and overburdened communities, the equitable distribution of resources and benefits, and eliminating harm" (RCW 70A.02.010(8)).*

Background

The Benton-Franklin Council of Governments (BFCOG) administers the Benton-Franklin Economic Development District (BFEDD). The BFCOG is the regional economic planning agency for Benton and Franklin Counties. Since 2014, the Benton and Franklin County region has experienced an increase in both population and economic growth. According to the BFEDD, economic growth measured by increases in employment opportunities through local businesses within the region grew by 2.1 percent per year between 2013 and 2019. This expansion in local employment contributed to the region's increase in gross domestic product of 3.5 percent per year since 2013 (BFCOG 2021).

Benton and Franklin Counties also contain the Kennewick-Richland Metropolitan Statistical Area (MSA). MSAs consist of integrated geographic regions typically made up of an urbanized economic core and economically related counties (U.S. Census Bureau 2020a). The U.S. Office of Management and Budget delineates MSAs according to published standards that are applied to U.S. Census Bureau data.

The general concept of an MSA is that of a core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core. The Tri-Cities of Kennewick, Pasco, and Richland are the core of the Kennewick-Richland MSA. Benton and Franklin are economically related counties that share a high degree of economic integration with the urbanized core and one another.

3.16.1 Affected Environment

Benton County is in southeastern Washington State. The Columbia River bounds Benton County to the north, east, and south, while Klickitat and Yakima Counties bound Benton County to the west. Benton County is predominantly rural and agricultural in nature, with unincorporated areas making up most of the jurisdiction. The Project's Lease Boundary is south of the Tri-Cities. Kennewick and Richland are located within Benton County, while Pasco is located in Franklin County.

As previously noted, WAC 463-60-535 states that the study area for socioeconomic impacts shall include the area that may be affected by employment within a 1-hour commute distance of the project site. In addition to Benton and Franklin Counties, Walla Walla and Yakima Counties in Washington are also within a 1-hour commute of the Lease Boundary.

3.16.1.1 Population and Growth Rate

Increases in population can occur from either net in-migration or natural increase. Net in-migration occurs when more people move to an area than leave. Natural increase occurs when there are more births than deaths (OFM n.d.[a]). The State of Washington's approximate population is 7,766,975 (OFM n.d.[b]). Since 2010, the

State of Washington's population has been growing at an average of over 100,000 persons per year. Between 2011 and 2021, in-migration accounted for 66 percent of Washington's population growth. Correspondingly, natural increases in population growth accounted for the remaining 34 percent. The OFM's projections for the state's population suggest that the pace of growth is likely to increase over the ensuing decades.

As shown in **Table 3.16-1**, Benton County had an estimated population of 209,400 as of 2021. This ranks Benton County as the 10th most populated county in the State of Washington (OFM n.d.[b]).

Table 3.16-1: Population (Postcensal Estimates) and Growth Management Act Mid-Level Growth Rate Projections

Location	2011 Population	2021 Population	Average Annual Growth Rate (2011–2021)	2030 Projection	2040 Projection	2050 Projection
Benton County	177,900	209,400	17.7 %	228,162	250,524	267,139
Benton City	3,145	3,500	11.3 %	Not Available	Not Available	Not Available
Kennewick	74,665	84,620	13.3 %	Not Available	Not Available	Not Available
Prosser	5,780	6,130	6.1 %	Not Available	Not Available	Not Available
Richland	49,090	61,320	24.9 %	Not Available	Not Available	Not Available
West Richland	12,200	17,070	39.9 %	Not Available	Not Available	Not Available
Franklin County	80,500	98,350	22.2 %	127,443	158,574	182,589
Connell	5,150	5,125	-0.48 %	Not Available	Not Available	Not Available
Kahlotus	190	145	-23.7 %	Not Available	Not Available	Not Available
Mesa	495	390	-21.2 %	Not Available	Not Available	Not Available
Pasco	61,000	78,700	29.0 %	Not Available	Not Available	Not Available
Walla Walla County	58,800	62,100	5.6 %	59,036	58,963	58,573
Yakima County	244,700	258,100	5.5 %	246,914	252,912	258,007
State of Washington	6,767,900	7,766,975	14.7 %	8,503,178	9,242,022	9,855,117

Sources: OFM n.d.[b], n.d.[c]
Note: Postcensal data for each calendar year between the census and the current year are updated annually using information on the components of population change.

An estimated 82 percent of Benton County's population lives in one of five incorporated communities. Of the county's incorporated communities, Kennewick has the largest population, with 84,620 residents. Kennewick's population accounts for approximately 40 percent of the county's total population. Richland is the second largest incorporated community within Benton County with a total population of 61,320 residents (OFM n.d.[b]). Benton County had an average population density of 123.17 persons per square mile in 2021. Benton County's population density is greater than the statewide average of 116.88 persons per square mile (OFM n.d.[d]).

Benton County's total population increased by 31,500 people or 17.7 percent between 2011 and 2021. Benton County's increase in population exceeded the state average of approximately 14.7 percent (OFM n.d.[e]). When

compared to the state's population growth, migration played a slightly smaller role in Benton County's increase. In-migration accounted for approximately 63 percent of the county's growth in population over this period. Natural increase accounted for the remaining 37 percent (OFM n.d.[e]).

In 2021, Franklin County's estimated population was 98,350. Pasco is the largest incorporated community in Franklin County, with a population of 78,700. Franklin County had an average population density of 79.21 persons per square mile in 2021, compared to a statewide average of 116.88 persons per square mile (OFM n.d.[b], n.d.[d]). The total population in Franklin County increased by more than 17,850 people, or 22 percent, between 2011 and 2021. Franklin County's population growth rate exceeded the state's average of 14.7 percent over the same period. Natural increase accounted for more than 65 percent of Franklin County's population growth, with net in-migration making up the remaining 35 percent (OFM n.d.[e]).

In 2021, the populations of Walla Walla and Yakima Counties were 62,100 and 258,100, respectively. The largest incorporated community in Walla Walla County is the City of Walla Walla, with a 2021 population of 33,680. The largest incorporated community in Yakima County is the City of Yakima, with a population of 97,810. The population density for Walla Walla County in 2021 was 48.90 persons per square mile, while the population density of Yakima County was 60.10 persons per square mile. The population densities of Walla Walla and Yakima Counties are approximately half the statewide average of 116.88 persons per square mile (OFM n.d.[b], n.d.[d]).

Population Projections

The OFM prepares county population projections for planning under Washington State's GMA. The OFM prepares high-, medium-, and low-growth expectations for each county, with the medium series considered the most likely because it is based on assumptions that have been validated with past and current information. Current projections developed in support of the GMA extend through 2040, with supplemental projections developed from 2040 through 2050. **Table 3.16-1** presents projection data based on the OFM's medium growth scenario.

From 2021 to 2030, the populations of Benton and Franklin Counties are projected to increase by approximately 9 percent and 30 percent, respectively. These percentages indicate that Benton County's percent increase in population would be similar to that of the State of Washington's (9 percent) over the same nine-year period. As noted, Franklin County is projected to experience a much higher percent growth rate than either Benton County or the State of Washington over the same nine-year period (OFM n.d.[e]).

As shown in **Table 3.16-1**, the OFM has projected population growth for Benton and Franklin Counties as far out as 2050. The projected 17 percent increase in population for Benton County during the 20-year period between 2030 and 2050 is anticipated to be slightly higher than the State of Washington's 15 percent increase over the same period. Franklin County's 43 percent increase in population from 2030 to 2050 is expected to be almost three times the percent increase that Washington is projected to experience over the same period (OFM n.d.[e]).

From 2021 to 2030, population is projected to increase by approximately 6 percent and 5 percent in Walla Walla and Yakima Counties, respectively. The projected growth rates for Walla Walla and Yakima Counties suggest a slower increase in population for these counties than expected for the State of Washington or Benton and Franklin Counties over the same nine-year period. For the 20-year period from 2030 to 2050, the OFM has projected that the population of Walla Walla County would decrease by less than 1 percent. Over the same 20-year period, Yakima County's population is expected to increase by 4 percent. Both percent changes in population would be

far less than the 15 percent increase in population that the OFM has projected for the State of Washington as a whole (OFM n.d.[e]).

3.16.1.2 People of Color Populations

The White House Council on Environmental Quality (CEQ) guidance states that “minority populations should be identified where either: a) the minority population of the affected area exceeds 50 percent; or b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis” (CEQ 1997).

The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, a census tract, or other similar unit chosen so as to not artificially dilute or inflate the affected minority population (CEQ 1997).

Table 3.16-2 presents race and ethnicity data from the U.S. Census Bureau’s 2020 Decennial (every 10 years) Census of Population and Housing for the study area. According to the most recent census estimates, approximately 64 percent of the population of Washington State is white. Persons of Hispanic or Latino origin were identified as the single largest people of color group, accounting for 14 percent of the state’s total population. In Benton County, 66 percent of the population identified themselves as white alone, while approximately 24 percent of Benton County’s population identified themselves as Hispanic alone. The percentage of Benton County’s population that identifies themselves as Hispanic alone is higher than the statewide average of 14 percent (U.S. Census Bureau 2021a).

Table 3.16-2: Breakdown by Race and Ethnicity by City and County (2020 Decennial Census) for the Project Study Area

Location within Study Area	Total Population for Whom Race Status Is Determined	Hispanic or Latino %	White alone %	Black or African American alone %	American Indian and Alaska Native alone %	Asian alone %	Native Hawaiian and Other Pacific Islander alone %	Some Other Race alone %	Combined Percentage of People of Color who Identify as One Race or Ethnicity Alone
Benton County, Washington	206,873	23.8	65.6	1.3	0.6	3.0	0.3	0.5	29.5
Benton City, Washington	3,479	34.8	58.6	0.3	0.8	0.5	0.2	0.6	37.3
Kennewick city, Washington	83,921	30.2	59.2	1.7	0.6	2.8	0.4	0.5	36.1
Prosser city, Washington	6,062	46.0	47.4	0.5	0.4	2.2	0.2	0.4	49.6
Richland city, Washington	60,560	13.3	73.3	1.4	0.4	5.2	0.2	0.6	21.1
West Richland city, Washington	16,295	13.7	76.8	0.8	0.6	2.1	0.1	0.5	17.8
Franklin County, Washington	96,749	54.2	38.5	1.7	0.5	1.9	0.2	0.3	58.7
Connell city, Washington	5,441	41.1	42.5	8.0	2.0	2.2	0.0	0.0	53.3

Table 3.16-2: Breakdown by Race and Ethnicity by City and County (2020 Decennial Census) for the Project Study Area

Location within Study Area	Total Population for Whom Race Status Is Determined	Hispanic or Latino %	White alone %	Black or African American alone %	American Indian and Alaska Native alone %	Asian alone %	Native Hawaiian and Other Pacific Islander alone %	Some Other Race alone %	Combined Percentage of People of Color who Identify as One Race or Ethnicity Alone
Kahlotus city, Washington	147	18.4	73.5	0.0	0.0	0.7	0.0	0.7	19.7
Mesa city, Washington	385	76.1	19.5	0.0	0.0	1.6	0.0	0.0	77.7
Pasco city, Washington	77,108	57.5	35.3	1.5	0.4	2.0	0.2	0.4	62.0
Walla Walla County, Washington	62,584	22.7	68.0	1.6	0.7	1.5	0.2	0.4	27.1
Yakima County, Washington	256,728	50.7	40.3	0.7	3.6	1.1	0.1	0.4	56.5
Washington	7,705,281	13.7	63.8	3.8	1.2	9.4	0.8	0.6	29.5

Source: U.S. Census Bureau 2021
Notes:
Table 3.16-2 is based on respondents that identified their racial makeup based on one race alone. Percentages for each jurisdiction may not equal 100 percent as individuals are allowed to self-identify based on any number of racial groups.
“Other races” as reported by the U.S. Census Bureau could be “Other Race” or combination of races.

Six census block groups intersect with or are located adjacent to the Project Lease Boundary (**Figure 3.16-1**). A census block group is a statistical subdivision of a census tract, generally defined to contain between 600 and 3,000 people and 240 and 1,200 housing units (U.S. Census Bureau 2022). **Table 3.16-3** and **Figure 3.16-1** present race and ethnicity data for the six census block groups that intersect with or are adjacent to the Lease Boundary.

Table 3.16-3: Race and Ethnicity of Census Block Groups Intersecting the Project Lease Boundary

Lease Boundary	Total Population for Whom Race States Is Determined	White Alone	White Alone (%)	Hispanic Alone	Hispanic Alone (%)	Other Races Alone	Other Races (%)	All People of Color (Hispanic and other Races)	All People of Color (Hispanic and Other Races) (%)
Census Tract 108.07, Block Group 1	1,558	1,194	77	232	15	63	4	295	19
Census Tract 108.14, Block Group 1	5,129	4,286	84	406	8	194	4	600	12
Census Tract 115.01, Block Group 1	1,392	966	69	344	25	28	2	372	27
Census Tract 115.06, Block Group 1	2,161	1,755	81	171	8	132	6	303	14
Census Tract 116, Block Group 1	835	442	53	366	44	11	1	377	**45***
Census Tract 118.01, Block Group 3	898	705	79	133	15	25	3	158	18
Block Group Totals	11,973	9,348	78	1,652	14	453	4	2,105	18
Benton County	206,873	135,718	66	49,339	24	11,641	6	60,980	29[(a)]

Source: 2020 Decennial Census (U.S. Census Bureau 2021a)
Note:
[(a)] Reference threshold for the analysis of people of color
Total percent population may not be equal to 100 percent due to rounding.
Bold* values = Percentage of people of color that are greater than reference threshold

When comparing the percentage of people of color who reside in Benton County (29 percent) to the percentage of people of color who reside in other counties within the socioeconomic study area (**Table 3.16-2**), the percentage of people of color population within the Benton County (29 percent) is considered a conservative reference threshold for people of color analysis within the identified six census block groups that intersect with or are adjacent to the Lease Area.

White alone represents the majority population in all six census block groups. The percentage of white residents ranges from 53 to 84 percent within the six block groups. For most of the block groups (four out of six block groups), between 8 and 15 percent of residents identify as Hispanic alone. Percents for other races range between 1 and 6 percent for all census block groups. The percentage of people of color for the six census block groups combined (18 percent) is well below the identified threshold for this analysis (29 percent). However, the population of people of color in Census Tract 116, Block Group 1 (45 percent) is greater than this value for Benton County as a whole (29 percent), which is the identified reference community in this study.

Census Tract 116, Block Group 1, spans a very large area, with the majority falling outside the Project Lease Boundary. This census block group is among the least populated of the census block groups, but it is the largest census block group that intersects with the Project Lease Boundary. Review of aerial imagery indicated that this block group contains little built-up development, and proximity values to other EJ indicators, such as superfund, traffic, and hazardous waste, are low in this area (**Appendix 3.16-1**) (EPA 2022).

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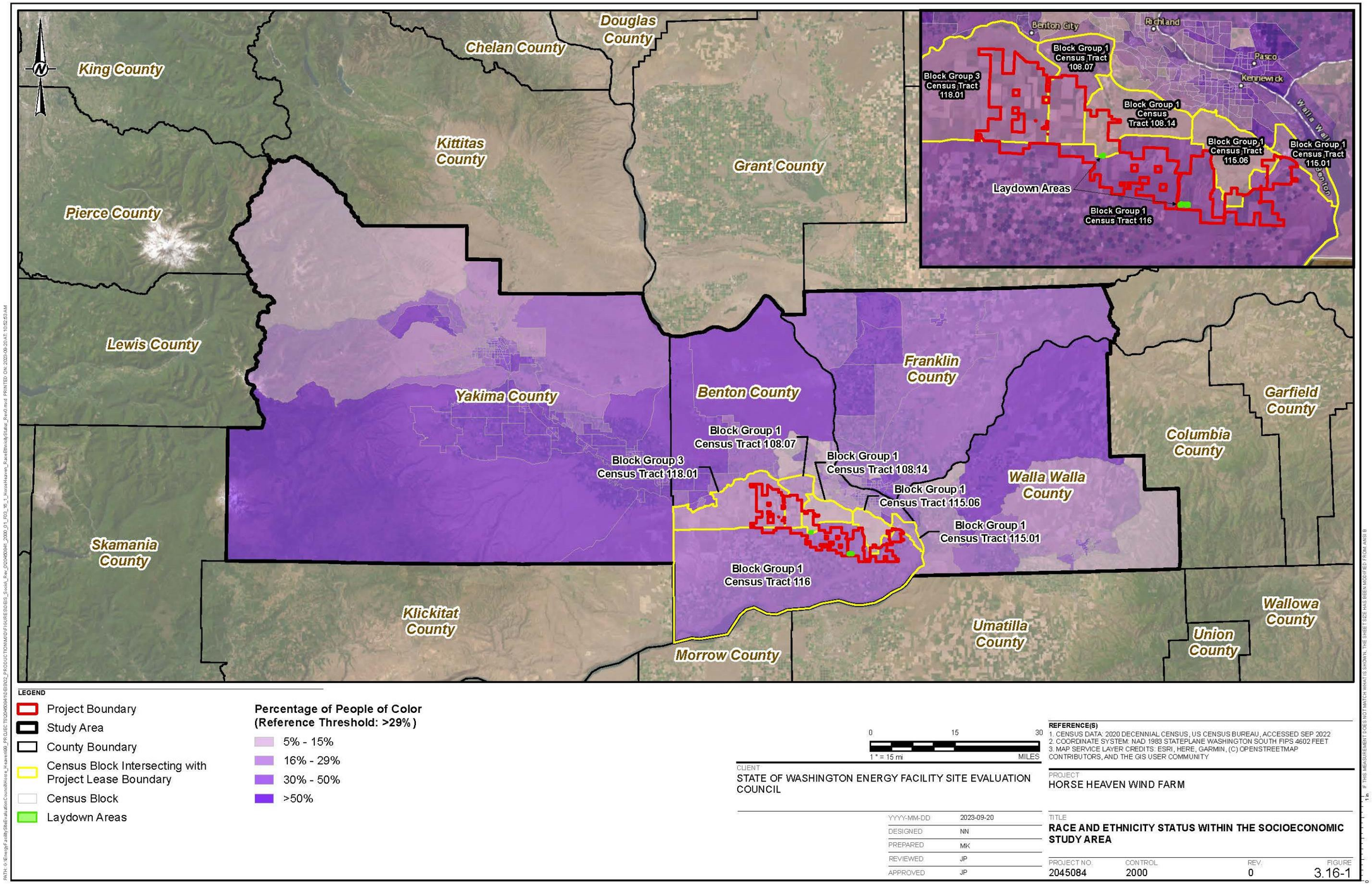

Figure 3.16-1: Race and Ethnicity Status

3.16.1.3 Low-income Population

According to the CEQ, a community that has a significant amount of its population living at or below the poverty level could be considered a low-income community (CEQ 1997). RCW 19.405.020 defines low-income as follows:

> *Household incomes as defined by the department or commission, provided that the definition may not exceed the higher of eighty percent of area median household income or two hundred percent of the federal poverty level, adjusted for household size.*

In accordance with RCW 19.405.020, this analysis defines low-income as individuals who make less than 200 percent of the federal poverty level, adjusted for household size.

Table 3.16-4 shows income and poverty data for the Project's socioeconomic study area. The estimated share of total households below the poverty level in Washington State is 11 percent. Poverty levels were slightly higher in Benton County (12 percent) and Franklin County (15 percent). Similarly, the estimated shares of total households below the poverty level were 13 percent in Walla Walla County and 17 percent in Yakima County. In Benton County, the share of households below the poverty level in its five incorporated communities ranged from about 8 percent in West Richland to 18 percent in Prosser. In Franklin County, the share of households below the poverty level in its four incorporated communities ranged from about 9 percent in Kahlotus to 29 percent in Mesa (U.S. Census Bureau 2020b).

Table 3.16-4: Household Income Level within the Project Study Area

Geographic Area	Median Household Income	Mean Household Income
Benton County	$69,023	$87,525
Benton City	$55,175	$64,786
Kennewick	$59,533	$74,073
Prosser	$50,164	$57,745
Richland	$77,686	$99,631
West Richland	$99,817	$108,641
Franklin County	$63,584	$79,145
Connell	$51,154	$55,688
Kahlotus	$51,250	$54,681
Mesa	$50,000	$61,620
Pasco	$62,775	$77,031
Walla Walla County	$57,858	$76,351
Yakima County	$51,637	$69,036
State of Washington	$73,775	$98,983

Note: Income presented in the American Community Survey was adjusted by the U.S. Census Bureau for inflation based on 2019 dollars
Source: U.S. Census Bureau American Community Survey 5-year estimate (U.S. Census Bureau 2020b)

As shown in **Table 3.16-4**, median incomes were below the state average in Benton, Franklin, Walla Walla, and Yakima Counties. This was also the case for the incorporated communities of Benton and Franklin Counties, with the exceptions of Richland and West Richland, Washington.

Table 3.16-5 presents the low-income data for the Project's socioeconomic study area. In comparison to the State of Washington, the low-income level in the study area was the highest in Yakima County (6 percent of low-income

population in the State of Washington), followed by Benton County (3 percent of low-income population in the State of Washington). This value for the study area (Benton, Franklin, Walla Walla, and Yakima Counties together) is 11.62 percent, indicating that the low-income population within the study area represents 11.62 percent of the low-income population within the State of Washington.

Table 3.16-5: Low-income Status Within the Project Study Area

Lease Boundary	Total Population for Whom Income Status Is Determined	Low-income Population (All Individuals with Income below 200% of the Federal Poverty Level)	Percentage of low-income Population (Comparison to Total Population) (%)	Comparison of All Individuals with Income Below 200% of the Federal Poverty Level and this Value for the State of Washington (%)
Benton County	198,731	52,180	26	3
Franklin County	90,828	30,749	34	1.7
Walla Walla County	55,803	17,142	31	1
Yakima County	246,943	106,806	43	6
Benton, Franklin, Walla Walla, and Yakima Counties combined	592,305	206,877	35	11.62
State of Washington	7,372,433	1,780,174	24	100

Source: U.S. Census Bureau, American Community Survey, Table S1701, Poverty Status in the past 12 months, 2020 (U.S. Census Bureau 2020b)

Because of the location of the Project, and the fact that Benton County has the lowest percentage of low-income individuals in comparison to other counties within the Project study area, Benton County was selected as the most conservative reference community, and therefore the percentage of low-income individuals in Benton County (26 percent) was used as the conservative reference threshold for the analysis of low-income status in this study.

Table 3.16-6 and **Figure 3.16-2** present low-income data for the census block groups that intersect with or are adjacent to the Project Lease Boundary. The total population of low-income individuals within the studied census block groups (1,721) constitutes 3.3 percent of the total population of low-income individuals within Benton County as a whole (52,180), while the total population for whom income status is determined within the studied census block groups (12,637) constitutes 6.3 percent of the total population within Benton County (198,731).

Table 3.16-6: Low-income status of Census Block Groups Intersecting the Project Lease Boundary

Geographic Area	Total Population for Whom Income Status is Determined	Low-income Population (All Individuals with Income Below 200% of the Federal Poverty Level)	Percentage of low-income Population (Comparison to Total Population) (%)	Percent of Low-income Population (Comparison to Benton County Low-income Population) (%)
Census Tract 108.07, Block Group 1	1,772	330	19	0.63
Census Tract 108.14, Block Group 1	5,250	414	8	0.8
Census Tract 115.01, Block Group 1	1,077	446	**41**	0.85
Census Tract 115.06, Block Group 1	2,736	51	2	0.1
Census Tract 116, Block Group 1	977	224	23	0.43
Census Tract 118.01, Block Group 3	825	256	**31**	0.49
Census Block Groups Totals	12,637	1,721	14	3.3
Benton County	198,731	52,180	26[(a)]	100
State of Washington	7,372,433	1,780,174	24	-

Source: U.S. Census Bureau, America Community Survey, Table S1701, Poverty Status in the past 12 months, 2020 (U.S. Census Bureau 2020b)
Note:
[(a)] = Reference threshold for the analysis of low-income communities
Bold = Percentage of low-income communities that is greater than the reference threshold.

While the percentage of low-income population for the six census block groups combined (14 percent) is well below the identified low-income threshold for this analysis (26 percent), Census Tract 115.01, Block Group 1 and Census Tract 118.01, Block Group 3 with 41 percent and 31 percent of low-income population, respectively, exceed the low-income threshold (26 percent) and are identified as low-income communities.

Census Tract 115.01, Block Group 1, with a low-income population of 41 percent, is the only census block group (among the six) that is completely outside the Project Lease Boundary but is located adjacent to the Project Lease Boundary. This census block group is also among the least populated block groups (1,077 individuals for whom income status is determined). Review of aerial imagery indicated a low amount of built-up development and dispersed housing in the majority of the areas within this census block group. Proximity values to other EJ indicators, such as superfund, traffic, and hazardous waste are low for this census block group (**Appendix 3.16-1**) (EPA 2022).

Similarly, Census Tract 118.01, Block Group 3, with a low-income population of 31 percent, has the lowest population of individuals for whom income status is determined (825 individuals). While this census block group does intersect the Project Lease Boundary, large portions are located outside the Project Lease Boundary.

Review of the imagery indicated a very low amount of built-up areas and dispersed housing in this census block group. Also, proximity values to other EJ indicators, such as superfund, traffic, and hazardous waste are low for this census block group (**Appendix 3.16-1**) (EJ Screen 2022).

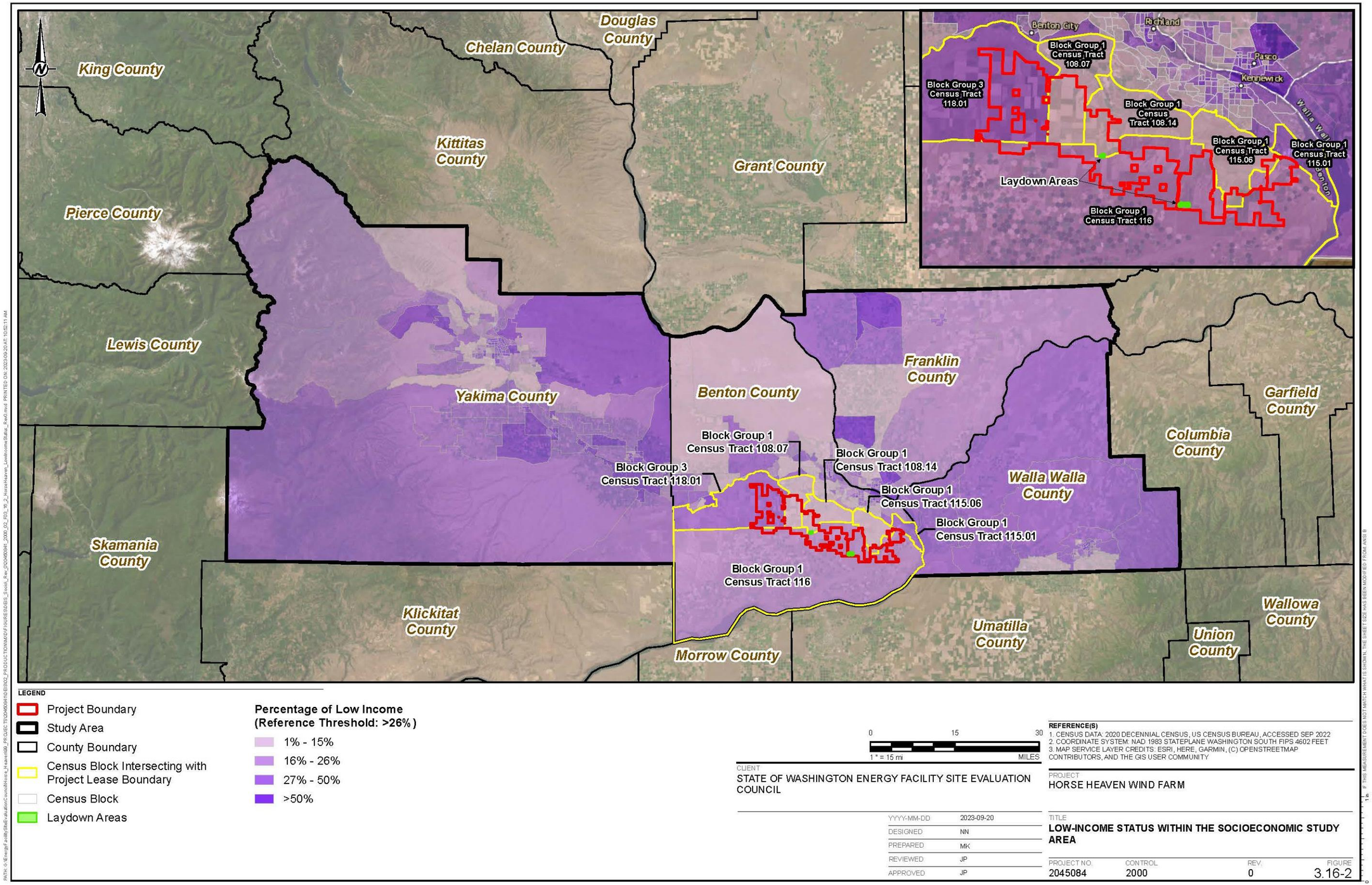

Figure 3.16-2: Low-income Status within the Socioeconomic Study Area

3.16.1.4 Economic Conditions

The economy in Benton and Franklin Counties has largely been dependent on federal funding for Hanford Site projects. Employment in the Hanford area has decreased in recent years as part of federal spending cuts. This decrease was part of a region-wide decline in employment between 2012 and 2013 and the end of American Recovery and Reinvestment Act funding (BFCOG 2021).

