Exhibit R

Scenic Resources

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

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Terms and Definitions

Collector Line	An underground or overhead electrical 34.5 kV line transmitting power from the turbines to a Substation
Construction Yard	The temporary area for construction activities and Project component storage prior to installation
GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
CMP	Comprehensive Management Plan
DoD	Department of Defense
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
I-84	Federal Interstate Highway 84
KOP	Key Observation Point
kV	Kilovolt
MBTH	Maximum Blade Tip Height
NTSA	National Trails System Act
NPS	National Parks Service
OAR	Oregon Administrative Rule
ONHT	Oregon National Historic Trail
OR-##	Oregon State Highway ##
RMP	Resource Management Plan
USFS	U.S. Forest Service
VRM	Visual Resource Management
ZVI	Zone of Visual Influence
k	

1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit R provides an analysis of the Project impacts to scenic resources, as required to meet the submittal requirements of Oregon Administrative Rule (OAR) 345-021-0010 (1)(r) paragraphs (A) through (F). This Exhibit demonstrates that the Project can comply with the approval standard in OAR 345-022-0080:

> ***345-022-0080 Scenic Resources;***
>
> *…to issue a Site Certificate, the Council must find that the design, construction, and operation of the Facility, taking into account mitigation, are not likely to result in significant adverse impacts to scenic resources and values identified as significant or important in local land use plans, tribal land management plans, and federal land management plans for any lands located within the analysis area described in the Project Order.*

2.0 Analysis Area

The analysis area for scenic resources is defined in the Project Order as "the area within the Site Boundary and 10 miles from the Site Boundary." The Site Boundary is defined in detail in Exhibits B and C. The Analysis Area is shown on Figure R-1.

3.0 Identification of Significant or Important Scenic Resources

This section inventories scenic resources identified as significant or important in local, tribal and federal land use plans within the analysis area, as required to demonstrate compliance with the approval standard in OAR 345-022-0080. The analysis area includes parts of two Oregon counties, seven Oregon municipalities, and land administered by the Bureau of Land Management (BLM), National Park Service (NPS), and Department of Defense (DoD).

Based on a review of applicable land management plans, Wheatridge concludes that there are no significant or important scenic resources identified by any applicable plan within the analysis area. The following sections describe the applicable jurisdictions, their applicable land use plans, and the determination as to whether visual resources in the analysis area are designated as significant or important. These descriptions are summarized in Table R-1 and the locations of scenic resources are shown on Figure R-1.

Table R-1. Important Scenic Resources Inventory					
Jurisdiction	**Plan**	**Scenic Resources Specified in Plan (Y/N)**	**Important or Significant Scenic Resources Identified in Analysis Area (Y/N)**	**Name of Scenic Resource**	**Location Scenic Resources Discussed in Plan**
COUNTIES					
Morrow County	Morrow County Comprehensive Plan and Zoning Ordinance, as updated through 2011	No	No	N/A	Natural Resources Element, p 96
Umatilla County	Umatilla County Comprehensive Plan, as amended through 2010	Yes	No	N/A	Chapter 8
CITIES					
City of Ione	City of Ione Comprehensive Plan (1987)	No	No	N/A	Section 5
City of Lexington	City of Lexington Comprehensive Plan (1979)	No	No	N/A	Section IV
City of Heppner	City of Heppner Comprehensive Plan (2004)	No	No	N/A	Chapter I
City of Hermiston	City of Hermiston Comprehensive Plan, as amended through 2014	No	No	N/A	Chapters II, III
City of Stanfield	City of Stanfield Comprehensive Plan (1983) and Development Code (2003)	No	No	N/A	Development Code Chapters 2-3
City of Echo	City of Echo Comprehensive Plan (2005) and Zoning Administrative Regulations (2010)	No	No	N/A	Comprehensive Plan Section 7-1-5
TRIBAL					
None Applicable	None	–	–	–	–
FEDERAL					
BLM, Vale District, Baker Resource Area	Baker Resource Management Plan (BLM 1989)	Yes	No	N/A	Chapter 2, Visual Resources; Management Guidance for applicable Geographic Units; Map 5

Table R-1. Important Scenic Resources Inventory					
Jurisdiction	**Plan**	**Scenic Resources Specified in Plan (Y/N)**	**Important or Significant Scenic Resources Identified in Analysis Area (Y/N)**	**Name of Scenic Resource**	**Location Scenic Resources Discussed in Plan**
NPS	Management and Use Plan Update, Oregon National Historic Trail and Mormon Pioneer National Historic Trail, 1999	No	No	N/A	Historic Routes and Significant Resources Chapter
DOD	Integrated Natural Resource Management Plan and Integrated Cultural Resource Management Plan for Boardman Bombing Range (Naval Weapons System Training Facility), 2012	No	No	N/A	N/A; scenic resources not addressed in plan
USFS/ ODOT	Blue Mountain Scenic Byway Interpretive Management Plan	Yes	No	N/A	Section II Resource Inventory

3.1 Counties

3.1.1 Morrow County, Oregon

The Morrow County Comprehensive Plan (Morrow County 1986) was reviewed for designated scenic resources or sites. In the Natural Resources Element, under the heading "Scenic Views; Sites" is the statement, "Addressed in plan (p. 69) but none identified." No information on scenic views or sites is found in the indicated location. In the Goal 5 Resources section of the Plan is the statement, "Morrow County contains a variety of landscapes, many of which may be considered to be scenic. The County has not, however, designated any sites or areas as being particularly high in scenic-resources value." Therefore, the Morrow County Comprehensive Plan does not identify any scenic resource of value for inclusion in this Exhibit.

3.1.2 Umatilla County, Oregon

The Umatilla County Comprehensive Plan (Umatilla County 2008) addresses the 14 statewide planning goals adopted by the State of Oregon. Chapter 8 of the Plan addresses Goal 5, which is "To conserve open space and protect natural and scenic resources." The Plan states that, "there are areas and views which are commonly recognized as striking in their effect upon those who experience them. Geological features, green vegetation, and water are major scenic features; human works and dry, shrub-steppe landscape are other attractions. So that areas do not lose their eye-catching attributes, plans attempt to identify 'commonly recognized' scenic features, and suggest uses for these areas that minimize conflicts with the valuable features" (p. 8-1). No specific scenic resources are identified in this portion of Chapter 8.

Subsequent material in Chapter 8 documents the finding that "Umatilla County has a number of outstanding scenic views and pleasant vistas" (p. 8-10). In response to the finding, the Plan establishes a series of policies intended to protect scenic views in the county. In general, the policies state the need to address and mitigate adverse visual effects of development and discuss programmatic steps to address potential scenic conflicts that might be associated with proposed changes in land use. One of the policies states that Wallula Gap (a prominent physiographic feature along the Columbia River where it enters Oregon) has been recognized as a significant scenic resource and the County shall enact special land use measures to protect this area (p. 8-12).

Based on the specific content of the plan, Wheatridge concludes that Wallula Gap is the only scenic resource that Umatilla County has been identified as important or significant. Wallula Gap is located outside the analysis area; therefore, the Umatilla County Comprehensive Plan does not identify any important or significant scenic resources within the analysis area.

3.2 Municipalities

3.2.1 City of Lexington

The City of Lexington Comprehensive Plan (1979) establishes a series of goals and policies corresponding to the applicable statewide planning goals. The plan includes a policy goal "to conserve open space and protect natural and scenic resources." This is followed by an Objective "to identify open spaces, scenic and historical areas, and natural resources which should be preserved from urban development." Section IV of the plan provides a summary of findings, and includes the statement, "No scenic views, wilderness areas, recreational trails or scenic waterways were identified." Implementing measures listed in the Comprehensive Plan related to scenic resources includes the use of an Open Space zoning district; however, there are no areas in the City of Lexington to which that designation has been applied.

Based on the content of the comprehensive plan, Wheatridge concludes that no features within the City of Lexington have been identified as important scenic resources.

3.2.2 City of Echo

The City of Echo Comprehensive Plan (2005) establishes goals and policies for a series of topical areas corresponding to the statewide planning goals. Section 7-1-5 of the plan states a policy for Open Spaces, Scenic and Historic Areas, and Natural areas to "conserve open space and protect natural scenic, historic, and cultural resources." This is followed with a list of 7 policies, none of which specify any particular scenic resource. The city's Zoning Administrative Regulations (Ordinance 350-07 and 358-10) implement the goals and objectives of the comprehensive plan. The zoning regulations do not establish any scenic resource protection requirements or designate any scenic areas.

Based on the content of the comprehensive plan and zoning code, Wheatridge concludes that no features within the City of Echo have been identified as important or significant scenic resources for the purposes of this analysis.

3.2.3 City of Ione

Ione is a small, incorporated community located in the west-central part of Morrow County, with a population of approximately 330 persons (Portland State University 2011). The City of Ione Comprehensive Plan and implementing regulations were approved in 1979 and have been subsequently amended several times. Section 5 of the Plan establishes Plan Goals and Policies for a series of topical areas corresponding to the statewide planning goals. Section 5 states a policy for Open Spaces, Scenic and Historic Areas, and natural resources to "Examine any publicly owned lands including street rights-of-way for their potential open space use before their disposition; and conserve the area's natural resources and protect open space and natural resources which should be preserved from urban development."

The Ione zoning ordinance (Ordinance #158, as amended) implements the Comprehensive Plan (City of Ione 1999). The ordinance defines land use districts and establishes corresponding standards for the districts, along with other development standards.

Based on the content of the comprehensive plan and zoning code, Wheatridge concludes that no features within the City of Ione have been identified as important scenic resources.

3.2.4 City of Hermiston

Hermiston is a community of approximately 17,240 residents (Portland State University 2011) located along I-84 in the northwestern corner of Umatilla County. The City of Hermiston Comprehensive Plan and supporting technical report was adopted in 1984, and the plan is updated through amendments to the city development code (2012). Chapter II of the Plan documents Background Information and Findings. Under the heading Other Goal 5 Resources, this chapter indicates "According to Oregon State Parks and Recreation Division, there are no wilderness areas, potential or approved Oregon wilderness trails, or state and federal wild/scenic waterways within the Hermiston UGB. Other Goal 5 resources, including outstanding scenic views/sites and indigenous energy resources, are discussed in the appropriate sections below" (City of Hermiston 1984). Subsequent content in Chapter II addresses air, noise, and water quality; natural hazards and development limitations; energy resources and conservation; and open space and recreation, but does not include specific information about scenic sites or views.

Chapter III of the Plan identifies policies for the respective topical areas. Under the heading E. Resources (Goals 5, 6, 7 and 13), Policy 7 (p. III-10) is stated as "The City of Hermiston will protect natural resources to the maximum degree possible." The subsequent discussion of implementing actions references the Open Space designation applied to the 100 year floodplain, wetlands in the northeastern part of the city, and the Oregon State University Agricultural Experiment Station. A footnote related to Policy 7 states that "For other Goal 5 resources, see Policy 8: Surface and Groundwater Resources, Policy 9: Aggregate Resources, Policy 10: Historic Resources, and Policy 16: Parks, Recreation and Open Space." Policy 16 (p. III-18) indicates that Hermiston will acquire and develop additional parks and will preserve as open space city-owned land that possesses recreational, scenic and other environmental qualities or is subject to natural hazards.

Based on the specific content of the comprehensive plan, Wheatridge concludes that no features within the City of Hermiston have been identified as important scenic resources, and no such features are addressed in this Exhibit.

3.2.5 City of Stanfield

Stanfield is an incorporated community with a population of approximately 2,095 residents (Portland State University 2011) located adjacent to I-84 in the in the northwestern part of Umatilla County. The City of Stanfield Comprehensive Plan was adopted in 1983 and updated in 2001. The technical report supporting the comprehensive plan was updated in 1984, and a zoning ordinance was adopted in the same year. The plan and technical report include 14 goals corresponding to the

14 statewide planning goals. Comprehensive planning guidance and zoning are integrated into the City of Stanfield development code (2003). The land use districts defined in Chapter 2 of the development code correspond to the comprehensive plan designations; they include an Open Space (OS) District, but do not include any districts oriented to scenic resources. Chapter 3 of the development code establishes design standards that include landscaping and screening provisions that relate to the aesthetic aspects of development.

Based on the specific content of the comprehensive plan and development code, Wheatridge concludes that no features within the City of Stanfield have been identified as important scenic resources, and no such features are addressed in this Exhibit.

3.2.6 City of Heppner

Heppner is a community of approximately 1,290 residents (Portland State University 2011) located at the intersection of OR-74 and OR-207, near the center of Morrow County. The City of Heppner initially developed a comprehensive plan in 1980; it was updated in 2004. Chapter I of the Plan identifies a goal "To conserve open space and protect natural and scenic resources," with an objective to identify "open spaces, scenic and historical areas and natural resources which should be preserved from urban development" (City Code of Heppner, 2004).

Based on the specific content of the Heppner Comprehensive Plan, Wheatridge concludes that there are no specific scenic views or resources that are identified as significant or important in the City of Heppner.

3.3 Tribes

There are no tribal lands located within the analysis area; therefore, this Exhibit does not address any tribal land management plans.

3.4 Federal Land Management

This section includes an analysis of the federal land management plans that apply to lands within the Project's analysis area, as listed in Table R-1. The plans pertain to management of three parcels of BLM-managed lands within the analysis area, management of the Oregon Trail and its significant sites, and management of the Boardman Bombing Range.

3.4.1 BLM

There are three isolated parcels of lands managed by the BLM located within the analysis area, all in Umatilla County. Two of these are inholdings within the Wheatridge East area. The third is located approximately 5 miles north of Wheatridge East; this approximately 300 acre parcel is managed as the Oregon Trail Area of Critical Environmental Concern (ACEC), also known as Echo Meadows. The ACEC is also a protected area as analyzed in Exhibit L of this Application. The locations of these BLM parcels are shown on Figure R-1.

The Federal Land Policy and Management Act of 1976 requires the BLM to protect the quality of scenic values on public lands (43 USC 1701). The BLM manages scenic resources on the federal lands under its jurisdiction through application of the Visual Resource Management (VRM) system (BLM 2001). BLM-administered lands in Morrow, Umatilla, Union, and Baker counties are within the Baker Resource Area of the Vale District; the current Resource Management Plan (RMP) for the Baker Resource Area was adopted in 1989(BLM 1989). The RMP assigns the lands within the Baker area of the district to 14 geographic areas, or planning units; the ACEC is within the Oregon Trail planning unit, and the two inholdings are managed as part of the Blue Mountain planning unit.

The RMP assigns VRM classifications to all BLM lands within its scope; lands are placed within VRM Classes I, II, III or IV depending on their existing visual quality and the management objectives relative to the amount of visual change that would be allowed to occur within those lands. All lands within the Oregon Trail planning unit, including the Oregon Trail ACEC, are assigned to VRM Class III. The specific VRM classification for the two inholdings is unclear; however, it can be confirmed that neither is assigned to VRM Class I or II[1].

Wheatridge understands that ODOE considers BLM-administered lands managed as VRM Class I and II to be important scenic resources, based on the level of visual resource protection afforded to those lands. Based on the assignment of the BLM-managed lands within the analysis area to VRM Class III or IV, Wheatridge concludes that there are no scenic resources identified as significant or important by the BLM's Baker RMP located within the analysis area.

3.4.2 Oregon Trail Comprehensive Management and Use Plan, National Park Service

The analysis area includes a portion of the Oregon National Historic Trail (ONHT), which received federal designation as a "historic trail" under the National Trails System Act (NTSA) in 1978. The purpose of the historic trail designation on federal lands is to protect the historic route and any associated artifacts. Specifically, the purpose is described in the NTSA as follows:

> *National historic trails shall have as their purpose the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment. Only those selected land and water based components of an historic trail which are on federally owned lands and which meet the national historic trail criteria established in this chapter are included as Federal protection components of a national historic trail….*

Thus, the NTSA and its related protections apply only to where the ONHT is on federal lands. In addition, the focus of the NTSA is on historic preservation, not management of scenic resources.

The NTSA indicates that specific locations along a historic trail can be identified as "high-potential" sites or trail segments. High-potential sites and trail segments are described as those locations that

[1] GIS data obtained from BLM does not include VRM classifications for most of the northern half of the Vale District. The two inholdings are managed as part of the Blue Mountain planning unit. The Baker Resource Area RMP indicates that there are no areas within the Blue Mountain planning unit that are assigned to VRM Class I. Map 5 of the RMP identifies "areas of high visual quality" which are assigned to VRM Class II; none of these areas coincide with the location of the two inholding parcels. Because they are definitively not assigned to VRM Class I or II, the inholding parcels are managed either as VRM Class III or IV.

provide an opportunity to interpret the historic significance of the trail during its major use. As identified in the Comprehensive Management and Use Plan – Oregon National Historic Trail and Mormon Pioneer National Historic Trail (CMP; NPS 1999), The portion of the ONHT within the analysis area includes two high-potential sites, Echo Meadows and the Well Spring Interpretive Site, as well as a portion of the 12 mile-long high-potential trail segment that passes through the southern end of the Boardman Bombing Range (Figure R-1). Echo Meadows is managed by the BLM as the Oregon Trail ACEC. The Well Spring Interpretive Site is located along the southern boundary of the Boardman Bombing Range.

The CMP was developed to comply with the requirements of the NHTA and to manage preservation of the ONHT. The CMP explains that the purposes of the ONHT are "to identify, preserve, and interpret sites, route, and history of the Oregon Trail" and "to commemorate the westward movement of emigrants to the Oregon country as an important chapter of our national heritage." Thus, the ONHT is managed for historical significance and not primarily as a scenic resource. The CMP's focus on the historic significance of the ONHT and not management of scenic resources is consistent with Energy Facility Siting Council findings in Section IV.3(d) of the Final Order on the Shepherds Flat Wind Farm, dated July 25, 2008. The scenic value connected with the ONHT is focused on the view of visible trail remnants and ruts, along with the immediate surroundings. Therefore, the high-potential sites of the ONHT identified in the CMP and located in the analysis area are significant or important historic resources, but are not specifically identified as scenic resources.

Although the Oregon Trail and the two high-potential sites are important historic resources, they are neither considered nor managed as significant or important scenic resources. However, Wheatridge provides an analysis below to demonstrate that the Project will have limited impacts on the views from these locations.

3.4.3 Blue Mountain National Scenic Byway Interpretive Management Plan, USFS

Although it is a designated state scenic byway, the only "management plan" for this byway is the Blue Mountain Scenic Byway Interpretive Management Plan, prepared by the U.S. Forest Service (USFS; 1993), Umatilla National Forest (a significant portion of the route is along USFS roads). This management plan is focused on means to enhance wayfinding and visitor experience in the many towns along the tour route. It is not a land management plan, a transportation plan or a highway management plan, but is instead a plan for enhancing tourism. The plan does not grant or imply authority for land management outside of the Umatilla National Forest, which is outside of the analysis area.

The plan identifies a few specific views such as views of the Blue Mountains from a particular highway turnout; however, none of the identified viewpoints are located within the Project analysis area. In the area where the Project would be near to, or visible from, OR-74, no specific scenic resources are identified. Therefore, this plan does not identify important or significant scenic resources for the purposes of this analysis.

Although not included in the scenic resources analysis of this Exhibit, impacts to the Blue Mountain Scenic Byway are presented in Exhibit T.

3.4.4 Boardman Bombing Range, Department Of Defense

Literature search activities conducted for the Project visual assessment indicate the US Navy has not prepared an overall land or resource management plan for the Naval Weapons Training Facility Boardman (formerly the Boardman Bombing Range). The Navy has developed an Integrated Natural Resources Management Plan (2012a, 2012b) for the facility; this plan addresses wildlife and plant species and their habitats, but does not addresses scenery or other non-ecological natural resources. Similarly, the Navy has also developed an Integrated Cultural Resources Management Plan for the facility; this plan addresses historic and archaeological resources, but does not address scenery or other non-cultural aspects of the human environment. In summary, plans for the Naval Weapons Training Facility Boardman do not specifically address scenic resources and do not identify any scenic resource or value as significant or important.

4.0 Supplemental Visual Resource Assessment

Although it has been determined that applicable land use plans do not identify significant or important scenic resources within the analysis area, Wheatridge acknowledges that a number of comments submitted in response to the Notice of Intent indicate there is a public concern over the visual aspects of the Project. To address that concern, the following section provides a review of existing visual resource conditions in the area surrounding the Project and the potential changes to those conditions with the Project. The review uses a series of four Key Observation Points and visual simulations to demonstrate the visual effects of the Project.

As wind turbines are the dominant element of a wind project, wind turbines are the focus of this Exhibit. Ancillary Project facilities such as the Intraconnection Line(s), O&M Buildings, and Substations are features which are not by themselves, extraordinary features in a landscape and do not present the same level of visual impact as a wind turbine. The visibility analysis in this Exhibit is primarily an analysis of wind turbine visibility and impact, unless otherwise noted.

4.1 Visual Assessment Overview

The visual assessment began with a zone of visual influence (ZVI) analysis, using Environmental Systems Research Institute (ESRI) ArcGIS software to identify the areas from which the proposed Project turbines might be visible, as further described in Section 4.2.2. The ZVI analysis was used in conjunction with the information in the applicable land management plans, public comments from the Project Order, and consultation with local officials to choose a series of four Key Observation Points (KOPs), which represent potentially visually sensitive viewing locations in the area from which to provide an analysis of the visual effects of the Project. In addition to KOPs, an assessment of visibility from several nearby cities is also provided. Figure R-2 shows the location of KOPs and nearby cities. Figures R-3 and R-4 show the results of the visibility analysis for the GE 1.7-103 and

GE 2.5-120 turbine layouts, while Figures R-5 and R-6 show the results of the visibility analysis for the longest and shortest Intraconnection Lines option.

The visual effects of the Project at each KOP are described in Section 4.3. The descriptions are supported by visual simulations from each of the four KOPs, which demonstrate the visual effect of the Project at those locations. Section 4.2.4 describes the simulation methodology, and the simulations are provided as Figures R-7 through R-10.

4.2 Methodology

4.2.1 Identify KOPs

KOPs are viewing locations in the vicinity of the Project that are considered representative of visually sensitive areas from which viewers may be affected by Project-related changes in the landscape setting. Many candidate locations for KOPs were identified through review of federal, state, and local land use and resource plans, land use data available in Geographic Information Systems (GIS) format, protected areas identified by the State of Oregon, the NOI process, and consultation with federal, state, and county agencies and organizations. Potential viewpoints were chosen based on visibility, sensitivity or protection of resource, and number of viewers (i.e., where there is a high concentration of potential sensitive viewers).

Four KOPs were chosen for the visual impact analysis and simulation; these are listed and described in Table R-2. The locations of KOPs are shown on Figure R-2.

Table R-2. KOP Descriptions

KOP No.	KOP Name	Location Description	Viewers Represented
KOP 1	Oregon Trail Well Spring Interpretive Site	On Immigrant Lane adjacent to south end of Boardman Bombing Range; Site associated with Oregon Trail	Recreational/ Historic
KOP 2	Bombing Range Road	On Bombing Range Road, just north of intersection with OR-207 and Strawberry Lane; KOP is near center of Wheatridge West	Local Residents, Highway travelers
KOP 3	Near Oregon Trail ACEC/ Echo Meadows	On Oregon Trail Road (OR-320) just south of Oregon Trail ACEC	Local Residents, Recreational/ Historic
KOP 4	Willow Creek Terrace	In a residential area on high ground in south end of Heppner; near Willow Creek RV Park	Local Residents

4.2.2 Zone of Visual Influence Analysis

A ZVI analysis, also known as a visibility or viewshed analysis, was performed using ESRI GIS software and a bare-earth 10 meter digital elevation model to identify those areas from which the Project's turbines and Intraconnection Lines would likely be visible, and the amount of the Project potentially visible. Due to the siting of turbines on ridges to maximize the wind resource, the turbines are generally the most dominant visible feature compared to other Project facilities. To assess the potential visibility of the turbines, the ZVI analysis was performed for the GE 1.7-103 (Figure R-3) and GE 2.5-120 (Figure R-4) turbine layouts assuming 110% maximum blade tip height (MBTH). This resulted in an assumed turbine MBTH of 144 meters (472 feet) for the GE 1.7-103 turbines and 160 meters (525 feet) for the GE 2.5-120 turbines. The ZVI analysis also addressed potential visibility of the Intraconnection Lines; Figures R-5 and R-6 show the range of visibility for the longest and shortest Intraconnection Line routes, respectively.

It should be noted that this bare-earth modeling approach, based only on the effects of terrain on visibility, results in a highly conservative assessment of potential visibility for several reasons. First, a bare-earth analysis does not take into account the effects of vegetation or buildings, which will in practice block or screen views in some places. Second, by using a MBTH that is 10% taller than the turbine being analyzed, the ZVI analysis indicates potential visibility beyond what would actually occur. In addition, in some areas where the analysis indicates Project structures would be visible, the only visible components might be the tips of the turbine blades at MBTH, which would likely be noticeable only at relatively close viewing distances. Finally, the model does not account for distance, lighting, weather, and atmospheric attenuation factors that diminish visibility under actual field conditions.

Figures R-3 through R-6 show the areas from which the turbines and Intraconnection Lines towers would likely be visible; the number of turbines or towers potentially visible is indicated by color-coding on those figures.

Tables R-3 and R-4 present the results of the visibility analysis for nearby cities; these tables are split to indicate visibility independently for Wheatridge East and Wheatridge West.

Table R-3. Visibility Analysis Results for Wheatridge East for Nearby Cities

Jurisdiction	Assessment Results
Boardman	No visibility
Ione	Negligible visibility at a distance of at least 7 miles
Umatilla	No visibility
Hermiston	Low potential visibility at a distance of 10 miles
Stanfield	Low to moderate potential visibility at a distance of at least 7.0 miles
Heppner	No visibility
Lexington	No visibility

Table R-4. Visibility Analysis Results for Wheatridge West for Nearby Cities	
Jurisdiction	**Assessment Results**
Boardman	Low potential visibility at a distance of at least 13.8 miles
Ione	Negligible to low potential visibility at a distance of at least 7.8 miles
Umatilla	No visibility
Hermiston	No visibility
Stanfield	No visibility
Heppner	No visibility for all but southern end of Heppner; Negligible to low visibility from south Heppner at a distance of at least 3.6 miles
Lexington	No visibility

4.2.3 Depict the Visual Appearance of the Proposed Project

In order to demonstrate how the constructed Project turbines would look in the landscape to future viewers, photographic simulations were made for each of the four KOPs. The visual simulations for KOPs 1, 2, 3 and 4 are provided as Figures R-7, R-8, R-9 and R-10, respectively.

The photographic simulations were created using GIS software, 3-dimensional (3D) modeling software, and digital photographic editing software. The software used to create the visual simulations includes:

- ESRI ArcMap – Used for Project data mapping;
- Garmin Global Positioning System (GPS) – Used for photo and modeling location accuracy;
- AutoDesk 3D Studio Max 2010 – Used for 3D modeling, texturing, lighting, and rendering;
- PTGui – Used for digital photo panorama creation; and
- Adobe Photoshop CS4 – Used for photo editing and compositing.

When taking photographs of the existing landscapes, Tetra Tech's visual team used a Nikon D90 digital camera (digital single lens reflex [dSLR]) equipped with a 52 millimeter (mm)-equivalent lens. This lens is considered a "normal lens," which means it most closely approximates the field of vision of the human eye. In photos taken with this lens, the size and scale of objects in the background and foreground are depicted in ratio and are not distorted. The term "52mm equivalent" lens is used because of the difference in image sensor size between a traditional 35mm film camera and a modern dSLR. A Garmin GPSMap 60CSx GPS unit was used to record the latitude, longitude, elevation, date, and time of each photograph as it is taken.

To create the photo simulations, the location data captured by the GPS device are transferred to ArcMap, where they are combined with GIS data of the preliminary layouts of Project turbines and facilities. A map showing this data was then exported at true scale and imported into 3D Studio Max. Using this scaled map as a base, a three-dimensional (3D) model of the Project area was created to scale. 3D models of the proposed Project turbines, previously modeled to scale in 3D Studio Max, were then added in their appropriate locations and elevations. The views from the existing photographs were then stitched together to create a panorama image and matched in the 3D model using virtual cameras with the same focal length and field of view as the Nikon D90. After date- and time-specific lighting is added to the 3D model, renderings from the virtual cameras are created. These renderings were blended into the existing conditions photographs in Adobe Photoshop software. This process of creating a 3D model at true scale and rendering images using the same specifications used by the camera ensures that the spatial relationships of the landscape, Project features, and viewer perspective are accurate and match the existing site photographs.

In order to create visual simulations representing the maximum visual impact of the Project; the GE 2.5-120 turbine was simulated in the GE 1.7-103 turbine layout. This effectively creates a visual simulation of the Project showing the tallest turbine under consideration, the GE 2.5-120 with a MBTH of 145 meters (475 feet), in the layout with the most number of turbines, the 292 proposed locations of the GE 1.7-103 turbine layout. This would show a worst case scenario for visual impacts and it would be assumed that whatever turbine model and configuration is finally built will be a lesser impact than what is shown in the visual simulations. However, by using the actual turbine heights, this method provides an accurate assessment of the number of turbines visible, unlike the initial visibility assessment that used a maximum turbine height 10% taller than the tallest turbines under consideration.

4.3 Visual Assessment Results

Descriptions of the visual effects of the Project at each KOP are provided below.

4.3.1 KOP 1: Oregon Trail Well Spring Interpretive Site

KOP 1 is located at the Oregon Trail Well Spring Interpretive Site, which is located on Immigrant Lane adjacent to the southern boundary of the Boardman Bombing Range. This site was chosen for its importance as a historic site along the Oregon Trail. The information kiosk is located on the south side of the road and seems to be oriented southward; however, most of the trail-related interest (e.g., visible wagon ruts) is located to the north within the Bombing Range, in an area not accessible to the public.

Based on the visibility analysis, there would be moderate visibility of some Project turbines from a middleground distance of approximately 1.2 miles, with minimal opportunities for screening in this open landscape. As shown in the visual simulation for KOP 1 (Figure R-7), the tops of up to 30 turbines would be visible to the east and southeast from this location. Although only a few of the visible turbines would be seen at a middleground distance, and most would be seen at a background distance of more than 3 miles, the rotating motion of the turbine blades and the skylining effect (turbines seen silhouetted against the sky) would draw viewers' attention. The turbines would occupy less than 45 degrees, or 12.5 % of the total viewshed at this site. Although fewer turbines would be visible with the GE1.7-103 layout than with the GE2.5-120 layout, the overall visual effect at KOP 1 would be similar.

The site is managed to maintain the history and historic artifacts associated with the Oregon Trail, rather than for its scenic qualities; there is no management direction for preservation of views or scenic quality related to the lands on which the KOP or the Project are located. Although the relatively undeveloped viewshed is said to provide an experience that enables visitors to relate to the emigrants, the viewshed is no longer in the nearly pristine condition that it was during the emigrants' time. The road is evident, much of the landscape is farmed and fenced, little of the tallgrass native prairie remains, and the turbines of existing wind facilities are visible to the east and west The remaining evidence of the Oregon Trail at the Well Spring site would not be disturbed by the Project, allowing visitors to continue their enjoyment of the history of the site.

4.3.2 KOP 2: Bombing Range Road

KOP 2 is located on Bombing Range Road just north of its intersection with OR-207 and Strawberry Lane, in the heart of Wheatridge West. This site represents views for local residents, as well as travelers along Bombing Range Road and OR-207.

Due to its location within the Wheatridge West area, KOP 2 would provide an expansive view of the Project (Figure R-8). Many turbines would be visible, with the closest at a near-middleground distance of approximately 0.6 miles and others extending to background distances. There are minimal opportunities for screening in this open, panoramic landscape, and some turbines would be skylined. Although fewer turbines would be visible with the GE1.7-103 layout than with the GE2.5-120 layout, the overall visual effect at this KOP would be similar.

Although the turbines would be visible for both area residents and highway travelers, there is no management direction for preservation of views or scenic quality related to the private lands on which the KOP and Project are located, or to the corridors for the state highway and county roads.

4.3.3 KOP 3: Oregon Trail ACEC

KOP 3 is located on Oregon Trail Road (also known as the Lexington-Echo Highway or OR-320), 0.5 miles south of an isolated parcel of BLM land within the Oregon Trail ACEC, approximately 2.3 miles north of Wheatridge East. This site was chosen to represent views from the Echo Meadows interpretive site along the Oregon Trail.

As shown in the visual simulation for this site (Figure R-9), viewers at KOP 3 would have moderate visibility of Project turbines in Wheatridge East, to the south and southwest at middleground and background distances of 2.3 to over 6 miles from the KOP (2.8 to 6.7 miles from the ACEC). Some of the turbines would be skylined, but with the long viewing distance the turbines would appear smaller than the existing man-made features evident in the view. Some portions of Wheatridge West would also be visible, but at a far background distance of over 15 miles these would be barely noticeable. Although fewer turbines would be visible with the GE1.7-103 layout than with the GE2.5-120 layout, the overall visual effect would be similar.

Despite the site's historic interest and potential use as a tourism resource, and its management as an ACEC, it is not identified or managed as an important scenic resource (i.e., assigned to BLM VRM Class I or II). Regardless of its VRM classification, the BLM's VRM system does not apply outside the boundaries of the ACEC, thus there is no management direction for preservation of views or scenic quality related to the lands on which the Project is located.

4.3.4 KOP 4: Willow Creek Terrace

KOP 4 is located at Willow Creek Terrace, an assisted living facility situated on high ground in the south end of Heppner. This KOP was chosen to represent views for residents of Heppner and for users of the Willow Creek RV Park, an adjacent recreation resource discussed in Exhibit T.

There would be low visibility of the Project at this location, primarily because terrain would block views of nearly all of the Project turbines. Only the tops of a few turbines would potentially be visible, at a distance of approximately 5.6 miles for the closest turbine. The visual simulation (Figure R-10) demonstrates that only the tips of two turbines would be visible from the residential area. With these turbines being located 5.6 and 6.2 miles from the viewing location, it is unlikely that they would draw the attention of a casual observer.

As with the other KOPs, there is no management direction for preservation of views or scenic quality related to the private lands on which either the KOP or the Project is located.

5.0 Avoidance, Reduction, and Mitigation

The following section discusses anticipated Project design, engineering, and related measures to avoid, reduce, or otherwise mitigate adverse visual impacts from the Project as described above.

5.1 Project Planning and Design Measures

To avoid and minimize visual impacts, Wheatridge has sited the Project in a remote area of Morrow and Umatilla Counties, and designed the turbine array such visibility will be minimal from the nearest towns. Turbines will be painted with a grey, white, or off-white, low reflectivity coating to minimize reflection and contrast with the sky; this reduces the visual impact of skylining as well as makes the turbines highly visible to daytime pilots. Support towers for the Intraconnection Lines will be either wood, which will largely blend with the surroundings, or steel, which will have a low-reflectivity coating. Electrical collector lines will be placed underground, except where terrain may not permit. Lighting on the Project will be minimal. Turbine exterior lighting, as required by the FAA, will consist of red flashing lights placed at the end of turbine strings and approximately every 0.5 miles within the Project. Outdoor lighting at the Project Substations and O&M Buildings will be kept to a minimum through the use of motion sensors and switches to reduce lighting to a minimum required for safety when not in use, and lighting will be directed downward and inward to prevent off-site glare.

Additional mitigation measures may include refinements to Project siting during final design, particularly routing of access roads to reduce environmental and visual impacts, and right-of-way vegetation management measures such as vegetation screening, both to be considered on a case-by-case basis.

5.2 Landscape Treatment Measures

Landscape treatment measures that are considered to reduce the potential visual impacts of the turbines and associated Intraconnection Lines typically involve construction or post-construction actions that can help to screen facilities from view or soften their appearance. These measures can include vegetation clearing practices used in construction, landscape plantings in specific locations following construction, and practices used in long-term operation and maintenance of the wind energy facilities.

Options for wind turbine and Intraconnection Lines tower-construction visual mitigation are limited due to the height of the turbines and safety requirements that necessitate removal of vegetation. Notwithstanding such constraints, Wheatridge has adopted or will consider a number of landscaping or vegetation management measures that have been identified as potential means to reduce visual impacts from the Project. Similar to design measures, some landscape treatment measures may be specific to a visual concern for a certain portion of the Project area, while others will be applied on a Project-wide basis. Landscape treatment measures that have been suggested and could be incorporated into the Project are summarized as follows:

- Wheatridge will develop a Vegetation Management Plan that includes measures for rehabilitation of impacts related to vegetation clearing. Among other provisions in the plan, vegetation clearing and ground disturbance will be limited to the area necessary to safely and efficiently install the Project facilities.
- Survey crews will remove all stakes and flagging from the construction area following construction.
- Access roads and other areas of ground disturbance will be watered during construction, as needed, to avoid the generation of airborne dust.
- Planting of vegetation screening could be considered on a case-by-case basis where it would be practical and effective in reducing the visibility of Project facilities.