As the Hanford Site's role in the region's economy decreases, agriculture, food processing, and transportation services have experienced growth in recent years. Additional economic trends within the study area relate to increases in agri-tourism. These changes in economic conditions are often associated with an emerging viticulture (wine) industry and specialty crop farming and tourism-related commercial and recreational activities. The region's tourism activities are often associated with the Snake, Columbia, and Yakima Rivers (Benton County 2022).

3.16.1.5 Fiscal Conditions

Fiscal policy is the use of government spending and taxation to influence the economy. Governments typically use fiscal policy to promote strong and sustainable growth and reduce poverty. The following describes the existing fiscal conditions of the four Washington counties in the study area:

- Benton County's most recent financial statement filed with the Office of the Washington State Auditor was submitted in 2020 and covered the period from January 1, 2019 through December 31, 2019. Benton County's general fund is its principal operating reserve. The 2020 annual filing by Benton County with the Washington State Auditor indicates that the county's general fund had total revenues of approximately $69.7 million for the fiscal year that ended December 31, 2019. Taxes accounted for approximately 56 percent of the total account. In 2019, Benton County had total general fund expenditures of approximately $60.1 million, with spending on general government and public safety accounting for approximately 96 percent of the account's total distribution. The financial statement presented no noticeable trends between 2019 and 2020. This is due to Benton County operating under a biennium budget cycle that required no reportable amendments for year two (Washington State Auditor 2020a).
- Franklin County's most recent financial statement filed with the Office of the Washington State Auditor was submitted in 2020 and covered the period of January 1, 2019 through December 31, 2019. Franklin County's general fund is the County's primary operating reserve and is the largest source of day-to-day service delivery. Franklin County had total general fund revenues of $29 million, with property taxes and sales and use taxes accounting for 38 percent and 24 percent of the total account, respectively. Franklin County had total general fund expenditures of approximately $31 million, with spending on general government and public safety accounting for three-quarters of the account's total distribution. The General Fund's total 2019 revenue of $29,046,379 was $849,362 over 2018's total revenue, or an increase of 3 percent year over year. (Washington State Auditor 2020b).
- Walla Walla County's most recent financial statement filed with the Office of the Washington State Auditor was submitted in 2020 and covered the period from January 1, 2019 through December 31, 2019. The general fund is the chief operating reserve of Walla Walla County. Walla Walla County had total general fund revenues of approximately $18.4 million. Of the approximate $13.6 million in taxes collected, 64.3 percent was from property taxes, 35.1 from sales taxes, and 0.6 percent from other taxes. The total 2019 general fund expenditures, including transfers, were approximately $17.8 million, with spending on general government and public safety accounting for 89 percent of the account's total distribution. Both Walla Walla

County's 2019 general fund revenues and expenditures slightly increased when compared with 2018 (Washington State Auditor 2020c).

- Yakima County's most recent financial statement filed with the Office of the Washington State Auditor was submitted in 2021 and covered the period January 1, 2020, through December 31, 2020. The general fund is the chief operating reserve of Yakima County. Yakima County's general fund had a revenue increase of over $13 million from 2019 revenue. Twelve million of the increase in revenue was attributed to intergovernmental revenues dealing with COVID-19 funds. In 2020, Yakima County had general fund revenues of $80.4 million. Yakima County's general fund expenditures in 2020 were $61.2 million, with spending on general government and public safety accounting for 89 percent of the account's total distribution. Total revenues for Yakima County were over $185 million in 2020, an increase from 2019's total revenue's of $157 million. (Washington State Auditor 2020d).

3.16.1.6 Taxation

In accordance with RCW 82.08.020, the State of Washington imposes a sales and use tax of 6.5 percent. Sales tax applies to most retail sales of "tangible personal property" within Washington, including some services such as lodging and related services. Use taxes are equivalent to sales taxes and apply to taxable purchases made out of state for use in Washington. State sales and use tax revenues are deposited in the state general fund.

In addition to the 6.5 percent state sales and use tax, local governments can impose local sales taxes on the same tax base as the state. Cities and counties can impose up to 1 percent in "unrestricted" sales taxes that may be used for any lawful government purpose, as well as a number of "restricted" local sales taxes that may only be used for specific purposes (Municipal Research and Services Center 2022). The following describes the 2022 sales tax rates for the counties that occur within the study area (Washington State Department of Revenue 2021):

- **Benton County:** The overall local sales tax total for unincorporated Benton County is 2.1 percent.
- **Franklin County:** The overall local sales tax total for unincorporated Franklin County is 2.1 percent.
- **Walla Walla County:** The overall local sales tax for unincorporated Walla Walla County is 1.5 percent.
- **Yakima County:** The overall local sales tax for unincorporated Yakima County is 1.5 percent.

The State of Washington provides a sale and use tax exemption to wind and solar facilities with a generating capacity over 1 kilowatt. The exemption may be claimed in the form of a sales or use tax remittance of 50, 75, or 100 percent of the sales or use tax paid on qualified machinery and equipment, and installment labor and services (RCW 82.08.962; RCW 82.12.962). The amount of the remittance is determined by criteria established by the Washington Department of Labor and Industries and applied for through the Washington Department of Revenue. The program applies to projects where installation of exempt machinery and equipment has begun after January 1, 2020 and has completed by December 31, 2029 (RCW 82.08.962).

Property taxes are a primary source of revenue for counties in Washington State. The property tax system in Washington State is a "budget-based" system, which means that counties and other taxing districts first establish the total dollar amount of property tax revenue they wish to generate in the upcoming year. Once this amount is established, the county assessor then calculates the applicable levy rate based on the total assessed value of all properties in the county.

The total dollar amount of property taxes to be collected in one year is known as the levy amount. In Washington, the amount the levy can grow from year to year is limited by the "levy lid," also known as the "1% increase limit" or "101% limit." For counties with more than 10,000 residents, like Benton County, annual increases in the levy amount cannot exceed 1 percent or the rate of inflation, whichever is lower, plus an additional amount generated by new construction and "add-ons." These "add-ons" include increases in assessed valuation from the previous year due to new construction and property improvements and construction of renewable energy electricity-generating facilities, including turbine and solar facilities (RCW 84.55.010; Horse Heaven Wind Farm, LLC 2022).

Individual government units with property tax authority in Benton County include the state, county, cities, school districts, hospitals, libraries, and fire districts. These government units, known as taxing districts, combine to form Tax Areas, which represent unique combinations of overlapping taxing districts. The resulting combined levy or millage rate varies by Tax Area (Horse Heaven Wind Farm, LLC 2022). The following describes the property tax process for the State of Washington and Benton County:

- The levy, or millage (mills) rate, which determines the amount an individual property owner owes, is expressed as a dollar amount per $1,000 assessed value. A jurisdiction with a levy rate of 10 mills would impose tax at the rate of $10 per $1,000 of property value.
- The Washington State Constitution requires that levy rates are uniform for all properties within a taxing district. The one exception to this requirement is for agricultural, timber, and open space land.
- The Benton County Levy Rates report for 2021 identified 52 Tax Areas, with corresponding levy rates ranging from 7.37 to 12.8 mills (Benton County 2021).

3.16.1.7 Workforce and Economics

The region has experienced an increase in economic activities through job expansion in multiple industries. The increase in job opportunities has helped the region retain population and encourage in-migration. The diversity in workforce participation includes professional and technical services, healthcare, education, construction, manufacturing, retail trade, transportation, warehousing, and agriculture (BFCOG 2021). **Table 3.16-7** presents employment data by economic sector for the study area.

Table 3.16-7: Employment by Economic Sector

Economic Sector	Benton County	Franklin County	Walla Walla County	Yakima County	State of Washington
Total employment	111,173	42,590	36,328	132,124	4,385,827
Farm employment	5,124	4,030	3,535	19,290	90,166
Nonfarm employment	106,049	38,560	32,793	112,834	4,295,661
Private nonfarm employment	93,565	31,639	26,514	94,702	3,655,279
Forestry, fishing, and related activities	NA	NA	NA	10,470	43,128
Mining, quarrying, and oil and gas extraction	NA	NA	NA	95	8,601
Utilities	165	NA	143	175	5,861
Construction	9,124	3,209	1,519	5,409	271,188
Manufacturing	4,892	3,850	4,330	8,570	289,614
Wholesale trade	1,629	2,068	911	4,951	141,805
Retail trade	11,803	4,140	3,007	12,896	458,066

Table 3.16-7: Employment by Economic Sector

Economic Sector	Benton County	Franklin County	Walla Walla County	Yakima County	State of Washington
Transportation and warehousing	2,352	NA	725	4,680	189,866
Information	778	177	323	650	160,563
Finance and insurance	3,794	712	1,100	2,939	172,563
Real estate and rental and leasing	3,875	1,377	1,168	3,655	202,481
Professional, scientific, and technical services	11,151	1,176	NA	3,268	343,000
Management of companies and enterprises	611	46	NA	754	48,440
Administrative and support and waste management and remediation services	11,405	1,519	NA	3,038	213,476
Educational services	1,111	614	NA	1,974	78,717
Health care and social assistance	15,043	3,744	NA	18,282	491,237
Arts, entertainment, and recreation	1,544	411	NA	1,359	80,819
Accommodation and food services	7,281	2,043	NA	6,437	247,746
Other services (except government and government enterprises)	4,850	2,196	1,607	5,100	211,128
Government and government enterprises	12,484	6,921	6,279	18,132	640,382
Federal civilian	789	499	1,983	1,289	78,622
Military	519	232	147	711	68,608
State and local	11,176	6,190	4,149	16,132	493,152
State government	1,499	1,765	1,856	2,947	152,806
Local government	9,677	4,425	2,293	13,185	340,346

Source: U.S. Bureau of Economic Analysis 2020 Data (BEA 2022a, 2022b)
NA = not available

The labor market within the State of Washington and study area is summarized as follows (BEA 2022a, 2022b):

- An estimated 111,173 people were employed in Benton County in 2020, while 42,590 were employed in Franklin County. Employment in Benton and Franklin Counties represents 3 percent and 1 percent of the State of Washington's total employment, respectively.
- An estimated 36,328 people were employed in Walla Walla County, and 132,124 were employed in Yakima County in 2020. Walla Walla and Yakima Counties' employed population in 2020 consisted of 1 percent and 3 percent of the State of Washington's total employment, respectively.
- In 2020, farm employment accounted for 2 percent of the state's labor market. Farm employment in the study area counties ranged between 5 and 15 percent. In Benton County, farm employment accounts for approximately 5 percent of the county's workforce.
- In 2020, the private sector employed more people than the public sector in the State of Washington and the study area. The following summarizes employment by the economic sectors that employ the greatest number of residents within the study area:

- The two largest sectors for employment in Washington were government and health care and social assistance. Government sector jobs represented 15 percent of Washington's workforce and health care, and social assistance represented 11 percent.
- Government sector represented between 11 and 17 percent of the workforce in Benton, Franklin, Walla Walla, and Yakima Counties in 2020.
- Similar to the State of Washington, the health care and social assistance sector was the second largest employer in Benton and Yakima Counties. Health care and social assistance represented 14 percent of employment within Benton and Yakima Counties.
- In Franklin County, retail trade at 10 percent of work was the second largest employer.

3.16.1.8 Housing

The U.S. Census Bureau defines a housing unit as a house, apartment, mobile home or trailer, group of rooms, or single room occupied or intended to be occupied as separate living quarters. **Table 3.16-8** summarizes housing resources for the State of Washington and study area. The data presented in this table are annual estimates prepared by the U.S. Census Bureau from the 2020 Decennial Census and 2019 American Community Survey (ACS) 5-Year Estimate.

Table 3.16-8: Housing Characteristics for the Study Area

Geographic Area	Total Housing Units[(a)]	Occupied Housing Units[(a)]	Vacant Housing[(a)]	Median Home Value[(b)]	Median Rent Cost[(b)]
Benton County	80,076	76,369	3,707	$243,600	$974
Benton City	1,381	1,277	104	$164,000	Not Available
Kennewick	32,242	30,761	1,481	$223,000	$922
Prosser	2,346	2,164	182	$200,400	$835
Richland	25,524	24,327	1,197	$267,200	$1,087
West Richland	5,773	5,628	145	$291,700	$1,280
Franklin County	29,740	28,748	992	$216,400	$913
Connell	1,021	958	63	$129,500	$903
Kahlotus	70	59	11	$122,900	Not Available
Mesa	119	105	14	$93,600	Not Available
Pasco	24,334	23,653	681	$210,000	$922
Walla Walla County	24,971	23,082	1,889	$231,500	$926
Yakima County	90,504	85,882	4,622	$183,800	$825
State of Washington	3,202,241	2,974,692	227,549	$351,300	$1,258

Notes:
(a) 2020 Decennial Census Data (U.S. Census Bureau 2021)
(b) ACS (2019) 5-Year Estimate Data (U.S. Census Bureau 2020b)
Not Available = Data not included in the 2019 American Community Survey 5-Year Estimate

The following describes the housing market for the four counties within the study area:

- **Benton County**: An estimated total of 3,707 units were vacant in Benton County in 2020. In 2019, the median home value in Benton County was $243,600. In 2019, there were 21,205 units with a home value less than $300,000 in Benton County. This includes 1,561 units with a value less than $100,000. In 2019, the median monthly rent in Benton County was $974. Median rent for renter-occupied units ranged from almost $835 in Kennewick to more than $1,280 in West Richland (U.S. Census Bureau 2021a, 2020b).
- **Franklin County**: An estimated total of 992 units were vacant in Franklin County in 2020. In 2019, the median home value in Franklin County was $216,400. In 2019, there were 9,692 units with a home value less than $300,000 in Franklin County. This includes 730 units with a value less than $100,000. In 2019, the median monthly rent in Franklin County was $913. For renter-occupied units, rent ranged from almost $903 in Connell to $922 in Pasco (U.S. Census Bureau 2021a, 2020b).
- **Walla Walla County**: An estimated total of 1,889 units were vacant in Walla Walla County in 2020. In 2019, the median home value in Walla Walla County was $231,500. In 2019, the median home value in Walla Walla County was $216,400. In 2019, there were 5,568 units with a home value less than $300,000 in Walla Walla County. This includes 485 units with a value less than $100,000. In 2019, the median monthly rent in Walla Walla County was $926 (U.S. Census Bureau 2020b, 2021a).
- **Yakima County**: An estimated total of 4,622 units were vacant in Yakima County in 2020. In 2019, the median home value in Yakima County was $183,800. In 2019, there were 25,589 units with a home value less than $300,000 in Yakima County. This includes 3,399 units with a value less than $100,000. In 2019, the median monthly rent in Yakima County was $825 (U.S. Census Bureau 2020b, 2021a).

Lawrence Berkeley National Laboratory completed a study in 2013 that used data collected from the sale of more than 50,000 homes in 27 counties, in nine different states. These homes were within 10 miles of wind projects, with 1,198 sales within one mile and 331 within half of a mile. This study also used data from before a project; the post-announcement, pre-construction period; and during operation. The study found no evidence of an effect on prices of homes in proximity to wind turbines (Hoen and Atkinson-Palombo 2016).

As presented in **Table 3.16-9**, the number of housing units has increased statewide and in Benton, Franklin, Walla Walla, and Yakima Counties from 2011 through 2021. By percent of total housing units, the counties of Walla Walla and Yakima experienced smaller gains in housing than Benton and Franklin Counties over this same period. Housing in Benton and Franklin Counties increased with net gains of approximately 11,647 units and 5,371 units, respectively. Within the Tri-Cities, the City of Pasco experienced the largest absolute increase over this period, with an additional 5,574 units. Similarly, Richland added approximately 4,673 housing units, while Kennewick added an estimated 3,923 units (OFM n.d.[f]).

Table 3.16-9: Number of Housing Units in the Study Area

Geographic Area	Total Housing Units 2011	Total Housing Units 2021	Percent Change	Annual Growth Rate
Benton County	69,739	81,386	16.7 %	1.7 %
Benton City	1,241	1,403	13.1 %	1.3 %
Kennewick	28,745	32,668	13.6 %	1.4 %
Prosser	2,134	2,375	11.3 %	1.1 %
Richland	21,232	25,905	22.0 %	2.2 %
West Richland	4,606	6,104	32.5 %	3.3 %
Franklin County	25,070	30,441	21.4 %	2.1 %

Geographic Area	Total Housing Units 2011	Total Housing Units 2021	Percent Change	Annual Growth Rate
Connell	931	1,031	10.7 %	1.1 %
Kahlotus	113	67	**-40.7 %**	**-4.1 %**
Mesa	128	120	**-6.3 %**	**-0.6 %**
Pasco	19,350	24,924	28.8 %	2.9 %
Walla Walla County	23,537	25,079	6.6 %	0.7 %
Yakima County	85,940	91,292	6.2 %	0.6 %
State of Washington	2,904,623	3,248,747	11.8 %	1.2 %

Source: OFM n.d.[f]
Notes: Postcensal data for each calendar year between the census and the current year are updated annually using information on the components of population change.
Bold = Loss of available housing

Temporary Housing

Table 3.16-10 summarizes the rental housing market for the study area. Viewed by county, these estimates suggest that rental housing is available throughout the study area. The U.S. Census Bureau's American Community Survey 2019 5-Year data indicates rental vacancy rates for the study area counties ranged from 2.7 percent in Franklin County to 6.1 percent in Walla Walla County. Vacancy rates within the Tri-Cities ranged from 2.3 percent in Pasco to 6.6 percent in Richland (U.S. Census Bureau 2020b).

Table 3.16-10: Rental Market Conditions for Study Area Counties

Geographic Area	Total Housing Units	Occupied and Paying Rent	Rental Vacancy Rates (%)	Seasonal, Recreational, or Occasional Use[(a)]
Benton County	76,241	21,360	5.1	378[(b)]
Benton City	Not Available	Not Available	Not Available	Not Available
Kennewick	31,093	10,363	5.2	Not Available
Prosser	2,635	930	0.0	Not Available
Richland	23,582	7,415	6.6	Not Available
West Richland	4,931	724	0.0	Not Available
Franklin County	28,063	8,021	2.7	Not Available
Connell	1,208	478	3.2	Not Available
Kahlotus	Not Available	Not Available	Not Available	Not Available
Mesa	Not Available	Not Available	Not Available	Not Available
Pasco	22,736	6,561	2.3	Not Available
Walla Walla County	24,745	7,645	**6.1**	Not Available
Yakima County	88,698	28,647	2.8	1,431[(b)]
State of Washington	3,106,528	1,014,639	3.6	91,657[(b)]

Source: U.S. Census Bureau 2020b; U.S. Census Bureau 2020c
Notes:
(a) Housing units for seasonal, recreational, or occasional use are generally considered to be vacation homes. They are not included in the estimated number of housing units available for rent.
(b) Data from American Community Survey 2019 1-Year Estimate (U.S. Census 2020c)
Not Available = Data not included in the 2019 American Community Survey 5-Year Estimate

Within the study area, temporary housing is also available in the form of hotel and motel rooms. Data compiled by travel research firm STR Global identified 44 hotels in the Tri-Cities area in November 2017, with a total of 4,063 guestrooms (ECONorthwest 2018). STR Global compiles data for commercial lodging establishments with at least 15 rooms. STR Global does not count single-room occupancy hotels, most bed and breakfast inns, or short-term rentals (e.g., Airbnb) (Horse Heaven Wind Farm, LLC 2022).

The Tri-Cities short-term rental market is seasonal, with monthly occupancy rates ranging from 42 percent in December to 77 percent in June. Occupancy in July and August averaged 69 percent (ECONorthwest 2018). Additionally, ECONorthwest states that the Tri-Cities attract a larger than average share of business and meeting visitors, which tends to support higher occupancy in the spring and fall (ECONorthwest 2018).

In addition to short-term rentals, temporary accommodations in the study area also include recreational vehicle (RV) parks and campsites. Within Benton and Franklin Counties, there are 12 RV parks and campgrounds, with a total of 1,320 RV spaces (Horse Heaven Wind Farm, LLC 2022).

3.16.1.9 Schools

Table 3.16-11 summarizes school district, enrollment, teacher data, and poverty data for the school districts within the study area. Student/teacher ratios, calculated by dividing the total number of students by the total number of full-time equivalent teachers, is a common measure used to assess the overall quality of a school. The statewide average ratio in Washington was 18.4 for the 2019 through 2020 school year. The national student/teacher ratio for the 2019 through 2020 school year was 15.9. The average student/teacher ratios for the study area counties for the 2021 through 2022 school year were similar to the state ratio from the 2019 through 2020 school year and ranged from 16.2 in Walla Walla County to 19.9 in Benton County (NCES n.d.[a], n.d.[b]).

Within the Study area, all but two school districts meet or potentially meet the poverty percentages (above 50%) necessary to receive extended benefits under the Learning Assistance Program (LAP). LAP is a state-funded program designed to enhance educational opportunities by providing supplemental instruction and services to assist students who are not yet meeting academic standards.

The racial and ethnic demographics of the school districts within the study area are shown in **Table 3.16-12**. Based on the State of Washington's student demographics data for the 2017 school year for the school districts within the study area, diverse student populations occur in each county with Hispanic and American Indian student populations often exceeding the state's average.

Table 3.16-11: School Districts within the Project Vicinity

Study Area County	School District	Total Number of Schools	Total Number of Students	Number of FTE Teachers	Student/ Teacher Ratio	2020/2021 Poverty Percentages[(a)]
Benton	Finley School District	3	880	51.60	17.05	70.75
Benton	Kennewick School District	32	18,714	956.02	19.57	55.68
Benton	Kiona-Benton City School District	4	1,417	78.20	18.12	71.97
Benton	Paterson School District	1	142	12.79	11.10	99.15
Benton	Prosser School District	6	2,493	118.20	21.09	69.57

Table 3.16-11: School Districts within the Project Vicinity

Study Area County	School District	Total Number of Schools	Total Number of Students	Number of FTE Teachers	Student/ Teacher Ratio	2020/2021 Poverty Percentages[a]
Benton	Richland School District	22	13,831	668.86	20.68	31.59
Franklin	Educational Service District 123	1	93	1.10	84.55	Data Not Available
Franklin	Kahlotus School District	1	36	8.72	4.13	72.73
Franklin	North Franklin School District	9	2,071	125.00	16.57	74.44
Franklin	Pasco School District	29	18,538	1,005.66	18.43	71.05
Franklin	Selah School District	10	3,748	224.68	16.68	50.55
Franklin	Star School District No. 054	1	13	2.00	6.50	Data Not Available
Walla Walla	College Place School District	4	1,570	92.51	16.97	55.37
Walla Walla	Columbia (Walla Walla) School District	3	705	47.80	14.75	55.07
Walla Walla	Dixie School District	1	14	2.00	7.00	Data Not Available
Walla Walla	Innovation Schools	1	0	0.00	0.00	Data Not Available
Walla Walla	Prescott School District	4	241	21.29	11.32	93.03
Walla Walla	Touchet School District	1	203	17.00	11.94	55.20
Walla Walla	Waitsburg School District	3	290	15.85	18.30	56.78
Walla Walla	Walla Walla Public Schools	16	5,568	335.00	16.62	56.39
Yakima	East Valley School District	5	3,271	180.97	18.07	57.77
Yakima	Educational Service District 105	1	48	5.00	9.60	Data Not Available
Yakima	Grandview School District	7	3,659	193.40	18.92	84.18
Yakima	Granger School District	3	1,488	83.62	17.79	89.85
Yakima	Highland School District	4	1,100	60.56	18.16	81.70
Yakima	Mabton School District	3	814	45.91	17.73	90.16
Yakima	Mount Adams School District	3	857[b]	57.27	14.96	95.50

Table 3.16-11: School Districts within the Project Vicinity

Study Area County	School District	Total Number of Schools	Total Number of Students	Number of FTE Teachers	Student/ Teacher Ratio	2020/2021 Poverty Percentages[(a)]
Yakima	Naches Valley School District	4	1,221	80.93	15.09	50.51
Yakima	Sunnyside School District	9	6,500	326.94	19.88	78.96
Yakima	Toppenish School District	9	4,276	197.78	21.62	80.35
Yakima	Union Gap School District	1	589	31.48	18.71	93.36
Yakima	Wapato School District	8	3,231	189.44	17.06	89.70
Yakima	West Valley School District	16	5,373	281.33	19.10	44.34
Yakima	Yakima School District	29	15,997	882.89	18.12	80.49
Yakima	Zillah School District	4	1,264	69.73	18.13	58.09

Source: NCES n.d.[b]; Washington Office of Superintendent of Public Education n.d.[a] (Poverty Percentage for 2020/2021 school year)
Note: District Details (2021–2022 school year; fiscal data from 2019–2020)
FTE = full-time equivalent
(a) = Poverty percentage is determined based on the October 1, 2019 CEDARS Free and Reduced Price Lunch (FRPL) data reporting as of March 31, 2020 for grades K-12.
(b) = In the absence of 2021-2022 school year data, 2020-2021 school year data has been substituted

Table 3.16-12: School Districts within the Project Vicinity

District Name	County	Total Students	% Hispanic / Latino of any race(s)	% American Indian / Alaskan Native	% Asian	% Black / African American	% Native Hawaiian / Other Pacific Islander	% White	% Two or More Races
Washington State	**Not Applicable**	**1,103,269**	**22.78**	**1.40**	**7.48**	**4.38**	**1.06**	**55.17**	**7.72**
Finley School District	Benton	931	44.68	0.21	0.43	0.54	0.00	50.48	3.65
Kennewick School District	Benton	18,172	35.79	0.36	1.98	2.29	0.18	55.66	3.74
Kiona-Benton City School District	Benton	1,446	40.94	0.35	0.35	0.35	0.00	55.67	2.35
Paterson School District	Benton	130	48.46	0.77	0.00	0.00	0.00	50.77	0.00
Prosser School District	Benton	2,785	63.16	0.47	1.36	0.54	0.11	32.32	2.05
Richland School District	Benton	13,552	17.10	0.46	3.70	2.05	0.19	72.23	4.27
Kahlotus School District	Franklin	51	15.69	0.00	0.00	0.00	0.00	76.47	7.84
North Franklin School District	Franklin	2,163	71.29	0.00	1.11	0.23	0.00	26.35	1.02
Pasco School District	Franklin	17,882	70.52	0.09	1.01	1.22	0.17	24.47	2.52
Selah School District	Franklin	3,716	28.18	0.75	0.46	0.51	0.08	67.22	2.53
Star School District No. 054	Franklin	15	60.00	0.00	0.00	0.00	0.00	40.00	0.00

Table 3.16-12: School Districts within the Project Vicinity

District Name	County	Total Students	% Hispanic / Latino of any race(s)	% American Indian / Alaskan Native	% Asian	% Black / African American	% Native Hawaiian / Other Pacific Islander	% White	% Two or More Races
College Place School District	Walla Walla	1,347	42.02	0.59	1.04	1.63	0.37	51.67	2.45
Columbia (Walla Walla) School District	Walla Walla	795	36.48	0.75	0.13	0.75	0.00	59.87	2.01
Dixie School District	Walla Walla	23	0.00	4.35	0.00	0.00	0.00	95.65	0.00
Prescott School District	Walla Walla	284	83.10	0.00	0.00	0.35	0.00	16.55	0.00
Touchet School District	Walla Walla	205	52.20	1.46	0.00	0.00	0.00	45.37	0.98
Waitsburg School District	Walla Walla	299	13.04	0.33	1.67	0.00	0.00	80.60	4.35
Walla Walla Public Schools	Walla Walla	5,888	37.94	0.46	1.24	0.90	0.19	55.83	3.45
East Valley School District (Yakima)	Yakima	3,226	47.49	0.90	0.77	0.90	0.09	47.95	1.89
Grandview School District	Yakima	3,728	92.19	0.05	0.05	0.08	0.00	7.32	0.30
Granger School District	Yakima	1,514	92.80	2.84	0.00	0.07	0.00	3.24	1.06
Highland School District	Yakima	1,167	75.15	0.17	0.17	0.34	0.00	22.37	1.80

Table 3.16-12: School Districts within the Project Vicinity

District Name	County	Total Students	% Hispanic / Latino of any race(s)	% American Indian / Alaskan Native	% Asian	% Black / African American	% Native Hawaiian / Other Pacific Islander	% White	% Two or More Races
Mabton School District	Yakima	910	97.47	0.33	0.00	0.00	0.00	2.09	0.00
Mount Adams School District	Yakima	934	37.47	53.00	0.00	0.00	0.00	4.50	5.03
Naches Valley School District	Yakima	1,353	21.80	0.44	0.37	0.52	0.00	73.61	3.25
Sunnyside School District	Yakima	6,834	92.01	0.03	0.04	0.07	0.00	6.88	0.97
Suquamish Tribal Education Department	Yakima	74	20.27	37.84	0.00	2.70	2.70	8.11	25.68
Toppenish School District	Yakima	4,188	77.41	12.30	0.31	0.17	0.00	9.00	0.81
Union Gap School District	Yakima	649	78.58	1.69	0.92	0.15	0.00	16.80	1.85
Valley School District	Yakima	610	12.30	0.98	3.77	1.15	0.16	74.26	7.21
West Valley School District	Yakima	29.68	0.93	2.43	0.72	0.21	62.65	3.38	29.68

Source: Washington Office of Superintendent of Public Education n.d.[b] (Oct. 1 County of Students by District with Grade, Race, Ethnicity and Gender 2016/2017 school year)

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APPENDIX 3.5-1

Habitat Subtype Photographs

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Photo 1: Active wheat field representative of the agriculture habitat type (Tetra Tech 2021[1]).

Photo 2: Developed or disturbed habitat type (Tetra Tech 2021).

[1] Tetra Tech. 2021. 2021 Botany and Habitat Survey Report for Horse Heaven Wind Farm. Prepared for Horse Heaven Sind Farm, LLC by Tetra Tech. August 2021.

Photo 3: Eastside (interior) grassland along Badger Canyon (Tetra Tech 2021).

Photo 4: Non-native grassland dominated by cheatgrass (*Bromus tectorum*) and cereal rye (*Secale cereale*) (Tetra Tech 2021).

Photo 5: High-quality planted grassland dominated by native plants big bluegrass (*Poa secunda* ssp. *juncifolia*) and bluebunch wheatgrass (*Pseudoroegneria spicata*) (Tetra Tech 2021).

Photo 6: Dwarf shrub-steppe dominated by rock buckwheat (*Eriogonum sphaerocephalum*) and Sandberg bluegrass (*Poa secunda*) in the northwestern part of the Micrositing Corridor (Appendix K, Horse Heaven Wind Farm, LLC 2021[2]).

[2] Horse Heaven Wind Farm, LLC. 2021a. Horse Heaven Wind Farm Washington Energy Facility Site Evaluation Council Application for Site Certification. EFSEC. Docket Number: EF-210011. February 2021.

Photo 7: Rabbitbrush shrubland in area that was burned in 1990 during the Locust Grove Fire (Tetra Tech 2021).

Photo 8: Big sagebrush shrub-steppe habitat with evidence of disturbance from high cover of cheatgrass (Tetra Tech 2021).

APPENDIX 3.8-1

Land and Shoreline Use Consistency Analysis

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Comprehensive Plan Analysis

Table 3.8-1A shows an analysis of the Project's consistency with the Benton County Comprehensive Plan's relevant goals and policies. Revised Code of Washington (RCW) 36.70B.040 requires that, at minimum, Growth Management Act (GMA) regulated counties and cities must consider the following four factors in determining a proposed project's consistency with their development regulations or, in the absence of applicable development regulations, with their comprehensive land use plans:

- The type of land use allowed, such as the land use designation
- The level of development allowed, such as units per acre or other measures of density
- Infrastructure, such as the adequacy of public facilities and services to serve a proposed project
- The characteristics of the proposed development, measured by the degree to which a project conforms to specific development regulations or standards

For aspects of the Project's design that are not in alignment with the Benton County Comprehensive Plan, the Washington Energy Facility Site Evaluation Council (EFSEC) would review discrepancies through an adjudicative process intended to resolve disputes between the local government and the Applicant.

Table 3.8-1A: Benton County Comprehensive Plan Update Goals and Policies Consistency Analysis

Element Goal / Policy	Analysis
LU Goal 1: Ensure that land uses are compatible with surrounding uses that maintain public health, safety, and general welfare.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which provides that commercial wind farms and major solar power generating facilities may be permitted within the GMA Agricultural District if a conditional use permit is issued by the Hearing Examiner.
LU Goal 1 Policy 1: Maintain a mix of land uses that supports the character of each rural community.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which allows commercial wind farms with approval of a conditional use permit issued by the Board of County Commissioners.
LU Goal 1 Policy 3: Maximize the opportunities for compatible development within land use designations to serve a multitude of compatible uses and activities.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which allows commercial wind farms with approval of a conditional use permit issued by the Board of County Commissioners.
LU Goal 6: Preserve rural lifestyles outside UGAs and incorporated areas while accommodating new population growth consistent with the protection of rural character.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which allows commercial wind farms with approval of a conditional use permit issued by the Board of County Commissioners.
LU Goal 6 Policy 2: Development in rural areas is typified by large lots and less dense development. Favoring development that is less dense and has larger lots helps maintain the rural character of designated rural areas and supports the protection of ground and surface water.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which allows commercial wind and solar farms with approval of a conditional use permit issued by the Board of County Commissioners.

Table 3.8-1A: Benton County Comprehensive Plan Update Goals and Policies Consistency Analysis

Element Goal / Policy	Analysis
LU Goal 6 Policy 3: Designated rural areas will be utilized to reduce the inappropriate conversion of agricultural lands, prevent sprawling low-density development and assure that rural development is compatible with surrounding rural and agricultural areas.	The Project is consistent with LU Goal 6 Policy 3 as agricultural practices within the Lease Boundary may be allowed to continue throughout the operation stage. Additionally, the Project's presence would prevent future low-density, sprawling development within the Lease Boundary.
LU Goal 6 Policy 14: Support and encourage the use of and application of Firewise principles and other fire risk reduction measures consistent with the Benton County Natural Hazard Mitigation Plan and Community Wildfire Protection Plan to reduce fire risk for urban development, urban subdivisions, rural subdivisions and large rural developments susceptible to wildfires. Encourage the implementation of the Firewise principles, or similar best management measures, applicable to individual lots on all lots at risk from wildfires.	Appendix P of the Applicant's ASC includes a Draft Emergency Response Plan that addresses fire prevention and calls for the preparation of a Fire Prevention Plan. If the Applicant complies with their Draft Emergency Response Plan and prepares a site-specific Fire Prevention Plan, the Project would be consistent with LU Goal 6 Policy 14.
LU Goal 6 Policy 15: Encourage new rural development away from the 100-year floodplain, and as guided in the County's Flood Damage Prevention Ordinance, CAO, and SMP.	The Project is consistent with LU Goal 6 Policy 15 as the Lease Boundary does not intersect the referenced special land use designations.
NR Goal 1: Conserve and maintain agricultural land of long-term commercial significance as the local natural resource most essential for sustaining the County's agricultural economy.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which allows commercial wind and solar farms with approval of a conditional use permit issued by the BCC. Additionally, portions of the Lease Boundary would still be able to support agricultural activities.
NR Goal 1 Policy 1: Conserve areas designated "GMA Agriculture" in the Comprehensive Plan for a broad range of agricultural uses to the maximum extent possible and protect these areas from the encroachment of incompatible uses.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which allows commercial wind and solar farms with approval of a conditional use permit issued by the Board of County Commissioners. Additionally, portions of the Lease Boundary would still be able to support agricultural activities.
NR Goal 1 Policy 3: Recognize that only uses related or ancillary to, supportive of, complementary to, and/or not in conflict with agricultural activities are appropriate in areas designated GMA Agriculture.	The Project is consistent with BCC zoning ordinance Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit, which allows commercial wind and solar farms with approval of a conditional use permit issued by the Board of County Commissioners. Additionally, portions of the Lease Boundary would still be able to support agricultural activities.
NR Goal 1 Policy 4: Apply development standards that conserve water resources when reviewing proposed new non-agricultural developments to sustain the ability of the regional agricultural economy to expand and respond to new market conditions and opportunities.	The Project is consistent with NR Goal 1 Policy 4. The Applicant has committed to obtaining water through licensed vendors. Additionally, the Applicant has committed to conserving water through limited washing of panels and allowing wash water to infiltrate the ground surface. Finally, the Applicant has committed to mitigating water impacts in accordance with Ecology guidelines.

Table 3.8-1A: Benton County Comprehensive Plan Update Goals and Policies Consistency Analysis

Element Goal / Policy	Analysis
WR Goal 1: Conserve, maintain, and manage existing ground and surface water resources to meet existing and future water supply needs for cities, farms, industry, and rural growth.	The ASC states that the Project would obtain water through a vendor agreement and that water obtained from the City of Kennewick's water system would be hauled to the site for the Project's construction, operation, and decommissioning stages. As part of their commitments, the Applicant has identified water conservation practices that the Project would apply throughout each stage of the Project. As a result of not drawing water directly from a surface water or groundwater source, the Project is consistent with WR Goal 1.
WR Goal 4: Protect and enhance surface water resources to support rivers, streams, and wetlands that support fish and wildlife species and associated habitats.	There are no major rivers or other perennial streams within the Project Lease Boundary; however, the ASC presents a list of Applicant commitments that would help minimize off-site impacts from erosion, sedimentation, and stormwater runoff. Through the implementation of Applicant commitments, the Project would be consistent with WR Goal 4.
CA Goal 1: Protect the functions and values of critical areas within the county with land use decision-making and development review.	The Project is consistent with CA Goal 1 as the Applicant has submitted an ASC to EFSEC for review and EFSEC is preparing a SEPA-compliant EIS. Additionally, the Project would require a conditional use permit under Chapter 11.17.070 Growth Management Act Agricultural District – Uses Requiring a Conditional Use Permit from the Board of County Commissioners.
CA Goal 1 Policy 1: Apply standards, regulations, and mitigation strategies to development during the permitting and development approval process that protects critical areas functions and values.	The Project is consistent with CA Goal 1 Policy 1 as the Applicant has submitted an ASC to EFSEC for review that is inclusive of mitigation strategies in response to applicable regulations. Additionally, EFSEC is preparing a SEPA-compliant EIS that includes Applicant commitments and mitigation strategies that address potential impacts on critical areas.
CA Goal 2: Protect life and property and avoid or mitigate significant risks to public and private property and to public health and safety that are posed by frequently flooded and geologic hazard areas.	The Project is consistent with CA Goal 2 as it would be constructed in accordance with applicable codes and standards.
CA Goal 2 Policy 1: Limit developments in areas with higher risk for natural disaster or geologic hazard unless it can be demonstrated by the project proponent that the development is sited, designed, and engineered for long term structural integrity and that life and property on- and off-site are not subject to increased risk as a result of the development.	The Project is consistent with CA Goal 2 as it would be constructed in accordance with applicable codes and standards.
CA Goal 3: Protect the County's natural areas, shorelines, and critical areas as unique assets to the community.	The Project is consistent with CA Goal 3 as the Lease Boundary does not intersect a major river or other perennial stream.
CA Goal 3 Policy 1: Use the CAO, SMP, SEPA, and other ordinances, as applicable, to designate and protect critical areas and the natural environment.	The Project is consistent with CA Goal 3 Policy 1 as EFSEC is preparing a SEPA EIS that includes Applicant commitments and mitigation strategies that address potential impacts on critical areas.

Table 3.8-1A: Benton County Comprehensive Plan Update Goals and Policies Consistency Analysis

Element Goal / Policy	Analysis
CA Goal 5: Achieve balance among economic uses of land and critical areas protection.	The Project is consistent with CA Goal 5 as the Project's micrositing corridors are designed to avoid, where possible, Benton County's designated critical areas within the Project Lease Boundary. Where critical areas cannot be avoided, the Applicant proposes minimization and mitigation measures to protect critical areas functions and values.
CA Goal 5 Policy 1: Work with state, federal, and local agencies and other County stakeholders regarding the application of environmental protection laws and regulations.	The Project is consistent with CA Goal 5 Policy 1 as EFSEC is preparing a SEPA-compliant EIS.
ED Goal 2: Expand employment opportunities in unincorporated Benton County.	The Project is consistent with ED Goal 2 as it would have beneficial direct, indirect, and induced economic impacts within unincorporated Benton County for the construction, operation, and decommissioning stages.
ED Goal 3: Provide areas for the location of light and environmentally acceptable heavy industrial uses, while minimizing impacts on surrounding rural uses.	The Project is consistent with ED Goal 3 as it would allow for continued agricultural activities within portions of the Lease Boundary.
ED Goal 3 Policy 2: Do not locate non-agricultural related industry on "GMA Agriculture" designated land.	The Project may not be in alignment with ED Goal 3 Policy 2; however, as currently designed, it would allow for continued agricultural activities within portions of the Lease Boundary.
PL Goal 3: Conserve visually prominent naturally vegetated steep slopes and elevated ridges that define the Columbia Basin landscape and are uniquely a product of the ice age floods.	The Project is consistent with PL Goal 3 as it would not affect the prominent naturally vegetated steep slopes and elevated ridges that define the Columbia Basin landscape associated with the ice age floods.
PL Goal 3 Policy 1: Identify and preserve historically significant structures and sites whenever feasible.	The Project is consistent with PL Goal 3 Policy 1 as the Applicant's ASC documents archaeological and architectural surveys of the affected environment and states that the Project would be designed to avoid historically significant structures and sites.
PL Goal 4: Preserve significant historic structures, districts, and cultural resources that are unique to Benton County.	The Project is intended to be in alignment with PL Goal 4 as the Applicant's ASC documents archaeological and architectural surveys of the affected environment and states that the Project would be designed to avoid historically significant structures and sites. However, as some information remains unknown, the possibility to be inconsistent with PL Goal 4 exists.
PL Goal 4 Policy 1: Coordinate with local tribes to protect historic and cultural resources.	The Project is consistent with PL Goal 4 Policy 1 as the Applicant's ASC provides documentation of tribal discussions.
PL Goal 4 Policy 2: Preserve archaeologically significant sites by siting and designing development to avoid or mitigate impacts.	The Project is consistent with PL Goal 4 Policy 2 as the Applicant's ASC documents archaeological surveys of the affected environment and states that the Project would be designed to avoid historically significant structures and sites.

Table 3.8-1A: Benton County Comprehensive Plan Update Goals and Policies Consistency Analysis

Element Goal / Policy	Analysis
PL Goal 5: Identify, preserve, and protect historic, cultural, and archaeological resources found to be significant by recognized local, state, tribal or federal processes.	The Project is intended to be in alignment with PL Goal 5 as the Applicant's ASC documents archaeological and architectural surveys of the affected environment and states that the Project would be designed to avoid historically significant structures and sites. However, as some information remains unknown, the possibility to be inconsistent with PL Goal 5 exists.
PL Goal 5 Policy 1: Identify known, recorded archaeological, cultural, and historic resources.	The Project is intended to be in alignment with PL Goal 5 Policy 1 as the Applicant's ASC documents archaeological and architectural surveys of the affected environment and states that the Project would be designed to avoid historically significant structures and sites.
PL Goal 5 Policy 4: Prior to demolition, moving, or alteration to any designated historic, cultural, and archaeological landmark, ensure that due consideration is given to its preservation or, at a minimum, documentation of its historic, cultural, or archaeological value.	The Project is intended to be in alignment with PL Goal 5 Policy 4 as the Applicant's ASC documents archaeological and architectural surveys of the affected environment and states that the Project would be designed to avoid historically significant structures and sites.
UE Goal 2: Maintain public and private household water and sewer systems that are consistent with the rural character of the County.	The Project is consistent with UE Goal 2 as the Applicant's ASC states that water from the City of Kennewick's water system would be hauled to the site. Additionally, the Applicant's ASC states that the Project would discharge wastewater from the O&M facilities to an on-site septic system.
UE Goal 3: Facilitate efficiency in utility land use and development.	The Project is consistent with UE Goal 3 as the majority of the proposed transmission line route occurs on private property, where ongoing agricultural activity would occur along the corridors.
UE Goal 3 Policy 2: Encourage multiple uses, including passive recreational use, in utility corridors where practical.	The Project is consistent with UE Goal 3 Policy 2 as passive recreational uses within the proposed transmission line corridor would be possible on DNR land where practical. Additionally, the right-of-way for the transmission line would not be fenced.
UE Goal 3 Policy 3: Facilitate maintenance and rehabilitation of existing utility systems and facilities and encourage the use of existing transmission/distribution corridors.	The Project is consistent with UE Goal 3 Policy 3 as the transmission line connecting the Project's substations within the Project Lease Boundary would traverse parcels to optimize the most direct route between substations while minimizing potential environmental and agricultural impacts on surrounding lands. The eastern Project substation has been located adjacent to BPA's proposed Bofer Canyon substation, thereby eliminating the need for new transmission lines at this location. Proposed transmission lines would be located adjacent and parallel to existing public road right-of-way where possible.

Sources: Benton County 2020; Horse Heaven Wind Farm, LLC 2022
Applicant = Horse Heaven Wind Farm, LLC; ASC = Application for Site Certificate; BCC = Benton County Code; BPA = Bonneville Power Administration; CA = Critical Areas; CAO = Critical Areas Ordinance; DNR = Washington State Department of Natural Resources; ED = Economic Development; EIS = environmental impact statement; GMA = Growth Management Act; LU = Land Use; NR = Natural Resources; O&M = operations and maintenance; PL = Parks, Recreation, Open Space, and Historic Preservation; SEPA = Washington State Environmental Policy Act; SMP = Shoreline Master Program; UE = Utilities Element; UGA = Urban Growth Area; WR = Water Resources

Consistency Analysis – Benton County Code (Zoning Ordinance)

Areas within Benton County that maintain critical agricultural resources are zoned in accordance with Benton County Code (BCC) 11.17.030, GMA Agricultural District. These areas are officially demarcated on the Official Zoning Map of Benton County and in the Benton County Comprehensive Plan (see Section 3.8).

Under the version of BCC 11.17.070 that was in effect when the ASC was filed with EFSEC, wind farms, major solar-generating facilities, and ancillary buildings and structures may be permitted within a GMA Agricultural District with approval of a conditional use permit. For any aspects of the Project's design that are not in alignment with BCC 11.17.070 Growth Management Act Agricultural District (as in effect at the time of application), EFSEC may consider in the adjudication whether inconsistent provisions should be preempted, and if so, whether any conditions should be included to serve the purpose of such provisions.

Table 3.8-2A presents the 2019 BCC requirements for the development of a commercial wind farm on land zoned GMA Agricultural District, as well as a consistency analysis between the Project and the ordinance requirement. The 2019 BCC requirements were the applicable county code at the time the Applicant submitted the ASC for the Project.

Table 3.8-2A: 2019[1] Benton County Zoning Ordinance Consistency Analysis

Ordinance Requirement	Consistency Analysis
11.17.070(t)(1). The lowest point on all rotor blades must be at least thirty (30) feet above ground level;	The Project is consistent with BCC 11.17.070(t)(1). The lowest point on the proposed turbine rotor blades would be 36.5 feet above ground level.
11.17.070(t)(2). All wind turbine tower bases must be set back from all dwellings not located on the same parcel at least one thousand (1,000) feet;	The Project is consistent with BCC 11.17.070(t)(2). The ASC states that each turbine tower base would be set back a conservative distance of at least 1,250 feet from all dwellings not located on the same parcel.
11.17.070(t)(3). All wind turbine tower bases must be set back from all property lines a distance equal to the associated wind turbine height, except that, where contiguous properties are leased for an identical duration for development of a wind farm, the tower bases set back from the property lines common with such leased properties may be eliminated so long as no part of any wind turbine extends past any such interior property lines and the above-required setbacks are maintained from the property lines comprising the exterior boundaries of the wind farm;	The Project is consistent with BCC 11.17.070(t)(3). The ASC states, "each turbine tower base is set back at least 499 feet or 671 feet from exterior property lines, depending on Turbine model." Additionally, the ASC states that "Turbine tower bases are set back at least 280 feet from contiguous properties under lease for the Project." This distance is greater than the maximum blade tip length of 278.5 feet. This indicates that no part of a wind turbine under Option 1 and Option 2 would extend past any interior property lines for parcels included in the Project.
11.17.070(t)(4). All wind turbine tower bases must be set back from the closest edge of a state, county, or city road right-of-way a distance equal to the wind turbine height;	The Project is consistent with BCC 11.17.070(t)(4). The ASC states that each turbine tower base set back at least 650 feet or 671 feet from the closest edge of any state and county road right-of-way within the Lease Boundary. This distance is equal to or greater than the proposed wind turbine height for Turbine Option 1 and Turbine Option 2.

[1] The 2019 Benton County Code included ordinance 11.17.070 as updated on 12/20/18. The 2019 Benton County Code was the applicable version at the time of the ASC submittal on February 8, 2021.

Table 3.8-2A: 2019[1] Benton County Zoning Ordinance Consistency Analysis

Ordinance Requirement	Consistency Analysis
11.17.070(t)(5). All wind turbine tower bases must be set back a distance equal to the wind turbine height from all borders of the GMA Agricultural District, except for GMA Agricultural District borders adjacent to the Hanford Reservation owned by the Department of Energy or adjacent to another zoning district adopted by another county that contains a general minimum parcel size of at least twenty (20) acres per parcel;	The Project is consistent with BCC 11.17.070(t)(5). The ASC states that each turbine tower base is set back at least 499 feet or 671 feet from exterior property lines, including borders of the GMA Agricultural District. This distance is equal to or greater than the proposed wind turbine height for Turbine Option 1 and Turbine Option 2. The Project would not be adjacent to the Hanford Reservation or another county.
11.17.070(t)(6). For wind turbine(s) proposed to be located within four (4) miles of the nearest point of the nearest runway of the nearest airport available for public use, the applicant for a building permit must comply with all the requirements imposed by the Federal Aviation Administration (FAA) and provide a written statement from the FAA that sets forth the FAA's comments and requirements, if any, for the proposal;	The Project is consistent with BCC 11.17.070(t)(6). No turbine locations are proposed within 4 miles of the nearest point of the nearest runway of the nearest airport available for public use, which is the Tri-Cities Airport. The nearest turbine would be located approximately 9.9 miles south of the Tri-Cities Airport.
11.17.070(t)(7). All wind turbine(s) must comply with the Federal Aviation Regulations Part 77, Objects Affecting Navigable Airspace, as currently in effect or as hereafter amended, including but not limited to, providing such notices to the FAA as required thereunder and compliance with all requirements or prohibitions imposed by the FAA on the applicant's proposal;	The Project is consistent with BCC 11.17.070(t)(7). Per FAA regulations, the Project would provide a Notice of Proposed Construction or Alteration to the FAA and obtain a Determination of No Hazard prior to construction.
11.17.070(t)(8). Conditional use permit applications for the placement and operation of wind turbines under this section shall be made available for review by the United States Department of Defense (USDOD) in accordance with RCW 36.01.320, as in effect now or hereafter amended. The notice and processing of wind turbine permit applications will be in accordance with Benton County Code chapter 17.10. Pursuant to BCC 11.50.040 (d), the applicant is required to provide sufficient evidence to persuade the Hearings Examiner that the proposed wind turbine is compatible with other uses in the surrounding area, including any military training activities, or is no more incompatible than are any other outright permitted uses in the applicable zoning district, as well as provide all other evidence required by BCC 11.50.040;	The Project is consistent with BCC 11.17.070(t)(8). The Project layout avoids military training areas and would not interfere with military training activities.
11.17.070(t)(9). All wind turbine tower bases shall be located at least forty (40) feet for every one (1) foot of tower height or one mile, whichever is greater, from the ends of and at least five thousand (5,000) feet from the sides of all runways which are available solely for private use and identified on the most current edition of the Sectional Aeronautical Charts produced by the National Aeronautical Charting Office (NACO);	The Project is consistent with BCC 11.17.070(t)(9). The Project has been designed to locate turbines over 5,000 feet from the sides of all private runways identified on the most current edition of the Sectional Aeronautical Charts. Coopers Landing is the nearest runway available solely for private use and is located approximately 2 miles northeast of the Project's nearest turbine tower base. The private runway at Coopers Landing runs east to west. Based on this heading, no turbine under Option 1 or 2 would occur within 40 feet for every 1 foot of tower height from the ends of the runway, which is measured at 3.8 and 5.1 miles, respectively.

Table 3.8-2A: 2019[1] Benton County Zoning Ordinance Consistency Analysis

Ordinance Requirement	Consistency Analysis
11.17.070(t)(10). If the use of any wind turbine or wind turbine farm is discontinued for a period of one (1) year or more, the owner of such facility shall remove the facility within ninety (90) days of written notification by the Planning Department. If such facility is not removed within said ninety (90) days, the County may refer the issue to the code enforcement officer for appropriate action pursuant to Chapter 11.43 BCC;	The Project is consistent with BCC 11.17.070(t)(10). The Project is expected to have an operational life of 35 years, upon the completion of which all wind turbines will be removed prior to reaching the one year and ninety days deadline following the end of operations as outlined here.
11.17.070(t)(11). The wind turbine(s) and all associated service roads may not displace more than five (5) percent of the area of that parcel(s) on which they are located.	Consistency with BCC 11.17.070(t)(11) would be based on the Project's impact on each parcel that makes up the Lease Boundary. Permanent disturbances associated with turbine tower foundation pedestals and permanent disturbances associated with the Project's new 16-foot-wide access roads would not displace more than 5% of the parcel area on which they are located.

Source: Benton County 2019; Horse Heaven Wind Farm, LLC 2022
Notes:
ASC = Application for Site Certification; BCC = Benton County Code; FAA = Federal Aviation Administration; GMA = Growth Management Act; NACO = National Aeronautical Charting Office; RCW = Revised Code of Washington; USDOD = U.S. Department of Defense

Table 3.8-3A presents the five requirements under BCC 11.50.040(d) for when a conditional use permit may be issued by Benton County and responses based on existing conditions and Project information.

Table 3.8-3A: Benton County Conditional Use Permit Requirements and Project Analysis

Conditional Use Permit Requirement	Project Comparison
(a) Is compatible with other uses in the surrounding area or is no more incompatible than are any other outright permitted uses in the applicable zoning district.	Nine Canyon Wind Farm received a permit from Benton County that allowed it to be constructed on Growth Management Act Agricultural District zoned land, which indicates that the Project is not any less compatible than what has previously been permitted within the applicable zoning district.
(b) Will not materially endanger the health, safety, and welfare of the surrounding community to an extent greater than that associated with any other permitted uses in the applicable zoning district.	An analysis of Public Health and Safety is provided in Section 4.13.
(c) Would not cause the pedestrian and vehicular traffic associated with the use to conflict with existing and anticipated traffic in the neighborhood to an extent greater than that associated with any other permitted uses in the applicable zoning district.	An analysis of recreation and traffic is provided in Sections 4.12 and 4.14, respectively.
(d) Will be supported by adequate service facilities and would not adversely affect public services to the surrounding area.	An analysis of public services and utilities is provided in Section 4.15.

Conditional Use Permit Requirement	Project Comparison
(e) Would not hinder or discourage the development of permitted uses on neighboring properties in the applicable zoning district as a result of the location, size or height of the buildings, structures, walls, or required fences or screening vegetation to a greater extent than other permitted uses in the applicable zoning district.	An analysis of Project impacts on land use is provided in Section 4.8. The adjudication process for the Project would allow interested parties, including neighbors, to participate in the Project's review process. Through this process, conditions may be placed on the Project's construction and operation that address issues involving development of permitted uses on neighboring properties.

References

Benton County. 2019. Codes, Plans and Policies – Chapter 11 Zoning. Note: At the time of the ASC's submittal in February 2021, the 2019 update to Chapter 11 presented the applicable setback distances.

Benton County. 2020. 2017 Benton County Comprehensive Plan, Adopted February 13, 2018, Updated January 2020. Accessed October 16, 2023. https://www.co.benton.wa.us/files/documents/2017ComprehensivePlandJanuary20201290555480616 20PM.pdf.

Horse Heaven Wind Farm, LLC. 2022. Horse Heaven Wind Farm Washington Energy Facility Site Evaluation Council Updated Application for Site Certification EFSEC Docket Number: EF-210011. February 2021, Revised December 2022.

APPENDIX 3.10-1

Sky Glow Information and Comparisons

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Sky Glow Information and Comparisons

The earliest measures of sky glow, also called sky brightness, were based on a scale upon which the magnitude of stars visible to the human eye is divided into six levels. The brightest star is a magnitude 1, and the dimmest (faintest) star is a magnitude 6. More recently, the magnitude scale was modified to express astronomical surface brightness (stars, planets, etc.) in units known as magnitudes per square arcsecond (mag/arcsec2) as measured by a Sky Quality Meter (SQM). The measurement scale is inverse and logarithmic and is generally used in small area photometry and astronomy (Bortle 2001).