6.0 Monitoring

Monitoring for visual impacts is not proposed. Unlike some other types of impacts, such as some potential impacts to biological resources, visual impacts typically do not change over time. Therefore, monitoring for visual impact would not provide meaningful information.

7.0 Submittal Requirements and Approval Standards

7.1 Submittal Requirements

Table R-5. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(r) An analysis of significant potential impacts of the proposed facility, if any, on scenic resources identified as significant or important in local land use plans, tribal land management plans and federal land management plans for any lands located within the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0080, including:	
(A) A list of the local, tribal and federal plans that address lands within the analysis area.	Sections 3.1, 3.2, 3.3, 3.4, and 3.5
(B) Identification and description of the scenic resources identified as significant or important in the plans listed in (A), including a copy of the portion of the management plan that identifies the resource as significant or important.	Section 3.2
(C) A description of significant potential adverse impacts to the scenic resources identified in (B), including, but not limited to, impacts such as:	N/A
(i) Loss of vegetation or alteration of the landscape as a result of construction or operation; and	N/A
(ii) Visual impacts of facility structures or plumes.	N/A
(D) The measures the applicant proposes to avoid, reduce or otherwise mitigate any significant adverse impacts.	Section 5.0
(E) A map or maps showing the location of the scenic resources described under (B).	Figure R-1
(F) The applicant's proposed monitoring program, if any, for impacts to scenic resources.	Section 6.0
Project Order Comments	**Location**
All paragraphs apply. The application should include visual depictions (photo-simulations) of the project’s impact on scenic resources within the analysis area,	Section 4.0, Figures R-7, R-8, R-9, R-10

7.2 Approval Standard

Table R-6. Approval Standard	
Requirement	**Location**
OAR 345-022-0080 Scenic Resources	
(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic resources and values identified as significant or important in local land use plans, tribal land management plans and federal land management plans for any lands located within the analysis area described in the project order.	Section 3.0
(2) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	N/A

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Figures

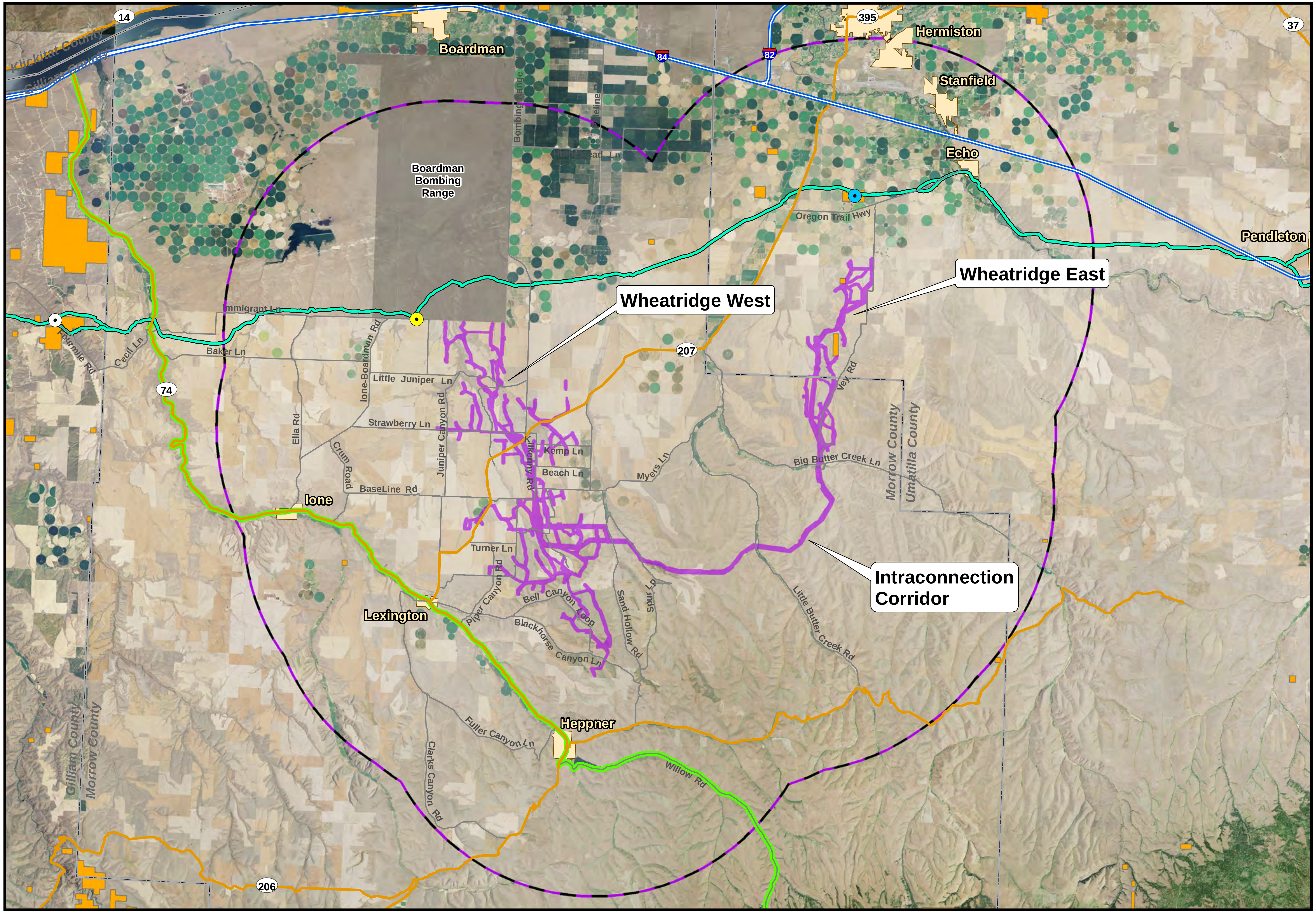

Figure R-1

Wheatridge Wind Energy Facility

Analysis Area

Morrow and Umatilla Counties, OR

December 2014

- Site Boundary
- Analysis Area (10 mile Buffer of Site Boundary)
- County Boundary
- Boardman Bombing Range
- Bureau of Land Management
- City/Town
- Interstate Highway
- State Highway
- Local Road
- Scenic Byway
- Oregon Trail
- Oregon Trail Four-mile Canyon Interpretive Site
- Well Spring Interpretive Site
- Echo Meadows (Oregon Trail Area of Critical Environmental Concern)

1:275,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: project facilities / ESRI: roads, political boundaries, cities / Oregon Dept. Transportation: scenic byway / Oregon BLM: oregon trail, Boardman Bombing Range / USDA NAIP: background imagery

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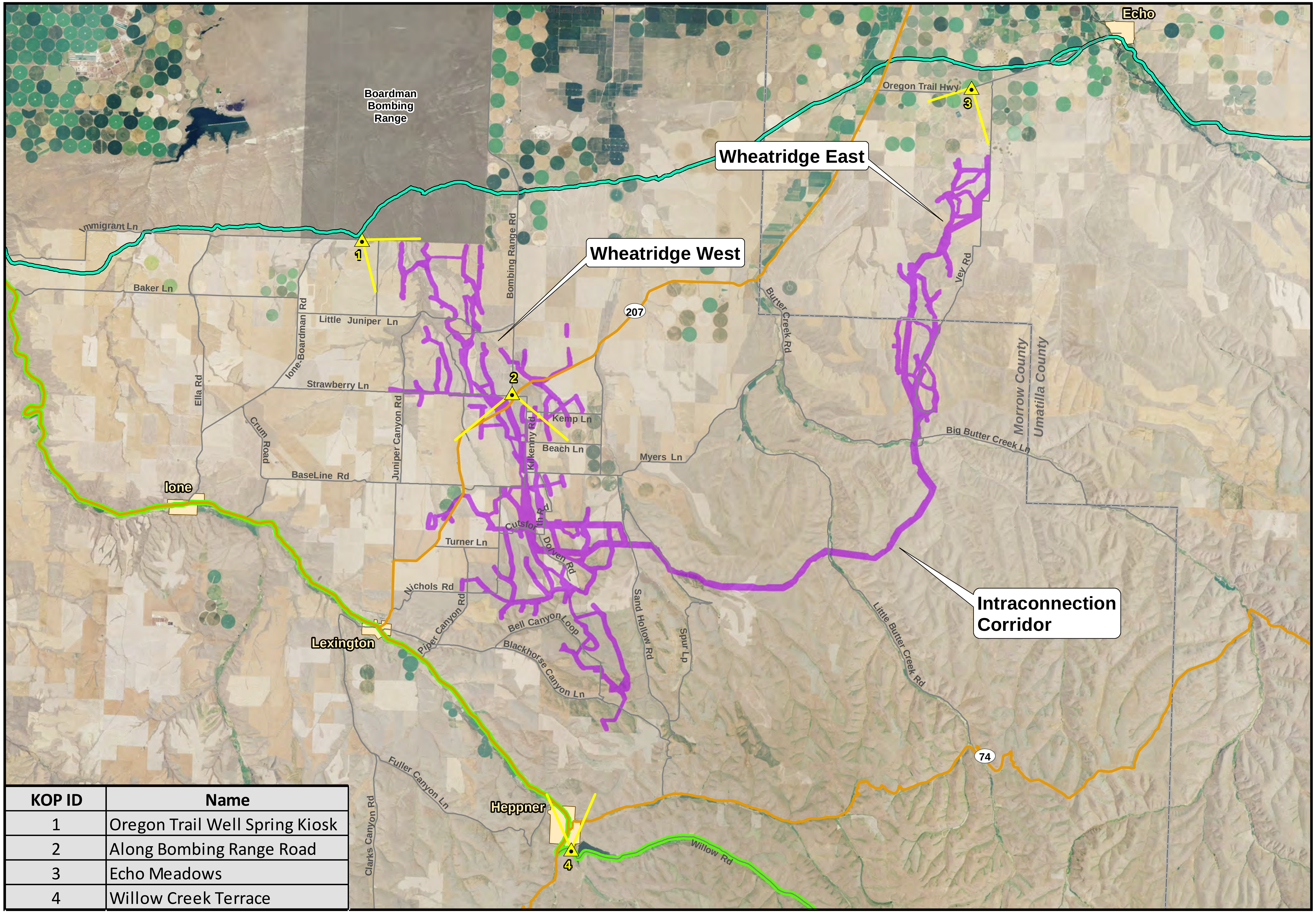
Figure R-2

Wheatridge Wind Energy Facility

Visual Assessment
Key Observation Points

Morrow and Umatilla Counties, OR
December 2014



KOP ID	Name
1	Oregon Trail Well Spring Kiosk
2	Along Bombing Range Road
3	Echo Meadows
4	Willow Creek Terrace

Data Sources Wheatridge Wind Energy: project facilities / ESRI: roads, political boundaries, cities / Oregon Dept. Transportation: scenic byway / Oregon BLM: oregon trail, Boardman Bombing Range / Tetra Tech: key observation points / USDA NAIP: background imagery

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TETRA TECH

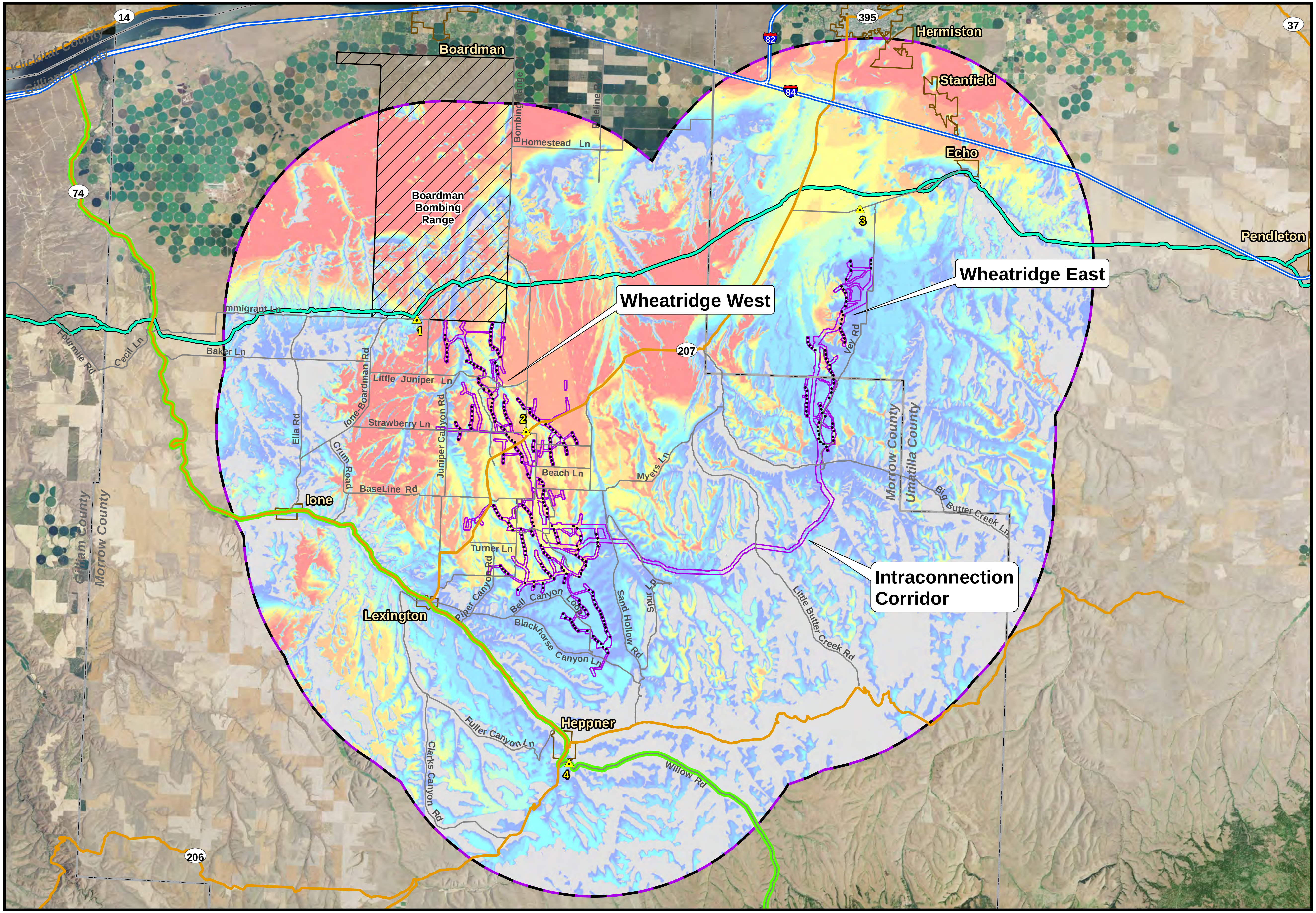
Figure R-3

Wheatridge Wind Energy Facility

Viewshed

- Maximum Project Impact -
GE 1.7-103 Turbines

Morrow and Umatilla Counties, OR
December 2014



- Site Boundary
- Analysis Area (10 mile Buffer of Site Boundary)
- County Boundary
- Boardman Bombing Range
- City/Town
- Interstate Highway
- State Highway
- Local Road
- Scenic Byway
- Oregon Trail
- Turbine
- Key Observation Point

Viewshed

Number of Turbines Visible *

- 0
- 1 - 25
- 26 - 50
- 51 - 75
- 75 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 225
- 226 - 250
- 251 - 275
- 275 - 292

* Potential turbine visibility calculated using a 10 meter bare-earth digital elevation model with turbine heights of 472 feet (144 meters) representing 110% Maximum Blade Tip Height and a viewing height of 6 feet (1.8 meters).

1:275,000 WGS84 UTM 11

0 2.5 5 10 15 20 25 30 35 40 Miles

Data Sources Wheatridge Wind Energy: project facilities / ESRI: roads, political boundaries, cities, background imagery / Oregon Dept. Transportation: scenic byway / Oregon BLM: oregon trail, Boardman Bombing Range / Tetra Tech: key observation points, viewshed / USDA NAIP: background imagery

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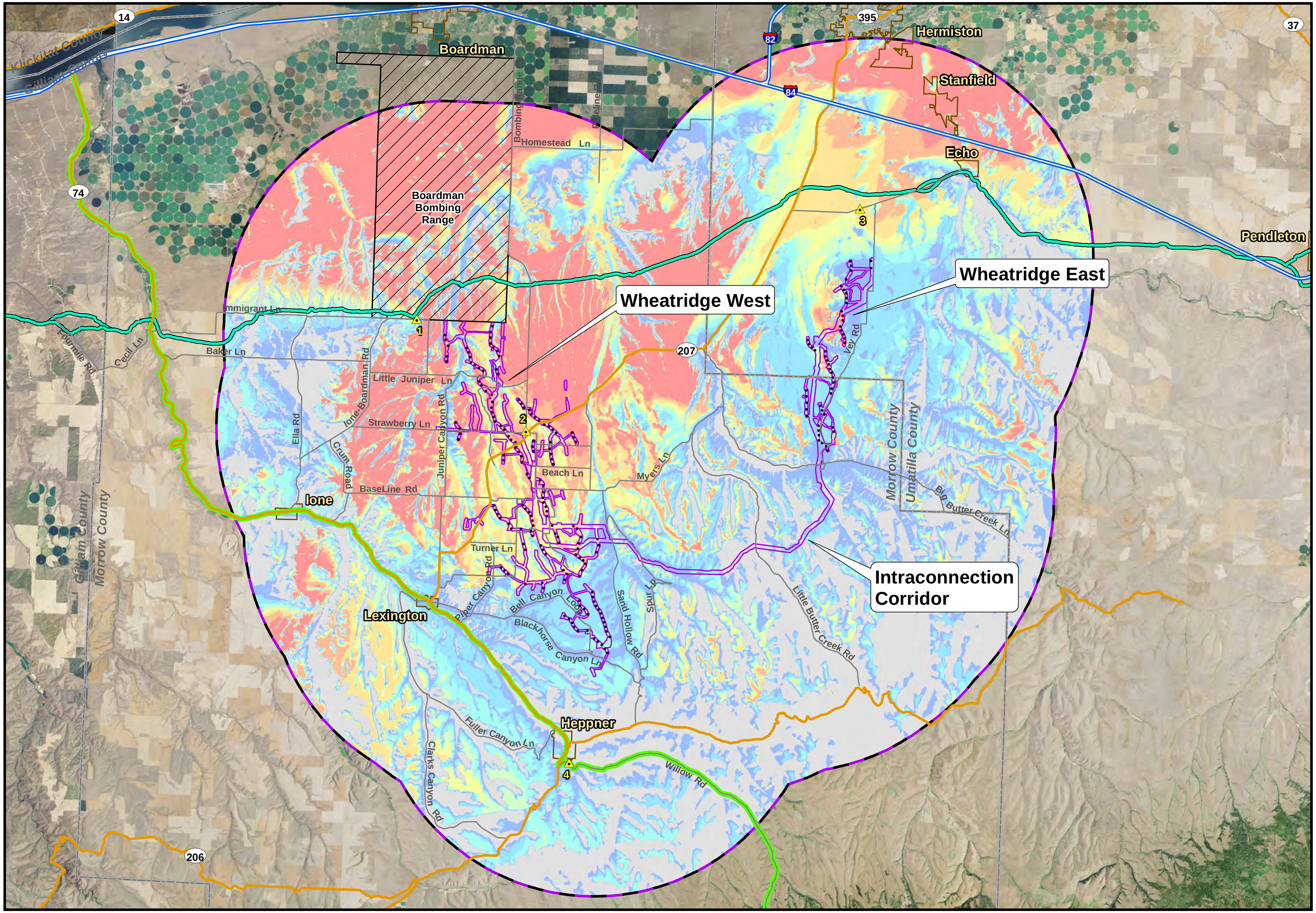

Figure R-4

Wheatridge Wind Energy Facility

Viewshed

- Minimum Project Impact -
GE 2.5-120 Turbines

Morrow and Umatilla Counties, OR
December 2014

- Site Boundary
- Analysis Area (10 mile Buffer of Site Boundary)
- County Boundary
- Boardman Bombing Range
- City/Town
- Interstate Highway
- State Highway
- Local Road
- Scenic Byway
- Oregon Trail
- Turbine
- Key Observation Point

Viewshed

Number of Turbines Visible *

- 0
- 1 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200

* Potential turbine visibility calculated using a 10 meter bare-earth digital elevation model with turbine heights of 525 feet (160 meters) representing 110% Maximum Blade Tip Height and a viewing height of 6 feet (1.8 meters).

1:275,000 WGS84 UTM 11

0 2.5 5 10 15 20 25 30 35 40 Miles

Data Sources Wheatridge Wind Energy: project facilities / ESRI: roads, political boundaries, cities, background imagery / Oregon Dept. Transportation: scenic byway / Oregon BLM: oregon trail, Boardman Bombing Range / Tetra Tech: key observation points, viewshed / USDA NAIP: background imagery

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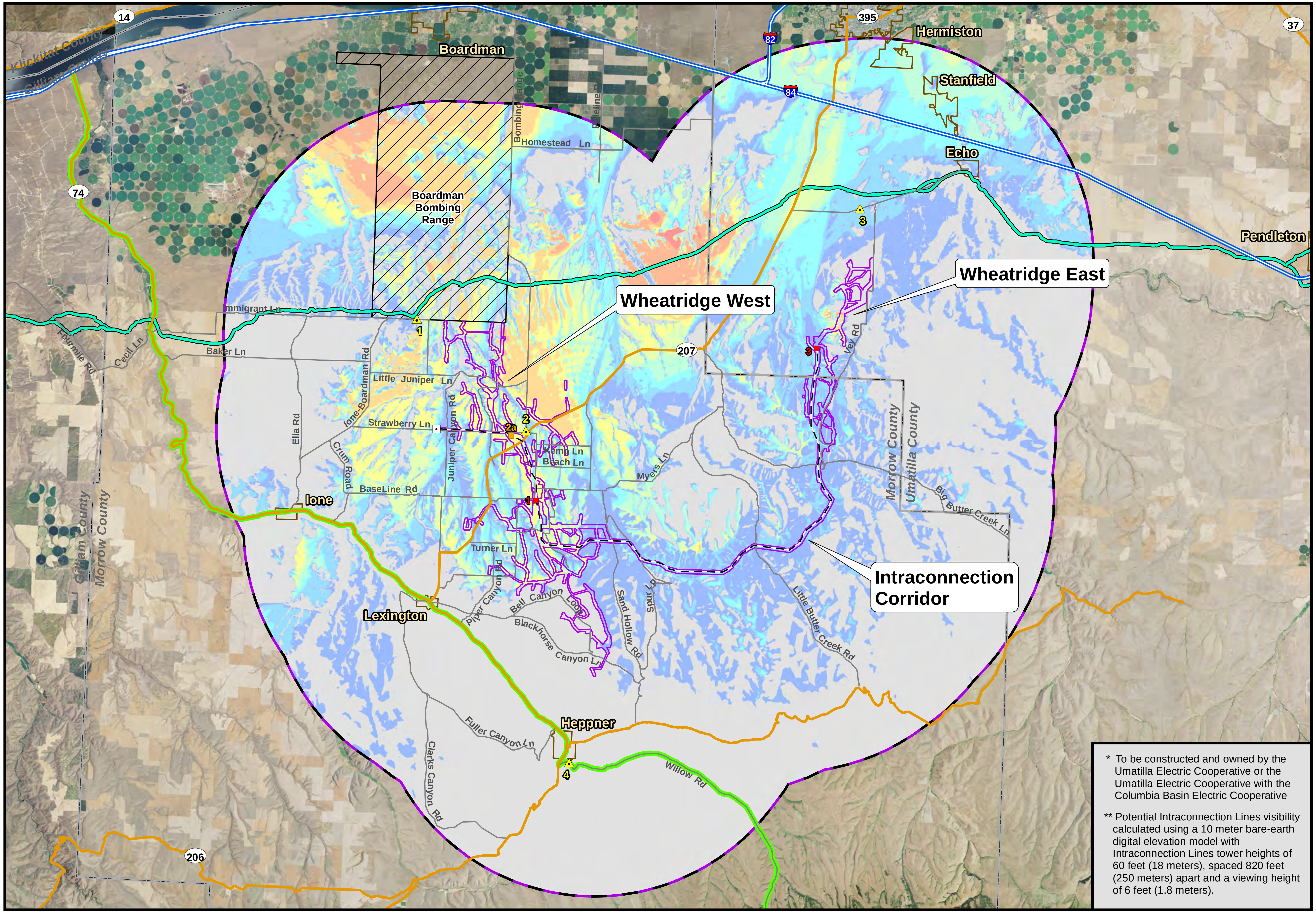

* To be constructed and owned by the Umatilla Electric Cooperative or the Umatilla Electric Cooperative with the Columbia Basin Electric Cooperative

** Potential Intraconnection Lines visibility calculated using a 10 meter bare-earth digital elevation model with Intraconnection Lines tower heights of 60 feet (18 meters), spaced 820 feet (250 meters) apart and a viewing height of 6 feet (1.8 meters).

Figure R-5

Wheatridge Wind Energy Facility

Viewshed

- Maximum Project Impact -
Option 1 230kV
Intraconnection Lines

Morrow and Umatilla Counties, OR
December 2014

- Site Boundary
- Analysis Area (10 mile Buffer of Site Boundary)
- County Boundary
- Boardman Bombing Range
- City/Town
- Interstate Highway
- State Highway
- Local Road
- Proposed Strawberry Substation *

Substation
- Primary
- Alternate
- Scenic Byway
- Oregon Trail
- Intraconnection Lines (Option 1)
- Key Observation Point

Viewshed

Number of Towers Visible **
- 0
- 1 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 225

1:275,000 WGS84 UTM 11

0 2.5 5 10 15 20 25 30 Miles

Data Sources Wheatridge Wind Energy: project facilities / ESRI: roads, political boundaries, cities, background imagery / Oregon Dept. Transportation: scenic byway / Oregon BLM: oregon trail, Boardman Bombing Range / Tetra Tech: key observation points, viewshed / USDA NAIP: background imagery

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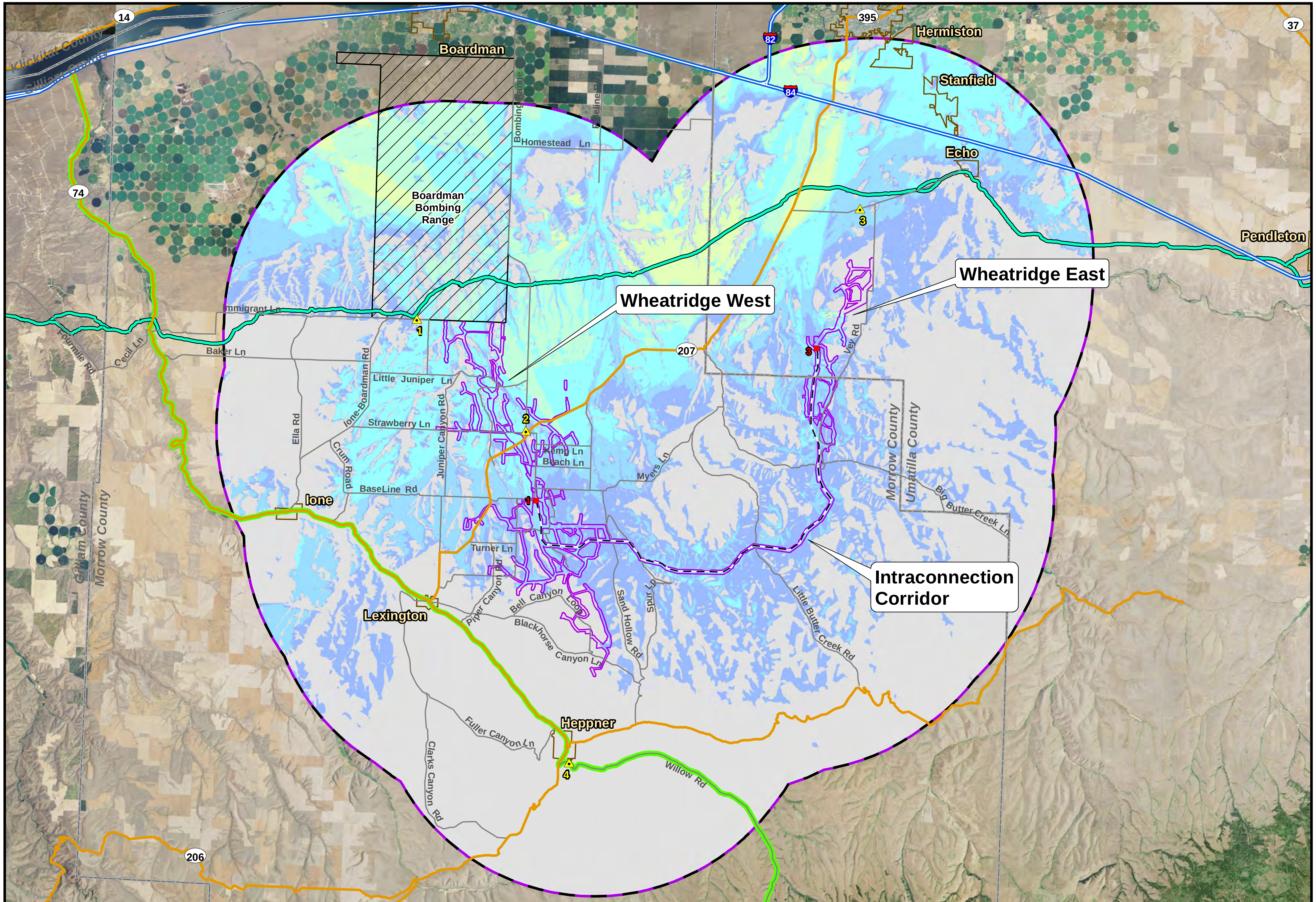
Figure R-6

Wheatridge Wind Energy Facility

Viewshed

- Minimum Project Impact -
Option 3 230kV
Intraconnection Lines

Morrow and Umatilla Counties, OR
December 2014



Site Boundary
Analysis Area (10 mile Buffer of Site Boundary)
County Boundary
Boardman Bombing Range
City/Town
Interstate Highway
State Highway
Local Road

Substation
Primary
Alternate
Scenic Byway
Oregon Trail
Intraconnection Lines (Option 3)
Key Observation Point

Viewshed

Number of Towers Visible *

0
0 - 25
26 - 50
51 - 75
76 - 100
100 - 125

* Potential Intraconnection Lines visibility calculated using a 10 meter bare-earth digital elevation model with Intraconnection Lines tower heights of 60 feet (18 meters), spaced 820 feet (250 meters) apart and a viewing height of 6 feet (1.8 meters).

1:275,000 WGS84 UTM 11

0 2.5 5 10 15 20 25 30 Miles

Data Sources Wheatridge Wind Energy: project facilities / ESRI: roads, political boundaries, cities, background imagery / Oregon Dept. Transportation: scenic byway / Oregon BLM: oregon trail, Boardman Bombing Range / Tetra Tech: key observation points, viewshed / USDA NAIP: background imagery

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Figure R-7

Wheatridge Wind Energy Facility

Visual Simulation: KOP 1 (Oregon Trail Well Spring)

Umatilla County, OR December 2014

Looking southeast from the Oregon Trail Well Spring Kiosk

To maximize the visual impact simulations were conducted using the tallest turbine under evaluation (GE 2.5-120); having a hub height of 85 meters (279 feet) and rotor diameter of 120 meters (394 feet) for a Maximum Blade Tip Height of 145 meters (475 feet). This tallest turbine model was simulated in the locations of the turbine layout with the greatest number of turbines (GE 1.7-103); consisting of 292 proposed turbine locations.

Figure R-8

Wheatridge Wind Energy Facility

Visual Simulation: KOP 2 (Along Bombing Range Road)

Morrow County, OR

December 2014

Looking south along Bombing Range Road near the intersection with Oregon State Highway 207

To maximize the visual impact simulations were conducted using the tallest turbine under evaluation (GE 2.5-120); having a hub height of 85 meters (279 feet) and rotor diameter of 120 meters (394 feet) for a Maximum Blade Tip Height of 145 meters (475 feet). This tallest turbine model was simulated in the locations of the turbine layout with the greatest number of turbines (GE 1.7-103); consisting of 292 proposed turbine locations.

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TETRA TECH

Figure R-9

Wheatridge Wind Energy Facility

Visual Simulation: KOP 3 (Near to Echo Meadows)

Umatilla County, OR

December 2014

Looking south along the Oregon Trail Highway near to Echo Meadows

To maximize the visual impact simulations were conducted using the tallest turbine under evaluation (GE 2.5-120); having a hub height of 85 meters (279 feet) and rotor diameter of 120 meters (394 feet) for a Maximum Blade Tip Height of 145 meters (475 feet). This tallest turbine model was simulated in the locations of the turbine layout with the greatest number of turbines (GE 1.7-103); consisting of 292 proposed turbine locations.

TETRA TECH

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Figure R-10

Wheatridge Wind Energy Facility

Visual Simulation: KOP 4 (Willow Creek Terrace)

Morrow County, OR **December 2014**

Looking north from Willow Creek Terrace

To maximize the visual impact simulations were conducted using the tallest turbine under evaluation (GE 2.5-120); having a hub height of 85 meters (279 feet) and rotor diameter of 120 meters (394 feet) for a Maximum Blade Tip Height of 145 meters (475 feet). This tallest turbine model was simulated in the locations of the turbine layout with the greatest number of turbines (GE 1.7-103); consisting of 292 proposed turbine locations.

TETRA TECH

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Exhibit S

Historic, Cultural, and Archaeological Resources

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Table of Contents

List of Tables

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Attachments

Terms and Definitions

Collector Line	An underground or overhead electrical 34.5 kV line transmitting power from the turbines to a Substation
Construction Yard	The temporary area for construction activities and Project component storage prior to installation
GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

CCS	Cryptocrystalline Silicate
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTUIR-CRPP	Cultural Resources Protection Program of the Confederated Tribes of the Umatilla Indian Reservation
GLO	General Land Office
GPS	Global Positioning System
NRHP	National Register of Historic Places
OAR	Oregon Administrative Rule
ODOE	Oregon Department of Energy
OR-##	Oregon State Highway ##
ORS	Oregon Revised Statutes
SHPO	State Historic Preservation Office

1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit S provides an analysis of potential significant adverse impacts by the Project to historic, cultural, and archaeological resources. Wheatridge has coordinated with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), who conducted the field archaeological survey, to ensure that all Project facilities have been sited to avoid all archaeological and cultural resources as much as possible to their satisfaction. This Exhibit demonstrates that the Project complies with the approval standards in Oregon Administrative Rule (OAR) 345-022-0090 and the submittal requirements in OAR 345-021-0010(1)(s). Specifically, OAR 345-022-0090 states that:

> ***345-022-0090 Historic, Cultural and Archaeological Resources***
>
> *(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:*
>
> > *(a) Historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places;*
> >
> > *(b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and*
> >
> > *(c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).*
>
> *(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the*

Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

2.0 Analysis Area

The Project Order defines the analysis area for historic, cultural and archaeological resources as "the area within the Site Boundary." The Site Boundary is defined in detail in Exhibits B and C, and is shown on Figure S-1. The entire Site Boundary is located on private land.

3.0 Background Information

Pursuant to OAR 345-022-0090(1)(a) this Exhibit addresses potential impacts to significant historic, cultural and archaeological resources. Significant resources, in this context, refers to structures, objects, or sites that 1) are currently listed on the National Register of Historic Places (NRHP) as individual sites or contributing resources to a recognized historic district; 2) have been deemed eligible for listing by the State Historic Preservation Office (SHPO); or 3) would become a contributing resource to a historic district or site as a result of a proposed preservation plan.

Pursuant to OAR 345-022-0090(1)(b) this Exhibit also addresses potential impacts to archaeological objects and sites, many of which are not eligible for NRHP listing but nevertheless contribute to the cultural landscape of Oregon. Archaeological objects and sites are defined in Oregon Revised Statutes (ORS) 358.905(1) as follows:

- Archaeological object – means an object that is at least 75 years old, part of the physical record of an indigenous or other culture found in the state or waters of the state, and is material remains of past human life or activity that are of archaeological significance including, but not limited to, monuments, symbols, tools, facilities, technological by-products and dietary by-products.
- Archaeological site – a geographic locality in Oregon, including but not limited to submerged and submersible lands and the bed of the sea within the state's jurisdiction, that contains archaeological objects and the contextual association of the archaeological objects with each other or biotic or geological remains or deposits.

As the Project is located in an area with pre-contact and historic ties to several Indian tribes, this analysis also addresses archaeological sites and objects that have been determined to be significant by the CTUIR.

4.0 Cultural Resources Inventory Methodology

Identification of cultural resources involved three phases of work: a review of existing cultural resource records, a field survey for previously undocumented resources, and a cultural plant and ethnographic survey.

4.1 Records Research

Background research was conducted by CTUIR and involved a review of the NRHP and records of documented historic, cultural, or archaeological sites maintained by the Oregon State Historic Preservation Office (SHPO).

4.2 Field Survey

Wheatridge contracted with the Cultural Resources Protection Program of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR-CRPP) to conduct the archaeological field survey (Dickson 2014). Field investigation followed Oregon SHPO *Guidelines for Conducting Field Archaeology in Oregon* (SHPO 2007).