Sky Glow Comparison Table

Class	Title	Approx. SQM mag/arcsec2
1	Excellent dark-sky site	21.7–22.0
2	Typical truly dark site	21.5–21.7
3	Rural sky	21.3–21.5
4	Rural/suburban transition	20.4–21.3
5	Suburban sky	19.1–20.4
6	Bright suburban sky	18.0–19.1
7	Suburban/urban transition	
8	City sky	< 18.0
9	Inner-city Sky	

Source: Bortle, John E. 2001. Gauging Light Pollution: The Bortle Dark-Sky Scale. Sky & Telescope. Sky Publishing Corporation. Accessed May 29, 2020. https://skyandtelescope.org/astronomy-resources/light-pollution-and-astronomy-the-bortle-dark-sky-scale/.
mag/arcsec^2 = magnitudes per square arcsecond; SQM = Sky Quality Meter

Examples of Typical Illuminance and Apparent Magnitude

Location	Classification	Illuminance[(a)] (lux)	Sky Brightness[(b)] (mag/arcsec^2)
Outdoor	Bright Sun	100,000–130,000	>0.1
	Hazy Day	32,000	1.3
	Partly Cloudy	25,000	1.6
	Cloudy	10,000	2.6
	Overcast	1,000	5.1
	Sunrise/Sunset on Clear Day	400	6.1
	Full Moon	0.1	15.1
	Moonless Clear Night Sky	0.001	20.1
	Moonless Overcast Night Sky	0.0001	22.6
	Starlight	0.00005	23.3

Examples of Typical Illuminance and Apparent Magnitude

Location	Classification	Illuminance[(a)] (lux)	Sky Brightness[(b)] (mag/arcsec^2)
Indoor	Typical TV Studio	1,000	5.1
	Bright Office with Large Contrast	400	6.1
	Hall Way	80	7.8
	Living Room	50	8.3
	Good Street Lighting	20	9.3
	Poor Street Lighting	1	12.6

Notes:
(a) G. R. Elion and H. A. Elion, 1979. Electro-Optics Handbook. CRC Press.
(b) Calculated based on conversion from lux to mags/arcsec^2
mag/arcsec^2 = magnitudes per square arcsecond; lux = luminous flux per unit area

APPENDIX 3.10-2

SWCA 2023 Visual Impact Assessment Report

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Updated Horse Heaven Wind Farm Project
Final Visual Impact Assessment Report

JULY 2023

PREPARED FOR

Washington Energy Facility Site Evaluation Council (EFSEC)

PREPARED BY

SWCA Environmental Consultants

UPDATED HORSE HEAVEN WIND FARM PROJECT
FINAL VISUAL IMPACT ASSESSMENT REPORT

Prepared for

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SWCA Project No. 71229

July 2023

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1 INTRODUCTION

In February 2021, the Washington Energy Facility Site Evaluation Council (EFSEC) received an Application for Site Certification (ASC) from Horse Heaven Wind Farm, LLC (the Applicant) proposing the construction and operation of the Horse Heaven Wind Farm Project (Project or Proposed Action). The ASC proposes the construction of a renewable energy generation facility that would have a nameplate energy generating capacity of up to 1,150 megawatts for a combination of wind and solar facilities as well as battery energy storage systems (BESSs). The 72,428-acre Lease Boundary is located on the Horse Heaven Hills south of Richland, Kennewick, and Benton City and is comprised mostly of private lands with some Washington Department of Natural Resources state trust parcels. The Project design includes the following components:

- Two wind turbine layout options
- Three potential solar array siting areas
- Up to five substations and associated transmission lines
- Three potential BESS locations
- An operation and maintenance (O&M) facility
- Other Project supporting infrastructure as depicted in Figures 1 and 2 in Attachment A

Additional details regarding the Project design are located in the Updated Project ASC (Horse Heaven Wind Farm, LLC 2022).[1]

The purpose of this report is to assist in EFSEC's determination of potential Project impacts under the Washington State Environmental Policy Act (SEPA), including significant unavoidable adverse impacts. Specifically, the report focuses on potential visual impacts resulting from modification of the landscape as well as the response of viewers to those features. Additionally, this report analyzes whether the Project would be consistent with and comply with state and local visual resource guidance. The information contained in this report was provided by the Applicant and supplemented with publicly available data where necessary. No additional fieldwork or simulations (beyond those provided in the ASC) were completed.

2 REGULATORY FRAMEWORK

The EFSEC process does not require a particular visual resource analysis method to be used. Instead, the goal is to describe the aesthetic impact of the proposed Project, provide the location and design of the facilities, depict how the Project will appear relative to the surrounding landscape, and describe procedures to restore or enhance the landscape disturbed during construction.

Both Washington State and the Benton County Comprehensive Plan provide guidance with regard to visual resources. As part of the EFSEC process, Washington Administrative Code 463-60-362(3) identifies the following standard for analysis of visual resource (aesthetics).

- The application shall describe the aesthetic impact of the proposed energy facility and associated facilities and any alteration of the surrounding terrain. The presentation will show the location and design of the facilities relative to the physical features of the site in a way that will show how

[1] The ASC can be viewed at the following website: Horse Heaven Application | EFSEC - The State of Washington Energy Facility Site Evaluation Council.

the installation will appear relative to its surroundings. The applicant shall describe the procedures to be utilized to restore or enhance the landscape disturbed during construction (to include temporary roads).

Benton County has adopted planning goals and policies in their Comprehensive Plan (Benton County 2022) to conserve areas of potential value to the county and its residents. The following planning goals and policies noted below are most applicable to this visual analysis:

- Public Lands designation Goal 3: Conserve visually prominent naturally vegetated steep slopes and elevated ridges that define the Columbia Basin landscape and are uniquely a product of the ice age floods.
- Policy 3: Pursue a variety of means and mechanisms such as the preparation of specific and area plans, conservation easements, clustered developments, land acquisitions and trades, statutory requirements to protect the natural landform and vegetative cover of the Rattlesnake uplift formation, notably Rattlesnake, Red, Candy, and Badger Mountains and the Horse Heaven Hills.
- Policy 4: Consider the preservation of the ridges and hillside areas through various development regulations.

These county goals and policies provide the intentions and interests of Benton County, rather than providing specific compliance requirements for this Project. No other federal, state, or local visual management requirements were identified for Project compliance.

The February 2021 Project ASC included a visual inventory and analysis within Section 4.2.3 (Horse Heaven Wind Farm, LLC 2021a), with an additional report submitted in October 2021 titled *Aesthetics Technical Memorandum for the Horse Heaven Wind Farm Project* (Horse Heaven Wind Farm, LLC 2021b). In December 2022, the Project ASC was updated, including Section 4.2.3 and associated visual simulations (Horse Heaven Wind Farm, LLC 2022). The updated ASC, serving as the Applicant's visual analysis, focused mostly on the Visual Resource Management (VRM) System from the Bureau of Land Management (BLM), which has become an industry standard to analyze potential visual impacts, particularly in the western United States, and is often applied to projects on non-BLM lands. The BLM VRM as well as other federal agency visual resource methodologies (e.g., U.S. Forest Service scenery management system and U.S. Federal Highway Administration Guidelines for the Visual Impact Assessment of Highway Projects) have three common elements. These include:

- Scenery: continuous units of land comprised of harmonized features that result in and exhibit a particular character,
- Views (sensitivity to visual change and visibility): public viewing locations including recreation areas, travel routes, residences, and lands with special management where viewers have sensitivity to landscape changes, and
- Agency visual management requirements: which identify allowable levels of change to landscape character and the allowable degree of attention the project could attract from viewing locations.

The application of the BLM VRM system in the Applicant's visual analysis document (Horse Heaven Wind Farm, LLC 2022) did not include some elements typically required, including the completion of contrast rating worksheets from key viewpoints or consideration of all 10 BLM contrast factors. Of these 10 factors, the Applicant's visual analysis did not address the effect of motion and its influence on both landscape character and views. This report builds on the BLM VRM analysis provided in the ASC, including the effects of motion, and incorporates elements from *A Visual Impact Assessment Process for Wind Energy Projects* from the Clean Energy States Alliance (CESA) (CESA 2011) to evaluate and

address the unique visual characteristics of wind energy projects. These combined methods are described further in Section 3 of this report.

3 AFFECTED ENVIRONMENT

To describe the Project's affected environment, this section outlines the inventory methods, describes the existing landscape character, and identifies potential viewing locations.

3.1 Inventory Methods

The visual resource area of analysis was identified in the ASC as the area within 10 miles of the proposed wind turbines and transmission line and within 5 miles of the proposed solar arrays, substations, and BESSs. Based on guidance from both the BLM (Sullivan et al. 2012) and CESA (2011), the area of analysis for the wind turbines was extended to 25 miles.

The visual resource inventory and impact assessment focused on three elements: landscape character, viewing locations, and compliance with state and county visual management guidance. These concepts are included both in the BLM VRM system and CESA process to identify potential impacts on visual resources. The methods for determining landscape character and viewing locations are described in the subsequent sections. Compliance with state and county visual management guidance (Section 2) is addressed in Section 4.2.2.6.

3.2 Existing Landscape Character

The term landscape character is used to describe the overall visual appearance of a given landscape, based on the visual aspects of the landscape's vegetation, landforms/water, and human-made modifications. Landscape character is often described in terms of landscape character areas, which are portions of a larger landscape that share harmonizing features that result in and exhibit a particular visual character.

The Project is located within the Columbia Plateau U.S. Environmental Protection Agency (EPA) Level III ecoregion (EPA 2010), which is typically characterized by a broad expanse of sagebrush-covered volcanic plains and valleys adjacent to the Columbia River and dotted with isolated mountains. There are landscape features in the area of analysis associated with a series of cataclysmic floods that occurred at the end of the most recent ice age, when glacially dammed lakes ruptured and large volumes of water rushed through the northwestern United States (National Park Service 2014).

The Lease Boundary is primarily characterized by the following features:

- Flat to rolling panoramic landscapes comprised of arid sagebrush steppe and grasslands that have been partially converted to agricultural lands.
- Topography gently slopes from north to south with a distinctive ridge located north of the Lease Boundary that connects the elevated sagebrush steppe to the Columbia River Valley.
- There are a series of minor drainageways that dissect the landscape with some forming small canyon settings.
- Due to the arid climate, there are limited trees within the Lease Boundary. Most trees visible in the Lease Boundary are associated with ornamental landscaping and windbreaks adjacent to residences, with the primary vegetation communities being agricultural lands with areas of remnant sagebrush steppe and grassland.

- Vegetation color in agricultural areas ranges from green to tan and brown depending on the season and the crop being grown. More vivid colors occur along the Columbia River Valley associated with residential, commercial, and agricultural development that contrasts with the arid, muted colors found within the Lease Boundary.

The inventory of existing landscape character, based on CESA guidance, also considered the intactness of the landscape. This relates to the extent of modifications present in the existing landscape and their overall effect on natural patterns, which define the landscape. These modifications have the potential to create unintended focal points contrasting with the natural landscape character. There are three main landscape character areas that define the Lease Boundary's landscape character:

- **Plateau lands west of I-82:** The arid, rolling plateau lands west of the interstate are mostly intact with limited existing utility or other industrial uses. An existing transmission line traverses the western edge of the Lease Boundary, influencing the adjacent setting. There are also residences dispersed across this rural agricultural landscape, introducing geometric structures and additional vegetation in the setting associated with wind breaks and ornamental landscaping. The juxtaposition of residences and agricultural lands, including barns and other structures, create an agrarian landscape character common to the region.
- **Plateau lands east of I-82:** The landscape east of the interstate is similar to the western area but includes a series of wind turbine strings associated with the existing Nine Canyon Wind Project. There is also an existing transmission line that crosses the Lease Boundary near the west side of the existing Nine Canyon Wind Project and along the southern edge of the Lease Boundary adjacent to I-82. The influence of the existing landscape modifications extends throughout this landscape, reducing its level of intactness. The tall vertical form of the existing wind turbines and their movement attract attention within the setting, generally dominating the local landscape character.
- **Ridgeline:** This landscape is most prominent east of I-82 but continues to the west as a connection between the flat lands adjacent to the Columbia River and the elevated steppe lands. Due to the steep terrain, this area is visually prominent as viewed from the communities located north of the Lease Boundary. There are multiple paragliding launch sites along the ridge including Jump Off Joe, M&M Ridge, and Kiona. Additionally, there are two strings of the existing Nine Canyon Wind Project sited along the ridge and a communication tower, which reduce the intactness of the setting east of I-82.

3.3 Viewing Locations and Key Observation Points

While landscape character is focused on the visual characteristics of the overall landscape regardless of specific viewing locations, visibility of the Project from typical or sensitive viewing locations represent the most critical places from which the public would view the Project. These are commonly referred to as key observation points, or KOPs, and establish the platforms where impacts on views are assessed. KOP locations include static locations, such as residential areas, where views would occur from a consistent location, as well as linear KOPs, such as travel ways, where views change based on moving along a road or trail with varying potential impact levels.

In order to identify these KOP locations, a series of bare-earth viewshed analyses were run to depict the visibility of the Project from the surrounding area. The bare-earth modeling approach used in the viewshed analysis does not account for screening effects from vegetation or buildings that could block or partially block some views. In this manner, the bare-earth viewshed approach results in a conservative assessment of potential Project visibility. The analysis in the ASC included six viewsheds to compare visibility of the two turbine layout options, identify visibility of the three solar array siting areas, and

provide visibility of the proposed transmission lines (Horse Heaven Wind Farm, LLC 2022). These viewsheds were run out to the different areas of analysis associated with each of the Project components as described in Section 3.1. Based on the expansion of the area of analysis for the wind turbines from 10 miles to 25 miles, the viewsheds associated with the two turbine layout options were updated for this report to include this larger, regional setting. See Figures 3 through 8 in Attachment A for the results of these viewshed analyses.

Within the Applicant's visual resources area of analysis, results of the viewshed analyses and aerial photography were used to identify possible residential structures, travel ways, cultural resources with visual aspects, recreation, and other areas of interest including open space areas, to identify potential KOPs. These KOPs represent critical viewpoints, typical views in representative landscapes, and views of any special Project features. Additionally, the Applicant sought input from Benton County to identify potential areas of interest to local community members. Benton County noted interest on the part of residents located north of the Project. This area of interest contains a large number of residences as well as a series of parks and other recreation areas. The resulting list of potential KOPs were visited and photographed, and a series of KOPs were identified for analysis to represent the range of viewers and locations that would have views of the proposed Project infrastructure. In addition to these Applicant-selected KOP locations, supplementary viewing locations were considered to represent views from dispersed residences located directly adjacent to the proposed wind turbines and views from Horse Heaven Hills, a BLM-managed dispersed recreation area (BLM 2022).

Viewer reactions to changes in the landscape (viewer sensitivity) can vary depending on the characteristics and preferences of the viewer group. For example, residential viewers are typically expected to have a high concern for changes in views from their residences. These preferences may also vary depending on if the residential viewer is a Project participant or if views are from a non-participating property. Motorists' concern generally depends on when and where travel occurs, and the type of travel involved (e.g., commuting vs. recreational travel). Recreation users' concern for changes in views varies based on the activities occurring and how long viewers would have to analyze the landscape (view duration). For example, viewers at a scenic overlook are expected to have a higher concern for changes in view, where the landscape would be viewed for a long duration and is integral to its use, compared to motorists on a non-scenic designated highway, in which landscape is viewed for a shorter duration and is not necessarily the focus of the viewer's activity.

The types of users in the visual study areas include residents of the adjacent Tri-Cities communities, including Benton City, Burbank, Kennewick, Pasco, Richland, West Richland, Finley, and Prosser; travelers on the various interstates and highways; recreators visiting the Rattlesnake, Red, Candy, and Badger mountains, McNary National Wildlife Refuge, and other recreational facilities in the area. Lands within the Lease Boundary are also of interest to the Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, and Nez Perce Tribe, who may attach cultural significance to natural landscape components.

The distance from the Project is a key factor in determining potential visual effects, with the amount of perceived contrast generally diminishing as distance between the viewer and the affected area increases (BLM 1986). Contrast is defined as the level of visible change to the existing features of the landscape (including landform/water, vegetation, and human-made structures) resulting from the introduction of a proposed project or management activity. The BLM VRM system and other visual resource systems establish a series of distance zones to identify visibility thresholds and inventory the existing landscape. For the purposes of this study, the distance to the Project (in miles) was used to identify viewing distance, with a particular focus on the foreground distance zone. This area corresponds to the area within 0.5 mile of the Project, where views of modifications in the landscape would be most prominent leading to views potentially dominated by Project infrastructure.

The list of viewing locations and KOPs used in this analysis as well as the associated viewer type, viewer sensitivity, and distance to the Project are presented in Table 1 and depicted on Figure 9 in Attachment A.

Table 1. Key Observation Point Locations Table

KOP Number	Viewer Name	Viewer Type	Viewer Sensitivity	Distance to Project	Description
1	McNary National Wildlife Refuge (NWR)	Recreation	Moderate	5.2 miles (wind turbines) Solar arrays, transmission lines, and substations/ BESSs would not be visible from this location.	Viewpoint is located along an unpaved road within the McNary NWR, looking southwest across the Columbia River towards the Project Lease Boundary.
2	S Clodfelter Road – East, Central, and West	Residential	High	3.0 miles (wind turbines) 3.4 miles (transmission line) Solar arrays and substations/BESSs would not be visible from this location.	Viewpoint is located along the south side of Manuel Drive, toward S. Clodfelter Road, looking southeast to southwest.
3	Chandler Butte	Recreation	High	2.5 miles (wind turbines) 2.1 miles (solar array) 4.2 miles (transmission line) The substations/BESSs would be visible from this location but would be outside of the photo frame.	Viewpoint is located along the unpaved road east of the communication towers, looking southeast.
4	I-82 South	Travel route	Moderate	7.0 miles (wind turbines) 6.0 miles (solar array) 6.5 miles (transmission line) The HH-East Substation/ BESSs would be visible from this location.	Viewpoint is located along the right shoulder of the highway, looking northwest to northeast.
5	Badger Mountain	Recreation	High	4.7 miles (wind turbines) Solar arrays, transmission lines, and substations/ BESSs would not be visible from this location.	Viewpoint is located along the southern side of the top of Badger Mountain looking southwest.
6	Bofer Canyon Road/I-82	Travel route	Moderate	1.7 miles (wind turbines) 0.6 mile (solar array) 1.2 miles (transmission line) The HH-East Substation/ BESSs would be visible from this location but would be outside of the photo frame.	Viewpoint is located along the right shoulder of the road, looking north.
7	Highway 221	Travel route, residential	High	5.8 miles (wind turbines) 3.1 miles (solar array) 2.2 miles (transmission line) The HH-West Substation/ BESSs would be visible from this location.	Viewpoint is located along the right shoulder of the highway, looking northeast.

KOP Number	Viewer Name	Viewer Type	Viewer Sensitivity	Distance to Project	Description
8	Kennewick (Canyon Lakes Area) – South and West	Residential	High	3.6 miles (wind turbines) 5.9 miles (solar array) 7.4 miles (transmission line) The substations/BESSs would not be visible from this location.	Viewpoint is located on the southwest end of S. Olson Street, looking west to south.
9	Benton City	Residential, travel route, commercial	High	2.7 miles (wind turbines) 3.9 miles (solar array) 5.5 miles (transmission line) The substations/BESSs would not be visible from this location.	Viewpoint is located on the east side of Division Street/State Route 225, looking south.
10	Badger Road	Residential, travel route	High	1.5 miles (wind turbines) 6.4 miles (solar array) 4.3 miles (transmission line) The substations/BESSs would not be visible from this location.	Viewpoint is located on the north side of Badger Road, looking southwest.
11	Highland/Finley Area	Residential	High	2.0 miles (wind turbines) 8.5 miles (solar array) 8.7 miles (transmission line) The substations/BESSs would not be visible from this location.	Viewpoint is located on the north side of E. Cougar Road near an entrance driveway to Finley Elementary School, looking southeast.
12	County Well Road	Residential, travel route	High	2.5 miles (wind turbines) 0.2 mile (solar array) 0.2 mile (transmission line) The HH-West (Alternative) Substation/BESSs would be visible from this location and located 0.5 mile away.	Viewpoint is located on the left shoulder of County Well Road, looking northeast.
13	Travis Road South of Sellards Road	Residential, travel route	High	1.1 miles (wind turbines) 1.0 mile (solar array located outside of photo frame) 0.1 mile (transmission line) The substations/BESSs would not be visible from this location.	Viewpoint is located on the right shoulder of Travis Road, looking north.
14	South of Benton City	Residential	High	1.7 miles (wind turbines) Solar arrays, transmission lines, and substations/ BESSs would not be visible from this location.	Viewpoint is located near Webber Canyon Road and adjacent residences looking southwest to southeast.
15	Interstate 82	Travel route	Moderate	0.7 mile (wind turbines) 0.1 mile (transmission line) 0.1 mile (solar array located outside photo frame) Substations/ BESSs would not be visible from this location.	Viewpoint is located along the left shoulder of the frontage road adjacent to the highway, looking northwest to northeast.

KOP Number	Viewer Name	Viewer Type	Viewer Sensitivity	Distance to Project	Description
16	U.S. Highway 730 – Wallula Gap	Travel route	Moderate	Wind turbines, solar arrays, transmission lines, and substations/ BESSs would not be visible from this location.	Viewpoint is located along the right shoulder of the highway, looking west toward the Wallula Gap
N/A	Dispersed residences located 0.5 mile from proposed turbines (foreground views)	Residential	High	Less than 0.5 mile (wind turbines) The other Project component distances would vary but are more specifically described from other KOP locations.	There are approximately 13 residences located within the foreground distance zone of the proposed wind turbines, less than 0.5 mile, with two of those identified as non-Project participating properties. Additionally, there are numerous residences located within 0.5 to1 mile of the proposed wind turbines.
N/A	Horse Heaven Hills Recreation Area	Recreation	Moderate	0.8 mile (wind turbines) Solar arrays, transmission lines, and substations/ BESSs would not be visible from this location.	Dispersed recreation including opportunities for hiking, nature viewing, and mountain biking with potential views of the Project to the south.

A series of visual simulations were prepared from KOPs 1 through 16, with both wind turbine options depicted, and are included in Attachment B. No simulations were developed from either of the un-numbered KOP viewing locations (e.g., Horse Heaven Hills Recreation Area or dispersed residences within foreground distance zone). Existing condition photographs were taken using standard focal lengths to most closely represent the human field of view. In order to create photographic simulations, a three-dimensional model of the turbine, solar array, and transmission line layouts were placed in the photographic view, taking into consideration Project topography (elevation) and distance from the observation point. Simulated turbines, solar arrays, and transmission lines were aligned to the photographs and the model rendered and composited to create the visualizations. Some of the KOP locations have multiple simulations looking in different directions, such as KOP 2, which includes potential views of the Project to both the southeast and southwest (Horse Heaven Wind Farm, LLC 2022). Visual simulations from KOPs 3, 5, 6, and 7, included in the draft environmental impact statement (EIS), were updated to reduce the effect of atmospheric conditions to best depict Project visibility under exceptionally clear atmospheric conditions. This included taking new photographs from these viewpoints, as well as digitally dehazing and replacing the sky in the existing photographs. The original and edited photographs are provided for each of these representative viewpoints in Attachment B. Additionally, three new KOPs (KOP 14, 15, and 16) with visual simulations were added to the analysis based on public comments on the Project's draft EIS. The existing photographs and visual simulation from KOP 14 were also updated to reduce the effect of atmospheric conditions and to depict Project visibility under exceptionally clear atmospheric conditions.

4 IMPACT ASSESSMENT

4.1 Method of Analysis

The Project visual analysis focuses on three elements: landscape character, viewing locations, and compliance with state and county visual management guidance. The CESA methods suggest three evaluation criteria as they relate to identifying if impacts rise to the magnitude of "undue" or "unreasonable" (CESA 2011):

- Does the project violate a clear written aesthetic standard intended to protect the scenic values or aesthetics of the area or a particular scenic resource?
- Does the project dominate views from highly sensitive viewing areas or within the region as a whole?
- Has the developer failed to take reasonable measures to mitigate the significant or avoidable impacts of the project?

Table 2 outlines the SEPA impact rating factors used for this visual impact assessment, including magnitude, duration, likelihood, and spatial extent of impacts. Table 3, in consideration of BLM and CESA methods, further describes the degrees of magnitude in Table 2 (negligible, low, medium, and high), as they relate to the visual impact analysis elements that form the foundation of this assessment. As identified in Table 3, the determination of impact magnitude is based on impacts to landscape character, impacts to viewing locations, and compliance with state and county visual resource requirements. These determinations are primarily focused on the concept of project contrast, which is a measure of the overall visual changes to existing features of the landscape (including landform/water, vegetation, and human-made structures) resulting from the construction, operation, and decommissioning of a project. The level of project contrast is assessed using the categories of slight, weak, moderate, and strong, which directly align with the magnitude of change degrees of negligible, low, medium, and high.

Other concepts from the CESA methods were included to evaluate and address the unique visual characteristics of wind energy projects. For the assessment of impacts on landscape character, this includes modifications to the existing setting, which may reduce the setting's overall level of intactness. With regard to impacts on views, the concepts of project dominance, prominence with the setting, and the extent of viewshed occupied by the project (i.e., extent of horizontal view occupied by Project) were included from the CESA methods. These concepts build upon the BLM VRM's 10 environmental factors that influence the amount of visual contrast introduced by a project (BLM 1986):

- Distance
- Angle of observation
- Length of time the project is in view
- Relative size or scale
- Season of use
- Lighting conditions
- Recovery time
- Spatial relationships
- Atmospheric conditions
- Motion

Of particular importance for a project with wind turbines is the influence of motion to attract attention and increase the level of visual contrast within view, compared to static elements (e.g., solar arrays, transmission lines).

Table 2. Impact Rating

Factor	Rating			
Magnitude	Negligible *indistinguishable from the background*	Low *Small impact, non-sensitive receptor(s)*	Medium *intermediate impact, may occur on sensitive receptor(s) or affect public health and safety*	High *high impact on sensitive receptor(s) or affecting public health and safety*
Duration	Temporary *infrequently during any phase*	Short-term *duration of construction or site restoration*	Long-term *during operation or operation plus another phase of Project*	Constant *during life of Project and/or beyond the Project*
Likelihood	Unlikely *not expected to occur*	Feasible *may occur*	Probable *expected to occur*	Unavoidable *inevitable*
Spatial Extent/Setting	Limited *small area of Lease Boundary or beyond Lease Boundary if duration is temporary*	Confined *within Lease Boundary*	Local *beyond Lease Boundary to neighboring receptors*	Regional *beyond neighboring receptors*

Table 3. Criteria for Assessing Magnitude of Impacts to Visual Resources

Magnitude of Impacts	Description
Negligible	**Landscape character:** landscape would appear unaltered and Project components would not attract attention. Project components would repeat form, line, color, texture, scale and/or movement common in the landscape and would not be visually evident. **Viewing locations:** contrast introduced by the Project would be slight and would be subordinate to existing landscape features and would not be readily seen from viewing locations. Project components would repeat elements or patterns common in the landscape. **State and county visual resource requirements:** Project would be consistent with state and county visual management requirements.
Low	**Landscape character:** landscape would be noticeably altered, and Project components would begin to attract attention in a partially intact visual setting. Project components would introduce form, line, color, texture, scale, and/or movement common in the landscape and would be visually subordinate (weak contrast). **Viewing locations:** A weak level of contrast would be introduced by the Project. The Project would occupy a small portion of the viewshed, and would be subordinate to existing landscape features, as seen from viewing locations. **State and county visual resource requirements:** Project would be consistent with state and county visual management requirements after implementation of mitigation measures.
Medium	**Landscape character:** landscape would appear to be considerably altered and Project components would begin to dominate a partially intact visual setting. Project components would introduce form, line, color, texture, scale, and/or movement not common in the landscape and would be visually prominent in the landscape (moderate contrast). **Viewing locations:** a moderate level of contrast would be introduced by the Project, attracting attention from viewing locations. The Project would be prominent in the existing landscape and co-dominate from viewing locations where the form, line, color, texture, scale, and/or movement of Project components would be moderately incongruent with existing landscape features. **State and county visual resource requirements:** Project would be partially consistent with state and county visual management requirements, and the implementation of mitigation measures would not sufficiently reduce impacts.

Magnitude of Impacts	Description
High	**Landscape character:** landscape would appear to be strongly altered and Project components would dominate an intact visual setting. Project components would introduce form, line, color, texture, scale, and/or movement not common in the landscape and would be visually dominant in the landscape (strong contrast). **Viewing locations:** a strong level of contrast would be introduced by the Project, demanding attention. The Project would be highly prominent and dominate views from viewing locations where the form, line, color, texture, scale, and/or movement of Project components would be highly incongruent with existing landscape features, including existing structures. A strong level of contrast may also be introduced if the Project components occupy a large portion of the viewshed from a given viewpoint. **State and county visual resource requirements:** Project would be inconsistent with state and county visual management requirements, and the implementation of mitigation measures would not sufficiently reduce impacts.

To support the visual impact discussions, the following visual terminology is used in this report as defined below:

- Viewer position (angle of observation)
  - Inferior: viewer is located below the Project in elevation.
  - Level: viewer is at the same elevation as the Project.
  - Superior: viewer is located above the Project in elevation.
- Project visibility factors
  - Screening: an existing visual barrier (landforms, vegetation, or structures) blocks or limits views of the Project, reducing the level of contrast introduced by the Project.
  - Unobstructed: views of the Project would not be screened by landforms, vegetation, or structures allowing for the extent of the Project to be visible.
  - Skylining: the Project would appear above the horizon or ridgeline, silhouetting its form against the sky attracting additional attention in the landscape.
  - Backdropping: distant hills or mountains would appear behind the Project potentially reducing contrast introduced by its form, line, color, and texture as those elements would appear to blend with the existing setting.

Since impacts on visual resources considered effects on scenery and on views from multiple KOPs, the summary impact level (i.e., magnitude of impact) at the end of each discussion focuses on the highest identified impacts.

4.2 Impacts of Proposed Action

4.2.1 Impacts during Construction

The construction of the Project would introduce form, line, color, texture, scale, and movement inconsistent with the existing landscape character and would modify views from the identified KOP locations. These short-term impacts would result from the construction of Project facilities as well as construction of new access roads and associated vegetation clearing. Because the Applicant has committed to active dust suppression, as described in Section 1.10 Mitigation Measures of the ASC, potential visual impacts associated with visible dust plumes is not considered in this assessment. Impacts associated with Project lighting or glare is considered in the draft EIS for the Project. The following sections describe visual/aesthetic impacts associated with the different Project components.

4.2.1.1 TURBINE OPTION 1

Impacts on visual resources would be elevated during construction activities, including the movement of vehicles that would attract attention, due to increased activity at proposed temporary staging areas and throughout the Lease Boundary. The construction of access roads, crane paths, collector and communication lines, and the wind turbines would be prominent when viewed within the foreground distance zone (0–0.5 mile) and would begin to modify the existing landscape setting.

During construction, the removal of vegetation and earthwork would introduce areas of exposed soil, which would contrast with the existing setting until vegetation is later reclaimed. The construction of access roads in the level to rolling terrain in the analysis area would require minimal modification of the existing terrain, resulting in negligible long-term visual impacts. Impacts common to all KOPs during construction would include views of additional vehicular traffic and areas of exposed soil after the removal of vegetation and during earthwork activities. Viewers located within the foreground distance zone (0–0.5 mile), or in locations where views would be occupied by a large portion of the Project under construction, would result in increased visual contrast on these views.

These impacts would be most intense during the 23-month construction schedule (as described in the ASC and in Chapter 2 of the EIS for the Project) and would diminish after construction is complete and vegetation has been re-established. Following the initial seeding, completed after construction, the Applicant would continue to monitor these revegetation areas for 3 to 5 years and apply remedial actions in order to meet the success criteria outlined in Appendix N of the ASC (Horse Heaven Wind Farm, LLC 2022). Construction activities for Turbine Option 1 would result in medium, short-term, probable, local impacts on visual resources.

4.2.1.2 TURBINE OPTION 2

Impacts would be similar to Turbine Option 1. Because there are fewer proposed wind turbines requiring less ground disturbance for construction, there would be a reduced level of contrast and fewer modifications to the existing landscape character introduced during Project construction when compared to Turbine Option 1. However, the ratings of impacts are consistent between the two turbine options as construction of either option would occupy a large portion of the landscape contrasting with its existing character. Construction activities for Turbine Option 2 would result in medium, short-term, probable, local impacts on visual resources.

4.2.1.3 SOLAR ARRAYS

The construction of the solar arrays would result in similar impacts as the wind turbines but would occur within a smaller, more defined area associated with the selected solar array site. Within the fenced boundary, all lands would be distributed through earthwork, vegetation clearing, and other construction efforts. Application of mitigation measures would reduce these impacts to the extent practicable to minimize these short-term visual impacts as described in Section 4.2.4. Construction activities for the solar arrays would result in low, short-term, probable, local impacts on visual resources.

4.2.1.4 SUBSTATIONS

Impacts from construction of the substations would be similar to the solar arrays, with the addition of multiple linear transmission lines connecting the proposed substations to the existing electrical grid. The construction of the transmission lines would include vegetation clearing within the right-of-way and construction of a series of tall, vertical structures. During construction, the motion associated with

construction equipment, structure building, and conductor stringing, as well as vegetation clearing and landform modification would be noticeable and create visual contrast within the viewshed. Construction activities for the substations and transmission lines would result in low, short-term, probable, local impacts on visual resources.

4.2.1.5 BATTERY ENERGY STORAGE SYSTEMS

Impacts would be similar to the proposed solar arrays and substations, with these proposed BESS sites located adjacent to the proposed substation locations. The construction of the BESSs would introduce additional motion from construction equipment into the setting. Additionally, the removal of vegetation and earthwork would introduce areas of exposed soil, which would contrast with the existing setting until vegetation has been restored. Construction activities for the BESSs would result in low, short-term, probable, local impacts on visual resources.

4.2.1.6 COMBINED IMPACTS OF COMPONENTS

During the 23-month construction schedule, there would be short-term impacts from construction activities occupying a large portion of the landscape when considering all of the Project components (i.e., wind turbines, solar arrays, collector lines, access road, multiple transmission lines and substations, O&M facility, and the BESSs). This would include views of additional vehicular traffic as well as areas of exposed soil after the removal of vegetation and during earthwork activities. The removal of vegetation would be noticeable in the setting and contrast with the existing character; however, over time, after vegetation is reclaimed in temporary disturbance areas, it would begin to repeat vegetation patterns common in the area.

Viewpoints and KOPs located within the foreground distance zone (0–0.5 mile) would be most impacted by the construction of multiple Project components, particularly when a large portion of their viewshed is occupied by construction activities. These short-term impacts are anticipated to extend beyond the neighboring receptors, resulting in potential regional impacts from more distant viewpoints where construction activities would occupy a large portion of their viewshed. Construction disturbance would be limited to the extent practicable in accordance with best management practices (BMPs) and the Project's site certificate conditions. After construction is completed, areas of temporary disturbance, including temporary access roads no longer used as Project access roads, would be reclaimed to appear similar to their original condition. In general, vegetated areas that are temporarily disturbed or removed during construction of the Project would be revegetated to blend with adjacent undisturbed lands with these areas being monitored for 3 to 5 years postconstruction to meet a series of success criteria outlined in the Project's Revegetation and Noxious Weed Management Plan (Horse Heaven Wind Farm, LLC 2022: Appendix N). Areas with soil compaction and disturbance from construction activities would also be revegetated in accordance with the Project's Revegetation and Noxious Weed Management Plan.

In summary, activities during construction of all components of the Project would result in medium, short-term, probable, regional impacts on visual resources.

4.2.2 Impacts during Operation

The introduction of the Project into the setting would result in long-term modifications to the existing landscape's form, line, color, and texture, and would modify views from the identified KOP locations to varying degrees. Although impacts would depend on a variety of viewing conditions, one overall concept to note is that the visual impacts associated with the Project tend to change considerably with distance. These effects would be most impactful on residential, travel route, and recreation viewers located within

the foreground distance zone (0–0.5 mile), where the Project would create strong vertical and horizontal forms and lines that would contrast with the primarily organic forms of the existing setting. There are 15 residences, mostly located on participating properties, that would have foreground views (less than 0.5 mile) of either the proposed turbines or solar arrays. Two residences on non-participating properties would have foreground views of the turbines while no residences on non-participating properties would have views of the proposed solar arrays. One residence on a participating property would have foreground views of both the turbines and proposed solar arrays, while an additional two residences on participating properties would have foreground views of the proposed solar arrays.

Impacts on views from the middleground (0.5–5 miles) would vary based on the extent of existing modifications in view. For locations with views of the existing Nine Canyon Wind Project, or where the existing transmission lines dominate the existing view, the Project would typically result in medium impacts and would be viewed as co-dominant within the existing setting. From viewpoints where existing modifications do not currently attract attention, the Project would dominate views since a large portion of the viewshed would typically be occupied by large, spinning wind turbines. From this distance, the individual turbines tend to visually "merge" with other turbines in the string from some viewing angles, resulting in the turbines appearing larger in mass and scale.

From more distant views, within the background distance zone (more than 5 miles away), the proposed wind turbines would appear as vertical lines with a faint spinning motion of the blades—particularly where seen skylined above ridges or other highpoints within the landscape. The proposed solar arrays and other Project components would be mostly indiscernible from the background distance zone.

4.2.2.1 TURBINE OPTION 1

Under Turbine Option 1, impacts to landscape character would range from high to medium. The Project would generally dominate the existing landscape character through the introduction of a large number of vertical protrusions that would be out of scale with and highly prominent in the landscape. The turbines would be most prominent where sited near the Horse Heaven Hills ridgeline, resulting in high impacts on landscape character. These structures would also introduce spinning movement into the landscape, which would attract attention throughout the area of analysis—particularly where the existing Nine Canyon Wind Project is not visible. Impacts to landscape character would be medium near the existing Nine Canyon Wind Project since this portion of the landscape—particularly the area east of I-82—has already been modified. In general, the existing level of landscape intactness would be diminished, resulting in landscapes characterized by energy generation, compared to the existing agrarian landscape character.

Impacts on key views would range from high to medium. Table 4 provides an overview of the impacts from each KOP/viewpoint, and includes the viewer position, the extent of the horizontal view occupied by the Project, the level of contrast, and the magnitude of impact.

In summary, activities during operation of Turbine Option 1 would result in areas of high, long-term, unavoidable, regional impacts on visual resources.

4.2.2.2 TURBINE OPTION 2

The Project, under Turbine Option 2, would have similar high impacts on landscape character as Option 1. There would be fewer structures introduced into the setting under this option, which would result in less visual clutter, however, due to the increased height of the structures in Option 2, these effects would be balanced, resulting in overall similar effects. The additional height of Option 2 turbines

would be more prominent near the Horse Heaven Hills ridgeline or adjacent to existing landscape modifications where the increased vertical forms would be most evident.

Table 5 describes the impacts on views from the KOPs and other viewing locations associated with Turbine Option 2. In summary, activities during operation of Turbine Option 2 would result in areas of high, long-term, unavoidable, regional impacts on visual resources.

Table 4. Key Observation Point/Viewpoint Impact Table – Turbine Option 1

KOP #	Viewer Name	Viewer Type	Distance to Project	Viewer Position	Approximate Extent of Horizontal View Occupied by Project	Level of Visual Contrast	Magnitude of Impact	Impact Description
1	McNary NWR	Recreation	5.2 miles	Inferior	80 degrees	Moderate	Medium	The tall, proposed turbines would be similar in appearance to the existing Nine Canyon Wind Project, also visible from this location, but the proposed turbines would be larger and out of scale with the existing landscape. Views would be unobstructed toward the Lease Boundary. The prominence of the proposed wind turbines rising above the landscape, including additional motion introduced by the spinning turbine blades, would further attract attention from viewers and dominate the existing landscape character. Because visitors and travelers would be visiting for a limited time, the level of contrast would be reduced by the short view duration limiting the influence of the Project on these views. The Project would expand the extent of view occupied by moving wind turbines and would be prominent from this inferior viewing angle, resulting in medium, long-term impacts on views.
2	S Clodfelter Road – East, Central, and West	Residential	3.0 miles	Inferior	200 degrees	Strong	High	The proposed turbines would dominate views from this location, approximately 3 miles away, as a large portion of the viewshed would include moving wind turbines. Views of the Project in open, rolling hills would be unobstructed. Views toward the east would include the existing Nine Canyon Wind Project, which occupies only a narrow portion of the landscape as viewed from this location. The series of proposed skylined wind turbines would be highly prominent in the view, resulting in high, long-term impacts on views, particularly where views of multiple wind turbines would overlap and appear larger in mass.
3	Chandler Butte	Recreation	2.5 miles	Superior	50 degrees	Strong	High	The proposed turbines would dominate views from this location, approximately 2.5 miles away, as a moderate portion of the viewshed would include moving wind turbines. Views of the Project in an open plains landscape would be unobstructed, with views of the existing Nine Canyon Wind Project occurring approximately 20 miles away on the distant hills. Due to the superior viewing angle, the contrast between the light color of the turbines and the agricultural fields would create strong visual contrast, visible to recreationists along Chandler Butte. The series of proposed wind turbines would be highly prominent in the view resulting in high, long-term impacts on views, particularly where views of multiple wind turbines would overlap and appear larger in mass.
4	I-82 South	Travel route	7.0 miles	Inferior	100 degrees	Moderate	Medium	The proposed turbines would attract attention from this location, approximately 7 miles away, as a large portion of the viewshed would include moving wind turbines. Due to the distance, the turbine's form would be distinguishable, but the texture and color would be muted and less detailed. Views from I-82 include an existing transmission line and the Nine Canyon Wind Project, approximately 12 miles away, with these existing features influencing but not dominating views from this location. As travelers drive I-82 from this point to KOP 6, approximately 10 miles, impacts on views of the proposed wind turbines would incrementally increase. From this location, the turbines would be viewed unobstructed and skylined, which would attract attention—particularly where only moving turbine blades would be seen over the horizon. The impacts on these views would be medium and long term.
5	Badger Mountain	Recreation	4.7 miles	Level	150 degrees	Strong	High	The proposed turbines would dominate views from this location, approximately 5 miles away, as a large portion of the viewshed would include moving wind turbines. Views of the Project in open, rolling hills would be unobstructed, with views of the Project occurring beyond developed lands of Badger and the Horse Heaven Hills ridgeline. The series of proposed skylined wind turbines would be highly prominent in the view, resulting in high, long-term impacts on views—particularly where views of multiple wind turbines would overlap and appear larger in mass.
6	Bofer Canyon Road/I-82	Travel route	1.7 miles	Level	120 degrees	Strong	High	The proposed turbines would be viewed in context with an existing transmission line from this KOP. The existing transmission line has introduced strong vertical lines into the existing setting. Due to the proximity of the proposed turbines (less than 2 miles), the introduction of movement into the landscape, and the extent of view occupied by these structures, the Project would dominate views from this location along Bofer Canyon Road and I-82. These impacts would continue to increase as viewers would pass the existing transmission line into an area where views of the proposed turbines would be highly prominent as viewed both to the east and west. Based on the landscape modifications introduced by the proposed wind turbines, the Project would result in high, long-term impacts on views.
7	Highway 221	Travel route, residential	5.8 miles	Level	70 degrees	Moderate	Medium	The proposed turbines would be viewed in context with a distant existing transmission line, which has introduced a series of skylined structures along the horizon. The proposed turbines would, however, appear larger and out of scale with the features of the existing landscape. Views would be unobstructed toward the Lease Boundary. The prominence of the proposed wind turbines rising above the landscape, including the introduction of motion, would further attract attention from viewers and modify the existing landscape character. The Project would be prominent within a moderate portion of the viewshed, resulting in medium, long-term impacts on views.
8	Kennewick (Canyon Lakes Area) – South and West	Residential	3.6 miles	Inferior	170 degrees	Strong	High	The proposed turbines would dominate views from this location, approximately 3.5 miles away, as a large portion of the viewshed would include moving wind turbines. Views of the Project in open, rolling hills would be unobstructed with views toward the west including an existing transmission line. Views to the southeast include the existing Nine Canyon Wind Project, which occupies a narrow portion of the landscape as viewed from this location. The series of proposed skylined wind turbines would be highly prominent in the view resulting in high, long-term impacts on views, particularly where views of multiple wind turbines would overlap and appear larger in mass.
9	Benton City	Residential, travel route, commercial	2.7 miles	Inferior	10 to 80 degrees (based on level of screening)	Moderate	Medium	The proposed wind turbines would be intermittently screened by development within Benton City, with partial screening of the Project features occurring where the Horse Heaven Hills would partially obstruct views to the south. Where visible, there would be a limited number of turbines in view, as depicted in the visual simulation (see Attachment B). The presence and motion of the turbines would attract attention but would appear co-dominant with other commercial and residential developments. Views from other areas within the city may have more expansive, unobstructed views of the proposed wind turbines similar to KOPs 2 and 10. The Project would expand the extent of view occupied by moving wind turbines and would be prominent from this inferior viewing angle, resulting in medium, long-term impacts on views.
10	Badger Road	Residential, travel route	1.5 miles	Inferior	150 degrees	Strong	High	The proposed turbines would dominate views from this location, approximately 1.5 miles away, as a large portion of the viewshed would include moving wind turbines. Views of the proposed wind turbines, from an inferior viewing angle, would be partially screened by topography and intermittently screened by development. Movement associated with the turbine blades would be highly visible, particularly where only the blades would visible, repeatedly rising over the hills. Based on the level of contrast introduced by the proposed wind turbines, which are much larger in scale than existing modifications in view, the Project would result in high, long-term impacts on views.

KOP #	Viewer Name	Viewer Type	Distance to Project	Viewer Position	Approximate Extent of Horizontal View Occupied by Project	Level of Visual Contrast	Magnitude of Impact	Impact Description
11	Highland/ Finley Area	Residential	2.0 miles	Inferior	100 degrees	Strong	High	The proposed turbines would dominate views from this location, approximately 2 miles away, as a large portion of the viewshed would include moving wind turbines. Views of the Project on the Horse Heaven Hills would be unobstructed, with views toward the southwest including residential and agricultural development, as well as the existing Nine Canyon Wind Project, which occupies a moderate portion of the landscape as viewed from this location. The series of proposed skylined wind turbines would be highly prominent in the view, resulting in high, long-term impacts on views, particularly where views of multiple wind turbines would overlap and appear larger in mass.
12	County Well Road	Residential, travel route	2.5 miles	Level	100 degrees	Moderate	Medium	The proposed turbines would be viewed in context with an existing transmission line. The existing transmission line has modified the existing setting, including the introduction of distinct, vertical lines. Due to the proximity of the proposed turbines (approximately 2.5 miles), the introduction of movement into the landscape, and the extent of view occupied by these structures, the Project would attract attention and begin to dominate views from this location. In consideration of the existing modifications in view, the Project would result in medium, long-term impacts on views from this location. These impacts would continue to increase as viewers would pass the existing transmission line into an area where views of the proposed wind turbines would be prominent.
13	Travis Road South of Sellards Road	Residential, travel route	1.1 miles	Level	150 degrees	Strong	High	The proposed turbines would dominate views from this location, approximately 1 mile away, as a large portion of the viewshed would include moving wind turbines. Views of the Project in open, rolling hills would be unobstructed within a mostly intact existing landscape. The series of proposed skylined wind turbines would be highly prominent in the view, resulting in high, long-term impacts on views, particularly where views of multiple wind turbines would overlap and appear larger in mass.
14	South of Benton City	Residential	1.7 miles	Inferior	90 degrees	Strong	High	Compared to KOP 9, views toward the Project area from this portion of Benton City are mostly unobstructed. The proposed turbines would dominate views from this location, approximately 1.7 miles away, as a large portion of the viewshed would include moving wind turbines. Views of the proposed wind turbines, from an inferior viewing angle, would be partially screened by topography, including those turbines visible to the southeast. Movement associated with the turbine blades would be highly visible, particularly where only the blades would be visible, repeatedly rising over the hills. Based on the level of contrast introduced by the proposed wind turbines, which are much larger in scale than existing modifications in view, the Project would result in high, long-term impacts on views.
15	Interstate 82	Travel route	0.7 mile	Inferior	180 degrees	Strong	High	The proposed turbines would dominate views from this location, less than 1 mile away, as views to the east, north, and west would include moving wind turbines. Views of the Project in open, rolling hills would be unobstructed within a landscape modified by the presence of the interstate highway and a communication tower. The prominence of the proposed wind turbines rising above the landscape, including additional motion introduced by the turbine blades, would further attract attention from viewers and dominate the existing landscape character, resulting in high, long-term impacts on views from these locations.
16	U.S. Highway 730 – Wallula Gap	Travel route	5.0 miles	Inferior	0 degrees	None	Negligible	The proposed turbines would be screened by topography as viewed from this location, approximately 5 miles away. Based on this level of screening, Project elements would not be visually evident from this location.
N/A	Dispersed residences located 0.5 mile from proposed turbines (foreground views)	Residential	Less than 0.5 mile	Level	Up to 300 degrees	Strong	High	The proposed turbines would dominate views from dispersed residences located within the foreground distance zone (includes views from participating and non-participating properties). These views would be most impacted where views of the existing Nine Canyon Wind Project and existing transmission lines would be screened with the proposed turbines dominating a viewshed with limited existing modifications. The prominence of the proposed wind turbines rising above the landscape, including additional motion introduced by the turbine blades, would further attract attention from viewers and dominate the existing landscape character, resulting in high, long-term impacts on views from these locations. Viewers located on participating properties may have less visual sensitivity to modifications introduced by the Project, compared to viewers located on non-participating properties, but the level of visual contrast and Project dominance would remain the same.
N/A	Horse Heaven Hills Recreation Area	Recreation	0.8 mile	Superior, level, and inferior	Up to 140 degrees	Strong	High	Views from the Horse Heaven Hills Recreation Area vary based on location, with elevated views represented by KOP 3, located on Chandler Butte, to inferior views occurring below the ridgeline and similar to KOPs 9 and 10. In general, views from this recreation area would be highly impacted where the Project would modify a large portion of the viewshed through the introduction of moving wind turbines. While hiking on trails below the ridge but within the recreation area, views may be partially screened by topography where visitors would only see the moving turbine blades repeatedly rising over the ridgeline as described for KOP 10. Viewers along the ridgeline trail would be located directly adjacent to the proposed turbines, where views would be strongly altered by the Project. The series of proposed wind turbines would be highly prominent in the view, resulting in high, long-term impacts on views from Chandler Butte, below the ridgeline trails, and from the ridgeline trail.

Table 5. Key Observation Point/Viewpoint Impact Table – Turbine Option 2

KOP #	Viewer Name	Viewer Type	Distance to Project	Viewer Position	Approx. Extent of Horizontal View Occupied by Project	Level of Visual Contrast	Magnitude of Impact	Impact Description
1	McNary NWR	Recreation	5.8 miles	Inferior	80 degrees	Moderate	Medium	Impacts would be similar to Option 1 except the taller turbines would be more prominent as viewed on the ridgeline. There would be fewer turbines in view, resulting in a less cluttered appearance, but since the proposed turbines would be larger in scale (and even larger as compared to the existing Nine Canyon Wind Project), the Project would result in medium, long-term impacts on views.
2	S Clodfelter Road – East, Central, and West	Residential	3.5 miles	Inferior	200 degrees	Strong	High	Impacts would be similar to Option 1 except the taller turbines would be more prominent as viewed on the ridgeline. There would be fewer turbines in view, resulting in a less cluttered appearance, particularly where views of multiple wind turbines would overlap and appear larger in mass. Since the proposed turbines would be larger in scale (and even larger as compared to the existing Nine Canyon Wind Project), the effects of a less cluttered view would be counterbalanced, resulting in high, long-term impacts on views.

KOP #	Viewer Name	Viewer Type	Distance to Project	Viewer Position	Approx. Extent of Horizontal View Occupied by Project	Level of Visual Contrast	Magnitude of Impact	Impact Description
3	Chandler Butte	Recreation	2.8 miles	Superior	50 degrees	Strong	High	Impacts would be similar to Option 1 except the taller turbines would be more prominent across the landscape. There would be fewer turbines in view, resulting in a less cluttered appearance, particularly where views of multiple wind turbines would overlap and appear larger in mass. Since the proposed turbines would be larger in scale (and even larger as compared to the existing Nine Canyon Wind Project), the effects of a less cluttered view would be counterbalanced, resulting in high, long-term impacts on views.
4	I-82 South	Travel route	7.3 miles	Inferior	100 degrees	Moderate	Medium	Impacts would be similar to Option 1 except the taller turbines would result in fewer turbines within view. The presence of fewer turbines would produce a less cluttered appearance, particularly where views of multiple wind turbines would overlap and appear larger in mass. Since the proposed turbines would be larger in scale (and even larger as compared to the existing Nine Canyon Wind Project), the effects of a less cluttered appearance would be counterbalanced, resulting in medium, long-term impacts on views
5	Badger Mountain	Recreation	4.7 miles	Level	150 degrees	Strong	High	Impacts would be similar to Option 1 except the taller turbines would be more prominent as viewed on the ridgeline. There would be fewer turbines in view, resulting in a less cluttered appearance, particularly where views of multiple wind turbines would overlap and appear larger in mass. The relative scale of the turbines proposed for Option 2, compared to Option 1, would be apparent as views include residential and agricultural development, providing a source of scale comparison.
6	Bofer Canyon Road/I-82	Travel route	1.8 miles	Level	120 degrees	Strong	High	Impacts would be similar to Option 1 but slightly increased in magnitude. The taller turbines proposed under this option would be apparent due to the existing transmission line providing a source of scale comparison, and most of the turbines proposed adjacent to this viewpoint would occur regardless of the option selected.
7	Highway 221	Travel route, residential	5.8 miles	Level	70 degrees	Moderate	Medium	Impacts would be similar to Option 1 except the taller turbines would be more prominent as viewed from the highway. There would be fewer turbines in view, resulting in a less cluttered appearance, but since the proposed turbines would be larger in scale (and even larger as compared to the existing transmission line in view), the Project would result in medium, long-term impacts on views.
8	Kennewick (Canyon Lakes Area) – South and West	Residential	5.4 miles	Inferior	170 degrees	Moderate	Medium	Impacts on views would be reduced under Option 2, as the closest proposed wind turbine would be more than 1.5 miles further away compared to Option 1 (approximately 5.4 miles). There would also be fewer turbines in view, resulting in a less cluttered appearance. However, since the proposed turbines would be larger in scale, (and even larger as compared to the existing Nine Canyon Wind Project), the Project would result in medium, long-term impacts on views.
9	Benton City	Residential, travel route, commercial	2.7 miles	Inferior	10 to 80 degrees (based on level of screening)	Moderate	Medium	Impacts would be similar to Option 1 but slightly increased in magnitude. The taller turbines proposed under this option would be more prominent and most of the turbines proposed adjacent to this viewpoint would occur regardless of the option selected.
10	Badger Road	Residential, travel route	1.5 miles	Inferior	150 degrees	Strong	High	Impacts would be similar to Option 1 except the taller turbines would be more prominent as viewed from this area. There would be fewer turbines in view resulting in a less cluttered appearance, but since the proposed turbines would be larger in scale, (and even larger as compared to the existing modifications in view), the Project would result in high, long-term impacts on views.
11	Highland/ Finley Area	Residential	2.5 miles	Inferior	100 degrees	Strong	High	Impacts would be similar to Option 1, except the taller turbines would be more prominent as viewed on the ridgeline. There would be fewer turbines in view, resulting in a less cluttered appearance, particularly where views of multiple wind turbines would overlap and appear larger in mass. Since the proposed turbines would be larger in scale, (and even larger as compared to the existing Nine Canyon Wind Project), the effects of a less cluttered appearance would be counterbalanced, resulting in high, long-term impacts on views.
12	County Well Road	Residential, travel route	2.5 miles	Level	100 degrees	Moderate	Medium	Impacts would be similar to Option 1 but slightly increased in magnitude. The taller turbines proposed under this option would be apparent due to the existing transmission line that provides a source of scale comparison.
13	Travis Road South of Sellards Road	Residential, travel route	1.1 miles	Level	150 degrees	Strong	High	Impacts would be similar to Option 1 but slightly increased in magnitude. The taller turbines proposed under this option would be apparent due to the existing development in view, which provides a source of scale comparison.
14	South of Benton City	Residential	1.7 miles	Inferior	90 degrees	Strong	High	Impacts would be similar to Option 1 but slightly increased in magnitude. The taller turbines proposed under this option would be more prominent, and most of the turbines proposed adjacent to this viewpoint would occur regardless of the option selected.
15	Interstate 82	Travel route	0.7 mile	Inferior	180 degrees	Strong	High	Impacts would be similar to Option 1 but slightly increased in magnitude. The taller turbines proposed under this option would be apparent due to the existing communication tower in view, which provides a source of scale comparison.
16	U.S. Highway 730 – Wallula Gap	Travel route	5.0 miles	Inferior	0 degrees	None	Negligible	The proposed turbines would be screened by topography as viewed from this location approximately 5 miles away. Based on this level of screening, Project elements would not be visually evident from this location.
N/A	Dispersed residences located 0.5 mile from proposed turbines (foreground views)	Residential	Less than 0.5 mile	Level	Up to 300 degrees	Strong	High	Impacts would be similar to Option 1 except the taller turbines would be more prominent as viewed from these residences. There would be fewer turbines in view, resulting in a less cluttered appearance. Since the proposed turbines would be larger in scale, the Project impacts would be most apparent where the existing Nine Canyon Wind Project or transmission lines are visible and provide a source of scale comparison. The Project would result in high, long-term impacts on views.
N/A	Horse Heaven Hills Recreation Area	Recreation	0.8 mile	Inferior	Up to 140 degrees	Strong	High	Impacts would be similar to Option 1 except the taller turbines would be more prominent as viewed from this recreation area. There would be fewer turbines in view, resulting in a less cluttered appearance. However, since the proposed turbines would be larger in scale (and even larger as compared to the existing modifications in view), the Project would result in high, long-term impacts on views.

4.2.2.3 SOLAR ARRAYS

The Project would introduce forms, lines, colors, and textures associated with the photovoltaic arrays that are inconsistent with the existing landscape character. The conversion of existing agricultural lands to large expanses of photovoltaic panels would result in visual contrast through their flat, geometric forms and dark, slightly reflective surfaces, which are not common in the setting. The addition of the repetitive, vertical upright features associated with the solar trackers and additional fenced land would be noticeable in this rolling, panoramic landscape.