The archaeological field survey was performed from October 28, 2013 through January 17, 2014. A total of 13,097 acres, the entirety of the Site Boundary, was surveyed. Field teams walked parallel transects spaced 30 meters (98 feet) apart. Typically, the pedestrian transects were parallel to the long axis of the Site Boundary. Field crews used Trimble Geo XT Global Positioning Systems (GPS) with the Site Boundary and background imagery to assist them in the survey. Field crews also carried topographic maps and aerial photos of the Site Boundary. Visibility varied: about 40% visibility in grazed areas; and a range in cultivated areas, from 10% visibility in areas with heavy stubble to 100% visibility in areas that were recently planted.

When archaeological resources were observed, the survey team examined the area of the find with tighter interval survey transects spaced between 2 to 3 meters (6.5 to 9.8 feet) apart to find additional artifacts and/or delineate boundaries of the resource. The team photographed each site or isolated find and completed the appropriate Oregon SHPO form. Locations of resources were plotted on USGS 7.5' topographic maps and were documented by use of the GPS units with Universal Transverse Mercator coordinates collected in North American Datum 1927 (NAD 27) Zone 11, corrected to sub-meter accuracy.

The archaeological field survey was performed by the CTUIR-CRPP, under the direction of Julius Patrick. The field archaeologists included Josh Moss, Breanne Taylor, Shari Sheoships, Joseph Alexander, Toby Patrick and Arthur Van Pelt. Shawn Steinmetz supervised the survey crews.

The archaeological survey encompassed the entire Site Boundary. No further archaeological survey is anticipated.

4.3 Cultural Plant and Ethnographic Study

Wheatridge contracted with the CTUIR to perform a cultural plant and ethnographic study within the Site Boundary. The results of this study are considered by the CTUIR to be confidential and, when completed, would be on file with the CTUIR Tribal Historic Preservation Office. If the Project would result in impacts to culturally-significant plants or traditional cultural properties, the CTUIR would inform Wheatridge of a potential adverse impact. Wheatridge would work with the CTUIR to avoid adverse impacts to significant cultural plants and traditional cultural properties.

5.0 Cultural and Historic Resources within the Analysis Area

5.1 NRHP-listed and –eligible Resources

Based on the results of background records research by CTUIR, there are no sites within the Site Boundary that are NRHP-listed or that have been determined by SHPO to be either eligible or likely to be eligible for NRHP listing. There are also no registered historic districts within the Site Boundary. Seven sites and/or objects identified during the archaeological field survey have been recommended as eligible for NRHP listing (Table S-1).

There are no Oregon Historic Trails, as listed in ORS 358.057, situated within the Site Boundary. Segments of the Oregon Trail exist north of the Project; approximately 3 miles north of Wheatridge East and approximately 1.5 miles north of Wheatridge West. See Exhibits R and T for more detail on the Oregon Trail.

5.2 Archaeological Sites and Objects

5.2.1 Previously Documented Resources

Background research conducted by CTUIR revealed four archaeological sites that had been previously recorded within one mile of the Site Boundary. For reference these are described below but are not within the analysis area of Exhibit S.

- Site 35MW14 – A lithic scatter comprised of one broken projectile point, one flake knife, seven basalt choppers, and four basalt hammerstones and numerous pieces of fire broken rock and stone chips, reported near McDaid Springs in Juniper Canyon
- Site 35MW223 – An historic artifact scatter, including glass, ceramic, and metal artifacts, dating to the 1920s in Little Juniper Canyon
- Sites 35MW224 and 35MW233 – Components of the Well Spring Oregon Trial Site, north of the Site Boundary. These sites were recommended as potentially eligible to the National Register of Historic Places (Hicks 1995). They contain both pre-contact components and historic components and may also contain materials associated with the Well Spring segment of the Oregon Trail.

- Isolated Find AAR 980-li – Included one cut nail and two pieces of glass reported from a shovel test probe adjacent to the northwestern portion of the Site Boundary (Roulette and Wanzenried 2011).

5.2.2 Archaeological Survey Findings

A total of 8 historic archaeological sites, seven pre-contact archaeological sites, and 6 isolated finds were identified by the CTUIR-CRPP and recorded during the archaeological survey within the Site Boundary. CTUIR-CRPP has recommended seven of the sites as potentially eligible to the National Register of Historic Places. These 21 sites and isolated finds are described below and Table S-1 in Section 6.0 describes measures taken by Wheatridge to avoid impacts, where necessary, for each site and isolated find.

The following descriptions of sites and isolated finds were taken from CTUIR's report "An Archaeological Investigation for the Wheatridge Wind Energy Facility, Morrow and Umatilla Counties, Oregon", dated February 5, 2014.

5.2.2.1 Wheatridge East: Archaeological Sites

- <u>102812A</u> – A scatter of historic farm equipment and agricultural artifacts found mostly within an ephemeral drainage on the east side of Service Buttes. The site comprises a sickle bar mower/field mower with steel wheels and steel treat; a wagon axle; a metal wheel with wooden spokes; milled lumber and wire nails; metal straps; barbed wire; a mouldboard plow (incomplete); a disc with a wooden tongue/yoke and wooden support; and a pivot wheel.
- <u>103012A</u> – Two stacked rock features described as cairns and one tertiary cryptocrystalline silicate (CCS) flake on Service Buttes.
- <u>110409A</u> – A single stacked rock feature near the highest point on Service Buttes. Interpreted as pre-contact, the feature appears to have been disturbed by grazing activities. A portion of a 50-gallon drum is adjacent and appears to have been used to provide minerals to cattle.
- <u>111414A</u> – Two stacked rock features on the end of a ridge overlooking Butter Creek.
- <u>Vey Ranch Phone Line</u> – A line of eight-inch (approximately) diameter wooden telephone poles that at one time supported telephone wire that served the Vey (now Schiller) ranch located on Butter Creek.

5.2.2.2 Wheatridge East: Isolated Finds

- <u>102809A</u> – A single tertiary obsidian flake found in a swale near an ephemeral drainage. (Noted as near the Indian Trail on the 1860 General Land Office [GLO] map for Township 2 North, Range 28 East, WM east of Service Buttes in Umatilla County.)

- 103111A – A manganese glass bottle fragment with hand-applied finish, noted as in the immediate vicinity of the Indian Trail on the 1860 GLO map for Township 2 North, Range 28 East, WM east of Service Buttes in Umatilla County.
- 110508B – A light scatter of historic artifacts comprised of manganese glass fragments, dark green glass fragments, a possible barrel hoop, a straight bar snaffle bit for a draft horse, and white-glazed stoneware shards. Site found in a drainage and appeared to reflect dumping activity.

5.2.2.3 Wheatridge West: Archaeological Sites

- 112013B – A single stacked rock feature on the eastern end of Swaggart Buttes. Nearby a portion of a five-gallon drum was observed and interpreted as used for providing minerals to cattle.
- 112108B - Two stacked rock features interpreted as cairns.
- 112112D - An abandoned, rusted, belt-driven combine on Swaggart Buttes. Remnant green paint may be indicative of John Deere brand.
- 112609A – An abandoned harvester and nearby Massey-Harris grain bin (possibly pre-1953) recorded on Swaggart Buttes.
- 112613A – An abandoned International Harvester pasture aerator recorded on Swaggart Buttes' north slope.
- 112714A – An abandoned Case disc plow with steel wheels recorded on north slope of Swaggart Buttes.
- 122408A – A partially buried horse-drawn running gear or chassis found in an unnamed tributary to Little Juniper Canyon.
- 010711A – A lithic scatter including 30 basalt flakes, one tertiary obsidian flake, and two quartz flakes. The scatter was recorded on top of a south facing slope above Little Juniper Creek.
- 010913A – A hand-dug rock-lined well with a wood-lined concrete superstructure that may have formerly supported a windmill, and a wooden superstructure covering a reservoir were recorded along Little Juniper Creek. The reservoir appeared to be at least eight feet deep and was filled with miscellaneous debris including bailing wire, 55-gallon drums, 5-gallon motor oil cans, a wood cook stove, a car bumper, a galvanized tub, and modern trash. A nearby large corral system was observed but no record of any domestic structure was either observed in the field or noted on historic maps. The well and reservoir may have been used to provide water to cattle and/or sheep that were at one time held in the corrals. This site was located within property originally part of the Site Boundary. Micrositing of the Project has resulted in the exclusion of this from the Site Boundary.

5.2.2.4 Wheatridge West: Isolated Finds

- 111813A – A single tertiary CCS flake found in a wheat field on a ridge between Sand Hollow and Black Horse Canyon.
- 121808B – A white tertiary CCS flake found in Little Juniper Canyon.
- 010610D – A basalt biface fragment found on a ridge between Little Juniper Canyon and Strawberry Canyon.

5.2.2.5 Intraconnection Corridor: Archaeological Sites

- 111410A – A single stacked rock feature on a west-facing ridge east of Morris Canyon.

6.0 Impacts Assessment

Wheatridge has taken into consideration the results of the archaeological survey in its Project design. There would be no impacts to archaeological resources as a result of the development of the Project. In coordination with CTUIR, Wheatridge modified the Project design to move facility components away from features identified by CTUIR during the archaeological field investigation, to the satisfaction of CTUIR. A summary of the Project changes made at each find, where necessary, is detailed below in Table S-1.

Table S-1. Summary of Archaeological Resource Avoidance

Site/Isolate Number	Project Location	Site/Isolate Description	NRHP Eligibility Recommendation	Avoidance Measures Taken	Distance to Nearest Project Infrastructure
111813A	Wheatridge West	Isolated CCS flake	No recommendation	No avoidance measures necessary	70 meters
121808B	Wheatridge West	Isolated CCS flake	No recommendation	Moved Intraconnection Lines 30 m	30 meters
010610D	Wheatridge West	Isolated biface fragment	No recommendation	Moved 100 meters of underground collector line	60 meters
112013B	Wheatridge West	Rock feature	Eligible	No avoidance measures necessary	300 meters
112108B	Wheatridge West	Rock feature	Eligible	No avoidance measures necessary	300 meters

Table S-1. Summary of Archaeological Resource Avoidance

Site/Isolate Number	Project Location	Site/Isolate Description	NRHP Eligibility Recommendation	Avoidance Measures Taken	Distance to Nearest Project Infrastructure
112112D	Wheatridge West	Farm equipment	Not eligible	Moved 200 meters of underground collector line	20 meters
112609A	Wheatridge West	Farm equipment	Not eligible	Moved a turbine 100 meters	20 meters
112613A	Wheatridge West	Farm equipment	Not eligible	Removed 1,700 meters of road to be improved	150 meters
112714A	Wheatridge West	Farm equipment	Not eligible	No avoidance measures necessary	120 meters
122408A	Wheatridge West	Farm equipment	Not eligible	No avoidance measures necessary	10 meters
010711A	Wheatridge West	Lithic scatter	Eligible	No avoidance measures necessary	200 meters
010913A	Wheatridge West	Well and reservoir	Not eligible	Revised Site Boundary to avoid feature	No longer within Site Boundary
102809A	Wheatridge East	Isolated obsidian flake	No recommendation	No avoidance measures necessary	600 meters
103111A	Wheatridge East	Isolated bottle fragment	No recommendation	Removed 1.3 miles of road to be constructed	400 meters
110508B	Wheatridge East	Historic artifact scatter (isolated find)	No recommendation	Re-routed 220 meters of underground collector line	50 meters
102812A	Wheatridge East	Farm equipment	Not eligible	Removed 1.8 miles of road to be constructed, moved a construction yard 450 meters	350 meters

Table S-1. Summary of Archaeological Resource Avoidance					
Site/Isolate Number	**Project Location**	**Site/Isolate Description**	**NRHP Eligibility Recommendation**	**Avoidance Measures Taken**	**Distance to Nearest Project Infrastructure**
103012A	Wheatridge East	Rock feature	Eligible	Moved a turbine 200 meters, removed 300 meters of road to be constructed, re-routed 825 meters of underground collector line	51 meters
110409A	Wheatridge East	Rock feature	Eligible	No avoidance measures necessary	60 meters
111414A	Wheatridge East	Rock feature	Eligible	Moved Intraconnection Lines 30 meters	65 meters
Vey Ranch Phone Line	Wheatridge East	Phone line	No recommendation	Moved construction yard 50 meters, centered access road between two remaining phone line poles	Project access road crosses linear feature; approximately 41 meters to remaining phone line poles
111410A	Intraconnection Corridor	Rock feature	Eligible	Moved Intraconnection Lines 40 meters	70 meters

6.1 Umatilla Setback Requirement

Section 152.616(HHH)(6)(a)(5) of the Umatilla County Development Ordinance requires a 50-meter (164-foot) setback of wind facility elements from known archaeological, historical or cultural sites of the CTUIR; setbacks to other non-CTUIR archaeological, historical or cultural sites are to be considered on a case by case basis.

The Project is designed to maintain a minimum 50 meter setback to all identified archaeological, historic and cultural resources of the CTUIR within Umatilla County. While Table S-1 lists 5 additional known resources for which Project infrastructure would be closer than 50 meters, these five are not located in Umatilla County and/or are not associated with the CTUIR, thus are not subject to the 50 meter setback.

The Project has been designed to avoid impacts to all known archaeological, historic and cultural resources deemed eligible or potentially eligible for NRHP listing. In only one case would any

Project infrastructure be located closer than 50 meters to a listed or potentially eligible historic resource in Umatilla County that is not associated with the CTUIR; the Vey Ranch phone line. What remains of the Vey Ranch phone line consists of some of the poles once used to carry the telephone line. The phone line conductor wires are no longer in existence and all that remains of this dilapidated phone line are the scattered, remnant telephone poles along the western edge of Vey Road, some of which are now used as fence posts.

A Project access road must cross from Vey Road west into the project. The access road would be approximately centered between any remaining poles; features that are approximately 94.5 meters (310 feet) apart, yielding a setback of approximately 47 meters to each pole. This access road routing maximizes the setback to each pole and avoids direct impacts to any remaining evidence of the Vey Ranch Phone Line. As the Vey Ranch phone line is not a cultural feature of the CTUIR it is not subject to Umatilla Development Ordinance requiring a 50m (164 feet) setback from known archaeological, historical or cultural sites of the CTUIR. Additionally, considering the average spacing of the remnant poles, where they still exist, is approximately 94.5 meters, Wheatridge will be able to site the required access road 30 meters or more from any remaining pole as per the directions of the Oregon State Historic Preservation Office.

7.0 Additional Avoidance and Mitigation Measures

7.1 Avoidance Measures

One, or a combination of several, avoidance measures have been or would be implemented so that the Project may avoid impacts to archaeological resources. These include: facility location adjustment in coordination with CTUIR, environmental awareness training, construction drawing notations, exclusion flagging, and field compliance monitoring by a qualified archaeologist. These are described as follows.

- Facility location adjustment - Direct effects to the recorded archaeological resources was avoided by adjusting Project facilities away from identified archaeological resources, in coordination with the CTUIR. The Project design team adjusted various Project facilities to balance maximizing the available wind resource with avoidance of direct impacts to archaeological discoveries. Any further micrositing of facilities prior to construction will also avoid all known cultural and archaeological resources.
- Environmental awareness training – Wheatridge would train construction contractors to be aware of sensitive historic, cultural, and archaeological resources that are present on-site. This information would be presented in conjunction with hazard and safety training prior to construction.
- Construction drawings – Archaeological resources would be identified on construction drawings as 'sensitive resource areas – no entry'. Construction personnel who work in the field would be made aware of these locations.
- Exclusion flagging – Archaeological resources identified within 200 feet (61 meters) of planned construction would be marked with exclusion fencing or other marking

demarcating a 30 meter (98 foot) buffer and the contractor would be instructed to work outside of these boundaries at all times. The contractor would ensure that exclusion flagging is in place prior to the commencement of construction in the vicinity of any archaeological resource identified in Table S-1.

- Field compliance monitoring – The role of the compliance monitor is described in Section 7.3

7.2 Unanticipated Discovery Plan

Should any previously unidentified cultural resources be encountered during construction, construction activities will cease in the immediate vicinity of the newly identified cultural resource pending evaluation by a qualified archaeologist. Wheatridge would notify the Oregon Department of Energy (ODOE) and the SHPO of the find. If SHPO finds the cultural resources to be eligible for NHRP listing, Wheatridge would work with SHPO to determine appropriate mitigation measures such as avoidance or data recovery. Once mitigation measures are approved, implementation has been completed, and SHPO and ODOE have concurred that work has been adequately performed and reported, then, upon receipt of concurrence, Wheatridge would once again commence construction activities taking into consideration any agreed-upon modifications or mitigations.

7.3 Proposed Monitoring Program

Archaeological monitors would be present during construction in areas where construction activities would take place within 200 feet of archaeological cultural resources that were recommended as potentially eligible to the NRHP; based upon the final layout. As noted in Table S-1, archaeological monitors would be present during construction in the areas of Sites 103012A, 110409A, 111410A, 111414A, and 010711A.

8.0 Submittal Requirements and Approval Standards

8.1 Submittal Requirements

Table S-2. Submittal Requirements Matrix

Requirement	Location
OAR 345-021-0010(1) (s) Information about historic, cultural and archaeological resources. Information concerning the location of archaeological sites or objects may be exempt from public disclosure under ORS 192.502(4) or 192.501(11). The applicant shall submit such information separately, clearly marked as "confidential," and shall request that the Department and the Council keep the information confidential to the extent permitted by law. The applicant shall include information in Exhibit S or in confidential submissions providing evidence to support a finding by the Council as required by OAR 345-022-0090, including:	Attachment S-1 (Confidential, filed separately on 2/5/2014)

Table S-2. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(s) (A) Historic and cultural resources within the analysis area that have been listed, or would likely be eligible for listing, on the National Register of Historic Places.	Sections 5.1, 5.2, Table S-1
OAR 345-021-0010(1)(s) (B) For private lands, archaeological objects, as defined in ORS 358.905(1)(a), and archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area.	Sections 5.1, 5.2 and Table S-1
OAR 345-021-0010(1) (s) (C) For public lands, archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area.	N/A
OAR 345-021-0010(1)(s) (D) The significant potential impacts, if any, of the construction, operation and retirement of the proposed facility on the resources described in paragraphs (A), (B) and (C) and a plan for protection of those resources that includes at least the following:	6.0
(i) A description of any discovery measures, such as surveys, inventories, and limited subsurface testing work, recommended by the State Historic Preservation Officer or the National Park Service of the U.S. Department of Interior for the purpose of locating, identifying and assessing the significance of resources listed in paragraphs (A), (B) and (C).	4.0
(ii) The results of the discovery measures described in subparagraph (i), together with an explanation by the applicant of any variations from the survey, inventory, or testing recommended.	5.0
(iii) A list of measures to prevent destruction of the resources identified during surveys, inventories and subsurface testing referred to in subparagraph (i) or discovered during construction.	Section 7.0, Table S-1
OAR 345-021-0010(1)(s) € The applicant's proposed monitoring program, if any, for impacts to historic, cultural and archaeological resources during construction and operation of the proposed facility.	7.3
Project Order Comments	**Location**
No substantive comments.	

8.2 Approval Standard

Table S-2. Approval Standard	
Requirement	**Location**
OAR 345-022-0090 Historic, Cultural and Archaeological Resources	
(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:	
(a) Historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places;	Sections 5.1, 5.2, Table S-1
(b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and	Sections 5.1, 5.2, Table S-1
(c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).	N/A

Table S-2. Approval Standard	
Requirement	**Location**
(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	
(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	

9.0 References

Dickson, Catherine E. 2014. *An Archaeological Investigation for the Wheatridge Wind Energy Facility, Morrow and Umatilla Counties, Oregon.* Prepared by the Confederated Tribes of the Umatilla Indian Reservation Department of Natural Resources, Pendleton, Oregon for Wheatridge Wind Energy, Ione, Oregon.

Hicks, Brent A. 1995. *Archaeological and Historical Research at the Well Spring Oregon Trail Site, Naval Weapons System Training Facility, Boardman, Oregon*. Submitted to the National Park Service Pacific Northwest Region. BOAS, Seattle, WA.

Roulette, Bill R. and Michael Wanzenried. 2011*. Literature Review and Archaeological Resource Survey of the Mariah Wind Farm Site, Morrow County, Oregon*. Submitted to Mariah Wind. Applied Archaeological Research report number 980, Portland, OR.

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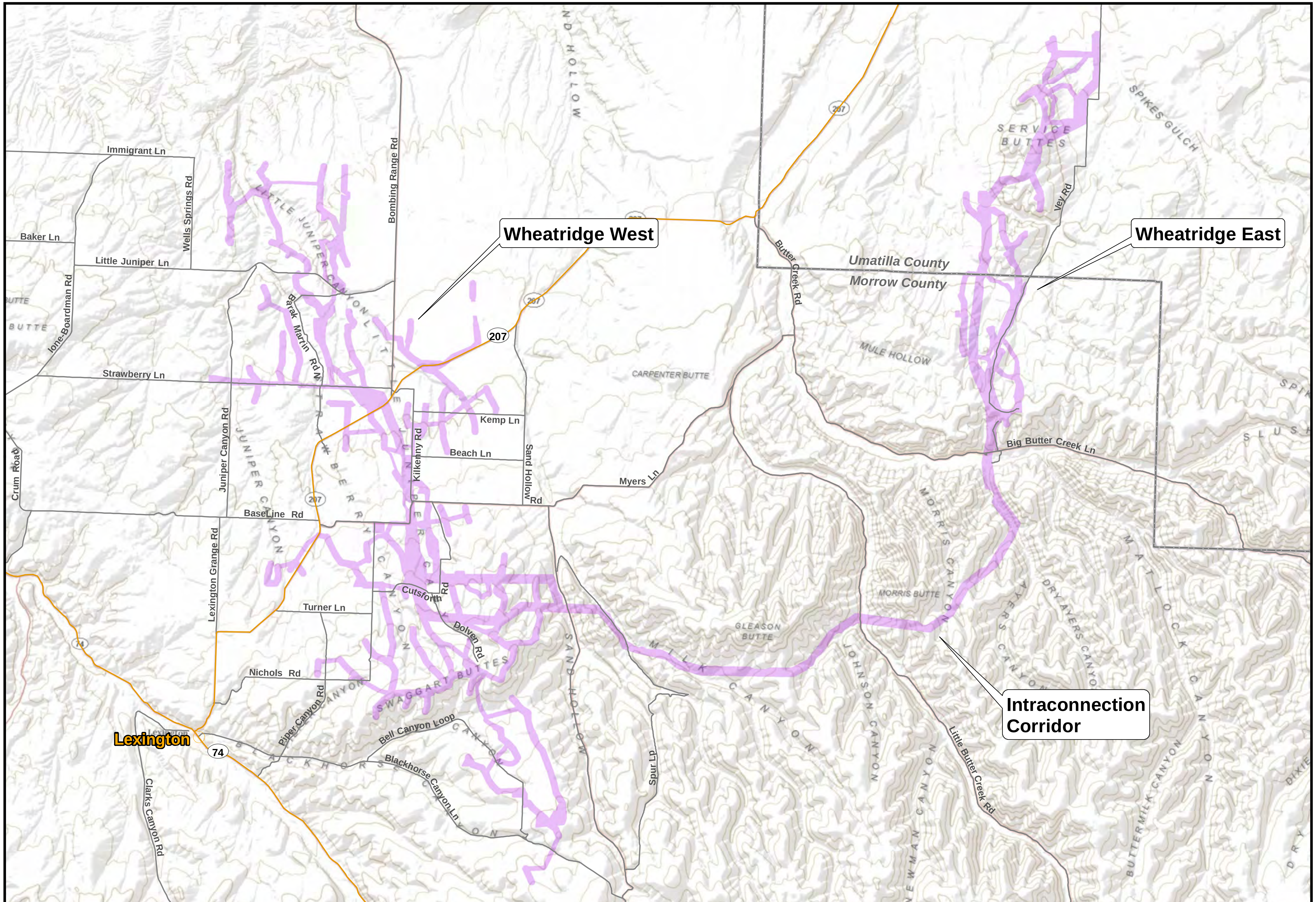
Figures

Figure S-1

Wheatridge Wind Energy Facility

Historic, Culural, and Archaeological Resources Analysis Area

Morrow and Umatilla Counties, OR
December 2014



Analysis Area *
County Boundary
State Highway
Local Road
City/Town

1:135,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: project facilities / ESRI: roads, political boundaries, background imagery

* The Analysis Area is the entirety Site Boundary

TETRA TECH

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Attachment S-1:

Cultural Resources Survey for the Wheatridge Wind Energy Facility

CONFIDENTIAL AND NOT FOR PUBLIC DISTRIBUTION.
SUBMITTED UNDER SEPARATE ATTACHMENT

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Attachment S-2:

Record of Correspondence with the Confederated Tribes of the Umatilla Indian Reservation

Eric Stoutenburg

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Thursday, January 30, 2014 10:11 AM
To: Eric Stoutenburg; Andrew OConnell
Subject: RE: Wheatridge site/isolate information

Eric:
I was out conducting field work yesterday and did not check my email. I can send you shapefiles of the archaeological sites and isolates for the Wheatridge project area. These location are mainly point data, but a small number are polygons. Let me know if this is what you need or if there is something else that I can provide to you that would useful. I'm in the office today, but will be out tomorrow.
~Shawn

Shawn Steinmetz
Archaeologist/Ethnographer
Confederated Tribes of the Umatilla Indian Reservation
Cultural Resources Protection Program
46411 Timine Way
Pendleton, Oregon 97801
(541) 429-7128
shawnsteinmetz@ctuir.org

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Wednesday, January 29, 2014 11:12 AM
To: Andrew OConnell; Shawn Steinmetz
Subject: RE: Wheatridge site/isolate information

Andrew,

Thanks for the introduction. I'll ensure none of the information ends up on public maps. I'll just use it to adjust our infrastructure design to ensure we don't impact any identified sites.

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From: Andrew OConnell [mailto:andrew@diversifiedwinds.com]
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Cc: Eric Stoutenburg
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Subject: RE: Wheatridge site/isolate information
Attachments: Phone Line.prj; Phone Line.sbn; Phone Line.sbx; Phone Line.shp; Phone Line.shx; Site Polygons.dbf; Site Polygons.prj; Site Polygons.sbn; Site Polygons.sbx; Site Polygons.shp; Site Polygons.shx

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Tribes of the Umatilla Indian Reservation. The information, contents and attachments in this email are Confidential and Private.

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Sent: Wednesday, February 05, 2014 12:01 PM
To: Eric Stoutenburg
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That is correct.

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Wednesday, February 05, 2014 11:27 AM
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Shawn,

Am I summarizing the information and files correctly as below:

Findings: (1) 15 sites of which 1 linear, 6 polygons, and 8 points. (2) 6 isolated finds.

Files:

Site_Points_final.shp 8 points. Sent by Shawn Steinmetz of CTUIR on 2014-02-04. 100 ft buffer around point. If farm equipment, no buffer required, just don't disturb. Will use 15 ft buffer for farm equipment.

isolate_final_.shp 6 points. Sent by Shawn Steinmetz of CTUIR on 2014-02-04. 100 ft buffer around point.

Phone Line.shp 1 linear feature (3 parts). Sent by Shawn Steinmetz of CTUIR on 2014-02-04. Linear feature - avoid poles.

Site Polygons.shp 6 polygons. Sent by Shawn Steinmetz of CTUIR on 2014-01-30. 100 ft buffer around the boundary.

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Site 102812A (Its reference number in the shape file was 102811B, sorry about not updating your tabular data) consists of several pieces of abandoned farm equipment. A buffer is not need and development along the existing road which runs through the middle of the site should be okay if we take steps to protect the artifacts present at this site.

I will take a look at the phone line shape file and send it to you today.

~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Monday, February 03, 2014 8:13 AM
To: Shawn Steinmetz
Cc: Andrew O'Connell (andrew@diversifiedwinds.com)
Subject: RE: Wheatridge site/isolate information

Shawn,

After reviewing the files are my questions for the Site Polygons:

Site 103012A – this is a polygon on top of a hill at the north end of the Service Buttes. The polygon covers almost the entire top of the hill, a place we would like to site a wind turbine. How should this site be treated? Is it an exclusion zone for all project infrastructure (buried cables, roads, turbines)?

Site 102811B – this polygon covers a small drainage feature, a wheatfield and a dirt road. We intended to use the existing dirt road by improving it. How should this site be treated? Should a new parallel road be constructed through the wheatfield around the polygon and leave the other existing dirt road untouched by any of our project infrastructure?

We avoid all the other site polygons in the project area.

The phone line shapefile would not open. Apparently something was corrupted in the file. Could you resend?

When you send the site and isolated find points, how should they be treated?

If these questions are answered easier by phone, I'm also available most mornings this week.

Thanks,
Eric

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Thursday, January 30, 2014 4:31 PM
To: Eric Stoutenburg
Subject: RE: Wheatridge site/isolate information

Eric:
Here is round 1. I still need to get you the site point and isolated find points. These are all in NAD 27. Sorry about the lack of metadata. Let me know if these don't work. I'll work on getting the rest of the shp file to you. The historic phone line is a linear site.
~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Wednesday, January 29, 2014 11:12 AM
To: Andrew OConnell; Shawn Steinmetz
Subject: RE: Wheatridge site/isolate information

Andrew,

Thanks for the introduction. I'll ensure none of the information ends up on public maps. I'll just use it to adjust our infrastructure design to ensure we don't impact any identified sites.

Eric

From: Andrew OConnell [mailto:andrew@diversifiedwinds.com]
Sent: Wednesday, January 29, 2014 10:56 AM
To: shawnsteinmetz@ctuir.org
Cc: Eric Stoutenburg
Subject: Wheatridge site/isolate information

Shawn,

Please let me introduce my colleague, Eric Stoutenberg. Eric is leading Wheatridge's engineering and design. He is interested seeing the shapefiles and setbacks corresponding to these sites/isolates so that he can see how they'll affect his design. When you have a moment would you please send Eric the shapefiles corresponding to these sites/isolates? If setbacks are not included, would you please specify the appropriate setback from these sites/isolates? Thanks very much for your help.

Andrew

Eric,

Please note the archeological sites and isolates should not go on any public maps. Thanks again for all the help.

Andrew

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Wednesday, January 22, 2014 4:57 PM
To: 'Andrew OConnell'
Subject: Wheatridge site/isolate information

Andrew:
Attached is a map of the project area and a table with a short description of what was found. There is a column under the heading of recommendations, if we can design the project in a way that avoids the resources that were located then the archaeology will not present a problem for this project. GPS coordinates for these location are also in the table too. We can talk about this in more detail on our call on Thursday.

The opinions expressed by the author are his or her own and are not necessarily those of the Confederated Tribes of the Umatilla Indian Reservation. The information, contents and attachments in this email are Confidential and Private.

Eric Stoutenburg

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Wednesday, February 05, 2014 2:02 PM
To: Eric Stoutenburg
Subject: RE: Wheatridge site/isolate information

FID 0 is site 102811B
FID 1 is site 103012A
FID 2 is site 111414A
FID 3 is site 112108B
FID 4 is site 010711A
FID 5 is site 010913A

Sorry about the confusion, here are the corresponding site numbers for the Site_Polygon.shp.
~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Wednesday, February 05, 2014 1:16 PM
To: Shawn Steinmetz
Subject: RE: Wheatridge site/isolate information

Shawn,

Just one follow-up.

Site_Polygons.shp
The polygon object with the FID #2 does not have a site number in the shapefile attribute table. It is the polygon on the south end of the Service Buttes. Is it 111414A?

Thanks,
Eric

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Tuesday, February 04, 2014 12:15 PM
To: Eric Stoutenburg
Subject: RE: Wheatridge site/isolate information

Eric:
There are 15 sites and 6 isolated finds. Sites include: 1 linear site, 6 that are mapped as polygons, and 8 that are mapped as points. All of the isolates are mapped as points and there are 6 locations. Attached are shp files with all 6 isolated finds and the file with all eight site points. The Linear site location and the polygon location shape file that you have are correct. Let me know if you have any questions.
~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Tuesday, February 04, 2014 8:29 AM
To: Shawn Steinmetz
Subject: RE: Wheatridge site/isolate information

Shawn,

Thanks for the phone line. This one worked. It looks easy to avoid this linear feature entirely.

No problem with the back and forth. The earlier we see the stuff, even in draft form, the more I can work to change the project infrastructure to appropriately avoid the sites.

Eric

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Monday, February 03, 2014 4:41 PM
To: Eric Stoutenburg
Subject: RE: Wheatridge site/isolate information

Eric:
There will be flexibility with some of the archaeological sites. For instance, the historic farm equipment will be recommend as not eligible and will not need the 100 ft. buffer.

The phone line is linear, but the important features are the standing pole along the line. If these poles can be avoided then the route of the phone line should not impede the project.

We are just getting our report into a final draft format. So the things have been in draft form, I'm sorry about the back and forth. The shape file I sent to you today with the isolate location is missing two locations. I will get you an updated shape file with all six locations. There are 15 total sites. There are points, polygons and one linear location (attached). I will take a look at what I have sent to you and send a corrected shape file to you. What you have is correct spatially, but you might not have all of the total locations. I'll sort things out and get back to you.
~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Monday, February 03, 2014 1:21 PM
To: Shawn Steinmetz
Subject: RE: Wheatridge site/isolate information

Shawn,

Thank you for the information and the files. I reviewed all the point data. Even with a 100 ft buffer we are largely clear of all the sites with all our infrastructure. I was able to make small adjustments to our infrastructure for a few to make it work.

One site, CRPP112112D the combine, sits on the side of a road the landowner uses. It is the same case as the polygon that we intend to just improve the road and not disturb the combine, but we will be closer than 100 ft.

Thanks,
Eric

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Monday, February 03, 2014 11:54 AM
To: Eric Stoutenburg
Subject: RE: Wheatridge site/isolate information

Eric:
Oregon State standards are for a buffer of 100 feet (minimum) from an archaeological site that is potentially eligible for inclusion to the National Register of Historic Places. The buffer includes all development or ground disturbing activities,

like areas for staging materials. For the purpose of planning the placement of the Wheatridge infrastructure the sites and isolates should be treated as an exclusion zones. The shape files that I have sent to you are the actual site boundaries and do not include the 100 foot buffer. Attached are the rest of the sites and Isolated Finds that have a small footprint. The same buffer should be used. The majority of the sites are historic and are likely not eligible, which means that we will be able to have development closer or adjacent to those sites (recommendations will be in our report that we are working on).

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Thanks,
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To: Eric Stoutenburg
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Eric:
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From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Wednesday, January 29, 2014 11:12 AM
To: Andrew OConnell; Shawn Steinmetz
Subject: RE: Wheatridge site/isolate information

Andrew,

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Eric

From: Andrew OConnell [mailto:andrew@diversifiedwinds.com]
Sent: Wednesday, January 29, 2014 10:56 AM
To: shawnsteinmetz@ctuir.org
Cc: Eric Stoutenburg
Subject: Wheatridge site/isolate information

Shawn,

Please let me introduce my colleague, Eric Stoutenberg. Eric is leading Wheatridge's engineering and design. He is interested seeing the shapefiles and setbacks corresponding to these sites/isolates so that he can see how they'll affect his design. When you have a moment would you please send Eric the shapefiles corresponding to these sites/isolates? If setbacks are not included, would you please specify the appropriate setback from these sites/isolates? Thanks very much for your help.

Andrew

Eric,

Please note the archeological sites and isolates should not go on any public maps. Thanks again for all the help.

Andrew

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Wednesday, January 22, 2014 4:57 PM
To: 'Andrew OConnell'
Subject: Wheatridge site/isolate information

Andrew:
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Eric Stoutenburg

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Monday, March 24, 2014 2:16 PM
To: Eric Stoutenburg
Subject: RE: Review infrastructure changes from cultural survey results

I have not used go-to-meeting, but I should be able to figure it out. It looks like all I need is an ID that you will provide as the meeting organizer. I think it should work.
~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Monday, March 24, 2014 10:49 AM
To: Shawn Steinmetz
Subject: RE: Review infrastructure changes from cultural survey results

Shawn,

Wednesday 9am works. Have you used Go-To-Meeting before on your computer? This would be easiest since I can have the project open in a map document and I can zoom in/out/around to review all the sites in as much detail as needed and make adjustments on the fly. Otherwise I'm stuck making a map for each feature, but can if that's what you prefer.

Thanks,
Eric

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Monday, March 24, 2014 8:48 AM
To: Eric Stoutenburg
Subject: RE: Review infrastructure changes from cultural survey results

Eric:
Will Wednesday morning at 9am PDT work for you? If there are graphic you want me to look at during the meeting you could email those to me anytime.
~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Friday, March 21, 2014 11:59 AM
To: Shawn Steinmetz
Cc: Andrew O'Connell (andrew@diversifiedwinds.com); Robert.Friedel@tetratech.com
Subject: Review infrastructure changes from cultural survey results

Shawn,

I wanted to discuss with you the changes we made to our project's infrastructure to meet the guidelines of avoiding the cultural sites identified within the project area. Would you be able to have an online meeting/phone call Tuesday, Wednesday, or Thursday morning next week? Please choose any morning time that works for you. We can take a look at each site and ensure the changes I made reflect the guidance in the report.