The Project would be visually prominent in the setting, resulting in medium to high impacts on landscape character. Based on the viewshed analysis from the updated ASC (Horse Heaven Wind Farm, LLC 2022), the County Well Road (see Figure 5 in Attachment A) and Sellards Road (see Figure 6 in Attachment A) solar siting areas would be the most visible options, influencing a larger portion of the landscape, 45% and 51% respectively, within the 5-mile-wide area of analysis. These solar array siting areas would also occur in an area with a more intact existing landscape, as compared to the Bofer Canyon siting area, resulting in more intense impacts on landscape character. The Bofer Canyon option is located in proximity to the existing Nine Canyon Wind Project, which has introduced large-scale energy infrastructure into the landscape. The viewshed analysis identified that 31% of the area within the 5-mile-wide area of analysis would be influenced by the proposed solar arrays within the Bofer Canyon Siting Area (see Figure 7 in Attachment A).

Table 6 describes the impacts on views from the KOPs and other viewing locations associated with the three proposed solar array siting areas. In summary, activities during operation of any of the three solar array options would result in areas of (at minimum) medium, long-term, unavoidable, regional impacts on visual resources, with the County Well Road and Bofer Canyon siting areas resulting in areas of high, long-term, unavoidable, local impacts as viewed from identified KOP locations.

Table 6. Key Observation Point/Viewpoint Impact Table – Solar Array

KOP #	Viewer Name	Viewer Type	Distance to Project	Viewer Position	Level of Visual Contrast*	Magnitude of Impact			Impact Description
						County Well Road Siting Area	Sellards Road Siting Area	Bofer Canyon Siting Area	
1	McNary NWR	Recreation	Not visible	Inferior	None	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
2	S Clodfelter Road – East, Central, and West	Residential	Not visible	Inferior	None	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
3	Chandler Butte	Recreation	2.1 miles	Superior	Moderate	Medium	Negligible	Negligible	Views of the County Well Road option would be unobstructed with the Project being prominent and beginning to dominate views from this area. The contrast between the darker solar arrays and the tan/green grasses would be evident from this elevated viewing area, approximately 2 miles away, resulting in medium, long-term impacts on views.
4	I-82 South	Travel route	6.0 miles	Level	Moderate	Negligible	Negligible	Medium	The Bofer Canyon option would be prominent in view and modify the existing landscape through the introduction of dark, geometric solar arrays in a rolling landscape comprised of golden, tan grasses. The impacts on these views would incrementally increase as motorists drive I-82 between this location and KOP 6 (approximately 10 miles), with some views of the solar arrays being intermittently screened by topography. From this location, the Project would result in medium, long-term impacts on views.
5	Badger Mountain	Recreation	Not visible	Level	None	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
6	Bofer Canyon Road/I-82	Travel route	0.6 mile	Level	Strong	Negligible	Negligible	High	The Bofer Canyon option would be visually dominant and demand attention within the setting as solar arrays would be located on both sides of the interstate. An existing transmission line has modified the existing landscape, including the introduction of strong vertical lines. The contrast between the dark solar arrays and the tan grasses would be highly evident. In consideration of the existing modifications in view, the Project would result in medium, long-term impacts on views from this location. These impacts would continue to increase as viewers would pass the existing transmission line into an area where views of the proposed solar arrays would be highly prominent as viewed both to the east and west resulting in high, long-term local impacts.
7	Highway 221	Travel route, residential	3.1 miles	Level	Weak	Low	Low	Negligible	The County Well Road and Sellards Road options would begin to attract attention but would be visually subordinate in the setting. The low form of the solar arrays would blend with the existing landscape from this distance (approximately 3–4 miles) and would be partially screened by topography and existing structures. The Project would result in low, long-term impacts on views.
8	Kennewick (Canyon Lakes Area) – South and West	Residential	5.9 miles	Inferior	Slight	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
9	Benton City	Residential, travel route, commercial	3.9 miles	Inferior	Slight	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
10	Badger Road	Residential, travel route	6.4 miles	Inferior	Slight	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
11	Highland/ Finley Area	Residential	8.5 miles	Inferior	Slight	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
12	County Well Road†	Residential, travel route	0.2 mile	Level	Strong	High	Negligible	Negligible	The County Well Road Option would be prominent in view and modify the existing landscape through the introduction of dark, geometric solar arrays in a flat to rolling landscape comprised of tan-colored agricultural fields. An existing transmission line has already modified the landscape, including the introduction of strong vertical lines and geometric forms. In consideration of the existing modifications in view, the Project would result in medium, long-term impacts on views from this location. These impacts would continue to increase as viewers would pass the existing transmission line into an area where views of the proposed solar arrays would be highly prominent resulting in high, long-term local impacts.
13	Travis Road South of Sellards Road	Residential, travel route	1.0 mile	Level	Moderate	Negligible	Medium	Negligible	The Sellards Road Option would be prominent in view and modify the existing landscape through the introduction of dark, geometric solar arrays in a rolling landscape comprised tan-colored agricultural fields (note: visual simulation in Attachment B does not include these views to the west). The views from this area are generally intact, with views of the Project occurring away from the direction of travel along the road. Views of the Project would therefore be short in duration. In consideration of view duration and partial screening by existing topography, the Project would result in medium, long-term impacts on views from this location.
14	South of Benton City	Residential	3.2 miles	Inferior	None	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.

KOP #	Viewer Name	Viewer Type	Distance to Project	Viewer Position	Level of Visual Contrast*	Magnitude of Impact			Impact Description
						County Well Road Siting Area	Sellards Road Siting Area	Bofer Canyon Siting Area	
15	Interstate 82	Travel route	0.1 mile	Level	Strong	Negligible	Negligible	High	The Bofer Canyon option would be visually dominant and demand attention within the setting, as solar arrays would be located on both sides of the interstate. (note: visual simulation in Attachment B does not include these views to the east, south, or west). The interstate highway, distribution power line, and communication tower have modified the existing landscape, including the introduction of vertical and curving lines, but the overall composition of the landscape is visually intact. Views of the proposed, geometric solar arrays, both to the east and west, would be highly prominent, resulting in high, long-term local impacts as described under KOP 6.
16	U.S. Highway 730 – Wallula Gap	Travel route	Not visible	Inferior	None	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.
N/A	Horse Heaven Hills Recreation Area	Recreation	Not visible	Inferior	None	Negligible	Negligible	Negligible	Project elements associated with the three solar siting areas would not be visually evident.

* Level of visual contrast indicated here refers to the solar siting area(s) where a low, medium, or high magnitude of impact was identified in subsequent columns. For alternatives where a "negligible" magnitude of impacts was identified, the proposed solar arrays would not be readily seen from those KOP locations.

† Views from dispersed residences within the foreground distance zone (0–0.5 mile) were analyzed from KOP 12.

4.2.2.4 SUBSTATIONS

The proposed substations would introduce a flat, rectangular, geometric form associated with the substation yard and tall, vertical, and geometrical substation equipment. These industrial features would contrast with the existing rolling agrarian landscape character. Where located adjacent to existing transmission lines or substations, the proposed elements would be in scale and consistent with the landscape setting, but in areas where there are limited existing utilities, the proposed substations would alter the landscape setting and would be visually prominent.

In general, the proposed substations would not attract attention from most locations within the area of analysis. The introduction of the proposed substations into views from KOPs 6 and 12, which have been modified by an existing transmission line, would result in long-term, medium impacts on views from 1.2 miles and 0.5 mile away respectively. The geometric form of the proposed substation yard and vertical structures would attract attention but would be co-dominant with the existing modifications in the landscape. Views from KOPs 3, 4, and 7 would be minimally modified by the proposed substations as views would occur from approximately 2.7 to 7.3 miles away, where the Project would mostly blend with the existing setting. The geometric form of the substation and vertical protrusions would appear in scale with the existing landscape from these more distant viewpoints.

The proposed substations would not be visible from KOPs 1, 2, 5, 8, 9, 10, 11, 13, 14, 15, 16, and the Horse Heaven Hills Recreation Area, therefore no impacts from this Project component would occur on these views.

The proposed transmission lines would modify the existing landscape character through the introduction of repeating vertical transmission line structures, associated linear access roads, and associated vegetation clearing. These effects would be most apparent where there are no adjacent existing transmission lines or other vertical protrusions (e.g., communication towers, substations, etc.), and would result in long-term impacts on landscape character.

Impacts to viewers from proposed transmission lines would vary from high to low. The highest impacts would occur on the views from four KOP locations (KOPs 6, 12, 13, and 15) located within 2 miles of the proposed transmissions lines. Views from KOP 6 have been modified by an existing transmission line, with the introduction of the proposed transmission line resulting in medium, long-term impacts from approximately 1.2 miles away. The form of the existing transmission line would be repeated by the Project (H-frame structures), reducing potential landscape clutter, and would be sited further away than the existing transmission line. Therefore, the Project would attract attention but would be co-dominant with the existing modifications.

The proposed transmission facilities would begin to dominate views from KOP 12, where an existing transmission line crosses the road, and the Project parallels the road with a series of transmission line structures stretching to the horizon. Due to the head-on view of the proposed transmission line and its difference in design compared to the existing line, the Project would result in medium, long-term impacts from this location. Views from KOPs 13 and 15 would be highly impacted by the proposed transmission line. From this location, there are limited existing modifications in view, with the existing landscape setting appearing mostly intact. The Project would dominate these unobstructed views through the introduction of tall transmission line structures viewed as skylined above the low, rolling terrain.

The proposed transmission lines would not be visible from KOPs 1, 5, and the Horse Heaven Hills Recreation Area, therefore no impacts from this Project component would occur on these views. Impacts to views from all other KOPs would be low. Impacts on views resulting from the introduction of the proposed transmission lines would be low in magnitude from KOPs 2, 3, 4, 7, 8, 9, 10, and 11 due to the viewing distance (more than 2 miles away).

In summary, during operation the substations and transmission lines would result in areas of high, long-term, unavoidable, local impacts as well as areas of medium, long-term, unavoidable, regional impacts on visual resources.

4.2.2.5 BATTERY ENERGY STORAGE SYSTEMS

Each proposed BESS would introduce a flat, rectangular, geometric form associated with its proposed yard, similar to the proposed substations, with equipment contained in geometric shipping containers (stacked up to 40 feet tall). These proposed features would contrast with the existing rolling agrarian landscape character.

In general, the proposed BESSs would not attract attention from most locations within the area of analysis. The introduction of the proposed BESSs into views from KOPs 6 and 12, which have already been modified by an existing transmission line, would result in long-term, medium impacts on views from 1.2 miles and 0.5 mile away respectively. The geometric form of the proposed BESSs, including the vertically stacked rectangular containers, would attract attention but would be co-dominant with the existing modifications. Views from KOPs 3, 4, and 7 would be minimally modified by the BESSs as views would occur from approximately 2.7 to 7.3 miles away, where the Project would mostly blend with the existing landscape setting. The geometric form of the BESSs from these three KOPs would appear in scale with the existing landscape from these more distant viewpoints.

The proposed BESSs would not be visible from KOPs 1, 2, 5, 8, 9, 10, 11, 13, 14, 15, 16, and the Horse Heaven Hills Recreation Area, therefore no impacts from these Project components would occur on these views. Overall, activities during operation of the BESSs would result in medium, long-term, unavoidable, local impacts on visual resources.

4.2.2.6 COMBINED IMPACTS OF COMPONENTS

The combined impacts of the different Project components would result in a landscape character dominated by large-scale energy infrastructure, including wind turbines, solar arrays, collector lines, access roads, multiple transmission lines and substations, the O&M facility, and the BESS. The existing setting does include a smaller wind farm and two existing transmission lines, but the scale of the Project and prominence of the proposed turbines would result in high, long-term impacts to the existing landscape.

Views from most residences and other KOP locations would primarily be impacted by the presence of the large, moving proposed wind turbines. The turbines would attract attention and depending on the extent of their viewshed modified by the turbines, could dominate views as described in Tables 4 and 5. In addition, some viewers, such as those associated with KOPs 3, 6, 12, 13, and 15 would have views of multiple Project components, introducing additional variety and visual clutter into these views as shown in the visual simulations (see Attachment B). Views from these locations would be dominated by energy infrastructure as a result of the additive effects from each Project component, resulting in high, long-term impacts on these views. Since these impacts occur on viewpoints beyond the neighboring receptors, these effects would be regional in extent. In summary, activities during operation of all components of the Project would result in high, long-term, unavoidable, regional impacts on visual resources.

In consideration of the CESA methods and the EFSEC process, the Project was assessed as it relates to compliance with state and local visual management requirements. The Project analysis contained in this report would meet WAC 463-60-362(3), which establishes the requirements for a visual resource analysis to meet the EFSEC process. Specifically, the analysis describes the aesthetic impacts of the proposed Project, shows its location relative to physical features of the site, and outlines procedures to restore or

enhance the landscape disturbed during construction (see Section 4.2.4 of this report for proposed mitigation measures, the Applicant's ASC including the Revegetation and Noxious Weed Management Plan and Initial Site Restoration Plan).

The Benton County Comprehensive Plan identified a planning goal to conserve the visually prominent naturally vegetated steep slopes and elevated ridges that define the Columbia Basin landscape, which are uniquely a product of ice age floods. The planning policy further states that the County should "consider the preservation of the ridges and hillside areas through various development regulations" (Benton County 2022). Since these lands have not been placed into Open Space Conservation, or other types of conservation, and there are no specific policies to protect the landscapes impacted by the Project, the Project would technically be in compliance with this aspect of the county plan. The Horse Heaven Hills and northern ridgeline would, however, become dominated by energy infrastructure, with potential long duration views from areas within the communities between Benton City and Kennewick. These impacts on views would be most intense where unobstructed views of a large number of turbines occur.

4.2.3 Impacts during Decommissioning

The decommissioning and removal of the Project and its components would have similar impacts as the construction process. The option to repower the Project with new models of wind turbines and solar arrays would also have impacts similar to the construction process but would not result in long-term decommissioning and reclamation of the site. Repowering of the facility is not analyzed further in this report.

The decommissioning process would result in increased motion associated with construction equipment, short-term impacts from dust generation, and landform modification to more closely match preconstruction conditions. The removal of Project components would likely require additional ground disturbance and vegetation clearing, resulting in reclamation efforts similar to those conducted after the construction process was completed. The restoration of vegetation in these areas would take a number of years to fully establish, but over time the landscape impacted by the Project would begin to more closely resemble preconstruction conditions.

4.2.3.1 TURBINE OPTION 1

Impacts would be similar to the construction of the Project including the movement of vehicles attracting attention during decommissioning activities. Viewers located within the foreground distance zone (0–0.5 mile) or in locations where views would be occupied by large portions of the Project being decommissioned, would result in increased visual contrast on these views. These impacts would be short in duration and would cease after removal of the Project is complete and vegetation has been reestablished. Decommissioning activities for Turbine Option 1 would result in medium, short-term, probable, local impacts on visual resources.

4.2.3.2 TURBINE OPTION 2

Impacts would be similar to Turbine Option 1 except there are fewer proposed wind turbines, requiring fewer roads and other supporting facilities to be removed. This would result in slightly reduced visual contrast and modifications to the existing landscape introduced during Project decommissioning. Decommissioning activities for Turbine Option 2 would result in medium, short-term, probable, local impacts on visual resources.

4.2.3.3 SOLAR ARRAYS

Impacts would be similar to the construction of the Project, which would be focused within the selected solar siting areas. Within the fenced boundaries, all lands would be restored to more closely match preconstruction conditions, including revegetation of the site. Decommissioning activities for the solar arrays would result in low, short-term, probable, local impacts on visual resources.

4.2.3.4 SUBSTATIONS

Impacts would be similar to the construction of the Project for both the proposed substations and transmission lines. The removal of the tall, vertical structures associated with both components would result in additional motion from construction equipment, structure deconstruction, and conductor removal. As described for other components, vegetation restoration would occur in these disturbed areas, and the landscape would begin to more closely resemble preconstruction conditions. Decommissioning activities for the substations and transmission lines would result in low, short-term, probable, local impacts on visual resources.

4.2.3.5 BATTERY ENERGY STORAGE SYSTEMS

Impacts would be similar to the construction of the Project with the removal of the BESS containers and reclamation of those sites. This would include additional motion from construction equipment and associated dust during those activities. As described for other components, vegetation restoration would occur in these disturbed areas, and the landscape would begin to more closely resemble preconstruction conditions. Decommissioning activities for the BESSs would result in low, short-term, probable, local impacts on visual resources.

4.2.3.6 COMBINED IMPACTS OF COMPONENTS

During Project decommissioning, there would be short-term impacts from these activities, which would occupy a large portion of the landscape and include removal of wind turbines, solar arrays, the O&M facility, transmission lines, BESSs, and substations, as well as the reclamation of access roads, turbine pads, and other areas disturbed during construction and operation of the Project. These activities would include views of additional vehicular traffic as well as areas of exposed soil after the removal of vegetation and during earthwork activities, prior to site reclamation efforts. The removal of vegetation would be noticeable in the setting and contrast with the existing character; however, over time, as vegetation is re-established in the area, it would begin to repeat vegetation patterns common in the area.

Viewpoints and KOPs located within the foreground distance zone (0–0.5 mile) would be most impacted by decommissioning, particularly where a large portion of their viewshed would be occupied by decommissioning multiple Project components simultaneously. Overall, activities during decommissioning of all components of the Project would result in medium, short-term, probable, regional impacts on visual resources.

4.2.4 Mitigation Measures

4.2.4.1 APPLICANT COMMITTED

To reduce impacts on landscape character and views and to strive to minimize any incompatibility with state and local visual management requirements, the Applicant has developed a series of BMPs and other mitigation measures as part of the Project ASC. Many of these BMPs, as well as the design of the Project, incorporated mitigation measures outlined in the BLM's *Best Management Practices for Reducing Visual*

Impacts of Renewable Energy Facilities on BLM-Administered Lands (BLM 2013) and CESA's visual impact assessment process (CESA 2011), including (but not limited to)

- Considering topography when siting wind turbines including less rigid turbine configurations in rolling terrain responding to local topography;
- Clustering or grouping turbines to break up long lines of turbines;
- Striving to create visual order and unity among turbine clusters;
- Maintaining operational turbines and other Project components;
- Preparing an effective decommissioning plan; and
- Selecting appropriate paint and finish selection to match the existing setting.

The Project also considered two different turbine options as part of the assessment of impacts to compare one design with more, smaller turbines (Option 1) to a design with fewer, taller turbines (Option 2). Due to the siting and operating requirements for wind turbines, there are limited mitigation measures that would considerably reduce impacts on visual resources, beyond downsizing the Project to reduce the number of turbines in view. The use of the following Applicant-committed mitigation in the Project design, construction, operation, and decommissioning stages would both directly and indirectly reduce impacts on visual resources:

- Active dust suppression will be implemented during construction.
- Following completion of construction, temporarily disturbed areas (e.g., laydown yards, crane paths not used as Project access roads) will be returned to their previous conditions once construction is complete.
- Restoration of the laydown yards will involve preconstruction stripping and storing topsoil (including weed avoidance), removing the gravel surface, regrading to preconstruction contours, restoring topsoil and de-compacting subsoils as needed, and reseeding with approved seed mixes.
- Following completion of construction, the temporary crane paths will be removed and the area restored in accordance with the Project's Revegetation and Noxious Weed Management Plan.
- The Applicant will provide a clean-looking facility free of debris and unused or broken-down equipment by storing equipment and supplies in designated areas within the O&M facilities and promptly removing damaged or unusable equipment from the site.
- The turbines and solar arrays will be uniform in design to present a trim, uncluttered, aesthetically attractive appearance.
- The Applicant will construct support facilities with non-reflective materials in muted tones and will use white or light gray, non-reflective paint to minimize the need for daytime aviation lighting and eliminate glare from the turbines.
- After construction is completed, vegetated areas that are temporarily disturbed or removed during construction of the Project would be restored to pre-disturbance conditions as reasonably possible, in accordance with the Revegetation and Noxious Weed Management Plan.

4.2.4.2 RECOMMENDED MITIGATION MEASURES

To further reduce impacts on visual resources, this report includes additional recommended mitigation measures adapted from the BLM (2013) and CESA (2011).

- **Wind turbines**

  - Relocate turbines located within the foreground distance zone (0–0.5 mile) of residences (BLM 2013; CESA 2011).
  - No piggyback advertising, cell antennas, commercial messages, or symbols placed on proposed wind turbines (BLM 2013).
  - Maintain clean nacelles and towers to avoid any spilled or leaking fluids accumulating dirt, contrasting with the clean, white/gray wind turbine (BLM 2013).
- **Solar arrays**
  - Avoid complete removal of vegetation beneath solar arrays, where possible, to reduce contrast between the exposed soil and adjacent undisturbed areas (BLM 2013).
  - Install opaque fencing to directly screen views of the solar arrays where sited within 0.5 mile of KOPs (including the alignment of I-82) or residences. To allow the proposed fencing to blend into the setting, color-treat the fencing to minimize color contrast with the existing landscape (BLM 2013).
- **Substation and transmission lines**
  - Maximize the span length across highways, and other linear viewing locations, to reduce visual contrast at the highway crossings, moving the structures as far from the road as possible (BLM 2013).
  - Choose the type of proposed transmission structure (H-frame or monopole) to best match the adjacent transmission lines, minimizing clutter and visual contrast introduced into the landscape (BLM 2013).

Application of these mitigation measures would incrementally lessen visual contrast but based on the scale of the Project, including the height of the proposed wind turbines, these measured would not effectively reduce identified levels of contrast or degrees of impact magnitude.

4.3 Impacts of No Action Alternative

Under the No Action Alternative, impacts related to visual resources from the construction, operation, and decommissioning of the Proposed Action would not occur. Although the Proposed Action would not occur, other renewable energy projects may be constructed within the visual area of analysis. These projects could lead to development of a wind and/or solar facility within the Project's Lease Boundary, which could result in impacts similar to those described herein for construction, operation, and decommissioning of the Proposed Action. However, for the purpose of this analysis, it is assumed that no future development would occur within the Lease Boundary, and therefore, impacts on visual resources would not occur.

5 LITERATURE CITED

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ATTACHMENT A

Maps

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Horse Heaven Wind Farm

SCOUT CLEAN ENERGY

Figure 1
Turbine Layout Option 1

BENTON COUNTY, WA

HH-West Intermediate Substation (Alternate)

HH-West Step-up Substation 500-kV (Alternate)

HH-West Intermediate Substation (Primary)

BPA Webber Canyon Substation (Alternate)

BPA Webber Canyon Substation (Primary)

HH-West Step-up Substation 500-kV (Primary)

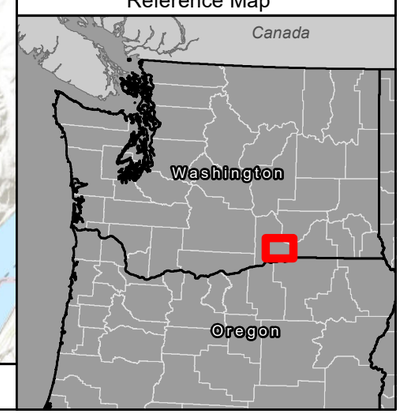
BPA Bofer Canyon Substation

HH-East Substation

- Project Lease Boundary
- Option 1 Turbine Layout
- Sellards Road 230-kV Transmission Line (Primary)
- Sellards Road 500-kV Transmission Line Step-up (Primary)
- Sellards Road 230-kV Transmission Line (Alternate)
- Solar Intertie 230-kV Transmission Line
- County Well Road 230-kV Transmission Line (Primary)
- County Well Road 500-kV Transmission Line Step-up (Primary)
- County Well Road 230-kV Transmission Line (Alternate)
- 230-kV Intertie Transmission Line (Primary)
- 230-kV Intertie Transmission Line (Alternate)
- 230-kV Alternate Intertie Transmission Line
- Project Substation (Primary)
- Project Substation (Alternate)
- Solar Siting Area
- Solar Array
- BPA Substation (Primary)
- BPA Substation (Alternate)

TETRA TECH

Reference Map



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NOT FOR CONSTRUCTION

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Horse Heaven Wind Farm

SCOUT CLEAN ENERGY

Figure 2
Turbine Layout Option 2

BENTON COUNTY, WA

HH-West Intermediate Substation (Alternate)

HH-West Step-up Substation 500-kV (Alternate)

HH-West Intermediate Substation (Primary)

BPA Webber Canyon Substation (Alternate)

BPA Webber Canyon Substation (Primary)

HH-West Step-up Substation 500-kV (Primary)

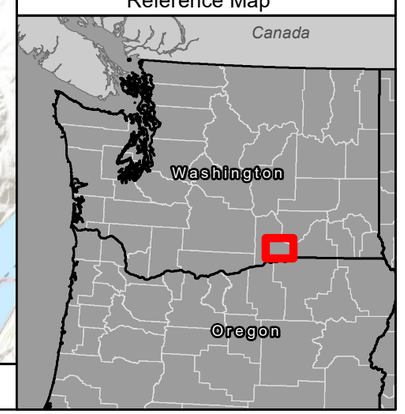
BPA Bofer Canyon Substation

HH-East Substation

- Project Lease Boundary
- Option 2 Turbine Layout
- Sellards Road 230-kV Transmission Line (Primary)
- Sellards Road 500-kV Transmission Line Step-up (Primary)
- Sellards Road 230-kV Transmission Line (Alternate)
- Solar Intertie 230-kV Transmission Line
- County Well Road 230-kV Transmission Line (Primary)
- County Well Road 500-kV Transmission Line Step-up (Primary)
- County Well Road 230-kV Transmission Line (Alternate)
- 230-kV Intertie Transmission Line (Primary)
- 230-kV Intertie Transmission Line (Alternate)
- 230-kV Alternate Intertie Transmission Line
- Project Substation (Primary)
- Project Substation (Alternate)
- Solar Siting Area
- Solar Array
- BPA Substation (Primary)
- BPA Substation (Alternate)

TETRA TECH

Reference Map



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0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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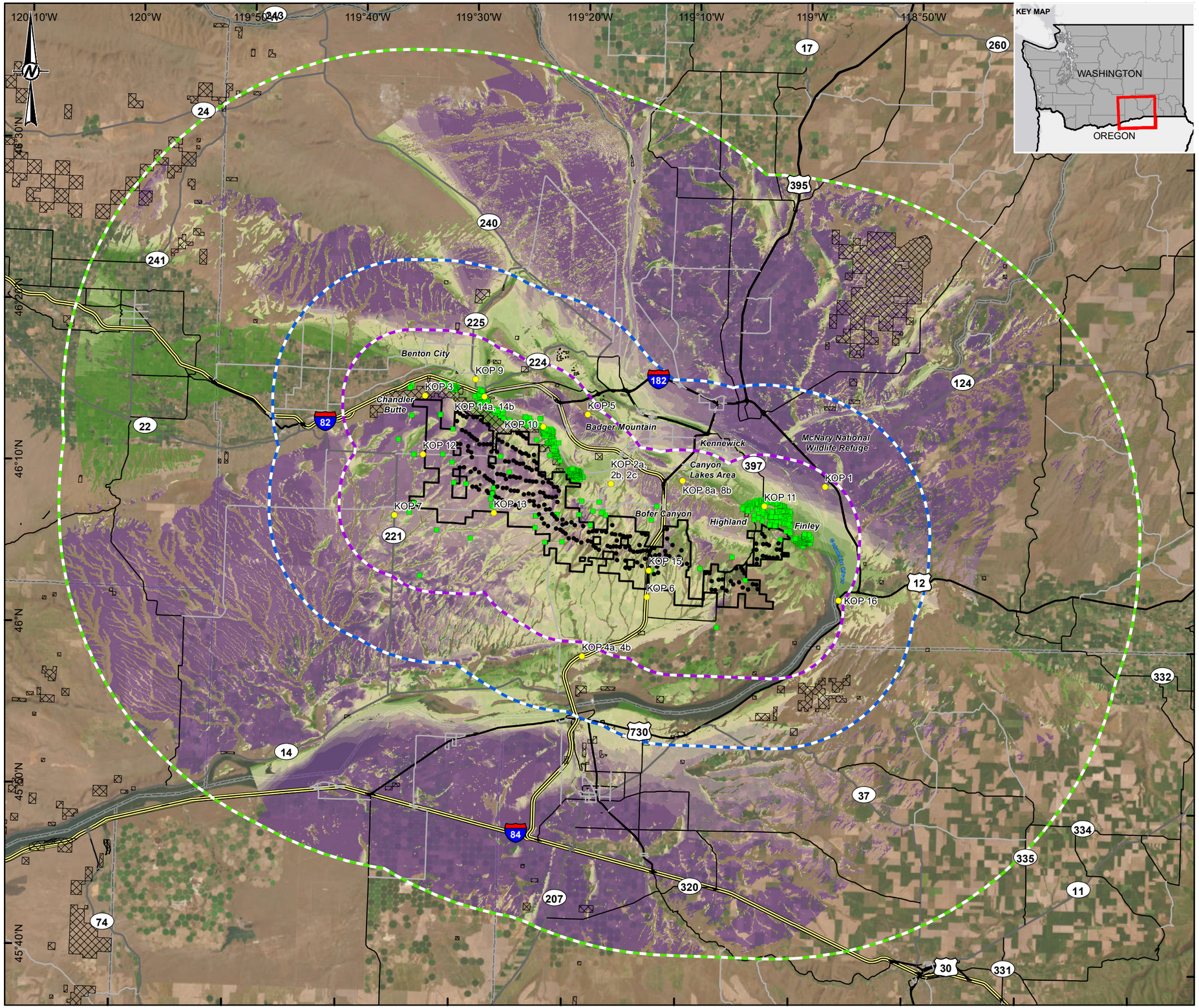

LEGEND

- Proposed Turbine Location (244 Turbines modeled at 499' blade-tip height)
- Viewpoint Location
- Existing Residence
- Project Lease Boundary
- 10 mile Buffer
- 5 mile Buffer
- 25 mile Buffer
- BLM Land

Number of Turbines Potentially Visible

- 0
- 1 - 10
- 11 - 25
- 26 - 50
- 51 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- > 200

0 5 10
MILES

NOTE(S)
1.

REFERENCE(S)
1. PROJECT FEATURES PROVIDED BY EFSEC, NOV 2021
2. SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
State of Washington Energy Facility Site Evaluation Council

PROJECT
Horse Heaven Wind Farm

TITLE
Viewshed Analysis Results: Turbine Layout Option 1

CONSULTANT		
	YYYY-MM-DD	2023-07-07
	DESIGNED	HJ
	PREPARED	HJ
	REVIEWED	KW
	APPROVED	####

PROJECT NO.	CONTROL	REV.	FIGURE
20450841	2000	1	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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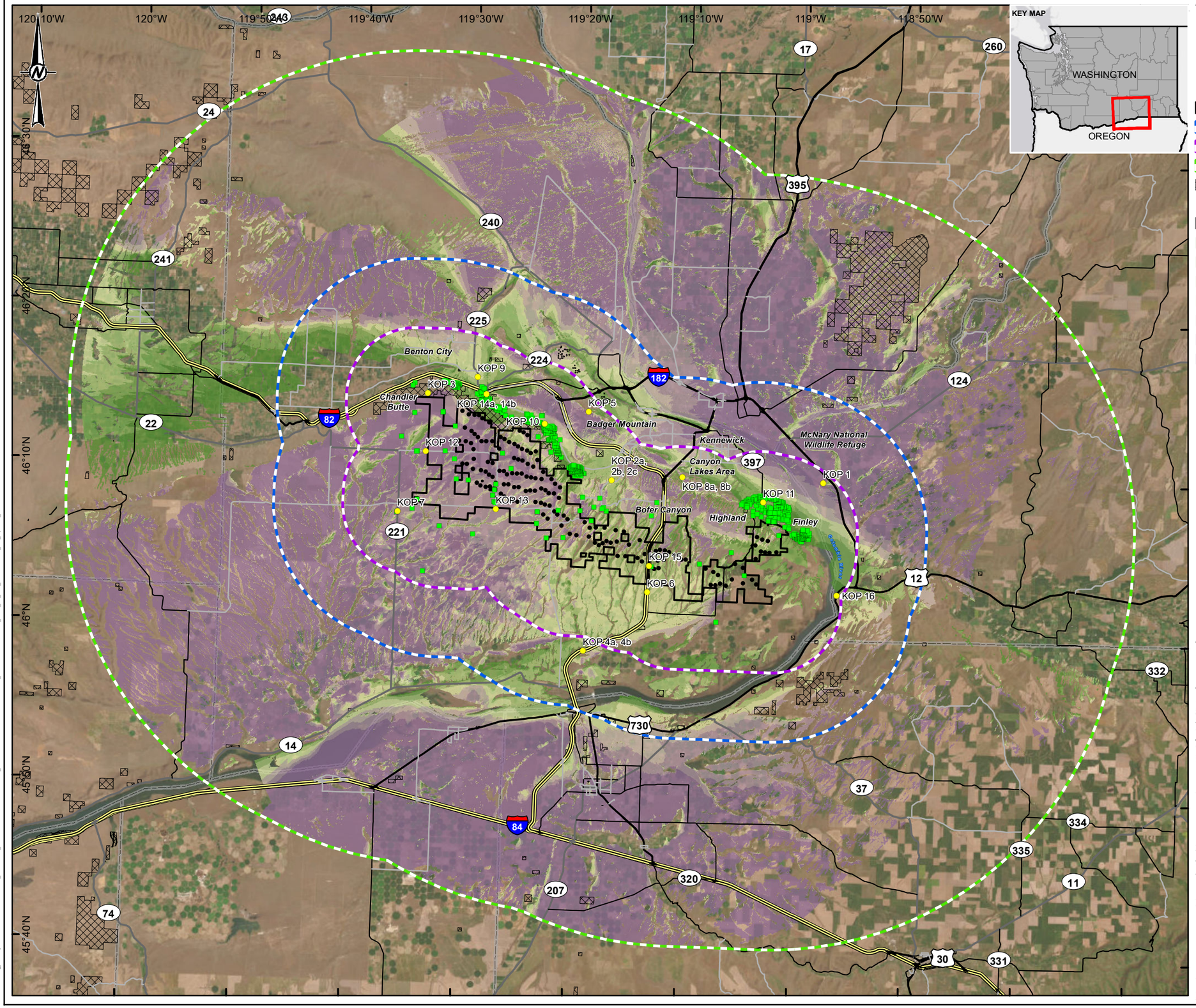

LEGEND

- Proposed Turbine Location (150 Turbines modeled at 671' blade-tip height)
- Viewpoint Location
- Existing Residence
- Project Lease Boundary
- 10 mile Buffer
- 5 mile Buffer
- 25 mile Buffer
- BLM Land

Number of Turbines Potentially Visible

- 0
- 1 - 10
- 11 - 25
- 26 - 50
- 50 - 75
- 76 - 100
- 101 - 125
- 126 - 150

0 5 10
MILES

NOTE(S)
1.

REFERENCE(S)
1. PROJECT FEATURES PROVIDED BY EFSEC, NOV 2021
2. SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
State of Washington Energy Facility Site Evaluation Council

PROJECT
Horse Heaven Wind Farm

TITLE
Viewshed Analysis Results: Turbine Layout Option 2

CONSULTANT

YYYY-MM-DD	2023-07-07
DESIGNED	HJ
PREPARED	HJ
REVIEWED	KW
APPROVED	####

PROJECT NO.	CONTROL	REV.	FIGURE
20450841	2000	1	4

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Horse Heaven Wind Farm

SCOUT CLEAN ENERGY

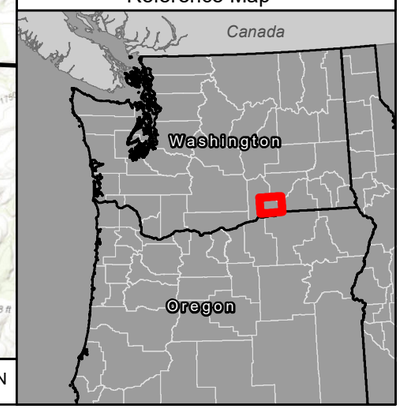
Figure 5
Viewshed Analysis Results: Western Solar Array (County Well Road)

BENTON COUNTY, WA

- Visual Receptor
- Solar Array Fence Line
- Project Lease Boundary
- Solar Array 5-mile Buffer
- Potentially Visible
- Not Visible

TETRA TECH

Reference Map



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0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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Horse Heaven Wind Farm

SCOUT CLEAN ENERGY

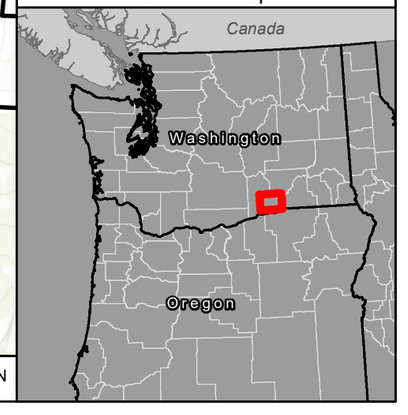
Figure 6
Viewshed Analysis Results: Western Solar Array (Sellards Road)

BENTON COUNTY, WA

- Visual Receptor
- Solar Array Fence Line
- Project Lease Boundary
- Solar Array 5-mile Buffer
- Potentially Visible
- Not Visible

TETRA TECH

Reference Map



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0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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Horse Heaven Wind Farm

SCOUT CLEAN ENERGY

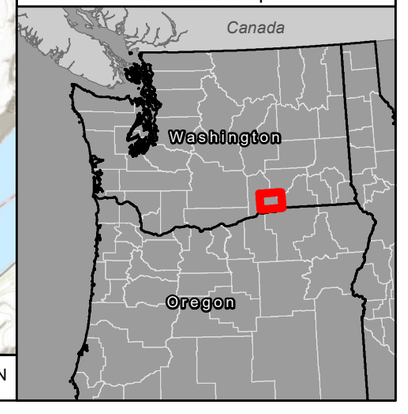
Figure 7
Viewshed Analysis Results: Eastern Solar Array (Bofer Canyon)

BENTON COUNTY, WA

- Visual Receptor
- Solar Array Fence Line
- Project Lease Boundary
- Solar Array 5-mile Buffer
- Potentially Visible
- Not Visible

TETRA TECH

Reference Map



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0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION

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Horse Heaven Wind Farm

SCOUT CLEAN ENERGY

Figure 8
Viewshed Analysis Results: Proposed Transmission Lines

BENTON COUNTY, WA

- Proposed Transmission Line
- Visual Receptor
- Project Lease Boundary
- 5-mile Buffer
- 10-mile Buffer
- Potentially Visible
- Not Visible

TETRA TECH

Reference Map

1:250,000 WGS 1984 UTM Zone 11N

0 2 4 8 12 16 Miles

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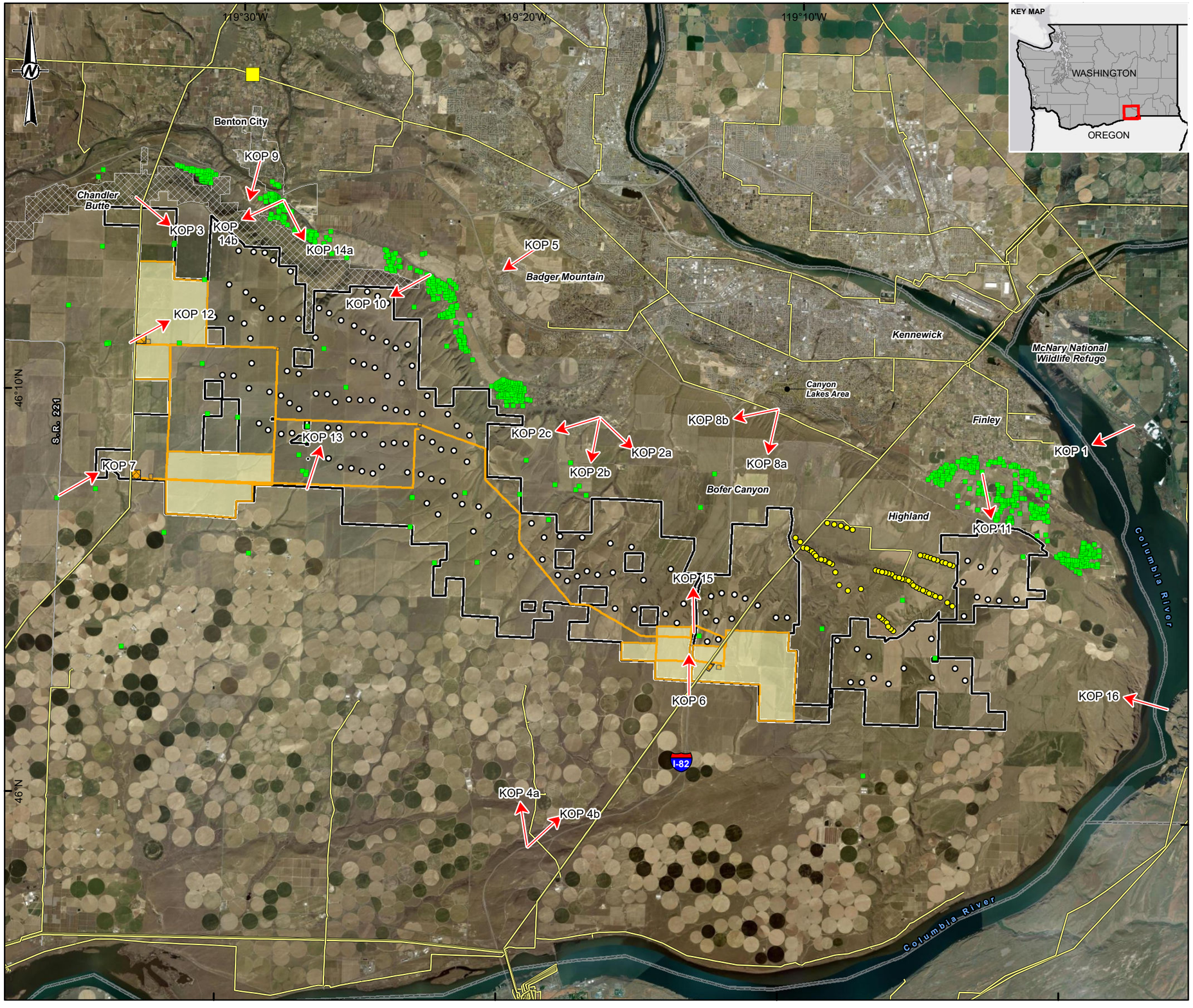

LEGEND

- Option 1 Turbine Location
- Key Observation Point (KOP) # Location
- Existing Residence
- Project Lease Boundary
- Proposed Substation
- Proposed Transmission Lines
- Solar Siting Area
- Horse Heaven Hills Recreation Area (BLM)
- Existing Turbine
- Existing Substation
- Existing Transmission Line
- State Road

0 2 4
MILES

REFERENCE(S)

1. PROJECT FEATURES PROVIDED BY EFSEC, NOV 2021
2. SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
State of Washington Energy Facility Site Evaluation Council

PROJECT
Horse Heaven Wind Farm

TITLE
Representative Viewpoint Locations

YYYY-MM-DD	2023-07-13
DESIGNED	HJ
PREPARED	HJ
REVIEWED	KW
APPROVED	JP

PROJECT NO.	CONTROL	REV.	FIGURE
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ATTACHMENT B

Visual Simulations

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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 1
Representative Viewpoint 1

Existing Conditions and Project Simulations

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	244
Horizontal field of view (deg):	75
Vertical field of view (deg):	20
Max. WTGs within field of view:	244 / 150
Max. Visible WTGs at tip height:	199 / 137
Max. Visible WTGs at hub height:	148 / 107
Closest WTG (mi):	5.2 / 5.8
Furthest WTG (mi):	26.8 / 26.5
Closest Solar Array (mi):	No view
Closest Transmission Line (mi):	No view
Closest Substation / BESS (mi):	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

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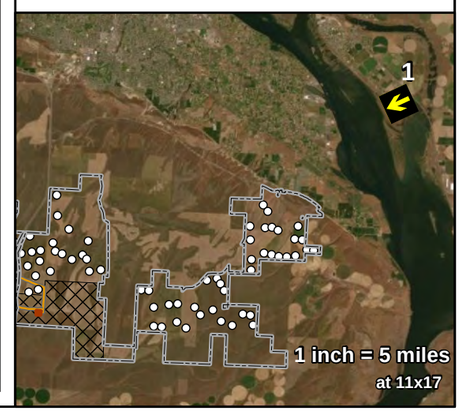

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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 2
Representative Viewpoint 2a

Existing Conditions and Project Simulations

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	132
Horizontal field of view (deg):	57
Vertical field of view (deg):	15
Max. WTGs within field of view:	75 / 38
Max. Visible WTGs at tip height:	56 / 29
Max. Visible WTGs at hub height:	50 / 24
Closest WTG (mi):	3.9 / 4.8
Furthest WTG (mi):	13.4 / 13
Closest Solar Array (mi):	No view
Closest Transmission Line (mi):	No view
Closest Substation / BESS (mi):	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

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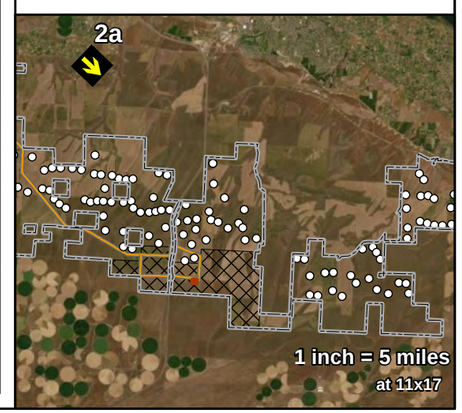

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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 3
Representative Viewpoint 2b

Existing Conditions and Project Simulations

BENTON COUNTY, WA

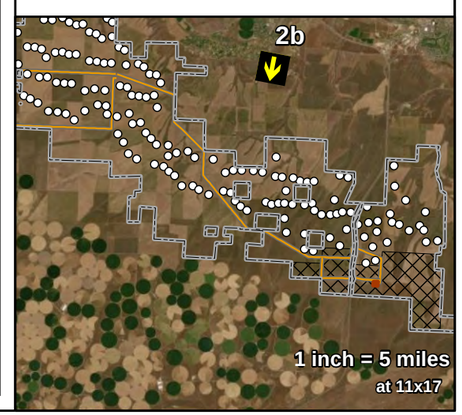
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	189
Horizontal field of view (deg):.....	57
Vertical field of view (deg):.....	15
Max. WTGs within field of view:...	37 / 19
Max. Visible WTGs at tip height:..	36 / 19
Max. Visible WTGs at hub height:	30 / 17
Closest WTG (mi):.....	3 / 3.5
Furthest WTG (mi):.....	6.2 / 5.9
Closest Solar Array (mi):.....	No view
Closest Transmission Line (mi):.....	No view
Closest Substation / BESS (mi):..	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 4
Representative Viewpoint 2c

Existing Conditions and Project Simulations

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	251
Horizontal field of view (deg):.....	56
Vertical field of view (deg):.....	15
Max. WTGs within field of view:...	85 / 60
Max. Visible WTGs at tip height:..	46 / 39
Max. Visible WTGs at hub height:	24 / 21
Closest WTG (mi):.....	3.7 / 3.7
Furthest WTG (mi):.....	10.8 / 10.8
Closest Solar Array (mi):.....	No view
Closest Transmission Line (mi):.....	3.4
Closest Substation / BESS (mi):..	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

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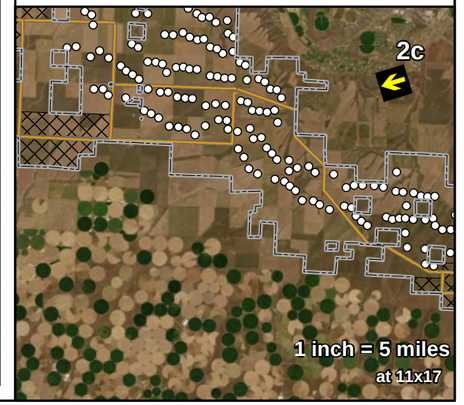


Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 5-1a
Representative Viewpoint 3

Existing Conditions - Revised*

BENTON COUNTY, WA

As Taken (April 2022)

Sky Replacement and De-hazing

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

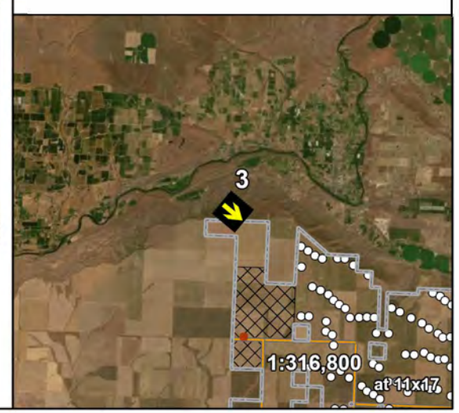
View direction (deg): 128
Horizontal field of view (deg):..... 56
Vertical field of view (deg):..... 15

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 5-1b
Representative Viewpoint 3

Existing Conditions and Project Simulations - Revised*

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

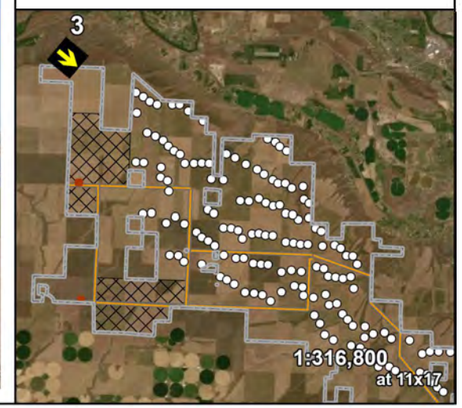
View direction (deg):	128
Horizontal field of view (deg):	56
Vertical field of view (deg):	15
Max. WTGs within field of view:	244 / 150
Max. Visible WTGs at tip height:	239 / 150
Max. Visible WTGs at hub height:	219 / 139
Closest WTG (mi):	2.5 / 2.8
Furthest WTG (mi):	28.1 / 27.6
Closest Solar Array (mi):	2.1
Closest Transmission Line (mi):	4.2
Closest Substation / BESS (mi):	Not in frame

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 6
Representative Viewpoint 4a

Existing Conditions and Project Simulations

BENTON COUNTY, WA

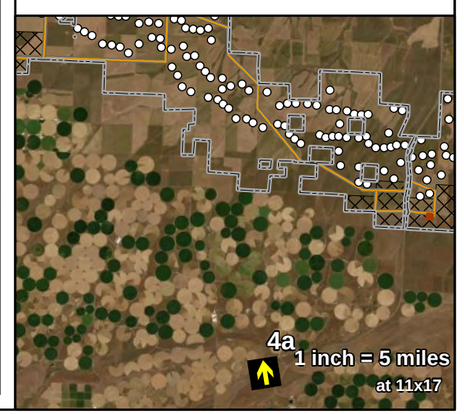
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	350
Horizontal field of view (deg):	57
Vertical field of view (deg):	15
Max. WTGs within field of view:	163 / 110
Max. Visible WTGs at tip height:	51 / 40
Max. Visible WTGs at hub height:	34 / 26
Closest WTG (mi):	7.3 / 7.3
Furthest WTG (mi):	19.6 / 19.4
Closest Solar Array (mi):	Not in frame
Closest Transmission Line (mi):	6.5
Closest Substation / BESS (mi):	Not in frame

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 7
Representative Viewpoint 4b

Existing Conditions and Project Simulations

BENTON COUNTY, WA

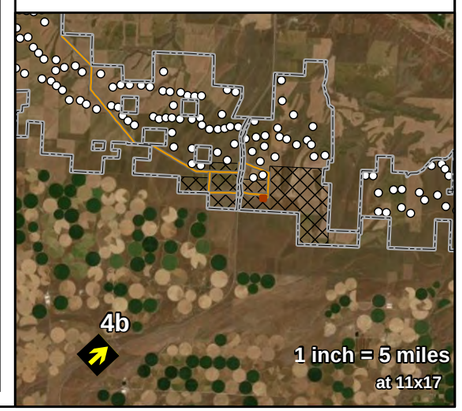
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	46
Horizontal field of view (deg):	57
Vertical field of view (deg):	15
Max. WTGs within field of view:	85 / 42
Max. Visible WTGs at tip height:	66 / 37
Max. Visible WTGs at hub height:	58 / 33
Closest WTG (mi):	7 / 7.3
Furthest WTG (mi):	16.2 / 15.6
Closest Solar Array (mi):	6.0
Closest Transmission Line (mi):	6.5
Closest Substation / BESS (mi):	7.3

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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As Taken (April 2022)

Sky Replacement and De-hazing

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 8-1a
Representative Viewpoint 5

Existing Conditions - Revised*

BENTON COUNTY, WA

Viewpoint Location and Photo Direction
Project Lease Boundary
Proposed Turbine Location
Proposed Transmission Line

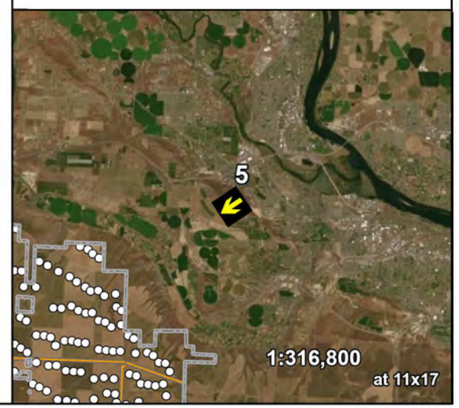
View direction (deg): 236
Horizontal field of view (deg):..... 58
Vertical field of view (deg):..... 15

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 8-1b
Representative Viewpoint 5

Existing Conditions and Project Simulations - Revised*

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Transmission Line
- Solar Siting Area

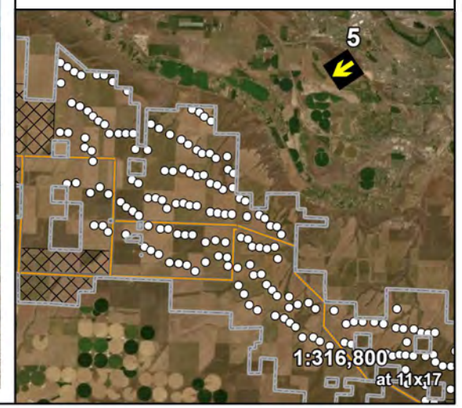
View direction (deg):	236
Horizontal field of view (deg):	58
Vertical field of view (deg):	15
Max. WTGs within field of view:	101 / 76
Max. Visible WTGs at tip height:	101 / 76
Max. Visible WTGs at hub height:	101 / 76
Closest WTG (mi):	4.7 / 4.7
Furthest WTG (mi):	9.9 / 9.8
Closest Solar Array (mi):	No view
Closest Transmission Line (mi):	No view
Closest Substation / BESS (mi):	No view

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Horse Heaven Wind Project

Figure 9-1a
Representative Viewpoint 6

Existing Conditions - Revised*

BENTON COUNTY, WA

As Taken (April 2022)

Sky Replacement and De-hazing

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

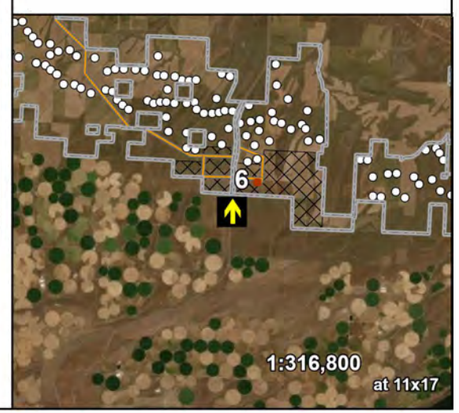
View direction (deg): 360
Horizontal field of view (deg):..... 60
Vertical field of view (deg):..... 15

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 9-1b
Representative Viewpoint 6

Existing Conditions and Project Simulations - Revised*

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

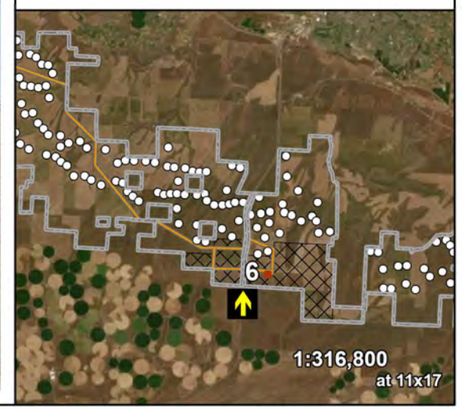
View direction (deg):	360
Horizontal field of view (deg):	60
Vertical field of view (deg):	15
Max. WTGs within field of view:	41 / 17
Max. Visible WTGs at tip height:	37 / 17
Max. Visible WTGs at hub height:	29 / 17
Closest WTG (mi):	1.7 / 1.8
Furthest WTG (mi):	5.7 / 5
Closest Solar Array (mi):	0.6
Closest Transmission Line (mi):	1.2
Closest Substation / BESS (mi):	Not in frame

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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As Taken (April 2022)

Sky Replacement and De-hazing

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 10-1a
Representative Viewpoint 7

Existing Conditions - Revised*

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg): 60
Horizontal field of view (deg):..... 58
Vertical field of view (deg):..... 15

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 10-1b
Representative Viewpoint 7

Existing Conditions and Project Simulations - Revised*

BENTON COUNTY, WA

- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	60
Horizontal field of view (deg):	58
Vertical field of view (deg):	15
Max. WTGs within field of view:	122 / 90
Max. Visible WTGs at tip height:	118 / 87
Max. Visible WTGs at hub height:	110 / 85
Closest WTG (mi):	5.8 / 5.8
Furthest WTG (mi):	11.9 / 11.8
Closest Solar Array (mi):	3.1
Closest Transmission Line (mi):	2.2
Closest Substation / BESS (mi):	No view

* Original photos and simulations submitted in 2021

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

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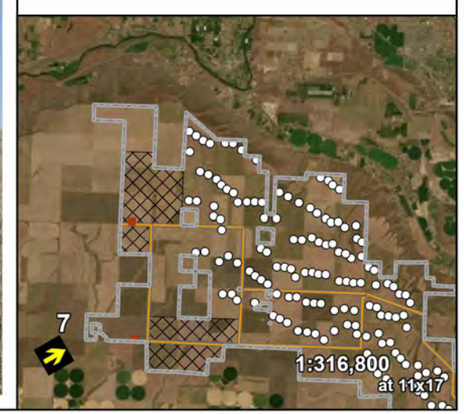