Thanks,
Eric

Eric Stoutenburg

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Tuesday, March 25, 2014 10:39 AM
To: Eric Stoutenburg
Subject: RE: Table for tomorrow's phone call

Looks great.
Thanks,
Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Tuesday, March 25, 2014 10:25 AM
To: Robert.Friedel@tetratech.com; Shawn Steinmetz
Subject: Table for tomorrow's phone call

Shawn,

Attached is a table Rob and I put together about the cultural features in relationship to our project infrastructure and the changes we made to the infrastructure to avoid impacting any of the sites. On the call tomorrow we can step through the table on the map and discuss a few of them in a bit more detail.

Thanks,
Eric

Eric Stoutenburg

Subject:	GoToMeeting Invitation - Review Wheatridge Infrastructure and Cultural Sites
Location:	Online
Start:	Wed 3/26/2014 9:00 AM
End:	Wed 3/26/2014 9:45 AM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Organizer:	Eric Stoutenburg
Required Attendees:	shawnsteinmetz@ctuir.org; Robert.Friedel@tetratech.com

Please join my meeting on Wednesday, March 26, 2014 at 9am PT to view my screen.
https://www4.gotomeeting.com/join/656536343

And join the conference call:

Dial +1 (805) 309-0010
Access Code: 656-536-343
Audio PIN: Not needed, just press #

Meeting ID: 656-536-343

Eric Stoutenburg

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Tuesday, April 01, 2014 11:50 AM
To: Eric Stoutenburg; Andrew OConnell
Cc: Robert.Friedel@tetratech.com; Marshall, Sydne
Subject: RE: Wheatridge arch report comments

Eric:
Thanks for the additional information. I'll incorporate this along with the comments from the reviewers and our phone discussion into products for the Oregon SHPO office. Thanks for the review and comments from everyone.
~Shawn

From: Eric Stoutenburg [mailto:estoutenburg@maproyalty.com]
Sent: Friday, March 28, 2014 9:47 PM
To: Andrew OConnell; Shawn Steinmetz
Cc: Robert.Friedel@tetratech.com; Marshall, Sydne
Subject: RE: Wheatridge arch report comments

Shawn,

And here are the shapefiles for the infrastructure footprints as we discussed on Wednesday. I provide here the shapefiles, which when combined cover everything the construction team, tractors, bulldozers, cranes, and equipment should touch on the project and nothing beyond it for the given layout. It will confirm what I showed you about implementing the avoidance and setbacks from the cultural features.

Thanks,
Eric

From: Andrew OConnell [mailto:andrew@diversifiedwinds.com]
Sent: Friday, March 28, 2014 2:45 PM
To: 'Shawn Steinmetz'
Cc: Eric Stoutenburg; Robert.Friedel@tetratech.com; Marshall, Sydne
Subject: RE: Wheatridge arch report comments

Shawn,

After you connect with Eric regarding our ability to incorporate the report's recommendations in our site design, would you please submit the report to SHPO with the updated cover letter/Eric's table as you describe below? Thanks very much.

Andrew

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Tuesday, March 25, 2014 1:17 PM
To: Andrew OConnell
Subject: Wheatridge arch report comments

Andrew,
Thank you for your kind words about the report. Regarding TetraTech's comments:

1. Yes, it is a fragment, but it is a quote, so we did not make a change.
2. We agree; this is confusing. This is a summary of a report in the previous work section, and that previous report was confusing. We did not feel it was necessary, especially since it is outside of the project area, to put extra time into figuring out exactly what they found where. We felt it was sufficient to indicate that there are two sites and the types of artifacts found there. Should we ever find ourselves doing work at Well Spring we'll have to sort all that out.
3. It would be nice to have different symbols for different site types. However, given the scale of this map, when we experimented with those ideas, we had trouble finding a color/symbology combination that was visible. We did not want the map to become so busy that the site location information was lost. We felt that there are not too many sites and that people could find the sites they are interested in.
4. Implemented change in document.
5. That's just the way those forms are.
6. I fixed it in the pdf we're providing you and SHPO. However, I can no longer access the original form because once you submit them to SHPO, you can't get them back.
7. I don't know what happened to that picture! I finally got it to convert from Word to pdf. As with above, it's fixed in the pdf. We'll work with SHPO to see if we can get them the correct version in their on line system.

As for your recommendation regarding site 010913A, I'm afraid the form has already been submitted to SHPO. We could remove reference to it in the report, but that would take re-drawing the maps and re-doing the numbers, and in the end, the site is still in SHPO's database. This is not necessarily a bad thing. It may end up saving the land owner money if they want a NRCS or FSA project in the future, since they would need to do cultural resource work. I've attached a brochure SHPO put together about what it means to have a site on your property.

As for the proposed new language, that doesn't usually go into the report. It's part of the review process between you, ODOE, and SHPO. If you would like us to submit the report to SHPO, we could include that in the cover letter along with the table that Eric produced showing the avoidance measures. If you would like to submit the report to SHPO, you could put it in your cover letter. It would just say that Wheatridge has incorporated the setbacks and will be able to implement all of the report recommendations.

Respectfully,
Shawn

From: Andrew OConnell [mailto:andrew@diversifiedwinds.com]
Sent: Friday, March 21, 2014 4:29 PM
To: Shawn Steinmetz
Cc: Eric Stoutenburg
Subject: Wheatridge arch report comments

Shawn,

Here are our minor editorial comments to the archeological report. As I said we were very impressed with the report.

I had one final comment regarding mention of Site 010913A (site with trash, drums, etc.). As Eric will demonstrate, this area has been removed from the project boundary. As such I was hopeful we could remove mention of the site from the report. I do not think that particular site is relevant any longer and I do not want to cause any issue for our landowner. I want to be sure you would be comfortable doing so though.

Eric will be following-up soon to close things out. Once that happens, it would be nice to add a brief couple sentences at the end of the report stating something like: "WR reps incorporated the setbacks successfully into the project design and so that impacts to all the identified sites can be avoided." Not set on how we say it though. Thanks again to your team for all the hard work.

Andrew
(503) 360-4044

Friedel, Robert

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Thursday, February 06, 2014 10:19 AM
To: Friedel, Robert
Subject: RE: Wheatridge - cultural report

Great. Yes, 229 pages is correct. Please let me know if you have any questions.
~Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Thursday, February 06, 2014 10:00 AM
To: Shawn Steinmetz
Subject: RE: Wheatridge - cultural report

Got it. I should be 229 pages correct?

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Thursday, February 06, 2014 9:59 AM
To: Friedel, Robert
Subject: RE: Wheatridge - cultural report

Robert:
I just sent the zipped report to you. Did it make it to your inbox?
~Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Thursday, February 06, 2014 9:50 AM
To: Shawn Steinmetz
Subject: RE: Wheatridge - cultural report

Thanks Shawn, I'll keep a lookout for it.

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Thursday, February 06, 2014 9:50 AM
To: Friedel, Robert
Subject: RE: Wheatridge - cultural report

Robert:
I'll zip the document and see how much that reduces the size of the document. I'll send it to you in another email and you can let me know if you receive it.
~Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Thursday, February 06, 2014 9:32 AM
To: Shawn Steinmetz
Subject: Wheatridge - cultural report

Shawn,

The file size is too large for our servers to process. Do you have a GMAIL account? We could try passing the document from you to me that way and then I can use an in-house file transfer proc to send it around to everyone else.

Rob

Robert Friedel - GISP
GIS Coordinator / Project Manager
direct: 503.721.7216 | cell: 541.231.9990
robert.friedel@tetratech.com

Tetra Tech, Inc.
1750 SW Harbor Way, Suite 400
Portland OR, 97201
Main: 503-221-8636
Fax: 503-227-1287
www.tetratech.com

Friedel, Robert

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Monday, May 05, 2014 11:03 AM
To: Friedel, Robert
Subject: RE: Wheatridge - cutural surveys and avoidance measures

Rob:
No problem. I'll get it to you this week.
~Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Thursday, May 01, 2014 1:35 PM
To: Shawn Steinmetz
Subject: Wheatridge - cutural surveys and avoidance measures

Afternoon Shawn,

I wanted to ask a favor of you. For our application for site certificate with EFSC, I would like to include a letter from your office stating that our efforts to avoid features identified by the CTUIR during the archaeological survey of the site boundary is satisfactory to you and that our efforts to avoid all features, even those identified as not-eligible, is sufficient. Essentially in the theme of: the developers did everything we asked of them to the best of their abilities and we are satisfied that the mitigation measures they have taken to avoid identified cultural sites is satisfactory to the needs of the Confederated Tribes of the Umatilla Indian Reservation. A short letter on CTUIR letter head and signed by you would be a big help to us. Thanks for your time and I hope to hear from you soon.

Sincerely,

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www.tetratech.com

Friedel, Robert

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Monday, May 12, 2014 12:05 PM
To: Friedel, Robert
Subject: RE: Wheatridge - cutural surveys and avoidance measures
Attachments: 363-013 transmittal letter to SHPO.pdf

Robert:
Attached is a letter sent to Oregon SHPO with corrections made to the final report that Andrew and Tetratech asked us to complete. If you need something a little different let me know.
~Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
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Friedel, Robert

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Tuesday, May 13, 2014 7:39 AM
To: Friedel, Robert
Subject: RE: Wheatridge - cultural surveys and avoidance measures

Sounds good.
~Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Monday, May 12, 2014 3:31 PM
To: Shawn Steinmetz
Subject: RE: Wheatridge - cutural surveys and avoidance measures

Thanks Shawn.

I think this should do it but you might hear back from me depending on how my meetings go. Have a good one until the next time I talk with you.

Rob

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Monday, May 12, 2014 12:05 PM
To: Friedel, Robert
Subject: RE: Wheatridge - cutural surveys and avoidance measures

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GIS Coordinator / Project Manager
direct: 503.721.7216 | cell: 541.231.9990
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Friedel, Robert

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Thursday, July 24, 2014 8:24 AM
To: Friedel, Robert
Subject: RE: Wheatridge: more stuff

Rob:
I'm away from the office this week and I will look into your questions next week when I'm back in the office. I can tell you now that the Oregon SHPO office had no comment on the report.
~Shawn

From: Friedel, Robert [Robert.Friedel@tetratech.com]
Sent: Wednesday, July 23, 2014 8:54 AM
To: Shawn Steinmetz
Subject: Wheatridge: more stuff

Afternoon Shawn,

Hope you've been doing well since I bothered you last. We're wrapping up exhibit S and I wanted to touch base on a few items again with you. Everything is pretty much solidified, just a few questions to make sure we didn't miss something and then one final favor to ask. I shouldn't say 'final', I'm not expecting to have to bother you again but you never know.

I have a copy of the CTUIR's archaeological investigation report dated February 5, 2014. This is still the latest and greatest correct, this wasn't amended or revised later? And I see it was submitted to John Pouley on May 12th: did he have any comments?

Also, I'd like to ask you for one more favor. We have a section in exhibit S stating that there would be no Project impacts to culturally significant plants or traditional cultural properties. This is mostly because we're going to ask Umatilla county for a variance on their rule to stay back 50m from cultural resources, something we can't quite do in two instances. The personal touch of a letter from you addressed to me would, in our opinion, help us out in that effort. If I drafted a letter on this topic for you to copy/paste into your letter head, sign and send back to me, pending your review and approval of the language, would you be OK doing this?

Rob

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The opinions expressed by the author are his or her own and are not necessarily those of the Confederated Tribes of the Umatilla Indian Reservation. The information, contents and attachments in this email are Confidential and Private.

Friedel, Robert

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Tuesday, July 29, 2014 2:25 PM
To: Friedel, Robert
Subject: RE: Wheatridge: more stuff

Robert:
As I mentioned before the CTUIR did not receive any comments from SHPO. And the archaeological report has not been changed or revised since the final report was submitted.

The work we conducted for the Wheatridge project was only for archaeological resources. Documenting culturally sensitive plants and traditional cultural properties was not part of the archaeological reporting. Since the CTUIR has not conducted work pertaining to culturally sensitive plants or traditional cultural properties for this project the Cultural Resources Protection Program (CRPP) cannot make the statement that traditional cultural properties and/or culturally sensitive plants will not be harmed by the project.

The CRPP would prefer to not lobby the County for the variance. In our report we mention the state of Oregon's minimum setbacks and buffers for archaeological site protection. The CRPP typically supports stronger measures to protect archaeological sites.

You also asked about previously documented archaeological sites . There are four document sites: 35MW14, 35MW223, 35MW224 and 35MW233 and one isolated find: AAR 980-1i. The four sites and one isolated find are all outside of the project boundaries that we surveyed. The four sites and one isolated find were the only archaeological sites that were previously recorded within one mile of the project boundary.

~Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Wednesday, July 23, 2014 8:54 AM
To: Shawn Steinmetz
Subject: Wheatridge: more stuff

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Friedel, Robert

From: Shawn Steinmetz <ShawnSteinmetz@ctuir.org>
Sent: Wednesday, August 06, 2014 10:16 AM
To: Friedel, Robert
Subject: RE: Wheatridge: more stuff

Robert:
Your email got buried, sorry I didn't respond sooner. I won't get into the details, but the CRPP will not write a letter of support for the variance. The CRPP will not oppose the variance either. I appreciate your efforts to protect the archaeological resources in the project area.
Respectfully,
Shawn

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Tuesday, July 29, 2014 7:04 PM
To: Shawn Steinmetz
Subject: RE: Wheatridge: more stuff

Morning Shawn,

I wasn't clear in my request to you on the letter for a variance request because I was typing too fast at 9 pm. The request for a variance we are going for with Umatilla county pertains to section 152.616(HHH)(6)(a)(5) of the Umatilla County Development Ordinance which requests a 50 meter setback of wind facility elements from known archaeological, historical or cultural sites, to be considered on a case by case basis. The ordinance also requests a setback of no less than 50 meters for any known archaeological, historical or cultural site of the CTUIR.

I didn't mean for this to apply culturally sensitive plants and traditional properties which I realize are a completely separate item from the archaeological field investigation conducted by CTUIR. Mostly what I was going for was a letter from you regarding the efforts made by Eric at Map to move project infrastructure away from the sites you documented during the archaeological field survey, specifically site 103012A (two stacked rock features described as cairns and one tertiary CCS flake on Service Buttes). Eric removed an access road, dropped a turbine, and moved another turbine down the hill as far as he could be it's just under 50m from the edge of site 103012A. I was thinking that a letter from you that you were good with the efforts made by the developer to avoid the archaeological features discovered during the field investigation would aid in our request to Umatilla on a variance on their 50m setback requirement.

Apologies for confusing the issue with improper use of terminology. And I totally understand if you don't want to provide this letter, just thought I would ask.

Take care,

rob

From: Shawn Steinmetz [mailto:ShawnSteinmetz@ctuir.org]
Sent: Tuesday, July 29, 2014 2:25 PM
To: Friedel, Robert
Subject: RE: Wheatridge: more stuff

Robert:

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Sent: Wednesday, July 23, 2014 8:54 AM
To: Shawn Steinmetz
Subject: Wheatridge: more stuff

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Exhibit T

Recreation

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Table of Contents

List of Tables

List of Figures

Terms and Definitions

Collector Line	An underground or overhead electrical 34.5 kV line transmitting power from the turbines to a Substation
Construction Yard	The temporary area for construction activities and Project component storage prior to installation
GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
dBA	A-weighted decibels
FHWA	Federal Highway Administration
GIS	Geographic Information System
KOP	Key Observation Point
MBTH	maximum blade tip height
MW	Megawatts
NPS	National Parks Service
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
OPRD	Oregon Parks and Recreation Department
OR-##	Oregon State Highway ##
OHTAC	Oregon Historic Trails Advisory Committee
USACE	US Army Corps of Engineers
VRM	Visual Resource Management
ZVI	zone of visual influence

1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit T contains information pertaining to potential adverse impacts of construction and operation of the proposed Project on important recreational opportunities, as required to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(t) paragraphs (A) through (E). This Exhibit demonstrates that the Project can comply with OAR 345-022-0100:

> ***345-022-0100, Recreation***
>
> *(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction and operation of a facility, taking into account mitigation, are not likely to result in a significant adverse impact to important recreational opportunities in the analysis area as described in the project order. The Council shall consider the following factors in judging the importance of a recreational opportunity:*
>
> > *(a) Any special designation or management of the location;*
> >
> > *(b) The degree of demand;*
> >
> > *(c) Outstanding or unusual qualities;*
> >
> > *(d) Availability or rareness; and*
> >
> > *(e) Irreplaceability or irretrievability of the opportunity.*

1.1 Analysis Area

The analysis area for recreational opportunities is defined in the Project Order as "the area within the Site Boundary and 5 miles from the Site Boundary." The Site Boundary is defined in detail in Exhibits B and C. The boundary of the recreational opportunities analysis area is shown on Figure T-1.

2.0 Recreational Opportunities in the Analysis Area

2.1 Inventory Methods

Recreational opportunities within the analysis area were identified through collection and review of existing published and unpublished information available from desktop research sources commonly used for recreation inventory efforts. Key types of information resources investigated for the inventory included the following:

- Published maps with geographic coverage applicable to the analysis area. Specific sources included US Geological Survey 1:100,000 scale and 1:24,000 scale topographic maps; maps published by land management agencies, primarily the Bureau of Land Management (BLM); and the Oregon Atlas and Gazetteer (DeLorme 2004), which includes topographic maps and data on a wide variety of recreational opportunities.
- Geographic Information System (GIS) files documenting recreational resources obtained from key recreation provider agencies, including the BLM, National Park Service (NPS), Oregon Department of Parks and Recreation (OPRD), and Oregon Department of Fish and Wildlife (ODFW).
- Land management agency planning documents.
- Comprehensive plans, park and recreation plans, and individual park master plans prepared by OPRD and by counties and municipal governments within the analysis area.
- Internet sites maintained by recreation provider agencies, including, OPRD and county and city park departments.
- Internet sites maintained by various commercial entities, including sites providing general recreation and tourism information and sites applicable to specific private-sector recreation opportunities.

2.2 Summary of Recreational Opportunities

In general, recreation activities in the analysis area consist of hiking, fishing, boating, camping, bicycling, photography, game and bird hunting, and sightseeing. These activities also occur in numerous locations outside the analysis area, and therefore some of the recreational opportunities identified within the analysis area do not rise to the level of uniqueness or irreplaceability that is required by OAR 345-022-0100(1).

There are 15 identified recreational opportunities within the analysis area. These include the Morrow County Fairgrounds, several parks managed by the City of Heppner, Willow Creek

Reservoir and the adjacent Willow Creek RV Park, the Blue Mountain Scenic Byway, a portion of the Oregon Trail, a golf course open to the public, and several areas open to the public for hunting.

Recreational opportunities within the analysis area are described below in order of federal, state, local and private ownership/management. Table T-1 provides a summary of each identified recreational opportunity, and an assessment of the importance of each opportunity. Figure T-1 shows the location of all of the recreation opportunities identified in the analysis area.

2.2.1 Federal

The NPS, in conjunction with the Oregon Historic Trails Advisory Committee manage the remaining segments and important sites of the Oregon National Historic Trail. The trail route passes about 1.2 miles north of Wheatridge West and about 2.9 miles north of Wheatridge East. The Well Spring Interpretive Site and the Echo Meadows interpretive site are two high potential sites located within the analysis area. Due to its rareness and historic importance, the Oregon Trail and Well Spring and Echo Meadows sites are considered important recreational resources. The Echo Meadows site is managed by the BLM as an Area of Critical Environmental Concern (ACEC); as such it is also considered a protected area for the analysis in Exhibit L of this application.

The US Army Corps of Engineers (USACE) constructed and manages the Willow Creek Dam and the impounded Willow Creek Reservoir. A baseball field is located near the foot of the dam on USACE property. The dam and lake were constructed primarily for flood control; secondary uses include providing irrigation water and recreational use – fishing and boating. Water quality in the reservoir has been an ongoing problem, sometimes limiting the availability of the reservoir for recreational use. The baseball field is one of four in Heppner.

The BLM Prineville District manages two parcels within the analysis area; neither parcel contains a designated recreation area nor is considered to be a recreational resource.

There are no other federal lands or lands managed by a federal agency within the analysis area.

2.2.2 State

There are no lands owned or managed by the State of Oregon within the analysis area except for state highway rights-of-way. Within the analysis area, OR-74 is designated as a part of the route of the Blue Mountains Scenic Byway. The designation turns this highway into an important recreation resource, inviting travelers from afar and providing an economic boost to towns along the route.

2.2.3 Local Governments and Special Districts

Counties, cities, and special districts provide a number of recreation opportunities within the analysis area. Local government resources tend to be smaller-scale parks with an emphasis on day-use activities and typically serve more localized user populations. Local government recreation providers within the analysis area include the following:

- Morrow and Umatilla counties; and

- Cities of Heppner and Lexington.

Morrow County (2011) operates one recreational facility in the analysis area, the Morrow County Fairgrounds in Heppner. The County Fair and other agricultural- and ranching-related events that take place at the fairgrounds form an important part of community life in Morrow County. Because of its role in community life and the rare nature of county fairgrounds, this is considered an important recreation resource.

Four parks owned and managed by the City of Heppner are located in the analysis area: Hager Park, Heritage Park, Heppner City Park, and the Willow Creek Water Park. Hager Park and Heppner City Park both have some recreational facilities (playgrounds), restrooms and usable open space. Heritage Park is primarily dedicated to history with several displays of antique farming equipment and informational signs, but no recreational facilities. These parks primarily serve the residents of Heppner, as do many other small parks in other towns and cities in the region. The Willow Creek Water Park is one of a few public pools in the region; due to its rarity it is considered an important recreation resource.

The Willow Creek RV Park is operated by a small group of Morrow County residents calling themselves the Willow Creek Park District. The 24-space Willow Creek RV Park is built into the side of a gently sloping hill above the Willow Creek Reservoir, on the southeastern outskirts of Heppner. It is a fairly typical small RV park; most spaces have electricity and some have full utility hookups, there are picnic tables, grills, restrooms and pay showers but little landscaping, and an undetermined number of tent spaces. It overlooks Willow Creek Reservoir, and offers swimming, boating, hiking and wildlife viewing. The campground is open March 15th through December 1st.

2.2.4 Private

Four privately-owned recreational opportunities have been identified within the analysis area. These recreation facilities are included in this Exhibit because, although they are privately owned, they are open to the public. These private opportunities include three hunting areas and the Willow Creek Country Club and golf course.

Hunting is an important recreational and subsistence activity in eastern Oregon. ODFW's Access and Hunting Program facilitates the use of private lands for hunting by the public; available sites are identified on ODFW's online map (ODFW 2014). There is one property within the analysis area, the Bunker Hill Access Area, that is designated as open to hunting by permission under ODFW's Access and Habitat Program; it is located south of OR-74, approximately 4 miles northwest of Heppner. Under this designation, hunters must contact the landowner for permission prior to entering the area to hunt, as well as obtain a daily permit from the self-serve box at the site entrance. There is also one area designated as "Welcome to Hunt" under ODFW's Access and Habitat Program within the analysis area, the Social Ridge Access Area. Hunters must obtain a daily hunting permit from the self-serve permit box at the entrance but do not need specific landowner permission.

Several privately owned and operated hunting and birding clubs are found in the region, but only one is within the analysis area: Rolling Hills Bird Hunting's Harrison Preserve, located south of OR-74 between Lexington and Ione. The owners of Rolling Hills Bird Hunting raise grouse and other game birds for release and hunting on the Harrison Preserve and two other large ranch properties located southeast of Heppner, outside the analysis area. Access is strictly controlled to one party, typically four to five people, per day during the hunting seasons.

The Willow Creek Country Club is a private, nonprofit social club located near the western outskirts of Heppner. While the club is private, the golf course is open to the public with greens fees. Facilities and amenities are few but include cart and club rental. The 9-hole course is rated below average difficulty by the USGA.

2.3 Important Recreational Opportunities

2.3.1 Important Criteria

Recreation opportunities identified within the analysis area were evaluated for importance based on the criteria outlined in OAR 345-022-0100. Specifically, the importance of each recreation opportunity was rated based on:

- Any special designation or management of the location;
- The degree of demand;
- Outstanding or unusual qualities;
- Availability or rareness; and
- Irreplaceability or irretrievability of the opportunity.

A recreation opportunity was determined to be important based on assessment of available information specific to each criterion and a qualitative balancing of the attributes for all five criteria for a given resource. Specific considerations used to characterize an opportunity relative to the five importance criteria are summarized as follows:

1) There are distinct, identifiable differences among the types of special management designations that apply to lands within the analysis area and their implications for resource protection. Some types of designations allow much more latitude in undertaking management activities and involve a lower degree of resource protection. The source of the special designation is also a relevant consideration; a designation established through an act of Congress clearly carries more weight than an administrative designation applied by a resource management agency.
2) Qualitative ratings of High, Moderate, and Low were used as proxy measures for the level of demand for a specific recreation opportunity.
3) Identification of characteristics that might be considered outstanding or unusual qualities for a given opportunity is a highly subjective task as a result of wide variation in values, tastes, and perceptions among the recreational public. The standard does not specify what qualities would define an opportunity as outstanding or unusual, or indicate how those characteristics could be measured. Some sites or areas have attributes that qualify them as

"unique" (i.e., one of a kind), while others have qualities that are not unique but intuitively set them apart from other opportunities and could be considered outstanding or unusual.

4) Qualitative ratings of Rare, Uncommon, and Common were used to address the criterion based on the rareness of an opportunity. Consideration of these rareness attributes was based on the approximate set of comparable opportunities (and the geographic scale appropriate to each type of opportunity) available within the general region surrounding the Project. Local parks are quite numerous and well distributed within the region, for example, and as a result all city parks in the analysis area were assigned attributes of Common for this criterion.
5) Ratings of Irreplaceable, Somewhat Irreplaceable, and Replaceable were used to address the criterion based on the ability to replace an opportunity. In general, opportunities based on inherent natural resource characteristics that could not feasibly be recreated in the same place or at another location (such as physical, visible evidence of the Oregon Trail) can reasonably be considered Irreplaceable. By contrast, most opportunities that are based on constructed recreation facilities or infrastructure (such as typical campgrounds) could feasibly be replaced and were considered Replaceable.

The overall assessment of importance for each recreational opportunity identified was conducted on a case-by-case basis. For example, it is conceivable that a resource would have a special management designation and high use, but still be a common and replaceable opportunity without unique or outstanding qualities; in that instance, a determination that the opportunity was not important would be justifiable. Alternatively, an opportunity might have little or no management protection and low evident demand, but still be considered important because it was rare and/or irreplaceable. Table T-1 summarizes the importance assessment for all identified recreation resources in the analysis area.

Table T-1. Inventory of Recreational Resources in the Analysis Area										
Recreational Opportunity	Responsible Entity	Distance from Site Boundary (miles)	Description	Size or Distance	Importance Factors					Important Recreation Resource?
					Designation	Demand	Qualities	Rareness	Replaceability	
Blue Mountain Scenic Byway	ODOT, FHWA	2.60	Route starts at Heppner Junction on I-84 and ends at Sumpter and Haines in Baker County. The route passes through agricultural land, forest land, near Oregon Trail segments and several historic towns. (USFS1993)	Approx. 145 miles total; Approx. 21 miles in analysis area	Oregon State Scenic Byway	Moderate	Entire route includes diverse scenery, historic towns, a national forest, rocky peaks, and streams; OR 74 is one of several highways through similar eastern Oregon landscapes	Relatively common travel route in the north-central Oregon region	Somewhat Irreplaceable	Yes
Oregon National Historic Trail Segments/Sites	NPS and OHTAC (Oregon Historic Trails Advisory Committee)	1.2 miles	The Oregon Trail was one of the main overland migration routes on the North American continent, leading from locations on the Missouri River to the Oregon Country. A high-potential trail segment has been identified, extending from the eastern boundary of the Boardman Bombing Range westward to Immigrant Road. (NPS 1999)	Approx. 8.7 miles of high-potential trail segment in analysis area	National Historic Trail	Low	Most trail segments destroyed by agricultural use; interpretive information at the Wells Springs Interpretive Site; public access to this high-potential trail segment restricted by federal and private ownership	Intact evidence of trail route rare	Irreplaceable (intact segments only)	Yes
		1.22 miles	The Well Spring Interpretive Site offers views of intact wagon ruts, a graveyard and remains of a stage station along with informational signage. (NPS 1999)	0.5 acres	National Historic Trail interpretive site	Low	Interpretive signage with historical information but no other facilities; views of intact wagon ruts; appears to be located on private land	Intact evidence of trail route rare	Irreplaceable	Yes
		2.5 miles	The Echo Meadows site offers a short paved trail walk with informational signage, and views of about one mile of intact wagon ruts. (BLM 2015, City of Echo 2013)	300 acres	National Historic Trail interpretive site; BLM ACEC	Low	Interpretive signage with historical information; paved trail leading to views of intact wagon ruts; no other facilities; surrounded by center-pivot irrigated agriculture	Intact evidence of trail route rare	Irreplaceable	Yes
Willow Creek Dam/ Reservoir	USACE	3.75	Flood control dam constructed to protect the City of Heppner and provide water supply and irrigation; offers fishing, boating and swimming but in-water activities often restricted due to ongoing water quality issues. Baseball diamond at foot of dam. (USACE 2014, DEQ 2012)	268 acres	Federal (USACE) project land with adjacent RV park/campground	Low	Shallow artificial impoundment in unremarkable setting of grassy rolling hills; lake stocked for fishing but ongoing water quality problems often restrict recreational use; provides setting for adjacent private RV park	Relatively common; one of several reservoirs and large water bodies in region. Baseball field is common, one of four in Heppner	Somewhat irreplaceable	No
Morrow County Fairgrounds	Morrow County	3.05	Site developed for County Fair with large riding/competition ring, stockyards, barns, grandstand, multipurpose sport field and other facilities, located in City of Heppner. (Morrow County 2011)	11.7 acres	County fairgrounds	Moderate	Venue for agricultural/ ranching-related events that are important part of community social and business life	Uncommon; one per county	Replaceable	Yes
Hager Park	City of Heppner	3.68	Typical small city park with playground and open activity area. (Google Earth 2014)	2.3 acres	City park	Low	Typical city park	Common in the local area	Replaceable	No
Heritage Park	City of Heppner	3.25	Open space between two roads, with historic information/ exhibits; no developed recreation facilities (Google Earth 2014)	1.4 acres	City park	Low	Typical neighborhood park	Common in the local area	Replaceable	No
Heppner City Park	City of Heppner	3.3	Small park near center of Heppner, with playground and restrooms (Google Earth 2014)	0.8 acres	City park	Low	Typical neighborhood park	Common in the local area	Replaceable	No
Willow Creek Water Park	City of Heppner		Community swimming pool offering seasonal public swimming, lessons and private parties; includes a basketball court (Willow Creek Water Park 2015)		City park	Moderate	Outdoor swimming pool open in summer; facilities include locker rooms, showers, slide, hot pool, basketball court	Rare; one of a few public pools in the region	Replaceable	Yes

Table T-1. Inventory of Recreational Resources in the Analysis Area										
Recreational Opportunity	Responsible Entity	Distance from Site Boundary (miles)	Description	Size or Distance	Importance Factors					Important Recreation Resource?
					Designation	Demand	Qualities	Rareness	Replaceability	
Willow Creek RV Park	Private/Willow Creek Park District	3.96	Commercial RV camping facility with 24 RV spaces, some with full utility hookups, restrooms, showers, BBQ pits, picnic tables, additional tent camping spaces, and a boat launch. Campground overlooks Willow Creek Reservoir. (USACE 2014, Travel Oregon 2015)	8 acres	Privately managed RV campground	Low-moderate	Typical small RV park with average level of development	RV parks common in local area	Replaceable	No
Willow Creek Country Club	Private	2.96	Private country club with 9-hole golf course open to public use. (Oregon Golf 2014)	30 acres	Private club and golf course	Low-moderate	Short course of below average difficulty in unremarkable setting	Relatively uncommon in the local area	Replaceable	No
Social Ridge Access Area	Private/ODFW	5	Private land designated "Welcome to Hunt" under ODFW's Access and Habitat Program. (ODFW 2015)	7,018 acres total, approximately 12 acres in analysis area	Private land where owner permits public hunting	Low-moderate	Open access area consists of rolling hills with a mix of agriculture and grasslands, with no developed facilities or trails	Common in the region	Replaceable	No
Bunker Hill Access Area	Private/ODFW	4.10	Private land designated for "hunting by permission" under ODFW's Access and Habitat Program. (ODFW 2015)	1,345 acres total, approximately 623 acres in analysis area	Private land where owner permits public hunting	Low-moderate	Access area consists of rolling hills with a mix of agriculture and grasslands, with no developed facilities or trails; access by owner permission only	Common in the region	Replaceable	No
Rolling Hills Hunting Preserve, Harrison section	Private	4.0	Fee hunting on private land for upland game birds raised on site; use limited by reservation to one group per day. (Ruralite 2002; personal communication between Tim Adams, Rolling Hills Hunting Preserve owner and Thomas Kruger, Tetra Tech, September 2014)	Approx. 1,000 acres total, XX acres in analysis area	Commercial hunting grounds	Low-moderate	Game birds raised on site for reliable hunting; hunting terrain in rolling grassland; limited availability	Uncommon; one of a few private hunting grounds with stocked game birds in region	Replaceable	No

2.3.2 Importance Assessment

Based on the importance criteria described above and summarized in Table T-1, six of the identified recreation resources have been determined to be important for the purposes of this application. These are:

- The high-potential segment of the Oregon National Historic Trail and the two high-potential sites;
- The Well Spring Interpretive Site and Echo Meadows/Oregon Trail ACEC;
- The Blue Mountain Scenic Byway;
- The Morrow County Fairgrounds; and
- The Willow Creek Water Park.

Each of these six resources is described below.

2.3.3 Summary Descriptions of Important Recreation Resources

2.3.3.1 Blue Mountain State Scenic Byway

The Blue Mountain Scenic Byway passes through the southwestern part of the analysis area. The designated route in this area follows OR-74 southeast to Heppner, then follows Willow Creek Road southeast out of Heppner into the Blue Mountains. Approximately 21 miles of the 145 mile route are within the analysis area.

The National Scenic Byway Program was created in 1995 in response to program requirements within the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Under this program, roads are designated as National Scenic Byways or All-American Roads based on their "scenic, historic, recreational, cultural, archeological, and/or natural intrinsic qualities" (Federal Register 1995). Roads are nominated through a state's "identified scenic byway agency and include a corridor management plan designed to protect the unique qualities of a scenic byway." Roads nominated for the federal program should already be designated as state scenic byways. Federal scenic byways are eligible for a variety of grants from the Federal Highway Administration (FHWA), which support the development of corridor management plans, safety improvements, byway facilities, access to recreation, interpretive information, and marketing programs (FHWA 2014).

The Oregon Scenic Byways Program was created "as an opportunity for Oregon to take advantage of the national program defined in ISTEA. The Program provides an 'umbrella' to include various federal, state, city and county defined scenic roads and highways. The Oregon Scenic Byways Program crosses jurisdictional boundaries and establishes appropriate signage for each designated byway, and statewide promotion. This program also offers an opportunity to preserve and enhance Oregon's most scenic corridors while ensuring the transportation function is protected" (Oregon.gov 2011).

The Blue Mountain State Scenic Byway management plan (USFS 1993) focuses on means to improve visitor experience while traveling the byway. While the scenery is important, the management plan focuses on appropriate signage and wayfinding, development of interpretive media, identification of local partnerships for economic development, and development of historic and cultural activities and sites within the towns along the route. The management plan focuses largely on the towns, views, and historic sites located in the Blue Mountains, with little discussion of the portion of the route in the Columbia Plateau. In the vicinity of the Project, the only scenic features noted in the management plan are the lava cliffs and outcrops, and no specific locations are identified.

2.3.3.2 Oregon National Historic Trail High-Potential Segment

Congress designated the route of the Oregon Trail as a National Historic Trail in 1978, and the Oregon Historic Trails Advisory Committee (OHTAC) was created to provide public input and advice to the NPS on management of historic trails in Oregon. The National Historic Trail designation applies to a general, primary route (and two specified branches) extending approximately 2,000 miles from Independence, Missouri to Oregon City, Oregon. The Oregon Trail designation was intended to preserve the legacy of the westward immigration of settlers to the Oregon Territory, based on routes used from 1841 to 1848 (NPS 1999). In recognition of the intermittent evidence of many of the historic trail routes, the National Trails System Act provided for the identification of "high-potential sites and segments" along these routes, using specified criteria for historic significance, the presence of visible historic remnants, scenic quality, and relative freedom from intrusion. High-potential segments are portions of a trail route that afford high-quality recreational experiences in areas that have greater than average scenic values or afford the opportunity to vicariously share the experience of the original trail users, while high-potential sites are specific locations with similar attributes. Each site or segment must have the potential to interpret the trail's historical significance and to provide opportunities for high-quality recreation. The following sections describe these locations within the analysis area that are available and accessible to the public for recreation.

In Umatilla County, the designated Oregon Trail route runs from Deadman Pass down Emigrant Hill to the Pendleton area, westward to cross the Umatilla River at Echo, and continues westward to cross OR-207 before turning southwesterly to cross Butter Creek and into Morrow County. In Morrow County, the designated Oregon Trail route runs across the southern end of the Boardman Bombing Range[1], then southwesterly to Cecil, Oregon, across Willow Creek, and continues west. NPS has formal responsibility for administering the Oregon Trail and preservation of the remaining trail segments. Approximately 15 miles of the 2,000 mile route are within the analysis area. The trail route passes approximately 1.2 miles north of Wheatridge West and approximately 2.9 miles north of Wheatridge East.

In many areas, the Oregon Trail has been erased from the landscape by generations of farming. In others, it has been replaced by newer roads. The NPS (1999) management plan identifies a 12-mile

[1] The US Navy recently renamed this installation as the Naval Weapons System Training Facility (NWSTF), Boardman. In recognition of conventional usage in the local area, this document employs the original Boardman Bombing Range term.

Boardman Segment of the trail in Morrow County as a high-potential trail segment. This trail segment extends from the eastern edge of the Boardman Bombing Range westward to Immigrant Lane; approximately 8.7 miles of this high-potential segment is within the analysis area. Physical evidence of the trail, i.e. wagon ruts, is still present in much of this 12-mile corridor. However, approximately 7 miles this segment is within the Boardman Bombing Range and is thus inaccessible to the public except for an area surrounding the Well Spring site; the remainder is on private lands to the west of the Bombing Range (most of which is managed by The Nature Conservancy as part of the Boardman Conservation Area) and is also not open to the public. Due to the restricted access to this high-potential trail segment, it is questionable whether this should be considered an important resource for recreation; however, its federal protection status, irreplaceability, and historical importance qualify it as important for the purposes of this analysis. There are a few locations within this 12-mile high-potential trail segment where the remaining trail evidence can be viewed; of these, only the Well Spring site is within the analysis area. Some non-high-potential segments of the trail route are also within the analysis area; where remaining evidence of the trail is present, they are located primarily on private lands (except for the BLM ACEC, described below) that are not open to the public, so are not considered important recreation resources for the purposes of this analysis.

2.3.3.3 Oregon Trail Well Spring Interpretive Site

This high-potential Oregon Trail site is located on Immigrant Lane adjacent to the southern boundary of the Boardman Bombing Range, approximately 1.2 miles northwest of the Site Boundary. Well Spring was an important emigrant water source and campsite. While the spring itself is now essentially dry, trail ruts, a graveyard, and the remains of a stage station can be found nearby (NPS 1999). Non-governmental organizations have installed several interpretive displays near the spring and trail location markers along the route in this area. The information kiosk is located on the south side of the road and seems to be oriented southward; however, most of the trail-related interest (e.g., visible wagon ruts) is located to the north within the Bombing Range, in a small portion of the Bombing Range that is accessible to the public. There are no facilities beyond the information kiosk. The Oregon-California Trail Association (OCTA), Northwest Chapter estimates that the level of visitorship to this site to be similar to the Echo Meadows site, at about 550 to 650 visitors per year, assuming that people who visit one will often visit the other; however, no actual use numbers are available (personal communication between Thomas Kruger, Tetra Tech and Billy Symms, Chapter Preservation Officer and Jim Tomkins, Chapter President on March 11, 2015).

2.3.3.4 Echo Meadows/ Oregon Trail ACEC

This high-potential Oregon Trail site is located approximately 5.5 miles west of the town of Echo, north of the Lexington-Echo Highway (a.k.a. OR-320 or Oregon Trail Road); approximately 2.7 miles north of Wheatridge East. This was a popular location for emigrants where they could rest themselves and their stock. Visitors can hike along a paved trail to see nearly one mile of intact wagon ruts, and read interpretive signs about the area and its history; there are no other developed facilities (BLM 2015). This site is managed by the BLM as the Oregon Trail ACEC, pursuant to the

BLM's Vale District, Baker Resource Management Plan (1989); it is also considered a protected area and discussed in Exhibit L. The BLM reports that this site receives fairly low levels of visitors, averaging about 550 to 650 visitors per year (personal communication between Thomas Kruger, Tetra Tech, and Kevin McCoy, BLM Vale District, Baker Office, March 9, 2015).

2.3.3.5 Morrow County Fairgrounds

Morrow County (2011) operates one recreational facility in the analysis area, the Morrow County Fairgrounds in Heppner, located approximately 3 miles south of Wheatridge West. The County Fair and other agricultural- and ranching-related events that take place at the fairgrounds form an important part of community life in Morrow County. The fairgrounds has been developed with a large riding/competition ring, grandstands, stockyards and stables, a large multipurpose field, and associated facilities. Due to both its rarity – there is only one fairgrounds site per county – and its importance in the life of the community, this is considered to be an important recreational resource.

2.3.3.6 Willow Creek Water Park

The Willow Creek Water Park is a community swimming pool owned and operated by the City of Heppner (Willow Creek Water Park 2015). Located approximately 3 miles southeast of Wheatridge West, this water park is considered to be an important resource primarily due to its rarity. It is one of a small number of swimming pools open to the public in the region; others are located only in Hermiston or Pendleton. As such, this water park is the only practical place where local residents can recreate in water known to be clean or learn to swim in a known safe environment.

3.0 Potential Impacts

Wheatridge analyzed potential effects to important recreational opportunities in the analysis area to determine whether the Project's design, construction, and operation, taking into account mitigation, would be likely to result in any significant adverse impacts. The following sections summarize the types of potential adverse impacts evaluated and provide summaries of the analysis for individual important recreational opportunities.

OAR 345-021-0010(1)(t)(B) calls for "A description of any significant potential adverse impacts to [important recreational opportunities] including, but not limited to:

(i) Direct or indirect loss of a recreational opportunity as a result of facility construction or operation;

(ii) Noise resulting from facility construction or operation; and

(iii) Increased traffic resulting from facility construction or operation."

These types of potential adverse impacts are summarized below.

3.1 Direct or Indirect Loss of Opportunity

For a direct loss of opportunity to occur, the Project would need to physically disturb the ground located within the affected recreational resource area. The Project would not directly impact any identified recreation resource.

An indirect loss of opportunity could occur if 1) a recreational opportunity nearby the Project would not be physically disturbed by construction activity but might need to be temporarily closed to public use in response to safety concerns; or 2) if development of the Project were to so alter the environment of a recreational opportunity through indirect effects that it substantially adversely impacted the quality of the recreation experience at that site. For example, if the Project were to destroy intact evidence of the Oregon Trail in view of an interpretive site (which it does not), it could render the site meaningless in terms of its historic importance and value as a tourism resource.

Because all of the important recreation resources in the analysis area are located farther than 1 mile from the Site Boundary, indirect loss of opportunity for safety concerns is unlikely to occur. The indirect effects of the Project, including traffic, noise, and visual impacts, are similarly unlikely to substantially impact any important recreation resource such that the resource would be considered lost. Indirect effects are described further below.

3.2 Indirect/Disturbance Impacts

Potential sources of indirect disturbance impacts to important recreational opportunities include noise, traffic, and changes in visual quality associated with the Project.

3.2.1 Noise

Noise would be generated during both construction and operation of the Project. Exhibit X provides an assessment of the existing acoustical environment and anticipated Project sound levels. The methodology for noise modeling is discussed in detail in that Exhibit.

Based on the results of noise reduced operations (NRO) modeling, described in detail in exhibit X, Project turbine noise would attenuate to below 26 A-weighted decibels (dBA), or less than the background noise level, within approximately 2 miles from the Site Boundary. Four of the six important recreational opportunities are located more than 2 miles from the Site Boundary so would not be affected by Project turbine operational noise. The two closer sites are the high-potential segment of the Oregon Trail that runs through the southern end of the Boardman Bombing Range, and the Oregon Trail Well Spring Interpretive Site. Modeled worst-case Project operational noise levels along the trail route would be as high as 31 dBA in some areas, and would be below 26 dBA and indistinguishable from background noise, along most of the route. Modeled worst-case operational noise levels at the Well Spring site would be similar; no higher than 31 dBA. Operational Project noise at Well Spring would be only marginally lower for the GE 2.5-120 turbines than for the GE 1.7-103 layout. The worst-case noise level of 31 dBA is comparable in volume to a whisper in a quiet library, and may be indistinguishable from background noise when the wind is blowing. This level of noise is unlikely to substantively diminish the experience of visitors to the Well Spring Interpretive Site or, should public access be permitted, along the high-potential Oregon Trail segment within the Bombing Range. Neither the Well Spring Interpretive Site nor the Oregon Trail would be considered noise-sensitive receptors under the ODEQ noise regulations.

The remainder of the identified recreation resources in the analysis area would similarly be unaffected by Project operational noise, due to their locations over 2.5 miles from the Site Boundary.

Noise from construction would similarly be less than 26 dBA and effectively inaudible in all but the two closest recreation sites, the Well Spring site and the high-potential Oregon Trail segment; Project noise levels along the trail would peak at the Well Spring site, the nearest point of the trail to the Project. Pursuant to OAR 340-035-0035(5), noise from construction activities is exempt from the state noise standards. Noise generating activities during construction could result from the use of heavy machinery, such as heavy trucks, bulldozers, graders and cranes. Based on the estimated noise levels of construction equipment provided in Exhibit X, construction noise levels at the Well Spring Interpretive Site would peak at approximately 34 dBA; this noise level is comparable to a quiet library. This elevated noise level would occur sporadically, generally 9 to 11 days of construction, over a period of about 3 to 4 weeks, while the access roads and turbines in the northern end of Wheatridge West closest to the Well Spring site are built; as construction progresses elsewhere in the Project, noise levels would drop to background levels. At this time, pending geo-technical investigation of the final layout, blasting is not anticipated to be required for Project construction.

3.2.2 Traffic

OAR 345-021-0010(1)(t) requires consideration of impacts to recreational resources from Project-related traffic that could occur during construction or operation. Exhibit U provides information on construction traffic levels and typical travel routes for Project truck and construction worker traffic. Based on the analysis provided in Exhibit U, construction traffic is not anticipated to result in a reduction of Level of Service (LOS) on any roads that provide access to the important recreational resources identified in this exhibit. However, some roads near some recreational opportunities would experience higher traffic levels during construction, and visitor travel to some areas may be disrupted or delayed for brief periods due to delivery of Project materials or construction equipment.

Delays are most likely to occur only during deliveries of oversized loads such as turbine blades, which will occur sporadically and will be accompanied by traffic control teams. These impacts would be intermittent and temporary, and traffic levels would return to normal following construction. The only recreation sites for which a temporary traffic impact is likely are the Oregon Trail Well Spring Interpretive Site and the Echo Meadows/Oregon Trail ACEC, because both are accessed by roads that would also carry Project construction traffic.

Access to the Well Spring Interpretive Site from the east most likely involves travel on OR-207 and/or Bombing Range Road and Little Juniper Canyon Road; all of these will carry Project construction traffic. The Well Spring Interpretive Site can also be accessed from the west, via routes that would not carry Project construction traffic, for example, from OR-74 via Immigrant Lane. The traffic analysis in Exhibit U demonstrates that the Project would not cause an appreciable reduction in Level of Service (LOS) on any roads in the area. Recreational traffic tends to be dispersed throughout the day rather than concentrated with the peak hours, and would generally coincide with Project truck traffic rather than worker commuter traffic. During peak construction periods the busiest of these roads, OR-207, would see up to an estimated 18 truck trips per hour and would continue to function at a high level of service. Other roads are much less busy in general and would see fewer truck trips as well. Bombing Range Road, the next most-busy road that will be utilized for project construction, would see up to an estimated 7 truck trips per hour during peak construction periods and would continue to function at LOS A. Little Juniper Canyon Road and other county roads in the vicinity of the Well Spring Site currently experience very low daily traffic volumes, typically less than 500 vehicles per day, and would see fewer than 6 truck trips per hour and would continue to function at LOS A. The use of Little Juniper Canyon and other minor roads in the vicinity of the Well Spring site would be limited to a relatively brief period of time while the northern end of Wheatridge West is constructed. The small number of turbines in the northern end of Wheatridge West, combined with the low visitor numbers to the Well Spring site, indicates that the likelihood of significant delays for visitors is very low.

The Echo Meadows site is accessed primarily via a gravel road extending north from Oregon Trail Road, which intersects with I-84 to the east at Echo, and with OR-207 to the west. The gravel road continues north past the site and joins with several other east-west gravel roads, e.g. Curtis Road, that in turn access OR-207 or wind eastward toward Echo or Stanfield. Truck traffic attributable to Wheatridge East would pass the entrance to the site from Oregon Trail Road, and OR-207 would carry truck traffic for all segments of the Project. None of the gravel roads north of Oregon Trail Road will be used for Project traffic. Oregon Trail Road and OR-207 would be most affected during the morning peak hours, when visitors are unlikely to arrive at the Echo Meadows site; for the remainder of the day truck trips would be sporadic and unlikely to cause any delays. During peak construction periods the busiest of these roads, OR-207, would see up to an estimated 18 truck trips per hour and would continue to function at a high level of service. Oregon Trail Road would see an estimated 4 truck trips per hour occurring on this highway segment during peak construction periods in Wheatridge East, and is projected to continue to operate at LOS A. It is noted in Exhibit U that the intersection of OR-207 may be cause for concern, largely due to the difficulty of turning/merging from a stop on Oregon Trail Road into high speed traffic on OR-207; this would most affect visitors *leaving* the site. However, the volume of construction traffic is unlikely to materially affect the operation of this intersection, and Wheatridge will work with ODOT and the counties to provide any necessary traffic controls. As with the Well Spring site, the level of visitorship at this site is fairly low, indicating that the likelihood for significant delays for visitors reaching the site is low.

Other important and identified recreation resources are accessed primarily by roads that would not carry substantial amounts of Project construction traffic, and are therefore unlikely to experience any traffic impacts. Construction truck traffic will not travel on OR-74, and based on the availability of housing in the area little construction worker traffic is anticipated on this road; Project construction would have negligible impact to the Blue Mountain Scenic Byway. Access to the Morrow County Fairgrounds or the Willow Creek Water Park is primarily via OR-74 and OR-207. Access to the sites via OR-74 is unlikely to be affected, while the traffic analysis in Exhibit U demonstrates that Project construction would not reduce Level of Service on OR-207. Again, temporary, short-term delays are most likely to occur only during deliveries of oversized loads such as turbine blades, which will occur sporadically and will be accompanied by traffic control teams.

The operational phase of the Project would affect recreational opportunities only to the extent that operation and maintenance activities generate significant amounts of traffic. Typical operational traffic would be minimal, as the Project would permanently employ only approximately 10 to 15 personnel. Larger amounts of traffic would be generated only if a turbine would need significant repairs or replacement. In that event, some roads would experience higher traffic levels, and visitor travel to some areas may be disrupted or delayed for brief periods during delivery of materials or equipment. However, these impacts would be rare, intermittent and temporary, and would not represent significant adverse impacts to any recreational resource in the area.

3.2.3 Visual

3.2.3.1 Visual Impact Assessment Methodology

Visual impacts of the Project are primarily related to views of the turbines, and to a lesser degree, other facilities such as the Intraconnection Line(s), access roads, O&M Buildings and Substations. Evaluation of visual impacts to recreational opportunities echoes the methodology described in Exhibit L. Some of the recreation resources are represented as Key Observation Points (KOPs) in the analysis of visual impacts in Exhibit R; these are noted below as applicable.

In evaluating the visual impacts, Wheatridge first determined whether the Project would be visible from each recreation resource area using digital bare earth modeling. The analysis began with a zone of visual influence (ZVI) analysis (also known as a viewshed or visibility analysis), using Environmental Systems Research Institute (ESRI) ArcGIS software, to identify the areas from which the proposed Project turbines might be visible. To assess the potential visibility of the turbines, the ZVI analysis was performed for the GE 1.7-103 (Figure T-2) and GE 2.5-120 (Figure T-3) layouts, assuming 110% maximum blade tip height (MBTH). This resulted in an assumed turbine MBTH of 144 meters (472 feet) for the GE 1.7-103 turbines and 160 meters (525 feet) for the GE 2.5-120 turbines. It should be noted that this "bare-earth" modeling approach, based only on the effects of terrain on visibility, results in a highly conservative assessment of potential visibility for several reasons. First, in some areas where the analysis indicates Project structures would be visible, the only visible components might be the tips of the turbine blades at MBTH, which would likely be noticeable only at relatively close viewing distances. In addition, the model does not account for distance, lighting, weather, and atmospheric attenuation factors that diminish visibility under actual field conditions. A bare-earth analysis also does not take into account the effects of vegetation or buildings, which will in practice block or screen views in some places. Finally, the use of turbine heights in the model that are 10% greater than the actual height overstates likely visibility.

Figures T-2 and T-3 show the areas from which the turbines would likely be visible, for the GE 1.7-103 and GE 2.5-120 layouts respectively; the number of turbines potentially visible is indicated by color-coding on those figures.

3.2.3.2 Visual Impact Assessment Results

Based on the results of the ZVI analysis, there would be visibility of some portions of the Project's turbines from four of the six important recreation resource areas in the analysis area (see Section 2.3.2 and Table T-1). Visibility is characterized as minimal (fewer than 20 turbines potentially visible), low (20 to 50 turbines visible), moderate (50 to 150 turbines visible), or good (more than 150 turbines potentially visible). In some protected areas, visibility is characterized as limited, meaning that there would be no views of the Project from a substantial portion of the recreation area.

Potential visibility is but one of several factors that comprise an assessment of visual impact to a recreation resource. Other factors to consider include the viewing distance; other natural and manmade features visible within the view; the likely number and nature of visitors to a recreation area; and whether there is any management direction related to preservation of scenic quality, either within the recreation area or outside of it. Table T-2 provides a summary of the visual impact assessment for each of the important recreation resources in the analysis area; Project visibility and the resulting impact would be similar for the GE 1.7-103 and GE 2.5-120 turbine layouts.

The Project would not be visible from the Morrow County Fairgrounds or the Willow Creek Water Park; similarly, views of the Project from other identified recreation resources in and around Heppner would be entirely or largely blocked by terrain. At the other four important recreation resource areas, visibility would range from none to good depending on location within the site.

For the recreation resources from which the Project would be visible (Oregon National Historic Trail, Well Spring Interpretive Site, Echo Meadows/Oregon Trail ACEC, and Blue Mountain Scenic Byway), the visibility ranges from none to good depending on specific location. Visual impacts for each of the four recreation areas from which the Project would be visible are described in the following paragraphs.

Blue Mountain Scenic Byway

The visibility analysis demonstrates that potential views of the Project turbines would be blocked by terrain for most of the length of the Blue Mountain Scenic Byway. At the limited points along the highway where some Project turbines may be visible, the visibility is characterized as minimal, and turbines would be viewed at middle- to background viewing distances of at least 3 miles. In addition, the viewing duration at highway speed would be short. Limited views of some turbines for a short portion of the 145 mile route, in a region experiencing substantial growth in wind energy development, is unlikely to substantially affect the overall tour route experience. While the Blue Mountain Scenic Byway Management Plan describes scenic resources in some segments of the route, none are specified in the vicinity of the Project, and there is no management direction for preservation of views or scenic quality related to the private lands on which the Project is located and through which the byway runs. Views of the Project would not compromise the integrity of the Scenic Byway route; would not affect wayfinding between the towns and sites along the route; would have no direct impacts to the historic properties or historic districts for which the towns are known; and would not affect programs or activities at the destination sites geared toward increasing tourism along the Byway.

Oregon National Historic Trail

The visibility analysis demonstrates that turbine visibility along the high-potential Oregon Trail segment would range from none to good depending on location along the route. The overall visual impact, however, would be negligible because there are virtually no viewers to be affected and existing wind turbines and other industrial infrastructure are visible from some portions of the trail. Most of the high-potential trail segment is within the Boardman Bombing Range and is off-limits to the public, except for an area surrounding the Well Spring site. The remainder of this high-potential Trail segment west of the Bombing Range is within the Boardman Conservation Area, which is also not open to the public (personal communication between Thomas Kruger, Tetra Tech, and Jeff Rosier, TNC, March 9 2015). The remaining evidence of the Oregon Trail can be viewed from a few points along Immigrant Road, and the Project would not intervene between those viewpoints and the trail route. Although the Oregon Trail and the two high-potential sites are important historic resources, they are neither considered nor managed as significant or important scenic resources. The management plans for the Bombing Range (U.S. Navy 2012a, 2012b) do not address scenic resources; there is no management direction for preservation of views or scenic quality related to the lands on which the high-potential trail segment or the Project are located. This segment of the Oregon Trail was nominated for listing in the National Register of Historic Places in 1978 by the US Navy, with a recommendation for a corridor extending "200 feet on each side of the Trail in order to preserve the historic appearance of the lands adjacent to the Trail, plus the stagecoach station site and the graveyard (NPS 1978)." The Project would not affect the visual quality within that corridor or on lands surrounding the stagecoach station and graveyard site.

Oregon Trail Well Spring Interpretive Site

Visual impacts to the Well Spring Interpretive Site are analyzed in Exhibit R; this site was chosen as KOP 1. Based on the visibility analysis, there would be moderate visibility of some Project turbines from a middleground distance of approximately 1.2 miles. As shown in the visual simulation for this site (Figure R-7), the tops of up to 30 turbines would be visible to the east and southeast from the Well Spring kiosk. Although only a few of the visible turbines would be visible at a middleground distance, and most would be seen at a background distance of more than 3 miles, the rotating motion would draw viewers' attention and many would be skylined (turbines seen silhouetted against the sky).

The site is managed to maintain the history and historic artifacts associated with the Oregon Trail, rather than for its scenic qualities; there is no management direction for preservation of views or scenic quality related to the lands on which the site or the Project are located. Although the relatively undeveloped viewshed is said to provide an experience that enables visitors to relate to the emigrants, the viewshed is no longer in the nearly pristine condition that it was during the emigrants' time. The road is evident, much of the landscape is farmed and fenced, little of the tallgrass native prairie remains and the turbines of existing wind farms are visible to the east and west. The Project turbines would be visible to the southeast, and would not intervene in views northward from the kiosk to the remaining evidence of the Trail within the Bombing Range. The remaining evidence of the Oregon Trail at the Well Spring site would not be disturbed by the Project, allowing visitors to continue their enjoyment of the history of the site.

Oregon Trail ACEC/ Echo Meadows

Visual impacts to the Oregon Trail ACEC/ Echo Meadows site are analyzed in Exhibit R; this site is represented by KOP 3, which is located on the Oregon Trail Highway (OR-320) approximately 0.5 miles south of the ACEC. The visual simulation (Figure R-8) shows visible turbines between 2.3 to 6.2 miles from the viewpoint (2.8 to 6.7 miles from the ACEC); the nearest turbines would be at least 3.1 miles from the remaining Oregon Trail ruts within the site. Some of the turbines would be skylined, but with the long viewing distance the turbines would appear comparable in size or smaller than the existing man-made features evident in the view. Some portions of Wheatridge West would also be visible, but at a far background distance of over 15 miles these would be barely noticeable. The existing views include evident vertical modifications including a power line, irrigation pivots, and existing wind turbines in the background, and the viewing distance is relatively long, reducing the apparent size of the turbines.

Despite the site's historic importance and potential as a tourism resource, this site receives fairly low levels of public use, up to an estimated maximum of about 650 visitors per year (personal communication between Thomas Kruger, Tetra Tech, and Kevin McCoy, BLM Vale District, Baker Office, March 9, 2015). With no facilities beyond the paved trail and some information signs, viewing durations would be fairly short, visitor numbers are fairly low, and the existing viewshed contains many reminders of modern life. Although it is managed as an important historic site, it is not managed as an important scenic resource (i.e., assigned to BLM VRM Class I or II). Regardless of its VRM classification, the BLM's VRM system does not apply outside the boundaries of the ACEC, thus there is no management direction for preservation of views or scenic quality applicable to the lands on which the Project is located. The remaining evidence of the Oregon Trail at the Oregon Trail ACEC/Echo Meadows site would not be disturbed by the Project, allowing visitors to continue their enjoyment of the history of the site.

3.3 Summary of Impacts

The Project has been designed to avoid direct loss to all important and identified recreational opportunities (see Table T-2), and indirect disturbance effects would not lead to an indirect loss of any important or identified recreational opportunity.

Most identified recreation resources would experience virtually no impact from the Project; they are located where they would not be affected by Project traffic, are too far away to hear operational noise, already have the turbines of existing wind farms in view, and would have limited views of the Project that would be unlikely to significantly adversely affect visitor experience. The only important recreation resource that is likely to experience more than negligible impacts to user experience is the Oregon Trail Well Spring Interpretive Site. The location of this site is such that it may experience some traffic impacts, would receive some Project operational noise, and would have moderate visibility of Project turbines at middleground to background viewing distances. Traffic impacts for this site would be limited to potential delays accessing the site rather than traffic at the site; any potential traffic impacts would be temporary and intermittent, and unlikely to affect the level of use at this site. The turbine noise level at this site would be comparable in volume to a whisper, and may be indistinguishable from background noise when the wind is blowing. Views of the turbines would not interfere with the purpose of the site and would not conflict with management direction for the site. Similarly to the other important recreation resources from which the some of the Project turbines may be visible, views of the turbines are considered unlikely to significantly affect visitor experience or numbers of visitors.

Table T-2. Summary of Impacts to Important Recreational Opportunities

Recreational Opportunity	Direct or Indirect Loss of Opportunity?	Worst-case Modeled Operational Noise Level (dBA L_{50})	Maximum Received Sounds Levels During Construction (dBA)	Potential Traffic Impacts	Potential Visual Impacts
Blue Mountain Scenic Byway	No	<26; indistinguishable from background	<26; indistinguishable from background	Negligible	Viewshed analysis indicates limited Project visibility ranging from low to none depending on location along OR-74; moderate viewer numbers but intermittent, short viewing duration at middle- to background distance; no conflict with management direction.

Table T-2. Summary of Impacts to Important Recreational Opportunities					
Recreational Opportunity	**Direct or Indirect Loss of Opportunity?**	**Worst-case Modeled Operational Noise Level (dBA L_{50})**	**Maximum Received Sounds Levels During Construction (dBA)**	**Potential Traffic Impacts**	**Potential Visual Impacts**
Oregon Trail high potential segment	No	<26; indistinguishable from background	34	Negligible	Viewshed analysis indicates Project visibility ranging from good to none depending on location; however, low visitor numbers due to restricted access yield an overall negligible visual impact; no conflict with management direction.
Oregon Trail Well Spring Interpretive Site	No	<26; indistinguishable from background	34	Negligible to Minor; potential short-term, intermittent access delays during construction	Viewshed analysis indicates good Project visibility at relatively close distance; turbines would be to the southeast and would not interfere with northward views from the information kiosk to the remaining evidence of the Oregon Trail; no conflict with management direction.
Oregon Trail ACEC/ Echo Meadows site	No	<26; indistinguishable from background	<26; indistinguishable from background	Negligible	Viewshed analysis indicates moderate Project visibility at middleground viewing distance; turbines would not interfere with viewing of remaining trail evidence within the ACEC; no conflict with management direction.
Morrow County Fairgrounds	No	<26; indistinguishable from background	<26; indistinguishable from background	Negligible	Viewshed analysis indicates Project would not be visible due to terrain; no visual impact.
Willow Creek Water Park	No	<26; indistinguishable from background	<26; indistinguishable from background	Negligible	Viewshed analysis indicates Project would not be visible due to terrain; no visual impact.

4.0 Mitigation

As described Section 3, the Project will have no significant, direct adverse impact on any important recreational opportunity in the analysis area, although it could indirectly impact the visual setting at 2 important recreational opportunities. Consequently, no mitigation measures are proposed.

5.0 Monitoring of Impacts

Because construction and operation of the proposed Project would have no significant adverse impacts on recreational opportunities in the analysis area, and no mitigation specific to recreation is warranted or proposed, no monitoring program for recreation is proposed.

6.0 Submittal Requirements and Approval Standards

6.1 Submittal Requirements

Table T-3. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(t) Information about the impacts the proposed facility would have on important recreational opportunities in the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0100, including:	
(A) A description of the recreational opportunities in the analysis area that includes information on the factors listed in OAR 345-022-0100(1) as a basis for identifying important recreational opportunities.	Section 2, Table T-1
(B) A description of any significant potential adverse impacts to the important opportunities identified in (A) including, but not limited to:	Section 3, Table T-2
(i) Direct or indirect loss of a recreational opportunity as a result of facility construction or operation.	Section 3.1
(ii) Noise resulting from facility construction or operation.	Section 3.2.1
(iii) Increased traffic resulting from facility construction or operation.	Section 3.2.2
Project Order Comments	**Location**
None	N/A

6.2 Approval Standard

Table T-4. Approval Standard	
Requirement	**Location**
OAR 345-022-0100 Recreation	
(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction and operation of a facility, taking into account mitigation, are not likely to result in a significant adverse impact to important recreational opportunities in the analysis area as described in the project order. The Council shall consider the following factors in judging the importance of a recreational opportunity:	Section 3, Table T-2
(a) Any special designation or management of the location; (b) The degree of demand; (c) Outstanding or unusual qualities; (d) Availability or rareness; (e) Irreplaceability or irretrievability of the opportunity.	Section 2, Table T-1,

Table T-4. Approval Standard	
Requirement	**Location**
(2) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	

7.0 References

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Figures

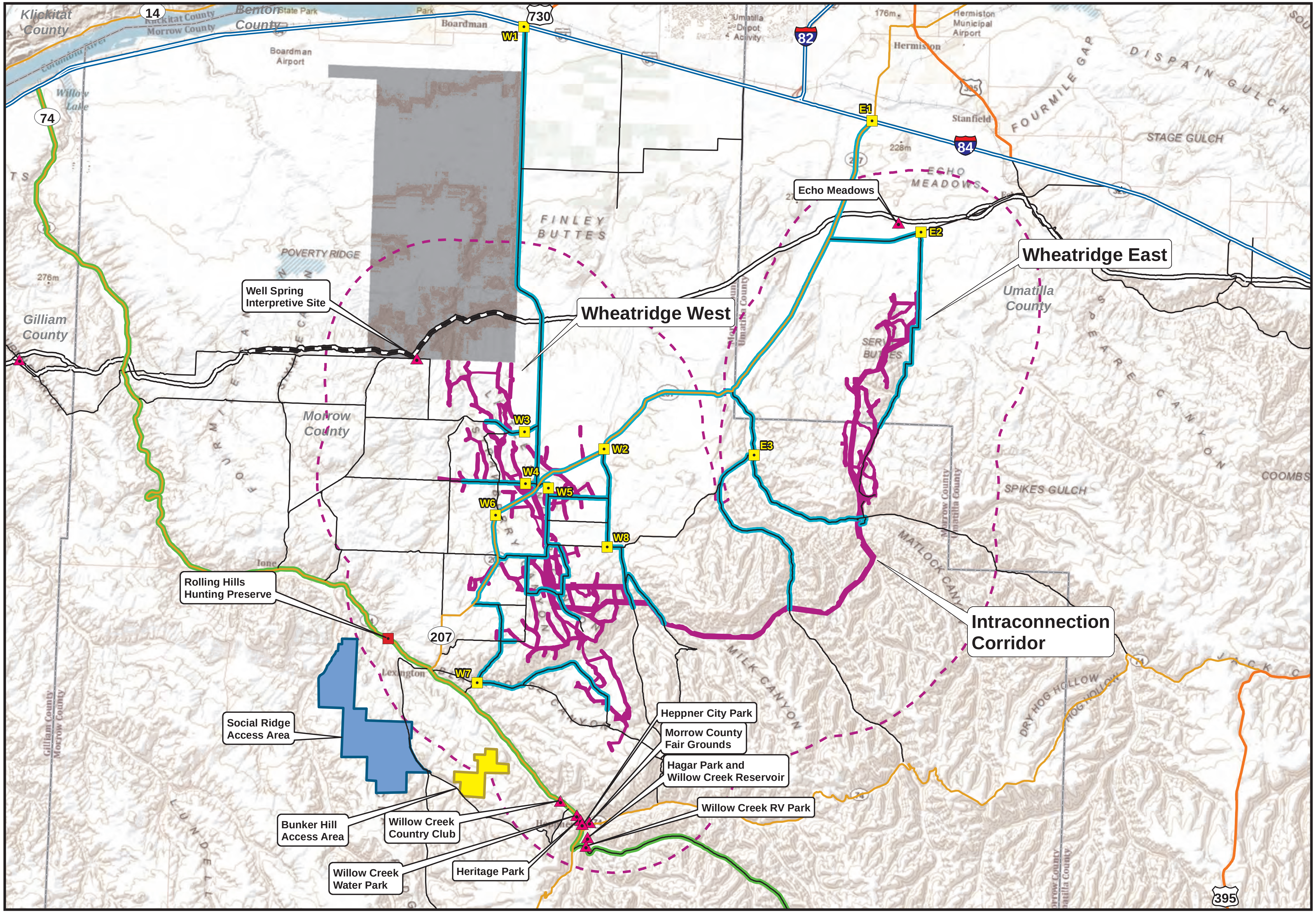

Figure T-1

Wheatridge Wind Energy Facility

Recreational Areas

Morrow and Umatilla Counties, OR

April 2015

- Site Boundary
- Analysis Area (5 mile Buffer of Site Boundary)
- County Boundary
- Boardman Bombing Range
- Construction Traffic Analysis Gates
- Interstate Highway
- Federal Highway
- State Highway
- Local Road
- Transportation Route

Recreational Areas

- Harrison Preserve
- Recreation Site
- Blue Mountain Scenic Byway
- Oregon Trail
- Oregon Trail High-Potential Segment
- Bunker Hill Access Area
- Social Ridge Access Area

1:250,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: site boundary / ESRI: roads, parks, rec sites, background imagery / BLM: rec sites / NPS: historic places / Oregon Parks and Recreation: parks / USGS: rec sites / ODFW: access areas

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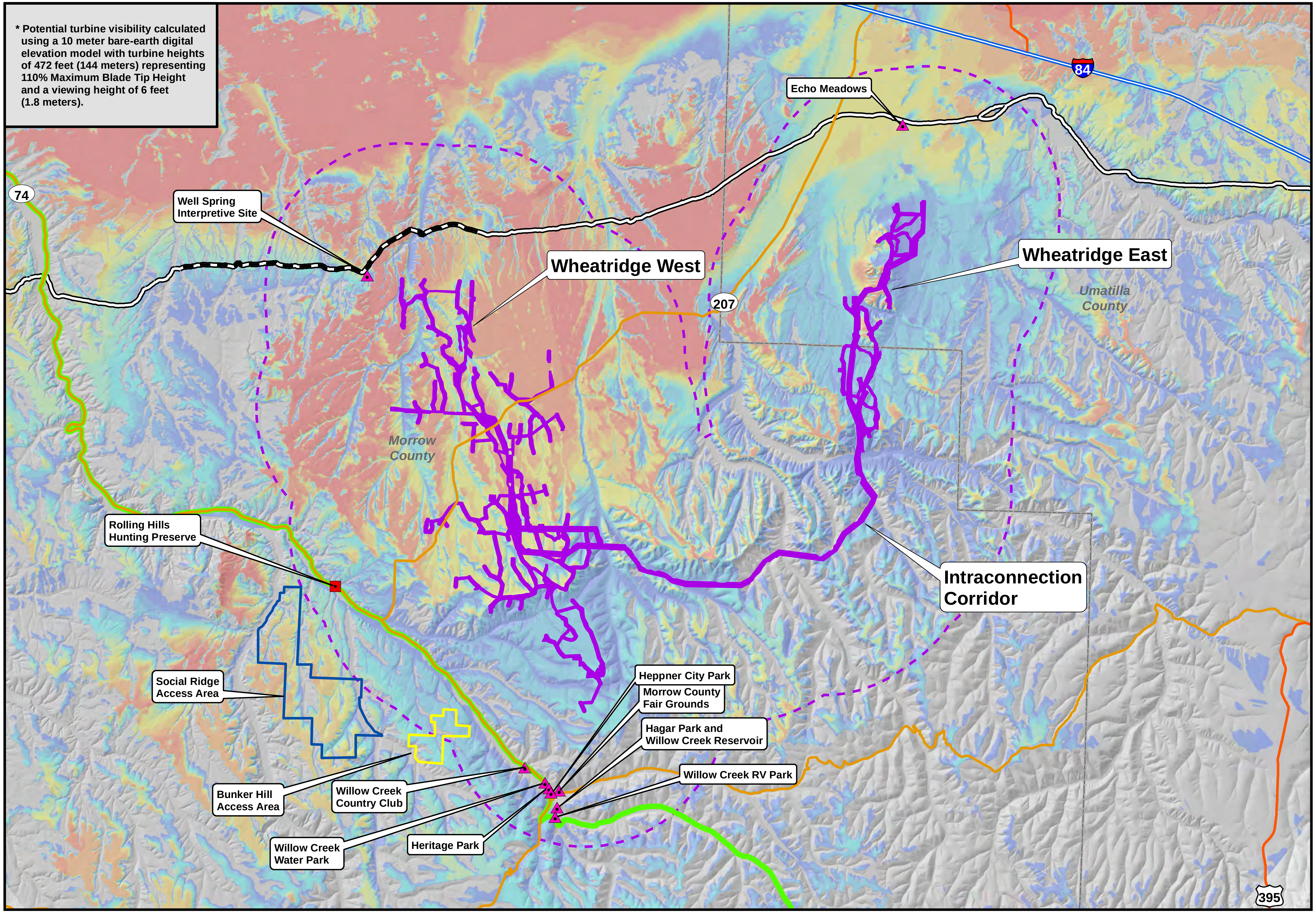