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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 11
Representative Viewpoint 8a

Existing Conditions and Project Simulations

BENTON COUNTY, WA

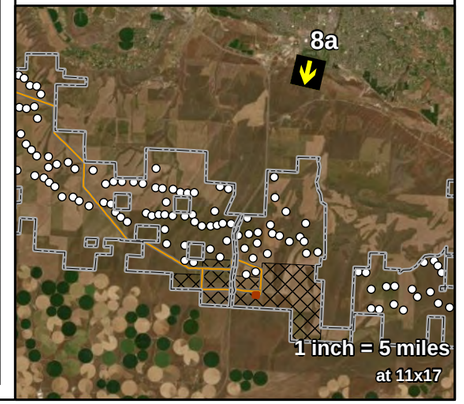
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	193
Horizontal field of view (deg):.....	57
Vertical field of view (deg):.....	15
Max. WTGs within field of view:...	43 / 20
Max. Visible WTGs at tip height:..	40 / 19
Max. Visible WTGs at hub height:	37 / 15
Closest WTG (mi):.....	3.6 / 5.4
Furthest WTG (mi):.....	7.4 / 7.3
Closest Solar Array (mi):.....	No view
Closest Transmission Line (mi):.....	No view
Closest Substation / BESS (mi):..	No view

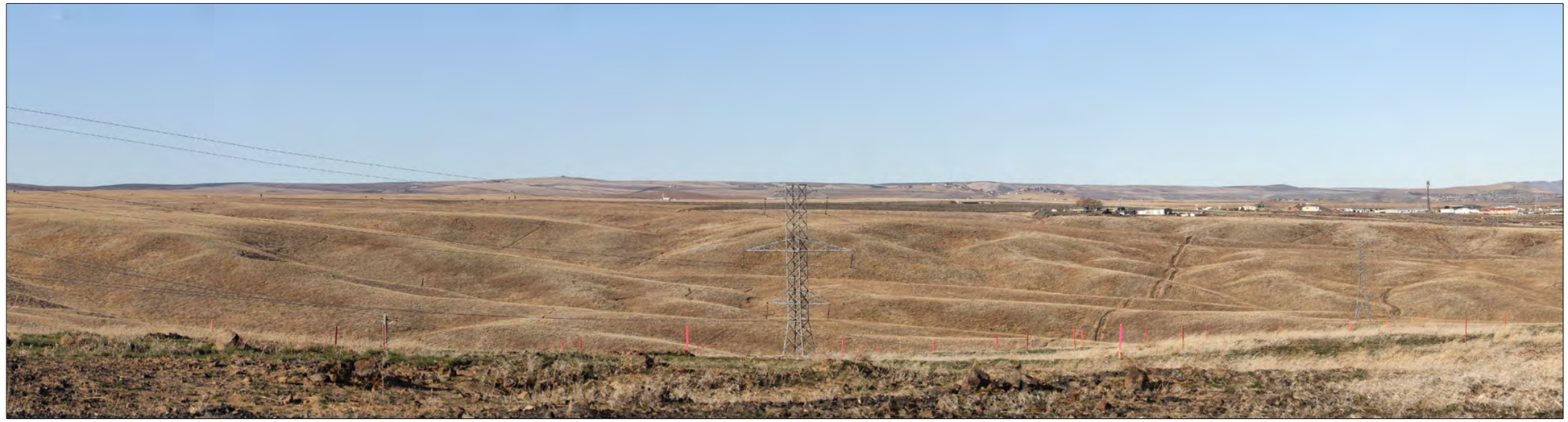
To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

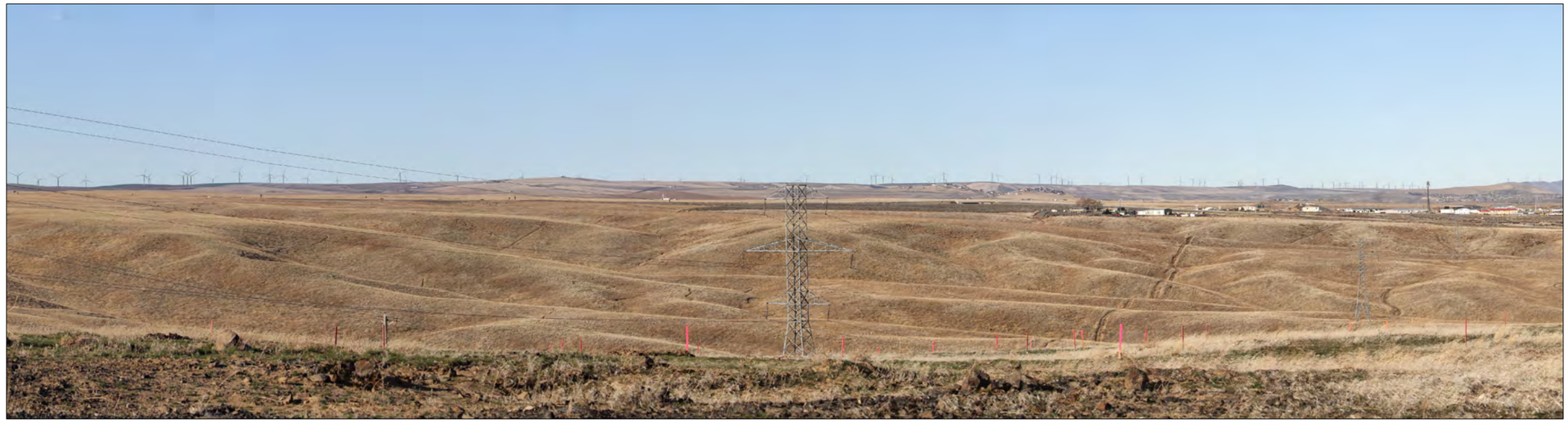
TETRA TECH



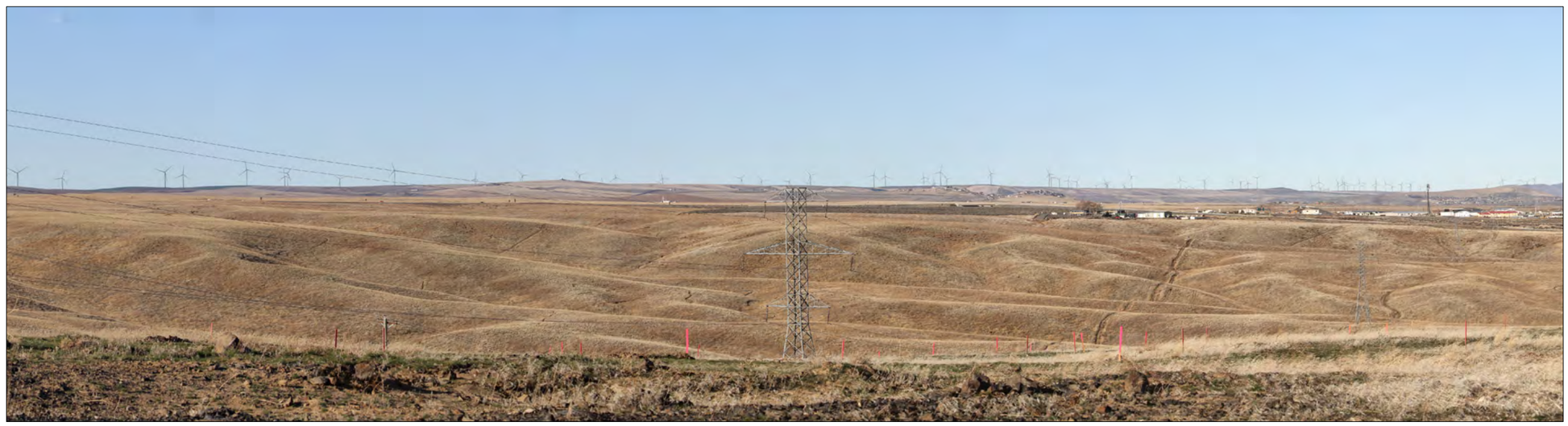
Existing Conditions



Project Simulation Option 1
244 WTG



Project Simulation Option 2
150 WTG



Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 12
Representative Viewpoint 8b

Existing Conditions and Project Simulations

BENTON COUNTY, WA

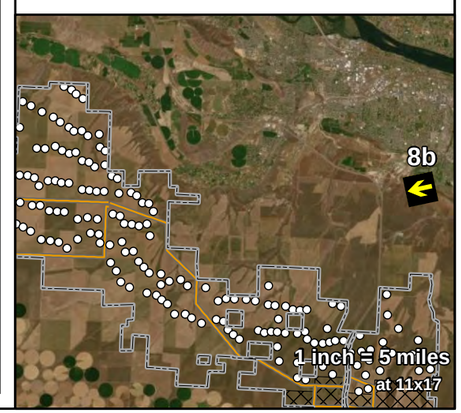
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	258
Horizontal field of view (deg):	57
Vertical field of view (deg):	15
Max. WTGs within field of view:	153 / 105
Max. Visible WTGs at tip height:	137 / 101
Max. Visible WTGs at hub height:	102 / 83
Closest WTG (mi):	5.9 / 6.1
Furthest WTG (mi):	16.8 / 16.6
Closest Solar Array (mi):	No view
Closest Transmission Line (mi):	No view
Closest Substation / BESS (mi):	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 8 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 8 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 13
Representative Viewpoint 9

Existing Conditions and Project Simulations

BENTON COUNTY, WA

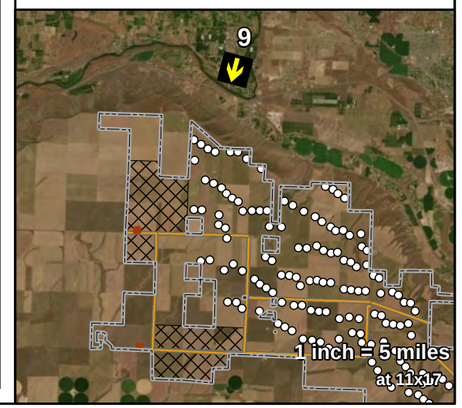
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	195
Horizontal field of view (deg):	73
Vertical field of view (deg):	19
Max. WTGs within field of view:	61 / 47
Max. Visible WTGs at tip height:	5 / 5
Max. Visible WTGs at hub height:	4 / 4
Closest WTG (mi):	2.7 / 2.7
Furthest WTG (mi):	9.7 / 9.6
Closest Solar Array (mi):	No view
Closest Transmission Line (mi):	No view
Closest Substation / BESS (mi):	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 14
Representative Viewpoint 10

Existing Conditions and Project Simulations

BENTON COUNTY, WA

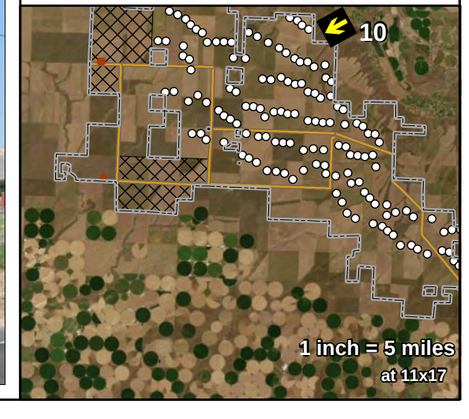
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	241
Horizontal field of view (deg):.....	76
Vertical field of view (deg):.....	20
Max. WTGs within field of view:...	79 / 59
Max. Visible WTGs at tip height:..	15 / 15
Max. Visible WTGs at hub height:	9 / 7
Closest WTG (mi):.....	1.5 / 1.5
Furthest WTG (mi):.....	6.6 / 6.6
Closest Solar Array (mi):.....	No view
Closest Transmission Line (mi):.....	No view
Closest Substation / BESS (mi):..	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 15
Representative Viewpoint 11

Existing Conditions and Project Simulations

BENTON COUNTY, WA

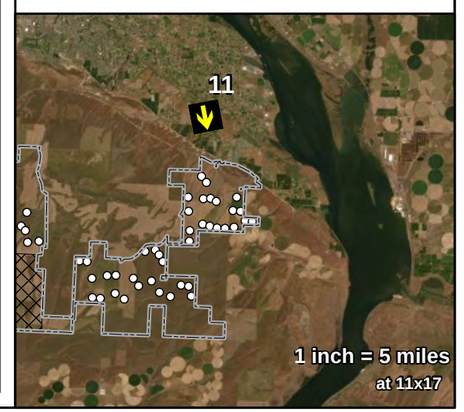
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Solar Siting Area

View direction (deg):	169
Horizontal field of view (deg):.....	73
Vertical field of view (deg):.....	19
Max. WTGs within field of view:...	33 / 47
Max. Visible WTGs at tip height:..	23 / 12
Max. Visible WTGs at hub height:	19 / 11
Closest WTG (mi):.....	2 / 2.5
Furthest WTG (mi):.....	6.6 / 6.6
Closest Solar Array (mi):.....	No view
Closest Transmission Line (mi):.....	No view
Closest Substation / BESS (mi):..	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 16
Representative Viewpoint 12

Existing Conditions and Project Simulations

BENTON COUNTY, WA

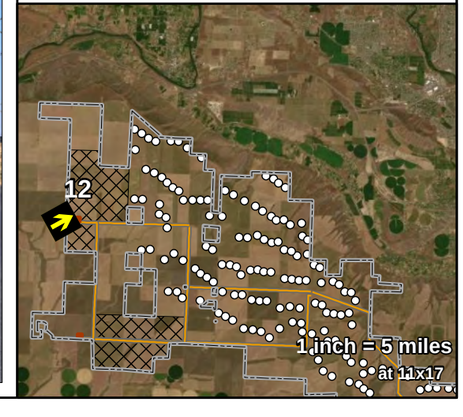
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	61
Horizontal field of view (deg):	73
Vertical field of view (deg):	19
Max. WTGs within field of view:	57 / 40
Max. Visible WTGs at tip height:	53 / 40
Max. Visible WTGs at hub height:	52 / 37
Closest WTG (mi):	2.5 / 2.5
Furthest WTG (mi):	8.7 / 8.6
Closest Solar Array (mi):	0.2
Closest Transmission Line (mi):	0.2
Closest Substation / BESS (mi):	0.5

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 17
Representative Viewpoint 13

Existing Conditions and Project Simulations

BENTON COUNTY, WA

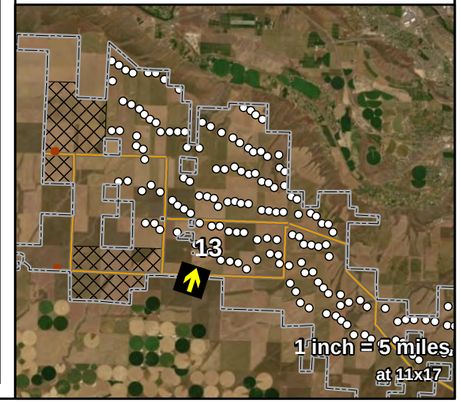
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	18
Horizontal field of view (deg):	73
Vertical field of view (deg):	19
Max. WTGs within field of view:	73 / 54
Max. Visible WTGs at tip height:	69 / 52
Max. Visible WTGs at hub height:	65 / 51
Closest WTG (mi):	1.1 / 1.1
Furthest WTG (mi):	7.3 / 7.1
Closest Solar Array (mi):	Not in frame
Closest Transmission Line (mi):	0.2
Closest Substation / BESS (mi):	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



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As Taken

Sky Replacement and De-hazing

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 18a
Representative Viewpoint 14a

Existing Conditions

BENTON COUNTY, WA

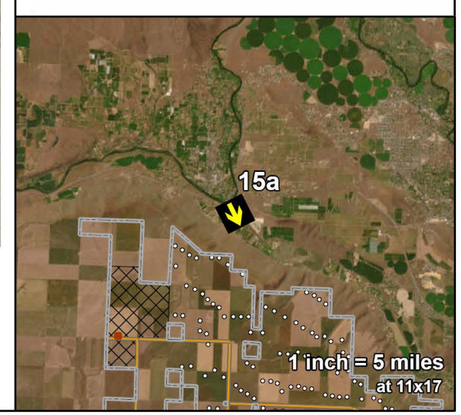
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	153
Horizontal field of view (deg):	93
Vertical field of view (deg):	24

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 18b
Representative Viewpoint 14a

Project Simulations

BENTON COUNTY, WA

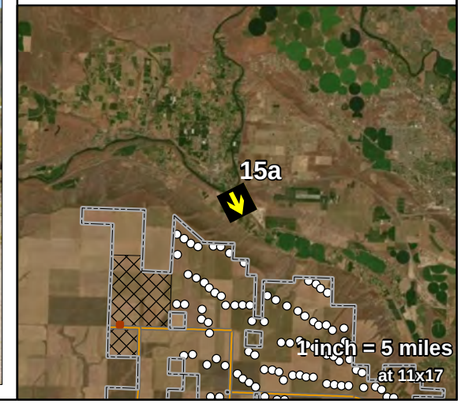
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	153
Horizontal field of view (deg):.....	93
Vertical field of view (deg):.....	24
Max. WTGs within field of view:...	234 / 144
Max. Visible WTGs at tip height:..	28 / 25
Max. Visible WTGs at hub height:	12 / 14
Closest WTG (mi):.....	1.7 / 1.7
Furthest WTG (mi):.....	8.6 / 8.6
Closest Solar Array (mi):.....	No view
Closest Transmission Line (mi):.....	No view
Closest Substation / BESS (mi):..	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 19a
Representative Viewpoint 14b

Existing Conditions

BENTON COUNTY, WA

As Taken

Sky Replacement and De-hazing

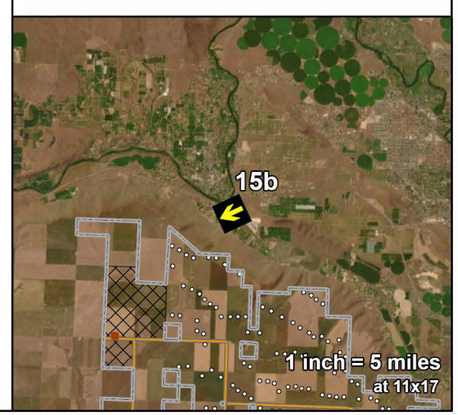
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg): 245
Horizontal field of view (deg):..... 93
Vertical field of view (deg):..... 24

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

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Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 19b
Representative Viewpoint 14b

Project Simulations

BENTON COUNTY, WA

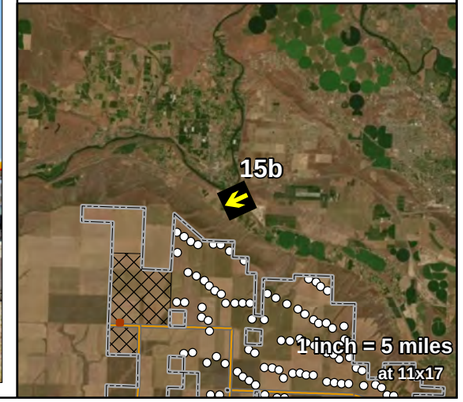
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	245
Horizontal field of view (deg):.....	93
Vertical field of view (deg):.....	24
Max. WTGs within field of view:...	12 / 8
Max. Visible WTGs at tip height:..	2 / 2
Max. Visible WTGs at hub height:	2 / 2
Closest WTG (mi):.....	1.7 / 1.7
Furthest WTG (mi):.....	1.7 / 1.8
Closest Solar Array (mi):.....	No view
Closest Transmission Line (mi):.....	No view
Closest Substation / BESS (mi):..	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG

Project Simulation Option 2
150 WTG

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 20
Representative Viewpoint 15

Existing Conditions and Project Simulations

BENTON COUNTY, WA

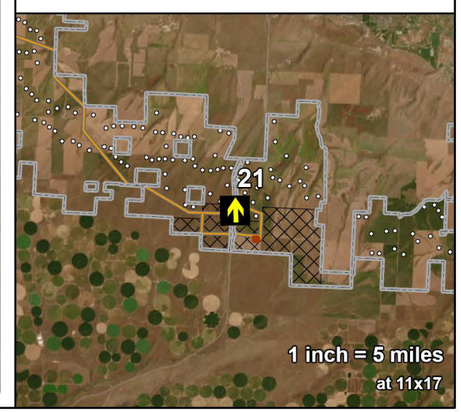
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Proposed Substation/BESS
- Proposed Transmission Line
- Solar Siting Area

View direction (deg):	359
Horizontal field of view (deg):	73
Vertical field of view (deg):	19
Max. WTGs within field of view:	18 / 6
Max. Visible WTGs at tip height:	11 / 6
Max. Visible WTGs at hub height:	10 / 5
Closest WTG (mi):	0.7 / 0.7
Furthest WTG (mi):	1.9 / 1.9
Closest Solar Array (mi):	No view
Closest Transmission Line (mi):	0.1
Closest Substation / BESS (mi):	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

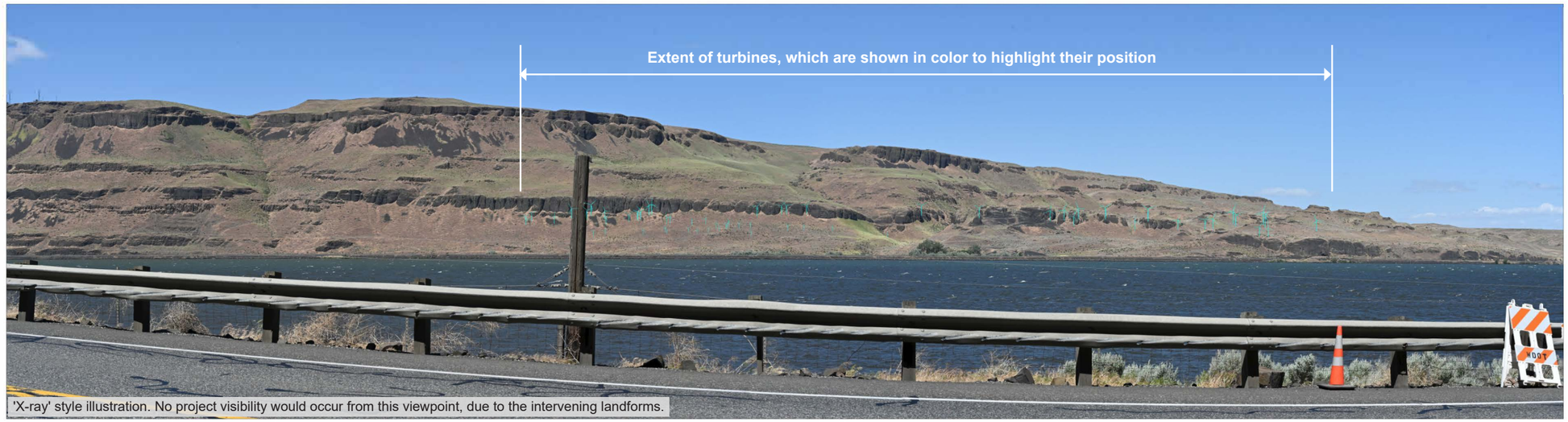
NOT FOR CONSTRUCTION

TETRA TECH



Existing Conditions

Project Simulation Option 1
244 WTG



'X-ray' style illustration. No project visibility would occur from this viewpoint, due to the intervening landforms.

Project Simulation Option 2
150 WTG

'X-ray' style illustration. No project visibility would occur from this viewpoint, due to the intervening landforms.

Horse Heaven Wind Project

SCOUT CLEAN ENERGY

Figure 21
Representative Viewpoint 16
Existing Conditions and Project Simulations

BENTON COUNTY, WA

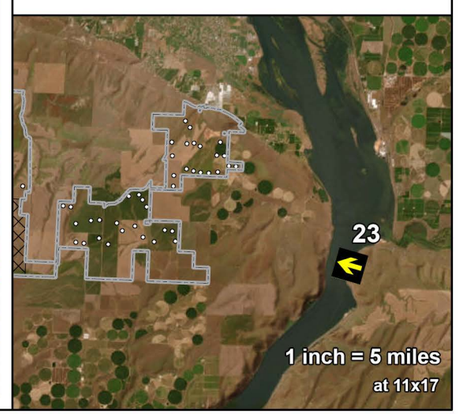
- Viewpoint Location and Photo Direction
- Project Lease Boundary
- Proposed Turbine Location
- Solar Siting Area

View direction (deg):	286
Horizontal field of view (deg):	73
Vertical field of view (deg):	20
Max. WTGs within field of view:	244 / 150
Max. Visible WTGs at tip height:	0 / 0
Max. Visible WTGs at hub height:	0 / 0
Closest WTG (mi):	No view
Furthest WTG (mi):	No view
Closest Solar Array (mi):	No view
Closest Transmission Line (mi):	No view
Closest Substation / BESS (mi):	No view

To approximate how the project will appear to a viewer in the natural setting, this sheet should be printed at 11 x 17 inches, full size with no scaling, and viewed at 6 inches from the eye. If viewed on a computer monitor, the document should be scaled at 100% and viewed at 6 inches from the eye.

NOT FOR CONSTRUCTION

TETRA TECH



APPENDIX 3.16-1

Horse Heaven Wind Farm's Proximity to other Environmental Stressors

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Proximity to other Environmental Stressors

Table 3.16-1A provides additional information regarding additional environmental justice indexes, including traffic proximity, superfund proximity, hazardous waste proximity, underground storage tanks counts, and wastewater discharge toxicity, for the census block groups that intersect with or are adjacent to the Lease Area in the Horse Heaven Wind Farm study area.

According to the U.S. Environmental Protection Agency Environmental Justice Screening and Mapping Tool (EJ Screen) data, the "Value" and "State Average" columns in **Table 3.16-1A** for each of these environmental stressors are defined as follows:

- Traffic proximity - Count of vehicles (annual daily traffic) at major roads within 500 meters, divided by distance in meters (not kilometers [km])
- Superfund proximity - Count of proposed superfund sites within 5 km (or nearest one beyond 5 km), each divided by distance in kilometers
- Hazardous waste proximity - Count of hazardous waste facilities within 5 km (or nearest beyond 5 km), each divided by distance in kilometers
- Underground storage tanks (USTs) - Count of leaking UST (multiplied by a factor of 7.7) and the number of USTs within a 1,500-foot buffered block group divided by the area of the combined census blocks in square kilometers
- Wastewater discharge – Risk Screening Environmental Indicators modeled toxic concentrations at stream segments within 500 meters, divided by distance in kilometers

Table 3.16-1A: Environmental Justice Indexes for the Census Block Groups that Intersect with or Located Adjacent to Project Lease Boundary

Environmental Stressors	Census Block Group	Value	State Average
Traffic Proximity (daily traffic count/meter distance to road)	Census Tract 108.07, Block Group 1	83	740
	Census Tract 108.14, Block Group 1	57	
	Census Tract 115.01, Block Group 1	2.3	
	Census Tract 115.06, Block Group 1	8.9	
	Census Tract 116, Block Group 1	3.4	
	Census Tract 118.01, Block Group 3	89	
Superfund Proximity (site count/km distance)	Census Tract 108.07, Block Group 1	0.061	0.18
	Census Tract 108.14, Block Group 1	0.048	
	Census Tract 115.01, Block Group 1	0.078	
	Census Tract 115.06, Block Group	0.077	
	Census Tract 116, Block Group 1	0.055	
	Census Tract 118.01, Block Group 3	0.035	

Table 3.16-1A: Environmental Justice Indexes for the Census Block Groups that Intersect with or Located Adjacent to Project Lease Boundary

Environmental Stressors	Census Block Group	Value	State Average
Hazardous Waste Proximity (facility count/ km distance)	Census Tract 108.07, Block Group 1	0.26	2.2
	Census Tract 108.14, Block Group 1	0.13	
	Census Tract 115.01, Block Group 1	0.9	
	Census Tract 115.06, Block Group 1	0.28	
	Census Tract 116, Block Group 1	0.068	
	Census Tract 118.01, Block Group 3	0.082	
Underground Storage Tanks (USTs) (count/km^2)	Census Tract 108.07, Block Group 1	0.058	6.3
	Census Tract 108.14, Block Group 1	0.086	
	Census Tract 115.01, Block Group 1	0	
	Census Tract 115.06, Block Group 1	0.03	
	Census Tract 116, Block Group 1	0.0058	
	Census Tract 118.01, Block Group 3	0.01	
Wastewater Discharge (toxicity-weighted concentration/km distance)	Census Tract 108.07, Block Group 1	4.4E-06	0.021
	Census Tract 108.14, Block Group 1	N/A	
	Census Tract 115.01, Block Group 1	0.0012	
	Census Tract 115.06, Block Group 1	N/A	
	Census Tract 116, Block Group 1	0.00021	
	Census Tract 118.01, Block Group 3	4.3E-08	

Source: EJ Screen (Environmental Justice Screening and Mapping Tool). 2022. Accessed September 20, 2022. https://www.epa.gov/ejscreen.
km = kilometers; km^2 = square kilometers; N/A = information not available