Figure T-2

Wheatridge Wind Energy Facility

Recreational Areas

- Maximum Project Impact -
GE 1.7-103 Turbines

Morrow and Umatilla Counties, OR

April 2015

- Site Boundary
- Analysis Area (5 mile Buffer of Site Boundary)
- County Boundary
- Interstate Highway
- Federal Highway
- State Highway

Viewshed

Number of Turbines Visible *

- 0
- 1 - 25
- 26 - 50
- 51 - 75
- 75 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 225
- 226 - 250
- 251 - 275
- 275 - 292

Recreational Areas

- Harrison Preserve
- Recreation Site
- Blue Mountain Scenic Byway
- Oregon Trail
- Oregon Trail High-Potential Segment
- Bunker Hill Access Area
- Social Ridge Access Area

1:225,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: site boundary / ESRI: roads, parks, rec sites / BLM: rec sites / NPS: historic places / Oregon Parks and Recreation: parks / USGS: rec sites / ODFW: access areas

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TETRA TECH

Figure T-3

Wheatridge Wind Energy Facility

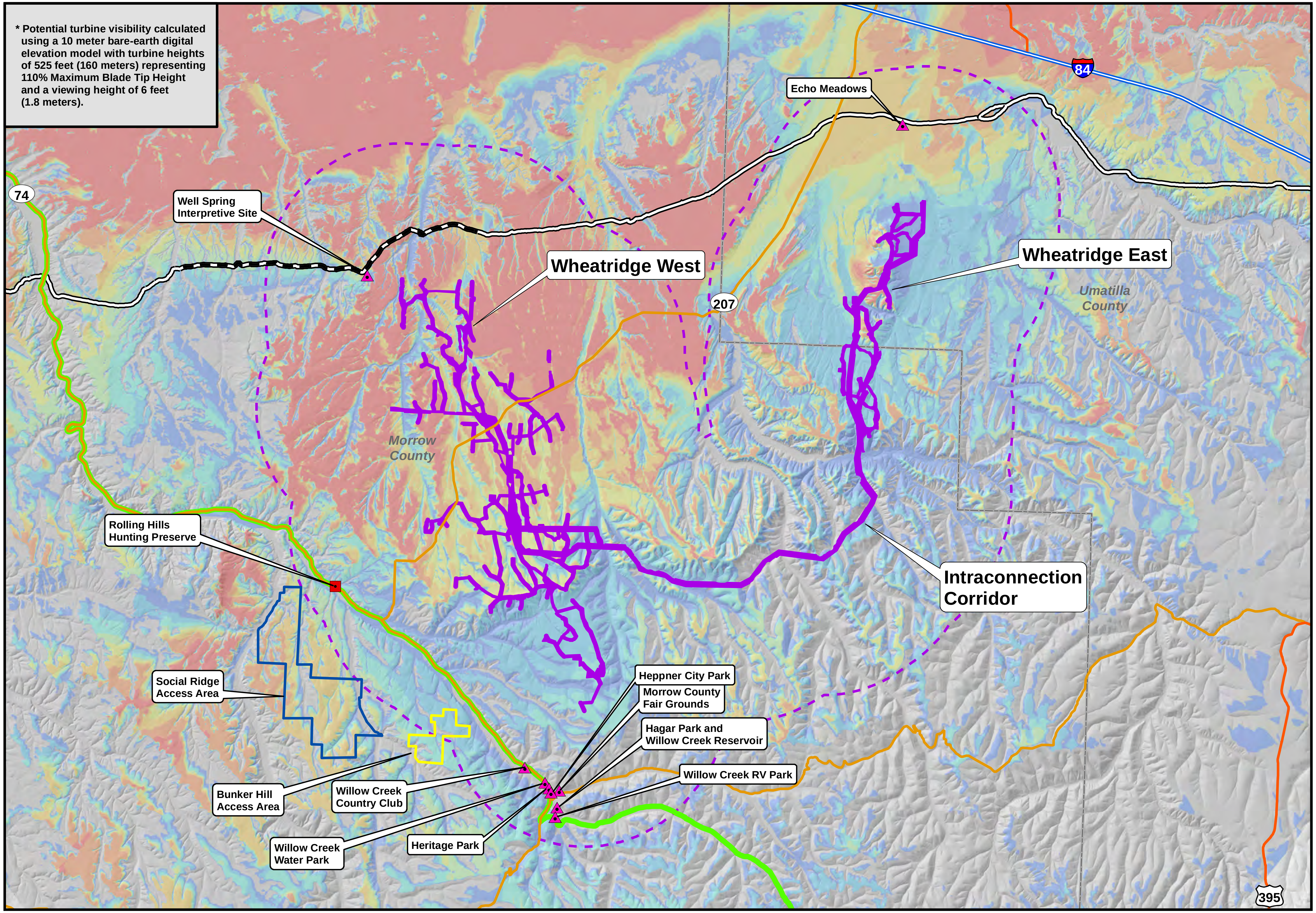
Recreational Areas

- Minimum Project Impact -

GE 2.5-120 Turbines

Morrow and Umatilla Counties, OR

April 2015



- Site Boundary
- Analysis Area (5 mile Buffer of Site Boundary)
- County Boundary
- Interstate Highway
- Federal Highway
- State Highway

Viewshed

Number of Turbines Visible *

- 0
- 1 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200

Recreational Areas

- Harrison Preserve
- Recreation Site
- Blue Mountain Scenic Byway
- Oregon Trail
- Oregon Trail High-Potential Segment
- Bunker Hill Access Area
- Social Ridge Access Area

1:225,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: site boundary / ESRI: roads, parks, rec sites / BLM: rec sites / NPS: historic places / Oregon Parks and Recreation: parks / USGS: rec sites / ODFW: access areas

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Exhibit U

Public and Private Services

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Table of Contents

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Terms and Definitions

Collector Line	An underground or overhead electrical 34.5 kV line transmitting power from the turbines to a Substation
Construction Yard	The temporary area for construction activities and Project component storage prior to installation
GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

ADT	Average daily traffic
EFSC	Energy Facility Siting Council
ESCP	Erosion and Sediment Control Plan
FAA	Federal Aviation Administration
LOS	Level of Service
NPDES	National Pollutant Discharge Elimination System
OAR	Oregon Administrative Rule
ODA	Oregon Department of Aviation
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
OR-##	Oregon State Highway ##
ORS	Oregon Revised Statutes
RV	Recreational vehicle
TSP	Transportation System Plan
V/C	Volume to capacity ratio

1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit U contains information pertaining to potential adverse impacts of construction and operation of the Project on the ability of public and private providers in the analysis area to provide critical services. This Exhibit was prepared pursuant to the Public Services standard in Oregon Administrative Rule (OAR) 345-022-0110 and the submittal requirements in OAR 345-021-0010(1)(u) paragraphs (A) through (E).

This Exhibit demonstrates that the Project can comply with the approval standard in OAR 345-022-0110:

> ***345-022-0110 Public Services***
>
> *(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area described in the project order to provide: sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools.*
>
> *(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.*

(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

1.1 Analysis Area

In accordance with Section VI of the Project Order, the analysis area for public services is the area within the Site Boundary and 10 miles from the Site Boundary. The Site Boundary is defined in OAR 345-001-0010 as "…the perimeter of the site of a proposed energy facility, its related or supporting facilities, all temporary laydown and staging areas, and all road and transmission line corridors proposed by the applicant." The Site Boundary is defined in detail in Exhibits B and C.

1.2 Assumptions Used for Evaluation of Potential Impacts

Wheatridge's base assumptions discussed in this Section pertain to or are associated with workforce needs of the Project and are divided into two distinct phases for this Project. The first is the construction phase, and the assumptions for this phase are discussed in Section 1.2.1. The second is the operation and maintenance phase, and the assumptions of that phase are discussed in Section 1.2.2. As noted in Section 1.2.3, facility decommissioning would have similar impacts as construction, so there is no additional discussion of that phase.

As described in Exhibit B Section 6.0, Wheatridge anticipates that the Project will be constructed in two or more phases; however, the phases are currently undefined. Potential phasing would be dependent upon the location and timing of construction of the Gen-Tie Line(s) by UEC or UEC/CB and interconnection facilities by the Bonneville Power Administration (BPA), and market demand. For the purposes of demonstrating impacts to public and private services Wheatridge presents the impact analysis as if the Project would be constructed in a single phase lasting 18 months. This approach maximizes the average daily traffic count, the daily water use requirement, and the number of workers onsite at any given time. Phasing of Project construction would spread the same impacts out over two or more construction periods, each with lesser impacts than if the Project were to be built in a single phase.

1.2.1 Construction Employment

During construction, an average of 240 workers would be present at the site, with an estimated maximum 360 workers onsite at one time, while multiple disciplines of contractors complete their work simultaneously during periods of the highest activity. Most construction workers would be employees of construction and equipment manufacturing companies under contract to Wheatridge.

Wind energy facility construction requires specialized skills; many workers move from project to project. Therefore, Wheatridge assumes that approximately 30% of the estimated construction workforce hired to work on the Project would be hired locally (i.e., from Oregon), and the remaining 70% of the workforce would be from out of state and would temporarily relocate to the Project. Very few, if any, of the out-of-state workers employed during the construction phase of the Project would be expected to permanently relocate to the area. The percentage of the construction workforce that is hired locally would depend on the availability of workers with appropriate skills. The size of the skilled local workforce is continually growing as more wind farms are built in eastern Oregon, so the percentage of local construction workers may be higher than estimated.

Workers in some positions, such as construction foremen and inspectors, would be employed for the entire duration of the Project, but many workers would be employed for 4 to 6 months and therefore would not be expected to bring families with them. Wheatridge assumes very few workers would relocate their families.

As Wheatridge assumes that because most construction workers would not be in the area for more than 6 to 12 months, housing for most construction workers would primarily be provided by hotels and recreational vehicle (RV) parks.

1.2.2 Operation and Maintenance Employment

An estimated 10 to 15 operational personnel would be permanently employed at the Project at its full 500MW capacity. The O&M staff would be hired locally, to the extent that skilled workers are available. Some outside contractors may also be required from time to time for specialized maintenance tasks, such as turbine inspections or the repair of nacelles or meteorological equipment. Wheatridge assumes that the Project would be in operation for at least 30 years.

1.2.3 Facility Retirement Employment

If the Project is retired (decommissioned), operational jobs would be eliminated. Retirement of the Project would require removal of most Facility components and restoration of disturbed areas. These activities would result in temporary construction employment similar to the construction of the Project.

2.0 Potentially Affected Public and Private Services

2.1 Sewers and Sewage Treatment

In the rural area surrounding the proposed Project, there are no developed sewer systems that would be impacted by construction or operation of the Project. Sewage treatment in this rural area is limited to on-site septic systems. The nearest developed sewer system is located in the city of Heppner, approximately 5 miles from the Site Boundary; other cities' sewer systems are farther away.

2.2 Water

In the rural area surrounding the proposed Project, there are no developed water systems that would be impacted by construction or operation of the Project. Water sources in the Site Boundary are limited to private landowners' wells. The nearest developed water systems are located in the cities of Lexington or Heppner, both approximately 5 miles from the Site Boundary; other cities' water systems are farther away.

Approximately 56.5 million gallons of water would be needed during Project construction, primarily for making concrete for wind turbine foundation construction and for dust control. As discussed in Exhibit O Section 2.1.3, potential sources include the cities of Hermiston, Heppner, Boardman, or other nearby municipalities. Multiple sources may be used to obtain sufficient quantities of water.

Water use during operation of the Project would be limited to small amounts used at the O&M Buildings for sanitation and human consumption. Wheatridge expects to rely on an exempt well allowed under Oregon Revised Statutes (ORS) 537.545 to provide water to the O&M Buildings. Each facility would use less than 5,000 gallons per day, which would not require Wheatridge to obtain a new water right.

2.3 Stormwater Drainage

In the rural area surrounding the proposed Project, stormwater infrastructure is limited to minimal facilities associated with public roads maintained by Morrow or Umatilla counties. The nearest developed stormwater drainage facilities in the vicinity of the Project are located within the limits of the cities of Heppner and Lexington; however, the Site Boundary is approximately 5 miles from each city and the Project would not connect to or otherwise impact either city's stormwater system.

2.4 Solid Waste Management

Both Morrow and Umatilla counties provide solid waste disposal and recycling services through franchise agreements with various private providers. Solid waste disposal for the Project during construction and operations would be provided through a private contract with a local commercial hauler (or haulers) and is not anticipated to cause adverse impacts to services already being provided in the counties or nearby communities. The public landfill closest to the Project Site Boundary is the Finley Buttes Regional Landfill, located approximately 10 miles south of Boardman, Oregon.

Morrow County has adopted a Solid Waste Management Ordinance that addresses solid waste disposal and recycling in the County. One of the purposes of this ordinance is to "[provide] the opportunity to recycle as part of the overall solid waste plan," and refers in turn to Oregon's reuse and recycling requirements. The majority of the ordinance relates to licensing of waste disposal sites and waste collection franchises and recycling franchises. The ordinance obligates the waste and recycling franchisees to maintain records of amounts of waste collected or received, and amounts and types of waste recycled, consistent with reporting requirements of the Oregon Department of Environmental Quality. Wheatridge will coordinate with waste and recycling franchisees servicing the Project to maintain required records.

2.5 Housing

In general, housing is not provided as a government service per se except in the case of subsidized housing for low-income people and through a variety of government loans and other incentives. There is no government housing within the Project Site Boundary. No existing housing would be directly impacted by the Project.

While some construction contractors would be hired locally, many construction workers are expected to come from outside the Project vicinity and would require temporary housing. Assuming conservatively that only 30% of the construction workers would be local residents, an average of about 168 and a peak of about 252 new workers would be temporary residents (in-migrants) in the area in need of temporary housing. Typical housing options for temporary workers include hotels or motels, apartments, short-term rental homes, and campgrounds, or other areas where workers can park mobile housing (e.g., trailers or RVs).

Construction workers may commute daily from many communities within and beyond the immediate Project vicinity, including Lexington, Arlington, Ione, Heppner, Boardman, Hermiston, Irrigon, Pendleton, and Umatilla, Oregon. Assuming construction workers are willing to travel an hour or more to work each way, several communities in Benton or Franklin Counties, Washington (including the Tri-Cities: Kennewick, Richland and Pasco) would also be within commuting distance of the Project. Because workers can spread out to many communities within a commutable distance, the impacts to housing in the immediate vicinity of the Project associated with the in-migration of outside workers would be lessened.

Motels, hotels, and trailer or RV parking would be the most available housing option for temporary residents. An Internet search identified more than 1,850 hotel and motel rooms and 660 RV spaces in Morrow and Umatilla counties. Most of these are found in Hermiston or Pendleton. Additional rooms may be available in establishments that do not have information on the Internet. Furthermore, additional rooms may be available in communities located somewhat farther from the Project but within a commutable distance, such as in Kennewick, WA. Although not all of these housing facilities would be available at any given time, adequate supplies are available in relation to the number of temporary workers.

The availability of temporary housing varies seasonally. Demand for temporary housing is generally greatest during the tourism season in the summer months. Statewide, the average hotel and motel occupancy rate in 2009 was 63.2% in June compared to 38.3% in December, with an annual average rate of 53.9% (Travel Oregon 2009a, 2009b). Based on these occupancy rates, an estimated 680 hotel and motel rooms would likely be available on any given day in June in Morrow and Umatilla counties, while an estimated 1,141 hotel and motel rooms would be available in December.

Some construction workers, particularly those employed for the entire duration of construction, may rent a house or apartment during construction of the Project. Table U-1 presents rental housing supply and availability data for Morrow and Umatilla counties, as reported in the 2010 US Census (US Census Bureau 2010). The reported rental vacancy rate in both counties was 6.9%. The estimated number of vacant rental units is calculated as a percentage of total vacant housing units;

that percentage is based on the ratio of renter-occupied dwellings to owner-occupied dwellings. Using this method, an estimated 1,184 housing units would be available for rent in Morrow and Umatilla counties.

Table U-1. Available Housing Estimates

Geographic Area	Total Housing Units	Vacant Housing Units	Of Occupied Housing, Percentage Occupied by Renter	Estimated Number of Vacant Rental Units	Rental Vacancy Rate
Umatilla County	29,660	2,855	35.6%	1,017	6.9%
Morrow County	4,445	590	28.3%	167	6.9%

Sources: US Census 2010.

2.6 Transportation and Traffic Safety

The affected transportation service providers are the Oregon Department of Transportation (ODOT) for state highways, and the Public Works departments for Umatilla and Morrow counties for other public roads.

The construction of the Project would result in a temporary increase in local traffic, including large trucks and construction equipment as well as construction workers' vehicles. Primary transportation corridors and a few major county roads would carry the majority of construction-related truck traffic and workforce traffic. The primary corridors are Interstate Highway 84 (I-84) and Oregon Highway 207 (OR-207). Major county roads that would convey significant amounts of construction traffic include: Bombing Range Road, Big Butter Creek Road, Little Butter Creek Road, Baseline Road, Juniper Lane, Strawberry Lane, and Sand Hollow Road in Morrow County, all of which are classified and constructed as either Major Collector or Minor Collector roads. Some local county roads and private roads may also see increases in traffic. Additional private access roads would be developed to each of the proposed wind turbines and associated facilities. The majority of Project materials and equipment, including most turbine components and large construction equipment loads, would arrive at the Project via I-84 and OR-207. Bombing Range Road would be used for large component or equipment deliveries to the northern end of Wheatridge West, and would also be used for other truck traffic including deliveries of aggregate, water, and other construction materials. Figure U-1 identifies primary construction traffic routes to the Project Area.

2.6.1 Performance Standards and Existing Traffic

A significant adverse impact in terms of transportation would result if construction or operation of the Project would meaningfully lower the level of service (LOS) provided to the public. That could occur if additional traffic generated by the Project were to exceed the capacity of existing roads, resulting in significant and ongoing delays in travel times or unmitigated damage to roads.

Transportation engineers have established various standards for measuring traffic capacity of roadways or intersections. Each standard is associated with a particular LOS. The LOS concept requires consideration of factors that include travel speed, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort and convenience, and operating cost. In the 1999 Oregon Highway Plan (OHP), LOS were defined by a letter grade from A-F, with each grade representing a range of volume to capacity ratios. A volume to capacity ratio (V/C) is the peak hour traffic volume on a highway divided by the maximum volume that the highway can handle. If traffic volume entering a highway section exceeds the section's capacity, then disruptions in traffic flow will occur, reducing the LOS. LOS A represents relatively free-flowing traffic and LOS F represents conditions where the road system is totally saturated with traffic and movement is very difficult.

The 1999 OHP and later amendments (ODOT 2006) guide state highway development and management for a 20-year planning horizon. In this plan, ODOT identified the performance standards in terms of V/C for State highways. Table U-2 lists applicable maximum V/C for peak hour operating conditions from the 1999 OHP (last amended in August 2005).

Table U-2. ODOT Maximum Volume-to-Capacity Ratios for Peak Hour Operating Conditions

Highway Category	Inside Urban Growth Boundary[1/]	Unincorporated Communities	Rural Lands
Interstate Highways (I-84)	0.70 to 0.85	0.70	0.70
Regional or District Highway (OR-207)	0.75 to 0.95	0.75	0.70

Source: ODOT 1999.

1/ The primary transportation routes to the Project are not located within any Urban Growth Boundary.

Performance standards for Morrow County roads are defined in the 2012 Morrow County Transportation System Plan (TSP). The Morrow County TSP discusses capacity in terms of LOS, and calls for a minimum LOS C in rural areas and LOS D for the areas surrounding cities within urban growth boundaries.

The Morrow County TSP also provides information on existing and projected future traffic volumes and LOS. Based on existing traffic data, the state highways and county roads in Morrow County are operating well below maximum acceptable V/C ratios. Existing daily volumes on the state facilities range from 13,800 average daily trips (ADT) on I-84 west of US-730, to less than 1,500 ADT on the rest of the state highways in the county, most segments of which carry less than 500 ADT. Traffic data from 2004 indicates that all state highways operated well within capacity, with a maximum V/C of 0.40 for I-84 at the Port of Morrow interchange; OR-207 operated at a V/C of 0.01 to 0.05. Over the next 20 years only one highway segment is expected to exceed a V/C of 0.50 (I-84 east of Paterson Ferry Rd), but would still operate within acceptable levels; this road would not be used for Project traffic. Traffic data is provided for only a few of the busiest county roads, and of those roads only Bombing Range Road and Wilson Road are likely to be used by Project traffic. Bombing Range Road carries an average of 1,250 vehicles per day, while Wilson Road carries an average of 1,060 vehicles per day; both operate at an estimated V/C ratio of below 0.10, or LOS A. Existing estimated

V/C for the four busiest county roads are low, with a maximum of 0.24. Rural access roads are low volume, usually carrying less than 200 vehicles per day. Although traffic count data is limited, the County assumes that with such low V/C on the county roads known to carry the highest traffic volumes (none of which would be used for access to the Project), existing capacity deficiencies on any county roadways are unlikely. Current data indicates that all intersections in Boardman and Heppner operate in an acceptable LOS A or B. The County assumes that, since traffic volumes in the cities are generally higher than rural areas, intersection operations in the rural areas are also acceptable.

Low to modest growth rates in population and resulting traffic are anticipated in the rural areas over the 20-year planning horizon. Consequently, no reductions in LOS on roads that would be used or impacted by the Project are anticipated.

Performance standards for Umatilla County roads are defined in the 2002 Umatilla County Transportation System Plan. The Umatilla County TSP discusses roadway capacity in terms of both LOS and V/C, and provides a useful comparison between the two for both freeways and two-lane highways; this comparison is presented in Table U-3, along with a description of typical traffic flow conditions for two-lane highways. The TSP includes a goal to "Preserve the function, capacity, LOS, and safety of the local streets, county roads, and state highways"; however, a minimum LOS is not specified in the TSP.

Table U-3. LOS to V/C Equivalencies

LOS	Equivalent V/C	Typical Traffic Flow Conditions for Two-Lane Highways
A	0.00 to 0.48	Motorists are able to drive at their desired speed which, without strict enforcement, would result in average speeds approaching 60 mph. Passing demand is well below passing capacity, and almost no platoons of three or more vehicles are observed.
B	0.49 to 0.59	Speeds of 55 mph or slightly higher are expected on level terrain. Passing demand needed to maintain desired speeds becomes significant and approximately equals the passing capacity.
C	0.60 to 0.69	Further increases in flow result in noticeable increases in platoon formation, platoon size, and frequency of passing impediment. Average speed still exceeds 52 mph on level terrain, even though unrestricted passing demand exceeds passing capacity. While traffic flow is stable, it is becoming susceptible to congestion due to turning traffic and slow-moving vehicles.
C-D	0.70 to 0.73	
D	0.74 to 0.83	Unstable traffic flow as passing demand is very high. Average platoon sizes of 5 to 10 vehicles are common, although speeds of 50 mph can still be maintained under ideal conditions. This is the highest flow rate that can be maintained for any length of time over an extended section of level terrain without a high probability of breakdown.
D-E	0.84 to 0.87	
E	0.88 to 0.97	Under ideal conditions, speeds will drop below 50 mph. Average travel speeds on highways with less than ideal conditions will be slower, as low as 25 mph on sustained upgrades. Passing is virtually impossible and platooning becomes intense when slower vehicles or other interruptions are encountered.
E-F	0.98 to 0.99	
F	1.00	Heavily congested flow with traffic demand exceeding capacity.

Source: 2002 Umatilla County TSP

As of 2002, all rural segments of freeways in Umatilla County operate at LOS A or better during average conditions and LOS B or better during peak summer conditions. All but one segment (on US 730, a road that would not carry Project traffic) of rural two-lane highways in Umatilla County operate at LOS C or better. OR-207 at the Morrow/Umatilla county line operates at LOS A, and operates at LOS B between I-84 and Oregon Trail Road (a.k.a. OR-320 or Lexington-Echo Highway). The TSP reports that approximately 1,300 vehicles per day used the segment of OR-207 between I-84 and Oregon Trail Road. The intersection of OR-207 with Oregon Trail Road operates at LOS A. Projected LOS for the year 2018 are similar, except that OR-207 north of Oregon Trail Road is projected to operate at LOS D by 2018, and that left and right turning movements from Oregon Trail Road on to OR-207 would function at LOS D (reserve capacity of 100 to 199 passenger cars per hour with long traffic delays) during the peak traffic hour; other movements through this intersection would function at LOS A. Peak traffic hour volumes are defined in the Umatilla TSP as 10% of total daily traffic.

Daily traffic volumes along most local roads are less than 500 ADT. Collector roads are intended to carry between 1,200 and 10,000 ADT, and the Umatilla TSP reports that most of these carry below 1,000 ADT. All roads used for access to the Project operate at LOS A (<0.48 V/C). Access to and from "highly important" roads at intersecting minor roads is also adequate, reaching an estimated LOS B, where peak hour minor road traffic volumes reach up to 150 VPD.

2.6.2 Road Design Standards

State highways are designed and constructed to handle legal loads of 80,000 pounds. Some trucks that deliver large and heavy equipment (typically the base tower sections, nacelles, main transformers and blades) will be required to obtain oversize/overweight permits. These permits allow travel on all unrestricted roads. At this time none of the state roads are restricted; nevertheless, at the time of construction, ODOT and the county transportation departments will be contacted by the transportation contractor to make certain that no roads are restricted at that time. The pavement conditions on the state roads are very good at this time and no impairment to the quality of these roads is expected.

The condition of the existing county roads that will be used by the Project vary widely from paved two-lane roads such as Bombing Range and Butter Creek Roads to little more than two track road with minimal aggregate surfacing, such as portions of SR 1349 (a.k.a. Vey Road). Some of the county or local roads will require upgrading to accommodate the truck traffic associated with the wind farm construction. This may include widening, replacing cattle guards, replacing or adding cover to culverts, or adding road base aggregate to the existing roads.

2.7 Law Enforcement

Police service in the analysis area is primarily provided by county police departments; some of the cities in the analysis area have a city police department that operates within their respective cities but would not cover the Project Site Boundary. As necessary, Wheatridge will seek assistance from the nearest Morrow County Sheriff's Office, located in Heppner, Oregon, or from the nearest Umatilla County Sheriff's Office, located in Hermiston, Oregon. Additional law enforcement service is available through the Oregon State Police, with offices in Arlington, Heppner, Hermiston, and Pendleton. The small number of temporary construction workers and additional permanent-resident employees is not anticipated to place significant new demands on law enforcement agencies in the area.

2.8 Fire Protection

Fire protection service in the analysis area is provided by a number of agencies including the Boardman Rural Fire Protection District, the Ione Rural Fire Protection District, the Heppner Volunteer Fire Department, and the Echo Rural Fire Protection District. Wheatridge will provide to all involved fire departments construction plans, phasing information, and locational information for all Project facilities, including Project access.

2.9 Attachments U-3 through U-6 are a record of correspondence with the Heppner Volunteer Fire Department, Ione Rural Fire Protection District, Echo Rural Fire Protection District, and Boardman Rural Fire Protection District confirming that the construction and operation of the Project would not impede their abilities to provide emergency services. As the Project is outside the boundaries of the city of Lexington and is completely within the rural fire protection districts of Heppner, Ione, and Echo, any emergency fire response would be by one of these three rural fire protection districts and any assistance by another fire department would be in the service of one of these three rural fire protection districts.Health Care

There are a number of health care service providers in the analysis area. The nearest hospitals are the Pioneer Memorial Hospital located in Heppner and the Good Shepherd Medical Center in Hermiston. The nearest Level III trauma center is the Mid-Columbia Medical Center in The Dalles (Oregon Rural Health Association 2011). Ambulance service in the area is provided by the Morrow County Health District's Emergency Medical Services and the Hermiston Fire and Emergency Services (Oregon Licensed Ambulance Service Providers 2012). Some of the nearby fire districts also have First Response Vehicles, with equipment and crew trained to stabilize a patient until the arrival of an ambulance for transport.

In the event of a serious injury during construction or operation of the Project, the patient may be flown by helicopter (operated by Life Flight) to one of the two Level 1 hospitals located in Portland: Oregon Health & Science University Hospital or Legacy Emmanuel Medical Center.

2.10 Schools

The Project Site Boundary falls within two school districts: Morrow County School District No 1 and Echo School District No. 5 in Umatilla County. Other nearby school districts (most of which are outside of the 10-mile analysis area) that may experience an increase in enrollment due to the Project include: the Hermiston, Stanfield, and Pendleton school districts in Umatilla County, the Ione School District in Morrow County, and the Richland, Kennewick, Prosser, Kiona-Benton City, and Finley school districts in Benton County, Washington.

According to the Morrow County TSP, The Mid-Columbia Bus Service provides school bus service to all county public schools on a contract basis. Their 25 buses are in operation from 6:30 to 8:30 AM and from 2:00 to 5:00 PM, with some mid-day service. The current condition of roads in the county is good and does not inhibit bus operations. The bus service reports a good working relationship with both the county and state road departments.

3.0 Description of Likely Adverse Impacts to Public and Private Providers

The Project is not expected to have any significant adverse impact on any public or private service providers in the analysis area, either during the construction phase or the operation and maintenance phase. Construction workers will be dispersed throughout the construction area, and would generally stay in a single location for a period from a few weeks to as long as 18 months.

3.1 Sewers, Sewage Treatment, and Water

The Project will not have an adverse impact to water or sewer services because in the rural area in which the Project is proposed, there are no developed water or sewer systems that would be impacted by construction or operation of the Project. The nearest developed water and sewer systems are located in the cities of Lexington or Heppner, both approximately 5 miles from the Site Boundary; other cities' water and sewer systems are farther away. During construction, sanitary waste will be collected on-site in portable toilets, to be provided and maintained by a licensed subcontractor. During operations, sanitary waste will be limited to domestic wastewater from the Project's O&M Buildings, which will be discharged to a licensed on-site septic system. Due to the distance to the nearest developed sewer system, Wheatridge does not anticipate that connection to sewers or sewage treatment facilities would be required. Therefore, impacts to community sewer systems are not anticipated.

Because water for construction will only be obtained from permitted municipal sources with adequate water rights, public water systems will not be adversely affected by construction of the Project. Wheatridge does not anticipate that groundwater or surface water sources or limited licenses would be needed. The Public Works Departments of Hermiston, Stanfield, and Boardman, as well as the Port of Morrow, have provided written correspondence (see Attachments O-1, O-2, O-

3 and O-4) that adequate water is available for the construction of the Project. Construction of the Project is highly unlikely to affect the small number of wells in the analysis area.

Water use during operations would be limited, and supplied through an exempt well located at each of the O&M Buildings. The limited amount of water that can be used from an exempt well is not expected to result in injury to other private water rights in the vicinity of the Project.

3.2 Stormwater Drainage

The Project will not have an adverse impact on the provision of stormwater drainage services because construction, operation and decommissioning would not require construction or expansion of public stormwater drainage facilities. The Project is located sufficiently far from existing municipal stormwater drainage facilities that there would be no impacts to those facilities.

Construction of the proposed Project will add new impervious surfaces to a small fraction of the total Project site acreage. Stormwater runoff generated in areas disturbed by Project construction will be managed onsite, typically through the use of retention and infiltration systems as described in the Project's National Pollutant Discharge Elimination System (NPDES) 1200-C construction permit and accompanying Erosion and Sediment Control Plan (ESCP), and the NPDES 1200-A permits for any concrete batch plants. Most of the Project site is vegetated, which will serve as a buffer to promote infiltration and minimize erosion.

Stormwater management infrastructure put in place to manage stormwater during construction will, as needed, be left in place to continue functioning throughout the life of the Project. Such features may include roadside ditches, infiltration swales or retention basins. All of these facilities will be located on private land and will not affect the provision of stormwater management services by any public agency.

The Project would comply with federal, state, and local statutes and regulations related to stormwater runoff including the NPDES 1200C permit, which will be completed prior to construction, and the associated ESCP (Exhibit I Attachment I-2). Construction Best Management Practices associated with these permits are expected to reduce any stormwater impacts below significant levels.

3.3 Solid Waste Management

Construction and operation of the Project will not have an adverse impact on solid waste management. Project construction will generate a variety of solid wastes, including concrete, scrap metal, and wood and plastics used to secure and protect components during shipping. All waste will be collected in a central location during construction, to be hauled away by a licensed waste disposal service for disposal or recycling. Excess soil from road construction and foundation excavation will be spread on site to the extent practicable, or hauled off-site to be disposed of in accordance with applicable regulations. Operation and maintenance of the Project would employ an estimated ten people, which would result in little generation of solid waste. Exhibit V includes detailed information about types and quantities of solid waste and disposal.

Wheatridge will recycle wastes to the extent practicable, and will contract with a local franchise waste hauler to remove both recyclables and solid waste from the Project area. As mandated by Morrow County's Solid Waste Management Ordinance, Wheatridge will coordinate with waste and recycling franchisees servicing the Project to maintain required records. Solid wastes are anticipated to be disposed at the Finley Butte Landfill, which has adequate capacity to serve the Project. Correspondence with Dean Large, Sales Manager at Finley Butte Landfill, confirms that Finley Butte will be able to easily handle construction waste generated by Project construction and operation (Attachment U-7)

3.4 Housing

Potential impacts on housing could result if there were an inadequate supply of housing in relation to the demand from the new temporary and permanent residents associated with the Project.

Construction and operation of the Project will not have a substantial adverse impact on housing in the analysis area. The construction workforce will be dispersed among a number of communities in the area, and would generally stay in one place for 6 to 12 months at a time. Any potential impacts to housing in the analysis area will be short term.

Morrow County identified that in the 2014 to 2016 timeframe, potential energy projects in the area include the Project, the Boardman to Hemingway transmission lines and associated substations, and the Carty Generating Plant and the associated lateral gas pipeline. In addition, one or more wind projects and related facilities may be developed and other non-energy projects may be undertaken.

The potential impact on Morrow County area housing from these projects will depend on the overlap of project construction workforces in the vicinity. The aggregate number of construction workers will fluctuate depending on timing of specific phases for each project, and detailed impact analysis is not possible at this time.

Construction of the Project would require temporary housing for an estimated peak of about 252 workers who would be temporary residents (in-migrants) in the area. Construction of the Boardman-to-Hemingway transmission line would require housing for up to approximately 243 workers during peak construction times, and construction of the Carty Generating Plant would require housing for approximately 350 workers during peak construction times.

Based on the total number of hotel and motel rooms in Morrow and Umatilla counties and on statewide average occupancy rates, an estimated 680 hotel and motel rooms would likely be available on any given day in June in Morrow and Umatilla counties, while an estimated 1,141 hotel and motel rooms would be available in December. Based on 2010 US Census data, an estimated 1,184 housing units would likely be available for rent in Morrow and Umatilla counties (US Census Bureau 2010). Over 660 RV spaces have also been identified in Morrow and Umatilla counties; vacancy rates for RV spaces are unknown.

An adequate stock of temporary housing is available for construction workers building the Project, even discounting the available RV spaces. Even if the identified three large infrastructure projects overlap such that their three workforces all require housing in the area at the same time, an adequate temporary housing stock appears to be available in Morrow and Umatilla counties. To the extent that housing in the immediate vicinity of a project may not be available, additional housing would be available in nearby areas within commutable distance, including Arlington, Oregon or the Tri-Cities, Washington.

3.5 Ground Transportation and Traffic Safety

3.5.1 Project Trip Generation

3.5.1.1 Truck Traffic

The construction activities are anticipated to take approximately 18 months from mobilization until commercial operation. During construction, trucks will be using I-84, OR-207 and local county roads to bring construction equipment, turbine components, Substation equipment, and transmission line equipment to the various Project sites. Trucks will also be used to bring road base aggregate to improve existing county roads and construct new access roads; to bring concrete for the turbine, Substations, and O&M Building foundations; and to bring water for dust control. As noted in Section 2.6, the majority of Project materials and equipment, including all turbine component and large construction equipment loads, would arrive at the Project via I-84 and OR-207. Bombing Range Road would be used for large component or equipment deliveries to the northern end of Wheatridge West, and would also be used for other truck traffic including deliveries of aggregate, water, and other construction materials. Figure U-1 identifies primary construction traffic routes to the Project Area.

The estimate of number of construction trips is based on experience with traffic from similar sized wind farms and actual construction experience. Included in the estimate were the following major Project elements:

- Civil construction and material (aggregate, culverts, etc.) supply for new roads and upgrades to existing roads; turbine erection and crane pads, Substations, laydown areas, Collector Line, transmission line and O&M Building area.
- Turbine and related component delivery including towers, nacelles, hubs, blades, pad mount transformers, Substation equipment and transformers, Collector Line components, Intraconnection Line towers and conductor, and O&M Building materials.
- Material supply for turbine foundations (sand, aggregate, cement, and steel rebar. Concrete assumed to be batched on-site in temporary plants; local suppliers may be used instead at the option of the construction contractor.).
- Delivery of on-site construction equipment such as cranes, dozers, graders, compactors, forklifts, etc.
- Water truck traffic (assumes water comes from Hermiston, Stanfield and Boardman).

Based on the above, the total number of trucks trips was estimated. For the wind farm construction alone, an 18 month construction period was assumed. For the Intraconnection Line(s), only a 6 month construction period was assumed. An estimated total of 32,000 truck trips would be required for the wind farm construction; the Intraconnection Line construction would require an estimated 3,680 trips. Over the 18 month wind farm construction period, and assuming an average of 24 working days per month, an average of 74 daily round trips would be generated by wind farm construction activities, and approximately 26 round trips per day would be generated by Intraconnection Line construction. It is further assumed that the Intraconnection Line construction would occur concurrently with the wind farm construction so that the combined average daily trips during the 6 months when both activities were going would be approximately 100 round trips per day. Since construction activity is not uniform this number is increased by 25% to account for peak periods, yielding an estimated maximum of 125 round trips per day or 250 one-way trips per day.

Truck traffic during operation of the Project would be minimal, and most of the time would be nonexistent. Heavy equipment may be brought in occasionally for major repairs or turbine replacement, but these occasions are expected to be few and far between.

3.5.1.2 Private Vehicle Traffic

Privately owned vehicles will be the primary means of transporting workers to and from the Project on a daily basis. During construction an estimated average workforce of approximately 240 workers will be employed. During the peak months of construction activity, the estimated number of workers will increase to approximately 360. Most of the construction worker traffic would originate from the communities that are along I-84 stretching from Boardman to Pendleton; a small number may also live in the small communities of Lexington, Ione, or Heppner which are located southwest of the Project. As such the workforce will use the same roads to access the Project as the equipment transporters.

Conservatively, it is assumed that most workers will drive alone and that the average vehicle will only have 1.25 occupants. This makes the daily vehicle counts 288 for the peak period and 192 for the average workforce. These daily vehicle counts are doubled to account for each one way trip, resulting in an estimated 576 peak or 384 average trips per day. Private vehicles would primarily travel mornings and evenings corresponding to the work day, whereas the construction truck traffic would be more uniformly distributed throughout the work day. As a result, the private traffic and the truck traffic would not overlap for the most part.

During operations, 10 to 20 employees will be hired for operations and maintenance. These employees will live in proximity to the Project and use the same roads that will be used by the construction workforce. Occasionally during operations, specialty contractors will be brought in to handle major repairs. Operational traffic generation would be minimal.

3.5.2 Impacts to Existing Levels of Service

State, county, and local roads may be temporarily affected by construction related traffic but the impact is expected to be minimal. Table U-4 provides a summary of current traffic volumes and level of service conditions, as well as projected traffic volumes and service levels with Project construction traffic at 11 points, or transportation gates, on the surrounding road network; the transportation gates are shown on Figure U-1.

Most Project traffic would travel on I-84 to reach the site, but would not cause a material reduction in service levels on the highway. The highest existing traffic volume on I-84 near the Project area is approximately 13,800 ADT (just west of the US-370 interchange) for the most recent period of record of 2011 (2012 Morrow County TSP). This ADT has remained steady over recent years and should be relatively stable in the future.

Assuming that all Project traffic (both truck and personal vehicle traffic) would use I-84, the increase in traffic on I-84 that would be attributable to Project construction would be less than 4% of total traffic volume on that highway. This is inconsequential as the Interstate is operating well below its design capacity. As indicated in the Morrow County TSP (2012), the performance of state highways is to be analyzed at the peak period, defined as the peak 15 minutes of the 30th highest volume hour of the year, or 30th design hour volume (30th DHV). The Morrow County TSP reports a 2005 30th DHV of 2,150 vehicles, during which time I-84 operated at a V/C ratio of 0.40; by comparison, when this is projected out to 2024 the 30th DHV traffic volume would be 3,010, at which time I-84 would operate at a projected V/C ratio of 0.47. Even assuming that all daily Project traffic – an estimated 825 trips per day at peak construction times - would occur on I-84 within the 30th design hour (which would not actually occur, as Project traffic would be distributed spatially and temporally), the total traffic volume on I-84 would be lower than the estimated volume in the year 2024, and the highway would continue to operate well below the State's maximum peak hour V/C ratio of 0.70.

The only other state highway that would carry significant amounts of Project construction traffic is OR-207, specifically that segment south of I-84 (traffic gate E-1). The traffic counts on OR-207 range from 1,400 ADT near I-84 to less than 1,000 ADT in the Project vicinity; this road operates at a V/C ratio of less than 0.1, or LOS A south of Oregon Trail Road, and LOS B (0.49-0.59 V/C) between Oregon Trail Road and I-84. Project construction traffic would most affect that segment between Oregon Trail Road and I-84, where an estimated 616 trips per day would be added during peak construction periods. This segment is predicted to carry over 6,000 ADT by 2018, at which time it is predicted to operate at LOS D (0.74-0.83 V/C). Traffic volumes with Project construction traffic would be approximately 2,020 ADT, indicating that the Project would not cause an appreciable reduction in Level of Service on this highway segment. Truck traffic will generally not coincide with morning and evening peak hours; rather, truck traffic would be dispersed throughout the working day, with an estimated 18 truck trips per hour occurring on this highway segment during peak construction periods.

Oregon Trail Road (Lexington-Echo Highway or OR-320) would also convey Project construction traffic, specifically truck trips into Wheatridge East, and a portion of morning and evening worker traffic (Traffic gate E-2). Existing traffic volumes on this road are about 550 vpd, and this highway operates at LOS A. Projected 2018 traffic volume is 610 vpd, at which time Oregon Trail Road is projected to continue to operate at LOS A (<0.48 v/c). Project construction would add an estimated 99 trips per day on this road segment, indicating that construction traffic would not cause an appreciable reduction in Level of Service on this highway segment. Truck traffic will generally not coincide with morning and evening peak hours; rather, truck traffic would be dispersed throughout the working day, with an estimated 4 truck trips per hour occurring on this highway segment during peak construction periods.

Project construction traffic would have lesser impacts on county roads in Morrow or Umatilla County. As indicated in the Morrow County TSP, traffic count data collected by the county is limited, but most rural county roads see little traffic currently, typically less than 500 vehicles per day. These volumes are minimal and LOS excellent; the additional traffic should have negligible impact to traffic flow or safety. The most heavily impacted Morrow County road will be Bombing Range Road (traffic gate W-1), which will be used by construction workers as well as for some truck trips. Generally, this route would be used only for construction materials deliveries; turbine components and heavy construction equipment would be routed via OR-207. Current traffic volumes on Bombing Range Road are about 1,250 vpd, and this road operates at LOS A. The Morrow County TSP projects a 2024 traffic volume of 1,700 vpd, at which time this road is projected to continue to operate at LOS A (0.11 v/c). Project construction would add an estimated 131 vpd on Bombing Range Road; the resulting total traffic volume would be less than the projected 2024 volume, indicating that Project construction would not result in a reduction of service level on Bombing Range Road. Project construction would add an estimated 7 truck trips per hour on this road.

As reported in the Umatilla County TSP (2002), "Since the observed traffic flows along many of the rural county roads are less than 1,000 vpd, peak hour traffic operations along these roads and at lower volume intersecting roads, are at excellent levels (LOS A, <0.48 v/c). Even where daily traffic volumes range between 1,000 and 6,000 vpd, roadway traffic operations are still at excellent levels (LOS A, <0.48 v/c). As indicated in Table U-4, the additional Project traffic is not anticipated to result in total traffic volume on any county road above 2,020 vpd, indicating that the Project would not result in a reduction of service level on any Morrow or Umatilla County road.

Based on the information available in the Morrow and Umatilla County transportation system plans, there is only one intersection of concern that would be affected by Project construction traffic. The intersection of Oregon Trail Road with OR-207 currently operates at LOS A, but is projected to operate at LOS D by 2018, with long delays for westbound traffic on Oregon Trail Road turning right or left onto OR-207. This is due primarily to the speed and spacing of traffic on OR-207 at this unsignalized intersection. While the volume of construction traffic is unlikely to materially affect the operation of this intersection, the type of traffic is such that some temporary traffic controls may be desirable at this location. Any requirement for traffic control at this location or elsewhere will be determined prior to construction, in consultation with the county roads departments and ODOT.

The private vehicle traffic mostly occurs out of phase with the truck traffic as the workers report earlier and leave later than most of the truck traffic. Given the typically early start times (7 a.m.) and late finish times (7 p.m.) common to wind farm construction, construction commuting traffic likely will overlap with only a portion of local community peak traffic hours. Given the low traffic volumes and V/C on existing roads, the additional Project traffic generated during construction commuting is not anticipated to cause notable congestion.

Table U-4. Project Construction Traffic Impacts to Area Roads

Traffic Gate	Location	Existing ADT (2011)	Current Peak Hour LOS	Existing Peak Hour V/C	Project Construction Traffic			ADT with Project Traffic	Projected V/C with Construction Traffic	Projected LOS with Construction Traffic
					Total Peak Trips per day, one-way	Worker Traffic, Peak trips per day, one-way	Truck Traffic, peak trips per day, one-way			
E1	OR-207 between I-84 and Oregon Trail Road (Lexington-Echo Highway)	1,400	B	0.49-0.59	615	438	177	2,015	0.49-0.69	B/C
E2	Oregon Trail Road (Lexington-Echo Highway)	370	A	<0.48	99	58	42	469	<0.48	A
E3	Butter Creek Road	<1,000	A	<0.1	29	0	29	1,029	<0.1	A
W1	Bombing Range Road south of I-84 Exit	1,250	A	<0.1	135	63	72	1,385	<0.11	A
W2	OR-207 at Sand Hollow Road	740	A	0.03	348	237	111	851	0.03	A
W3	Juniper Road	<200	A	<0.1	94	71	23	223	<0.1	A
W4	Strawberry Road	<100	A	<0.1	87	59	28	128	<0.1	A
W5	Kilkenney Road	<200	A	<0.1	57	39	17	217	<0.1	A
W6	OR-207 north of Baseline Road	950	A	<0.48	236	180	56	1,186	0.04	A
W7	Blackhorse Canyon Road	<100	A	<0.1	89	67	22	122	<0.1	A
W8	Sand Hollow Road at Baseline Road	<1,000	A	<0.1	242	166	76	1,076	<0.1	A

3.5.3 Road Conditions and Design Standards

State highways are designed and constructed to handle legal loads of 80,000 pounds. Some trucks that deliver large and heavy equipment (typically the base tower sections, nacelles, main transformers and blades due to length) will be required to obtain oversize/overweight permits. All such loads will obtain the appropriate ODOT and county road permits before traveling on Interstate, state or county roads. I-84 and OR-207 are constructed to standards that will safely allow the legally oversize/overweight trucks to pass with no adverse impact on the road surface. At this time none of the state roads are restricted; nevertheless, at the time of construction, ODOT and the county Roads Departments will be contacted by the transportation contractor to make certain that no roads are restricted at that time. The pavement conditions on the state roads are very good at this time and no impairment to the quality of these roads is expected.

The County roads vary considerably in quality and width from recently paved two lane roads to trails that are one lane wide and have minimal aggregate surfacing. In many cases where the roads are unpaved, these roads will require improvement to support the construction truck traffic. However, once the improvements are made, these roads will safely accommodate the construction traffic. Figure U-2 indicates existing public roads that are in good condition, those that are likely to require some minimal improvements, and those that would require substantial improvement in order to accommodate Project construction.

There are three County roads—Bombing Range Road, Big Butter Creek Road and Little Butter Creek Road—that are classified as Rural Major Collector roads. These three roads are two-lanes, undivided and paved. The pavement on these roads is relatively new and in good condition. It is expected that the construction truck traffic will have negligible impact on these roads since they are designed for legal loads without permits. The axle loads on the oversize/overweight vehicles are the same as legal loads but additional axles are used to distribute the greater total load such that the individual axle loading is no more than non-permit legal load limits.

There are several of the County roads that are designated as Minor Collector or are undesignated (local) that are also paved. These include Juniper Lane, Kilkenny Road, Baseline Road and Sand Hollow Road. The pavement on these is new and in good condition. Construction truck traffic should also not adversely impact these newly paved roads because they are also constructed for legal loads. These roads frequently see fully loaded trucks carrying grain and other agricultural materials with similar loading to the construction-related trucks.

The final category of roads are those County and local roads that are not paved. These roads are either 1 or 2-lanes wide; they have some to minimal aggregate on the surface; frequently have culvert pipes with inadequate cover; and have grades and corners that may require flattening or widening to accommodate the large and long construction trucks, in particular the turbine component and transformer delivery trucks. There are also occasional cattle guards that will have to be replaced to accommodate the construction traffic. These roads may require the addition of more road base aggregate to support the loads; replacement or lengthening of culverts; grading; and replacement of cattle guards. At the design stage of the Project, a careful inspection of these roads will be required to determine where and what improvements will be required to make these roads serviceable. The net result will be that the existing gravel roads will be significantly upgraded from their current status to support the construction activities.

3.5.4 Impact Minimization Measures

3.5.4.1 Agency Coordination

Wheatridge will coordinate with ODOT and with county roads officials as needed on road improvements, road closures, and permits needed for construction or movement of oversized loads of construction equipment or materials. Three permits from ODOT may be required (see also Exhibit E):

- Oversize Load Movement Permit/Load Registration. This permit is required for the movement of oversize or overweight loads on state highways, such as construction cranes, substation transformers, or other large equipment.
- Permit to Occupy or Perform Operations Upon a state highway. This permit addresses utility installations within the right-of-way of a state highway, including the crossings of several state highways by the Project.
- Access Management Permit. This permit may be needed if a Project access road intersects directly with a state highway, and improvements are required at that intersection.

In addition to these state permits, Wheatridge will coordinate with county roads officials as needed to address necessary road improvements, temporary road closures, oversize load movements, and monitoring of impacts to county roads. Pursuant to ORS 374.305, all affected counties require permitting for any work to be done within a county right-of-way, including making improvements to roads or intersections, or crossing a county road with the Intraconnection Line(s). The specific permit requirements and the names of those permits vary from county to county, as indicated in Exhibit E, Section 5, Local Permits; Wheatridge will verify and comply with all local permit requirements prior to beginning construction on the Project.

A traffic management plan will be developed prior to construction in cooperation with Morrow and Umatilla Counties, and with nearby cities, if necessary, to minimize impacts to traffic safety. The traffic management plan would address such issues as flagging, signage and traffic flow around work sites on public roads; timing of oversize/overweight truck loads to avoid impacts to school bus schedules or during peak travel hours; and other mitigation measures if deemed necessary. These measures would help to prevent any construction-related traffic safety issues and would facilitate the free movement of traffic through the Project vicinity. While the movement of heavy or oversized loads of construction materials or equipment may cause some localized traffic delays, these disruptions would be intermittent and temporary.

Wheatridge will cooperate with both of the Public Works departments in Morrow and Umatilla counties with respect to obtaining permits to improve the roads and also to make repairs to roads that might result from construction traffic. In addition, Wheatridge expects to enter into road use agreements with both counties, to ensure that public roads impacted by construction will be left in 'as good or better' condition than that which existed prior to the start of construction.

3.5.4.2 Transportation Best Management Practices

To minimize conflicts between Project traffic and background traffic, movements of normal heavy trucks (dump trucks, concrete trucks, standard size tractor-trailers or flatbeds, etc.) will be minimized (essential deliveries only), to the extent practicable, during peak traffic times. Movements of oversize trucks will be prohibited during peak times, to the extent practicable. If possible, and considering worker safety, such oversize deliveries will occur during other parts of the day, when background traffic tends to be lower, such as late morning and early afternoon. Wheatridge will work with local law enforcement as appropriate to assist with Project deliveries.

In addition, Wheatridge's construction contractor will implement the following mitigation measures:

- Coordinating the timing and locations of road closures or oversize load movements in advance with emergency services such as fire, paramedics, and essential services such as mail delivery and school buses.
- Maintaining emergency vehicle access to private property.
- Developing plans as required by county or state permit to accommodate traffic where construction would require closures of state- or county-maintained roads for longer periods.
- Posting signs on county- and state-maintained roads, where appropriate, to alert motorists of construction and warn them of slow, merging, or oversize traffic.
- Using traffic control measures such as traffic control flaggers, warning signs, lights, and barriers during construction to ensure safety and to minimize localized traffic congestion. These measures will be required at locations and during times when trucks will be entering or exiting highways frequently.
- Using chase vehicles as required (or police vehicles, if required by ODOT) to give drivers additional warning.
- Notifying landowners prior to the start of construction near residences.
- Restoring residential areas as soon as possible, and fencing construction areas near residences at the end of the construction day. Gates will be installed on access roads to reduce unauthorized access when requested by property owners.

3.6 Air Transportation

No less than 30 days prior to construction, Wheatridge will submit Federal Aviation Administration (FAA) form 7460-1 to the FAA and Oregon Department of Aviation (ODA) in accordance with ORS 836.535(2)(a) requesting a determination of No Hazard in order to allow the agency to evaluate the effect of the proposed construction on air safety and navigable airspace. This evaluation process begins with a determination of whether the proposed structure represents an obstruction.

Obstructions are defined in 14 CFR 77, Subpart C (Sections 77.13 through 77.23), which defines obstructions based on both absolute height of the proposed object and height in relation to protected airspace. Thresholds for notifying the FAA are defined in 14 CFR Subpart B Section 77.9, and are related to construction that would represent an obstruction or would intrude upon protected airspace or approach and takeoff clearance areas around airports. The first threshold for notice is any construction or alteration that would exceed 200 feet above ground level. The second threshold for notice is construction that would exceed the height of an imaginary surface extending upward and outward for a horizontal distance of 20,000 feet (3.8 miles) from an airport runway. For the purposes of notification and hazard determination, an airport is defined by the FAA as a public use airport, a military airport, an airport operated by a federal agency or the Department of Defense, or an airport with an FAA-approved Instrument Approach Procedure.

The Project meets the first threshold to notify the FAA for evaluation of the proposed wind turbines for their potential hazard to air traffic. Wheatridge is required to submit notice to the FAA and ODA due to the overall height of the considered wind turbine models exceeding 200 feet above ground level. There is one public airport located within 5 miles of the Project. The Lexington Airport is located approximately 2.5 miles southwest of the Site Boundary. Although the West Buttercreek airfield is also located within 4 miles of the Site Boundary, it does not meet the FAA definition of an airport; it is not a public airfield, is not operated by a federal agency or the Department of Defense, and does not have an approved Instrument Approach Procedure. Due to the presence of the Lexington Airport approximately 2.5 miles from the Site Boundary, the Project also meets the second threshold for notifying the FAA and ODA.

Following the submittal of the Project's notice to the FAA and ODA (a pre-construction requirement), the agency will conduct an aeronautical study; a Determination of No Hazard to Air Navigation will be issued when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard but would not have a substantial aeronautical impact to air navigation. A Determination of No Hazard may include conditional provisions, limitations to minimize potential problems, supplemental notice requirements, or requirements for marking and lighting, as appropriate. Wheatridge will provide to the Oregon Energy Facility Siting Council (EFSC) a record of all correspondence with FAA and ODA no less than 30 days prior to construction.

3.7 Law Enforcement

Construction and operation of the Project would not have a substantial adverse impact on the provision of law enforcement services in the analysis area. Wheatridge has contacted all of the law enforcement service providers listed below: see Attachments U-1 and U-2.

Morrow County:

- Undersheriff Steve Myren

Umatilla County:

- Sheriff Terry Rowan

Both have indicated that they can provide services to the Project without impact to their current customer service base. Any impacts to law enforcement caused by the Project would be intermittent and temporary, as construction workers would remain in any one location for not more than 6 to 18 months, and would not be expected to stay beyond the end of construction in an area. The construction contractor will be responsible for providing on-site security in the Project area.

3.8 Fire Protection

The greatest risk of fire on a wind farm occurs during construction, particularly from metal cutting and welding as needed to construct the steel reinforcing cages for turbine foundations. In addition, fire hazards can result from workers smoking, refueling vehicles and equipment, and operating or parking vehicles and other equipment off roadways in areas of tall dry grass that could ignite upon contact with hot vehicle parts (e.g., mufflers or catalytic convertors).

Fire danger during construction can be significantly reduced through the implementation of safe working practices, such as maintaining adequate firefighting equipment and water supplies on hand during operations that carry a high fire risk, conducting metal cutting and welding within a cleared or graveled area, and preventing parking of vehicles in areas with high, dry grass. The following list provides a summary of typical fire prevention measures that will be implemented during Project construction:

Fire Prevention

During periods of high fire danger, potential sources of fire ignition (vehicle exhaust systems, cigarettes, matches, propane torches, sparks from various hot work operations, etc.) must be used with extra precaution.

Vehicles

1. Plan and manage the work and the movement of vehicles. No off-road driving is to be done while working alone.
2. General Contractor will be responsible for identifying and marking the path for all off-road vehicle travel.
3. All vehicle travel off-road is to stay on the identified path.
4. In the event a vehicle gets stuck, shut the engine off. Periodically inspect the area adjacent to the exhaust system for evidence of ignition of vegetation. Do not "rock" the vehicle to free it, rather, pull it out. Inspect the area after the vehicle has been moved.
5. In tall grass (i.e., tall or taller than the exhaust system of the vehicle(s)), pre-wet the area with water prior to driving on it with vehicles.

Fueling

1. General Contractor will designate a location for field fueling operations at each construction yard. Any fueling of generators, pumps, etc. shall take place at this location only.
2. Fuel containers, if used, shall remain in a vehicle or equipment trailer, parked at a designated location alongside county R/W. No fuel containers shall be in the vehicles that

exit the R/W with the exception of one – five gallon container that is required for the water truck pump.

Smoking

1. Smoking shall only be allowed in the designated smoking areas on the project.

Fire Suppression and Emergency Preparedness

The site will be equipped with the following including instruction in proper use:

1. Each vehicle used onsite shall have a fire extinguisher of sufficient type and capacity to suppress small fires around vehicles. Vehicle occupants shall be familiar with the location of these fire extinguishers. All employees who may have a need to use a fire extinguisher shall be current in their training on the general principals of fire extinguisher use and the hazards involved with incipient stage fire fighting.
2. Prior to start of construction work activities, contact the local fire department and advise them of work type, location, and probable duration.
3. Prior to performing hot work (anything that creates a spark or an open flame is considered hot work) fire suppression equipment must be immediately available, hot work must only be done on road or turbine pad surfaces cleared of vegetation, and the on-site Fire Safety Supervisor must be notified.
4. A fire watch, equipped with a suitable fire extinguisher, shall be maintained for a period of 60 minutes after completion of work in a specific area and at the end of each day's activities.

Emergency Notification and Follow Up

The following course of action should be taken if an emergency situation develops:

1. Evacuate as necessary. Maintain site security and control if possible. If crews are working at different areas of the site, a designated meeting location will be created for all people to gather.
2. Notify proper emergency services (fire, ambulance, etc.) for assistance.
3. Notify site management on radio channel #1 of any possible fires.
4. Prepare a summary report of the incident as soon as possible after the incident.

During the operation and maintenance phase of the Project, fire danger will be minimal. Wind turbines contain a number of safety features designed to provide increased fire protection, for example, fully independent braking systems and emergency shutoff devices. In addition, the turbine models considered would be equipped with internal fire suppression systems in the nacelles. The O&M Buildings will be equipped with fire protection equipment in accordance with Oregon Fire Code, and the Substations, Collector Lines, and other electrical connections will be built to National Electrical Safety Code (NESC) standards. Typical maintenance activities would not carry a significant fire risk, while maintenance vehicles would drive and park on maintained gravel roads and turbine pads, avoiding hazards associated with driving or parking in tall dry grass. Given the inherent fire-safety features of Project components and the relatively small number of new temporary and permanent residents, significant new demands on fire protection forces are not anticipated.

Wheatridge has contacted all of the fire protection providers listed below: see Attachments U-3, U-4, U-5, and U-6.

Morrow County:

- Heppner Volunteer Fire Department: Fire Chief Rusty Estes
- Ione Rural Fire Protection District: Fire Chief Virgil L. Morgan
- Boardman Rural Fire Protection District: Fire Chief Marc Rogelstad

Umatilla County:

- Echo Rural Fire District: Fire Chief Merle Gehrke

All have indicated that the construction and operation of the Project will not impact their ability to provide fire protection services to their respective districts. Additionally, all have stated that they do not have the ability to perform high altitude rescues.

3.9 Health Care

The small number of new temporary workers and additional permanent resident employees is not expected to place significant new demands on routine health care services. However, impacts on health care could occur if Project construction activities were to result in an increase in the use of emergency health care services exceeding the capacity of local providers.

Construction and operation of the Project will not have an adverse impact on area health care providers. Impacts on local health care services during both construction and operation will be minimized by implementation of a robust safety program that will minimize health and safety risks. Should any worker suffer an injury that requires immediate medical attention, such injured worker(s) would be transported using one of the local ambulance services. Any worker suffering minor injuries would be transported and treated at the Pioneer Medical Center in Heppner or the Good Shepherd Medical Center in Hermiston. Workers suffering more serious injuries would be taken to the Mid-Columbia Medical Center in The Dalles, or would be flown by helicopter (operated by Life Flight) to one of the two Level 1 hospitals located in Portland: Oregon Health Sciences University Hospital or Legacy Emmanuel Medical Center.

The construction contractor will be responsible for implementing a safety program, which is expected to prevent nearly all serious injuries that would require ambulance or hospital services. Area ambulance services and hospitals appear to have adequate capacity and the Project should not impact their ability to serve local communities.

3.10 Schools

No significant adverse impacts to schools are anticipated during construction and operation of the Project. No schools are located within the Site Boundary or would be directly affected by Project construction or operations. Construction will be temporary and short-term, and much of the peak work period will occur during the summer months when school is not in session. The trend in construction projects of this nature is that only a small percentage of workers hired from outside the area bring their families and school-age children for a short-term relocation, so the number of additional students would be minimal (USDE 2010). The number of permanent new resident employees would also be small, and new families with school age children will be welcomed at local area schools. Impacts on school services will depend on the housing choices of new residents with children, which cannot be predicted; however, given the number of schools in the locations in which new residents are likely to settle, and the small number of new school children expected, it is unlikely that any one school will receive more new students than it can accommodate.

To the degree practicable, Wheatridge will coordinate the timing of large component or equipment deliveries to avoid peak hours for school buses and impacts to bus routes.

4.0 Conclusions

Based on the rural nature of the Project, the low number of workers needed during the operations phase, and impact minimization measures to be implemented during Project construction: adverse impacts to public or private service providers are not anticipated. For the reasons set forth in this Exhibit, the construction and operation of the Project are not likely to result in any significant adverse impact to the ability of public or private providers to provide the services listed in OAR 345-022-0110.

5.0 Monitoring of Impacts

Since no adverse impacts are anticipated during either the construction or operations phases of the Project no monitoring program is being proposed.

6.0 Submittal Requirements and Approval Standards

6.1 Submittal Requirements

Table U-5. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(u). Information about significant potential adverse impacts of construction and operation of the proposed facility on the ability of public and private providers in the analysis area to provide the services listed in OAR 345-022-0110, providing evidence to support a finding by the Council as required by 345-022-0110. The applicant shall include:	
OAR 345-021-0010(1)(u)(A) The important assumptions the applicant used to evaluate potential impacts.	Section 1.2

Table U-5. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(u)(B) Identification of the public and private providers in the analysis area that would likely be affected.	Section 2.0
OAR 345-021-0010(1)(u)(C) A description of any likely adverse impact to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0110.	Section 3.0
OAR 345-021-0010(1)(u)(D) Evidence that adverse impacts described in (C) are not likely to be significant, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts.	Section 3.0
OAR 345-021-0010(1)(u)(E) The applicant's proposed monitoring program, if any, for impacts to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0110.	Section 5.0
Project Order Comments	**Location**
None	N/A

6.2 Approval Standard

Table U-6. Approval Standard	
Requirement	**Location**
OAR 345-022-0110 Public Services	
(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area described in the project order to provide:	
a. sewers and sewage treatment,	Section 3.1
b. water,	Section 3.1
c. storm water drainage,	Section 3.2
d. solid waste management,	Section 3.3
e. housing,	Section 3.4
f. traffic safety,	Section 3.5
g. police and fire protection,	Sections 3.6 and 3.7
h. health care, and	Section 3.8
i. schools	Section 3.9
(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	N/A
(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	N/A

7.0 References

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Travel Oregon. 2009a. Oregon Travel and Hospitality Indicators Report. Issue 5 – Summer 2009. Accessed at: http://industry.traveloregon.com/

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US Department of Education (USDE). 2010. National Center for Educational Statistics, Common Core of Data (CCD). Accessed at: http://nces.ed.gov/

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Figures

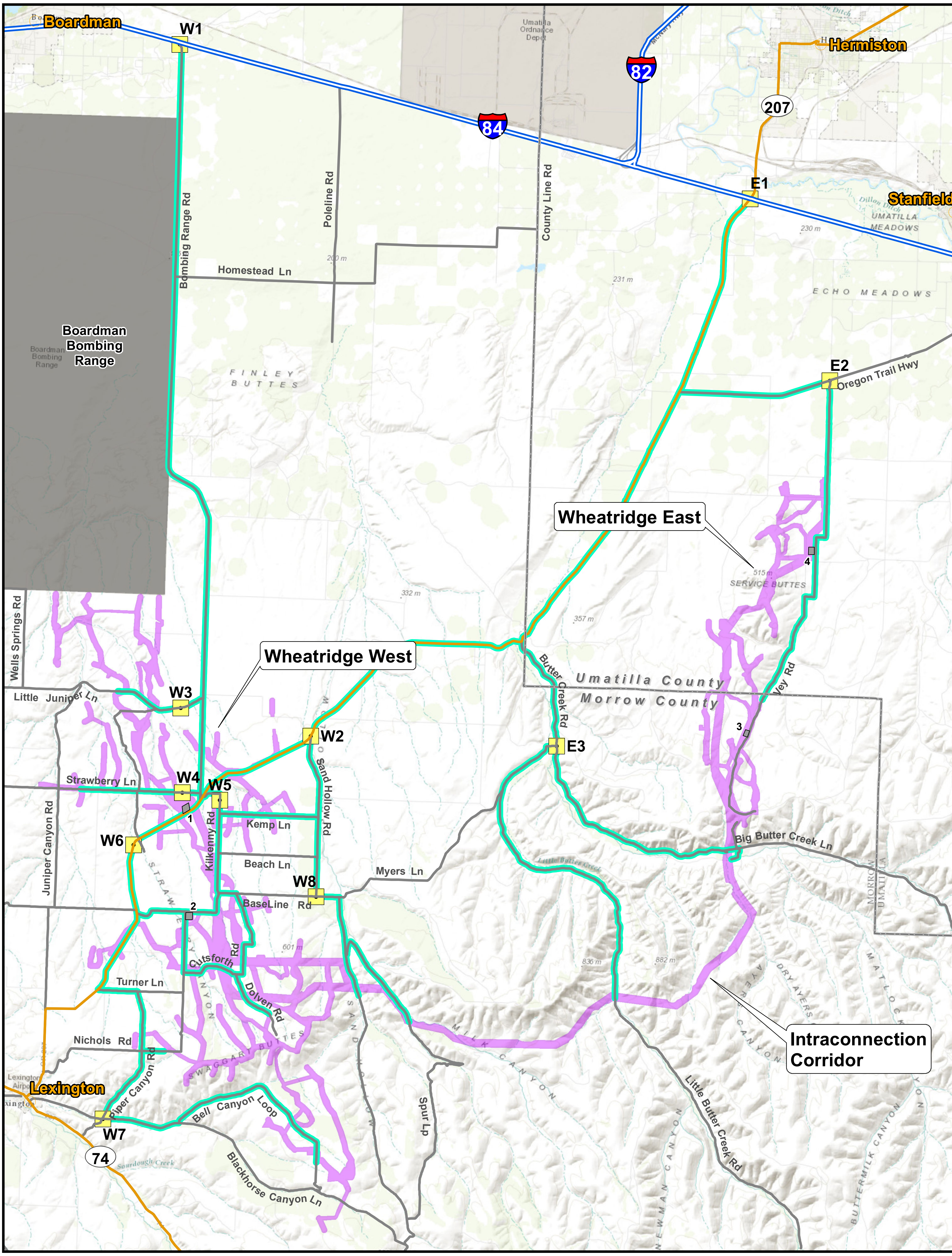

Figure U-1

1:150,000 WGS84 UTM 11

0 0.5 1 2 3 4 5 6 7 8 9 10 Miles

Wheatridge Wind Energy Facility

Primary Transportation Route

Morrow and Umatilla Counties, OR

December 2014

- Site Boundary
- Department of Defense
- County Boundary
- Construction Yard
- City/Town
- Transportation Route
- Transportation Gates
- Interstate Highway
- State Highway
- Local Road

Data Sources Wheatridge Wind Energy: site boundary, County Road Use / ESRI: political boundaries, roads, background imagery

TETRA TECH

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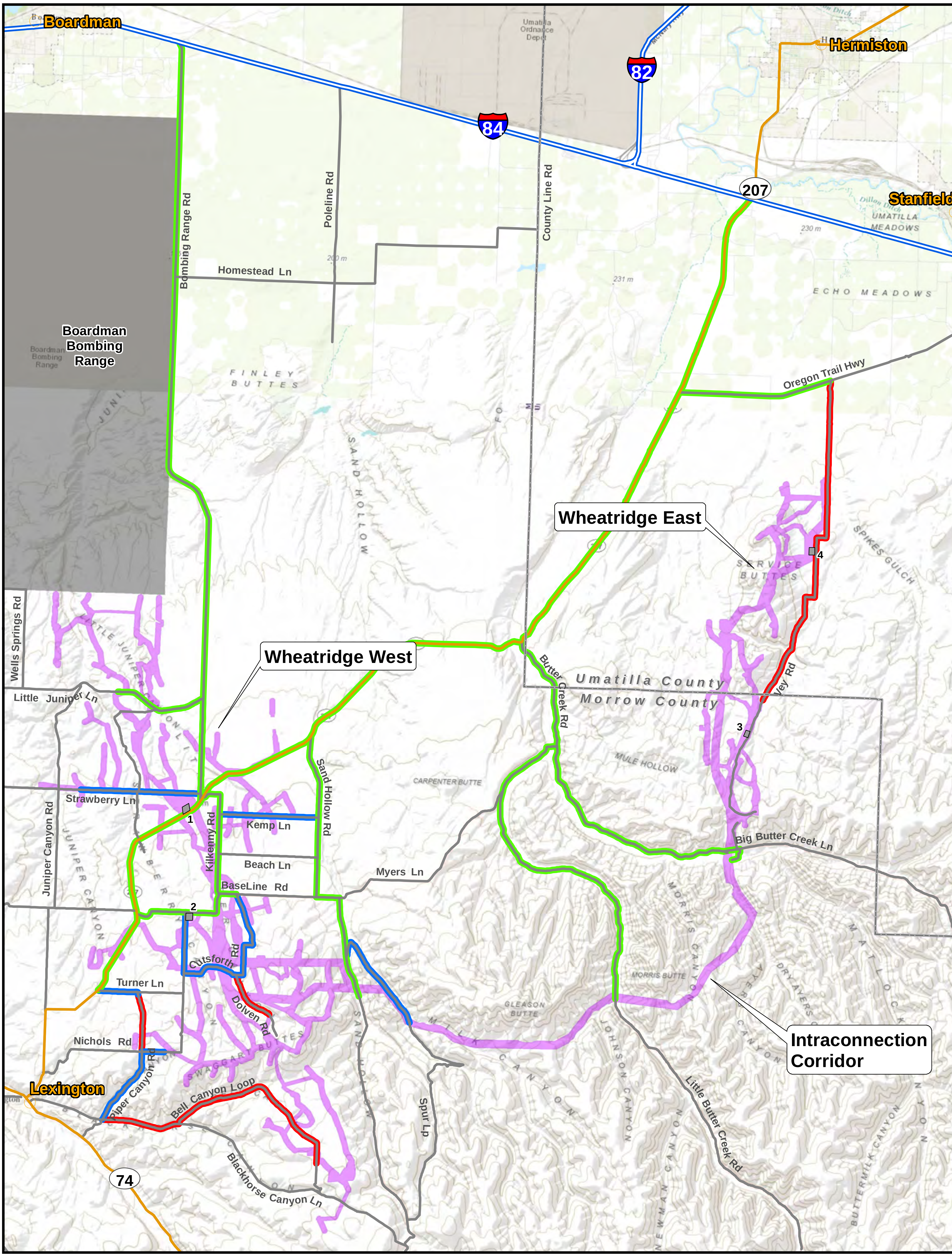

Figure U-2

1:150,000 WGS84 UTM 11

0 0.5 1 2 3 4 5 6 7 8 9 10 Miles

Wheatridge Wind Energy Facility

County Roads Requiring Upgrades Prior To Construction

Morrow and Umatilla Counties, OR
December 2014

- Site Boundary
- Department of Defense
- County Boundary
- Construction Yard
- City/Town
- Interstate Highway
- State Highway
- Local Road

County Roads Requiring Upgrades Prior To Construction *
- OK As Is
- Requiring Some Upgrades
- Requiring Major Upgrades

* All county roads requiring upgrades will be improved to a condition "as good as or better" than currently existing; in coordination with Morrow and Umatilla County Road Masters.

Data Sources Wheatridge Wind Energy: site boundary, County Road Use / ESRI: political boundaries, roads, background imagery

TETRA TECH

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Attachments

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Attachment U-1:

Record of Correspondence with Morrow County Sheriff’s Department

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MORROW COUNTY SHERIFF

325 Willow View Drive -:- P.O. Box 159
Heppner, OR 97836
Phone: (541)676-5317
Fax: (541)676-5577

Kenneth W. Matlack, Sheriff
Steven L. Myren, Undersheriff

To: Robert Friedel **Date:** 07-23-14

From: Steven L Myren, Undersheriff

Re: Wheatridge Energy Project

The Morrow County Sheriff's Office is the primary Law Enforcement agency for the area in which the Wheatridge Wind Energy Facility will be located. This project is in a low to medium crime area in our county.

The Sheriff's Office will respond appropriately and as necessary to all complaints that come from the Wheatridge Project. We do not expect this project to adversely affect the Morrow County Sheriff's Office in terms of additional workload.

Sincerely,

Steven L Myren, Undersheriff / Emergency Manager
Morrow County Sheriff's Office

Attachment U-2:

Record of Correspondence with Umatilla County Sheriff's Department

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UMATILLA COUNTY SHERIFF'S OFFICE

"Conservators of the Peace"

Sheriff Terry L. Rowan | Undersheriff Jim Littlefield

May 1, 2014

To: Robert Friedel-

From: Sheriff Terry L. Rowan

Re: Wheatridge Wind Energy Facility

The Umatilla County Sheriff's Office is the primary response police agency for the area in which the Wheatridge Wind Energy Facility is located. This project is in a low to medium crime area in our county. My main concern would be the theft of non-ferrous metals, copper and such.

The Sheriff's Office will respond appropriately and as necessary to all complaints that come from the Wheatridge Wind Energy Facility.

Sheriff Terry L. Rowan
Umatilla County Sheriff's Office

4700 Pioneer Place
Pendleton, OR 97801

phone 541.966.3601
fax 541.278.5496
www.co.umatilla.or.us/sheriff

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Attachment U-3:

Record of Correspondence with Heppner Volunteer Fire Department

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CITY OF HEPPNER

VOLUNTEER FIRE DEPARTMENT
197 WEST WILLOW STREET
P.O. BOX 743
HEPPNER, OREGON 97836
(541) 676-9618

FIRE & RESCUE
Rusty Estes, chief

June 23, 2013

Robert Friedel
Tetra Tech Inc.
1750 SW Harbor Way
Suite 400
Portland, OR 97201

City of Heppner Volunteer Fire is the responding Department for a portion of this project, we do not have the ability to do confined space rescue or high angle rescue. Beyond those two rescues, it has been determined that the Wheatridge Wind Energy Project will not have a significant impact on the operations of Heppner Fire Department.

Sincerely,

Rusty Estes

Rusty Estes
Fire Chief

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Attachment U-4:

Record of Correspondence with Ione Rural Fire Protection District

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I.R.F.P.D.
Ione Rural Fire Protection District
PO Box 6 — 160 West Main Street
Ione, Oregon 97843
541-422-7303

May 14, 2014

Robert Triedel

Tetra Tech, Inc.
1750 S.W. Harbor Way Suite 400
Portland, OR. 97201

The Ione Rural Fire Protection District is one of five departments that will provide protection to the area where Wheatridge Wind Energy Facility will be located.

Ione RFPD does not provide high angle or confined space rescue.

We find that this wind facility will not have a significant impact on our ability to fight wildfires.

Sincerely

Virgil L. Morgan

Virgil Morgan

Ione RFPD Fire Chief

541-422-7504 home
541-256-0256 cell

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Attachment U-5:

Record of Correspondence with Echo Rural Fire Protection District

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Robert Friedel
Tetra Tech. Inc
1750 SW Harbor Way, Suite 400
Portland, Or. 97201

Robert,

Echo Rural Fire District does not do high altitude rescues but would be able to handle any wild land fires. We would respond to any wild land fires and do not have any reservations regarding the Wind Project.

Sincerely,

Merle Gehrke

Merle Gehrke
Fire Chief- Echo RFD
June 30, 2014

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Attachment U-6:

Record of Correspondence with Boardman Rural Fire Protection District

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Boardman Rural Fire Protection District

(541) 481-FIRE (3473) *Fax (541) 481-0909* *e-mail: mrogelstad@boardmanfd.com*

Marc Rogelstad, Fire Chief **Bill Ellis, Assistant Chief**
Suzanne Matthews, Volunteer Coordinator **Marty Broadbent, Fire Marshal**
300 Wilson Lane, Boardman, Oregon 97818

March 10, 2015

Mr. Robert Fridel

In Regards to the Wheatridge Wind Energy Facility located in Morrow County OR. This project is not within the Boundaries of the Boardman Rural Fire Protection District. As such it has no significant impacts on us. Any response would be via mutual aid to the responsible Fire District and our response would be only to aid those departments in their operations.

Marc Rogelstad, Chief
Boardman Rural Fire Protection District

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Attachment U-7:

Record of Correspondence with Finley Butte Landfill

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Friedel, Robert

Subject: FW: Wheatridge: disposal of construction material at Finley Butte

From: Dean Large [mailto:DeanL@WasteConnections.com]
Sent: Monday, March 16, 2015 10:47 AM
To: Friedel, Robert
Cc: Jeff Bishop
Subject: RE: Wheatridge: disposal of construction material at Finley Butte

Robert,

Thank you for the Wheatridge project information. Finley Buttes Landfill receives approximately 600,000 tons of waste each year and has a projected 200 year remaining life. We build out cells every other year, or so, as we need more operating room. Your project contains approximately 9000 cy, but probably only 5000 tons. We can very easily handle your waste without adding additional operating cells.

I hope that is a sufficient statement from Finley Buttes Landfill to meet you need. If you need the statement on our letterhead, I can arrange for that to happen.

Thanks. Dean Large, Sales Manager
360-608-3902

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Monday, March 16, 2015 10:18 AM
To: Dean Large
Cc: Jeff Bishop
Subject: RE: Wheatridge: disposal of construction material at Finley Butte

Good morning Dean,

Well, I finally got some projected numbers on the waste we'll generate constructing the Wheatridge wind project. We're projecting to fill six 40 yard dumpsters every week for 34 weeks so that would be 204 loads (8,160cy) of waste; let's say 9,000cy total to be conservative. General construction materials, no hazmat stuff. If I'm remembering correctly our conversation from a few weeks back, I don't think this amount is going to be a problem for you guys.

When you get a chance, could I possibly trouble for you a statement that Finley Butte has adequate capacity to handle the construction waste generated by the Wheatridge project? It can be a statement on your letterhead with you signature if you like, or even a reply to this email that Finley Butte can adequately handle 9,000cy of waste over a 34 week period. If you have any questions please call me at your convenience. Thanks again for your help with this Dean, I appreciate it.

Sincerely,

Rob Friedel

Robert Friedel - GISP
GIS Coordinator / Project Manager
direct: 503.721.7216 | cell: 541.231.9990
robert.friedel@tetratech.com

Tetra Tech, Inc.
1750 SW Harbor Way, Suite 400
Portland OR, 97201
Main: 503-221-8636
Fax: 503-227-1287
www.tetratech.com

Exhibit V

Solid Waste and Wastewater

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Table of Contents

List of Tables

List of Attachments

Terms and Definitions

Collector Line	An underground or overhead electrical 34.5 kV line transmitting power from the turbines to a Substation
Construction Yard	The temporary area for construction activities and Project component storage prior to installation
GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

BMP	Best Management Practice
kV	kilovolt
MW	megawatt
NPDES	National Pollutant Discharge Elimination System
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
OR-##	Oregon State Highway ##
ORS	Oregon Revised Statutes
WPCF	Water Pollution Control Facility

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1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit V provides an analysis of solid waste and wastewater generated by the Project, as required to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010 (1)(v) paragraphs (A) through (G). This Exhibit demonstrates that the Project can comply with the Waste Minimization approval standard in OAR 345-022-0120:

> ***345-022-0120 Waste Minimization***
>
> *(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that, to the extent reasonably practicable:*
>
>> *(a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction and operation of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes;*
>>
>> *(b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas.*
>
> *(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.*

(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

2.0 Solid Waste

The following sections identify the types of solid waste anticipated to be generated throughout the Project and the estimated quantities of such waste.

2.1 Types and Amounts of Solid Waste

2.1.1 Solid Waste Produced During Construction

Construction of the Project would generate a small amount of non-hazardous solid waste. Solid waste generated during construction is anticipated to include scrap metal (e.g., wire and rebar scraps), wood, concrete, incidental litter, and other debris. Much of this waste would be packing material such as crates, pallets and paper wrapping to protect equipment during shipping. It is estimated that Project construction would produce approximately 9,000 cubic yards of waste. Concrete waste would be limited to washout from the concrete truck chutes and other equipment following pouring for foundations.

Access road construction and grading are expected to produce negligible amounts of dirt and rock spoils that would need disposal, since cut and fill measures are expected to balance the need for, and use of soils.

The excavation of turbine foundations is expected to produce dirt and rock spoils that would require disposal due to the volume of dirt and rock produced. These materials would be spread over areas previously disturbed during construction. Materials would only be spread as appropriate, resulting in no appreciable grade change and with adequate measures for soil conservation and erosion and sediment control (See Exhibit I, Attachment I-2). When it is not appropriate to spread materials over previously disturbed areas, materials would be hauled to appropriate disposal sites on participating landowner property; the location of such sites will be determined on an as-needed basis during construction.

Construction of the Project would create some concrete waste from the construction of turbines, O&M Buildings, and Substation foundations. Concrete truck chutes would be washed down at each foundation site to prevent the concrete from hardening within the chutes. In these cases, the concrete wastewater will be washed out into a dedicated concrete washout area located within each foundation excavation. The bottom will consist of the compacted foundation subgrade and the sides will consist of the excavation side cut, hardened concrete foundation, and soil berms at each end to construct a confined area. The soil used to construct the washout area berms (along with any concrete solids) will be buried as part of the foundation backfill. This method for concrete washout water management is a regularly utilized Best Management Practice (BMP) for construction of wind generation facilities within the area, and has been accepted by the Oregon Department of Environmental Quality (ODEQ).

2.1.2 Solid Waste Produced During Project Operation

An insignificant amount of non-hazardous waste is expected to be generated during the operation and maintenance of the Project. This waste may include equipment and components that are replaced, packing materials for replacement components, and waste typical of a small office employing up to 10 people. It is estimated that no more than 6 cubic yards of waste would be produced monthly, to be disposed of at either the Finley Butte Landfill or through the Morrow County Rural Solid Waste Collection Services.

2.1.3 Solid Waste Produced During Decommissioning

The anticipated working lifespan of the Project is 50 years, after which time the Project may be extended, repowered, or decommissioned. In the event the Project would be decommissioned and the site restored to a useful, non-hazardous condition for other planned uses, the amount of solid waste can be inferred from the Materials Inventory provided in Exhibit G. Should the Project be decommissioned, all turbine components and towers would be removed, all above-ground electrical components would be removed, and concrete foundations would be cut and removed to a minimum depth of 3 feet below ground, or deeper if required by a landowner for agricultural operations. Underground cables would typically be left in place, as removing them would cause unnecessary habitat disturbance. Metals are expected to be recycled as scrap rather than disposed of in a landfill wherever possible. Concrete foundations would be removed as waste. Transformers and other Substation equipment would be removed to be reconditioned for use elsewhere or recycled as scrap metal. The control buildings would be demolished and disposed in an appropriate facility, or converted to agricultural buildings for the use of the landowners. None of these materials are considered hazardous. It is estimated that decommissioning of Project facilities would produce approximately 15,000 cubic yards of waste, to be disposed of at the Finley Butte Landfill.

2.2 Management and Disposal of Solid Waste

Wheatridge will comply with all applicable waste handling and disposal regulations on all lands associated with the Project. Solid waste will be stored in a manner that does not constitute a fire, health, or safety hazard until such waste can be hauled off for recycling or disposal as appropriate. The following sections describe the handling and disposal of non-hazardous solid waste planned throughout the duration of the Project.

2.2.1 Construction

Construction staging yards, turbine pads, Substations, and Site Access Roads will be kept in an orderly condition throughout the construction period. Waste generated during construction of the Project will be temporarily collected at each construction site (e.g., at each turbine location) and then consolidated into larger disposal containers at the construction yards. Disposal and recycling containers will be labeled by waste type to segregate materials as appropriate for recycling or disposal.

Disposal and recycling containers will be of adequate size, design and number to handle the amount of waste being generated. Containers approximately 12 cubic yards in capacity will be used to collect scrap metal, wood and paper products, and other recyclable materials. All waste containers will be fitted with lids to prevent waste from scattered by the wind.

Solid waste generated during construction will be hauled away for recycling or disposal, as appropriate. Paper products and other materials, such as batteries, glass, metals and plastic, will be recycled when practicable. As disposal and recycling containers reach capacity they will be removed to disposal facilities that can handle these materials, and the containers will be replaced with empty units. Removal of the waste to appropriate disposal facilities will be done by a licensed waste hauler, under contract to the construction contractor. Licensed waste haulers must comply with OAR 340-093-0220 for transportation of wastes.

Soil and rock materials from foundation excavations will be spread within the temporary disturbance areas during construction or removed from the excavation site as soon as practicable. Most excess spoils generated during road cut and fill excavation activities will be incorporated into Project grading activities as fill material. Excess spoils would be a very small amount, and any excess spoils form excavation of the foundations will be spread out around the foundations. Disturbed soil and rock materials will be contained using appropriate BMPs to prevent sedimentation release to local habitat, especially wetlands and other waters that may be in the vicinity.

The construction contractor will arrange off-site disposal of excess soils if this should be necessary. Disposal sites may be on public or private lands, but must be approved by the Wheatridge environmental representatives and the receiving landowner. The disposal contractor will obtain signed consent between themselves and the party receiving the earth materials and copies of the documentation must be provided to Wheatridge. The disposal agreement between the landowner and construction contractor will be in place prior to disposal. All disposal sites will be inspected by the Wheatridge's environmental personnel to insure that sensitive environmental resources, such as wetlands or high quality habitats, are not impacted.

The construction contractor will submit a plan for approval by Wheatridge on how solid waste materials during construction activities will be reused, recycled, or disposed of in accordance with OAR 340-093-0010. That plan will specify the number and types of waste containers to be maintained at construction sites and construction yards, and how wastes are to be segregated for recycling or disposal. It will also specify the names and locations of appropriate recycling and waste disposal facilities, collection requirements, and hauling requirements.

2.2.2 Operation

Any solid waste generated during repair or replacement of turbines or associated Project components will be collected by the maintenance crews and transported off-site to facilities that handle the disposal or recycling of these items. Wastes generated at the O&M Buildings would be collected there in appropriate waste or recycling containers, to be removed by a licensed waste hauler under contract to Wheatridge.

2.3 Solid Waste Disposal Site

Solid waste generated will be disposed of at the Finley Butte landfill in Morrow County. See Exhibit U for further discussion of landfills. Wheatridge will provide information to the Morrow County Wasteshed on the amounts and types of wastes sent to landfill or recycling, as required by the Morrow County Solid Waste Ordinance. Correspondence with the Finley Butte Sales Manager (Attachment U-7) confirms that the Finley Butte Landfill has adequate capacity to handle the projected waste generated by construction, operation, and decommissioning of the Project.

2.4 Morrow County Solid Waste Management Ordinance

In its response to the Project's Notice of Intent, Morrow County identified five substantive criteria of its Solid Waste Management Ordinance as being applicable to the Project. The following discussion demonstrates how the project will comply with the identified requirements.

SECTION 5.000. PUBLIC RESPONSIBILITIES

5.010. Transportation of Solid Waste

No person shall transport or self-haul, as defined in the Solid Waste Management Plan, solid waste on a public road unless such waste or solid waste is covered and secured. "Covered and Secured" includes:

1. Loads which are totally contained within an enclosed vehicle or container;

2. Loads of solid waste contained in garbage cans with tightly fitting lids, tied plastic solid waste disposal bags or similar totally enclosed individual containers that are completely contained within the walls of a vehicle or container, such that no solid waste can reasonably be expected to escape during hauling;

3. Loads of brush, building materials and similar bulky materials which are secured in or on the hauling vehicle or completely contained within the walls of a vehicle or container, such that none can reasonably be expected to escape during hauling; or

4. Loads consisting entirely of rock, concrete, asphalt paving, stumps and similar materials that are completely contained within the walls of a vehicle or container, such that none can reasonably be expected to escape during hauling.

<u>Response:</u> Wheatridge anticipates that removal of solid waste from the collection points at the Construction Yards, or at the O&M Buildings once the Project is operational, will be done by a licensed waste hauler who would be responsible for compliance with these standards. Waste materials generated at each construction site will be transported by the construction workers to the temporary Construction Yards, within appropriate containers or enclosed

vehicles. Loads of rock, soil, brush, waste building or packing materials or other materials will be covered during transport on public roads or otherwise secured such that none could escape during transport.

5.020. Accumulation, Littering and Disturbance of Solid Waste Prohibited

No person shall accumulate or store wastes in violation of the Morrow County Nuisance Ordinance or in violation of regulations of the Oregon Littering Provisions (ORS 164.775 - 805). No unauthorized person shall remove the lid from any solid waste container or collect, disturb or scatter solid waste stored in the container or deposit solid waste into the container.

Response: Prior to beginning construction, Wheatridge and its construction contractor will develop a solid waste management and disposal plan to ensure that all wastes created during construction or operation of the Project will be collected and disposed of in accordance with the Morrow County Nuisance Ordinance and Oregon littering laws. Waste collection containers will be secured within the construction staging yards, reducing the risk of access by unauthorized persons.

5.030. Responsibility for Proper Disposal of Hazardous Waste

The owner, operator, or occupant of any premise, business, establishment, or industry shall be responsible for the satisfactory and legal disposal of all hazardous solid waste generated or accumulated by them on the property. All hazardous solid wastes shall be disposed of at an appropriate solid waste disposal site licensed to receive such waste, or in a manner consistent with Department of Environmental Quality regulations. It shall be unlawful for any person to dump, deposit, bury, or allow the dumping, depositing or burying of any hazardous solid waste onto or under the surface of the ground or into the waters of the state, except at a State permitted solid or hazardous waste disposal site.

Response: Wheatridge will contract with a qualified and licensed third party for the removal and transport of hazardous solid wastes from the Project to a licensed waste disposal site, the Finley Butte landfill. No hazardous solid wastes associated with the Project will be deposited, buried or dumped on-site.

5.040. Open Burning

Woody debris, brush, leaves, grass, tumbleweeds, wood and cuttings from trees, lawns, shrubs and gardens (excepting paper, cardboard, or wood containers in commercial quantities) may be burned on private property only if the method of burning is approved by the local fire department and is done in accordance with the rules and regulations of the Oregon Department of Environmental Quality. Agricultural open burning is allowed pursuant to Oregon air pollution laws (ORS 468A.020) and the requirements and prohibitions of local jurisdictions and the State Fire Marshal.

Open burning of any waste materials, including on agricultural lands, that normally emit dense smoke, noxious odors, or that create a public nuisance is prohibited. These materials include, but are not limited to, household garbage, plastics, wire, insulation, auto bodies, asphalt, waste petroleum *products, rubber products, animal remains, and animal or vegetable wastes resulting from the handling, preparation, cooking, or service of food.*

Response: Wastes created during construction or operation of the Project will not be burned.

3.0 Wastewater

Wastewater generated by the Project will include sanitary waste and construction wastewater; the latter would consist of equipment wash water and concrete washout water. This section discusses how each of these types of wastewater will be handled throughout the life of the Project.

3.1 Sanitary Wastewater

Sanitation during construction activities will be addressed through the provision of portable toilets located throughout the Project Site Boundary at locations that will determined prior to and during construction. Portable toilets will be provided by a licensed subcontractor, who will be responsible for servicing the toilets at regular intervals and disposing of wastewater in accordance with local jurisdictional regulations. The construction contractor will ensure that a sufficient number of toilets are provided, and that the licensed subcontractor complies with applicable regulations, including the use of holding tanks for biological waste that conform to OAR 340-071 and transportation of waste in accordance with Oregon Revised Statutes (ORS) 466.005.

For operation and maintenance of the Project, sanitary waste would be handled through an on-site septic system serving each of the O&M Buildings. Wheatridge will obtain necessary permits for the septic systems from the ODEQ Pendleton office. A Water Pollution Control Facility (WPCF) permit would not be necessary for this type of use; the WPCF permit is required for disposal of industrial wastewater directly to ground, including processing water; cooling water; stormwater from gravel, placer mining, or from feedlots; vehicle and equipment wash water from stationary wash facilities; and water from petroleum hydrocarbon cleanup. None of these industrial wastewater types would occur with the Project. However, a WPCF permit would be required for gray water re-use, such as for landscaping purposes; in the event that grey water re-use is considered at the O&M Buildings, either at Type 2 general permit or a Type 3 individual permit would be appropriate, and would be obtained from ODEQ prior to construction.

3.2 Construction Wastewater

3.2.1 Sources, Types, and Amounts of Construction Wastewater

Construction, operation or decommissioning activities may generate small amounts of wastewater that can be allowed to infiltrate on-site, according to the terms of a National Pollutant Discharge Elimination System (NPDES) Permit to be issued by ODEQ. Project construction, operation, and decommissioning would not generate substantial amounts of wastewater that would need to be treated as effluent. The nature of the Project is such that it would not produce industrial wastewater.

Most of the wastewater generated over the life of the Project will be concrete washout water produced during construction of turbine and Substation foundations. Concrete washout water typically makes up approximately 25 percent of the total water used for concrete in foundations. Based on the estimated water use for concrete presented in Exhibit O, estimated concrete washout water totals are as follows:

- 835,000 gallons for turbine foundation construction;
- 11,750 gallons for Substation and O&M Building construction;
- 4,500 gallons for met tower foundation construction; and
- 61,250 gallons for Intraconnection Line pole foundations.

Concrete wastewater will be washed out into a dedicated concrete washout area located within each turbine or Substation foundation excavation. The bottom of the washout area will consist of the compacted foundation subgrade and the sides will consist of the excavation side cut, hardened concrete foundation, and soil berms at each end to construct a confined area. The soil used to construct the washout area berms (along with any concrete solids) will be buried as part of the foundation backfill. This method for concrete washout water management is a regularly utilized management practice for construction of wind generation facilities within the area, and has been accepted by ODEQ (Attachment V-1).

Washing of vehicles and equipment to prevent the spread of weeds will also generate small amounts of wastewater. Vehicle and equipment washing will occur at construction yards, and wastewater from these activities will be covered by the general NPDES 1200-C stormwater permit (Exhibit I Attachment I-2). The estimated amount of wastewater for vehicle and equipment washing is expected to be minor compared to overall Project water use, and is included in the overall estimates of water use presented in Exhibit O. The amount of water used for vehicle and equipment washing will be sufficiently small that it would not create runoff, but would instead infiltrate into the ground.

Water will be sprayed onto disturbed areas during construction for dust control. The amount of water used for dust control will be sufficiently small that it would not create runoff, but instead infiltrate into the ground. Dust control water, therefore, will not contribute to wastewater volumes.

Stormwater is not considered to be wastewater. Stormwater will be managed in accordance the terms of the NPDES stormwater permit. Stormwater will be diverted around construction sites as much as possible. Precipitation that falls on a construction site will be allowed to run back to natural drainages, with erosion and sedimentation control systems in place to maintain water quality.

Construction dewatering activities, if necessary (including groundwater dewatering and well drilling discharge associated with the registered construction activity), are not considered stormwater discharges but are addressed by the NPDES permit. Typically dewatering back to the land is allowed, provided:

- Dewatering is applied in a way that results in complete infiltration with no potential to discharge to a surface water of the state; and
- BMPs or an approved treatment system (e.g., filter bags) are used to ensure compliance with discharge and water quality requirements.

Testing would not be required unless hazardous materials (e.g., petroleum products) were suspected of being in the water.

3.2.2 Reduction of Consumptive Water Use

Minimizing use of water for the Project will be an important environmental consideration as the Project moves into the construction phase. Wheatridge will use appropriate BMPs to reduce water use to the greatest extent feasible. Wind energy facility construction by nature does not afford the construction contractor significant opportunities for reducing water use. Specific quantities of water must be used in making concrete, a minimal amount of water is required for washing of concrete trucks and tools, and fugitive dust on surface roads must be controlled with water. In an effort to minimize water use, Wheatridge proposes the following:

- Weather and soil conditions will be regularly monitored to minimize watering the construction road while maintaining regulatory compliance for fugitive dust issues. Water for dust control would not be applied if weather conditions are such that disturbed soils remain sufficiently damp and fugitive dust is not created.
- Water will be applied only as needed in areas of active construction or vehicle movement, will be applied sparingly, and only at necessary intervals. Binders or tackifiers, such as magnesium chloride, may be used to lengthen the interval between necessary dust control water applications, if such additives are permitted by landowners and applicable regulations.

No industrial wastewater will be generated during operations. Operation of the Project does not require consumptive water use, except for minimal amounts at the O&M Buildings similar in nature to typical office use (see Exhibit O). Blade washing is not anticipated to occur; it has been found to be unnecessary in most environments, does not enhance turbine performance, and is generally not recommended by turbine manufacturers.

4.0 Impacts of Project Waste

Generation of wastes from construction will be minimized by estimating material needs and employing efficient construction practices. Waste generated during construction and operation of the Project will be recycled when feasible.

Because waste generation will be minimal, there is little anticipated adverse impact on surrounding areas from solid waste or wastewater from Project construction, operation, or retirement. Waste will be reused or recycled, or when necessary, disposed at permitted disposal facilities. Any waste disposed on-site (e.g., excess spoils from foundation or road excavation) will be inert, disposed of in a manner consistent with applicable regulations, and protective of human health and the environment.

Water will be used primarily for dust control, concrete mixing, and concrete washout. None of these activities would produce wastewater that would affect area streams, wetlands, or groundwater supplies. Sanitary waste during construction will be handled by a licensed contractor according to applicable regulations. Permitted and properly designed on-site septic systems at the O&M Buildings would safely handle sanitary wastes during operation of the Project. The Project would not generate industrial wastewater or effluent.

Disposal of materials as fill on-site will be conducted in accordance with OAR 340-093-0080 and other applicable regulations. OAR 340-093-0080 provides a permit exemption to the disposal permit requirement for disposal of inert wastes such as soil, rock, and concrete that does not contain contaminants that could adversely affect waters of the State or the United States. To meet the clean fill definition, any inert construction debris to be disposed on-site will be separated from other debris that is not inert.

Wheatridge's proposed measures to avoid, reduce, and mitigate any impacts on-site or to adjacent land include storing all petroleum products, paints and finishes, solvents, pesticides and herbicides, and other hazardous materials in containers that meet all federal, state, and local requirements for storage and containment. Petroleum products, including vehicle and equipment fuels, lubricating oils, and hydraulic fluids, will not be stored in substantial quantities on-site, but would instead be delivered on an as-needed basis using a specialized vehicle by a licensed contractor. In addition, spill kits containing items such as absorbent pads will be located on equipment and in on-site temporary storage to ensure a quick response to spills. Waste disposal or recycling will be handled by a licensed contractor.

Transportation of wastes to landfills or recycling facilities will involve periodic truck trips over public and private roads between the Project and the Finley Butte Landfill. Given the number and frequency of these trips, and the anticipated volume of waste materials, these trips are not anticipated to have adverse effects on the adjacent or surrounding areas (See Exhibit U for more detail on solid waste management).

5.0 Monitoring

Because no significant adverse impacts from waste or wastewater will occur in the adjacent or surrounding areas, no monitoring program is proposed. Waste management activities will be subject to periodic inspections to ensure compliance with applicable regulations.

6.0 Submittal Requirements and Approval Standards

6.1 Submittal Requirements

Table 1. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(v) Information about the applicant's plans to minimize the generation of solid waste and wastewater and to recycle or reuse solid waste and wastewater, providing evidence to support a finding by the Council as required by OAR 345-022-0120. The applicant shall include:	
OAR 345-021-0010(1)(v)(A) A description of the major types of solid waste and wastewater that construction, operation and retirement of the facility are likely to generate, including an estimate of the amount of solid waste and wastewater.	Sections 2.0 and 3.0
OAR 345-021-0010(1)(v)(B) A description of any structures, systems and equipment for management and disposal of solid waste, wastewater and storm water.	Sections 2.0, 3.0, and 4.0
OAR 345-021-0010(1)(v)(C) A discussion of any actions or restrictions proposed by the applicant to reduce consumptive water use during construction and operation of the facility.	Section 3.2.2
OAR 345-021-0010(1)(v)(D) The applicant's plans to minimize, recycle or reuse the solid waste and wastewater described in (A).	Sections 2.0, 3.0, and 4.0
OAR 345-021-0010(1)(v)(E) A description of any adverse impact on surrounding and adjacent areas from the accumulation, storage, disposal and transportation of solid waste, wastewater and stormwater during construction and operation of the facility.	Section 4.0
OAR 345-021-0010(1)(v)(F) Evidence that adverse impacts described in (D) are likely to be minimal, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts.	Section 4.0
OAR 345-021-0010(1)(v)(G) The applicant's proposed monitoring program, if any, for minimization of solid waste and wastewater impacts.	Section 5.0
Project Order Comments	**Location**
In the application for site certificate, the Applicant should provide information demonstrating either that the proposed septic system is exempt from the WPCF permit requirement, or if it is not exempt, that it meets the requirements for a permit.	Section 3.1

6.2 Approval Standard

Table 2. Approval Standard	
Requirement	**Location**
OAR 345-022-0120 Waste Minimization	
(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that, to the extent reasonably practicable:	

Table 2. Approval Standard	
Requirement	**Location**
(a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction and operation of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes;	Sections 2.0, 3.0, and 4.0
(b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas.	Sections 2.0, 3.0, and 4.0
(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	NA
(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.	NA

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Attachment V-1:

Record of Correspondence with Oregon Department of Environmental Quality Detailing their Acceptance of Proposed Methods of Concrete Washout Water Management

Robert Friedel

Subject: FW: Wheatridge: acceptance by DEQ of our concrete water washout management

From: RATLIFF Krista [mailto:RATLIFF.Krista@deq.state.or.us]
Sent: Thursday, April 2, 2015 11:07 AM
To: Robert Friedel
Subject: RE: Wheatridge: acceptance by DEQ of our concrete water washout management

Hello Robert,

The hydrogeologist I spoke with did not see any environmental impacts with burying the concrete wash water, dried concrete or slurry muds within the foundations. There would be restrictions if the pads were close to surface water, within shallow groundwater or could impact drinking water wells. I am happy to discuss it further with you or the Siting Officer as needed. Thanks,

Krista Ratliff, Natural Resource Specialist - Stormwater
Oregon Department of Environmental Quality, Eastern Region
541-633-2033

From: Friedel, Robert [mailto:Robert.Friedel@tetratech.com]
Sent: Friday, March 06, 2015 1:54 PM
To: RATLIFF Krista
Subject: Wheatridge: Oregon DEQ approval of stated concrete washout water management

Dear Ms. Ratliff,

Thank you again for taking time today to speak with me. In regards to our conversation regarding the Oregon Department of Environmental Quality's (DEQ's) approval of the methods of concrete washout water management as described by Wheatridge in our preliminary Application for Site Certificate (pASC) to the Oregon Department of Energy (ODOE), I would like to request approval from DEQ on our proposed methods for concrete washout water mangement. I understand that DEQ will reserve making a final determination on the Wheatridge Wind Energy Project until such time as the application has been deemed complete by ODOE.

Pursuant to OAR 345.021.0010(1)(v)(C) we have been requested by ODOE to provide evidence that Oregon DEQ supports the methods we have proposed in Exhibit V (Solid Waste and Wastewater) for concrete washout water management. In our exhibit we describe the methods proposed for concrete washout water management (sections and pages detailed at the bottom of this email) as well as reference as a source of additional information the NPDES 1200-C stormwater permit that we submitted to DEQ as part of the pASC.

I would like to request from Oregon DEQ a statement that Oregon DEQ has reviewed the methods of concrete washout water management and that Oregon DEQ approves of these methods. I have attached a copy of exhibit V as we submitted to ODOE in our pASC for reference. If you have any questions or would like any additional information please let me know. Thank you again for your time and I look forward to speaking with you again soon.

Sincerely,

Rob Friedel

Robert Friedel - GISP
GIS Coordinator / Project Manager

direct: 503.721.7216 | cell: 541.231.9990
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Exhibit V: references to concrete washout water management

- Section 2.1.1 paragraph 4
- Section 3.0
- Section 3.2.1 paragraphs 2 and 3
- Section 4.0 paragraph 3

Exhibit W

Facility Retirement

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Terms and Definitions

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GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

EFSC	Energy Facility Siting Council
OAR	Oregon Administrative Rule

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1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit W provides information on restoration of the Project site, should facility retirement and site restoration be necessary. This Exhibit demonstrates that the Project complies with the approval standard in Oregon Administrative Rule (OAR) 345-022-0050(1) based on information provided pursuant to OAR 345-021-0010(1)(w), paragraphs (A) through (E).

> ***OAR 345-022-0050 Retirement and Financial Assurance***
>
> *To issue a site certificate, the Council must find that:*
>
> > *(1) The site, taking into account mitigation, can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility.*
>
> OAR 345-021-0010(1)(w) *Information about site restoration, providing evidence to support a finding by the Council as required by OAR 345-022-0050(1).*

Under OAR 345-022-0050(1), before the Energy Facility Siting Council (EFSC) will approve the proposed energy facility, it must find that the proposed Project site can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility. This Exhibit describes the expected operating life of the proposed energy facility, provides information about site restoration and retirement of the Project facilities, and discusses the estimated costs of restoring the site, based on the Oregon Department of Energy's *First Revised Cost Guide for Decommissioning Oregon Energy Facilities*.

2.0 Estimated Useful Life of the Project

For the purposes of this application, the useful life of the Project is estimated to be 50 years. At the end of that period the Project may be decommissioned, its useful life extended if equipment continues to function well with routine maintenance, or the Project could be repowered with newer-generation wind turbines in the same locations. While retirement of the Project facilities is possible, the need for electricity generation and transmission, along with supporting facilities, is expected to increase into the foreseeable future.

3.0 Actions to Restore the Site

If the Project were to be retired or construction of the Project to cease prior to the commencement of commercial operation, Project facilities would be removed so that the site would be restored to a useful, non-hazardous condition for other planned uses, including other energy projects.

In the unlikely event that Wheatridge elects to retire the facility, that is, to permanently remove from service the wind turbines and associated facilities and relinquish the rights to the leased lands, Wheatridge will provide a final retirement plan to EFSC for approval. Wheatridge will provide the plan to EFSC at least 2 years prior to the start of retirement activities. The retirement plan will address all requirements necessary to protect public health and the environment, in addition to other permitting requirements. The retirement plan will include a complete description of all actions that would be necessary to restore the site to a useful, non-hazardous condition suitable for uses compatible with the surrounding land use, intended land use, and then-current applicable technologies.

Should the Project be decommissioned, all turbine components and towers would be removed, all above-ground electrical components would be removed, and concrete foundations would be cut and removed to a minimum depth of 3 feet below ground, or deeper if required by a landowner for agricultural operations. Underground cables would typically be left in place, as removing them would cause unnecessary habitat disturbance. Transformers and other substation equipment would be removed to be reconditioned for use elsewhere or recycled as scrap metal. The O&M buildings would be demolished and disposed of in an appropriate facility, or converted to agricultural buildings for the use of the landowners. Unless access roads or other gravel-surfaced areas are to be retained by the landowner, gravel surfacing materials would be removed, the impacted area would be decompacted as needed, the area regraded to appropriate contours and the topsoil replaced, and the area revegetated. None of the materials involved are considered hazardous in nature, and their presence and ultimate removal would leave the site in a non-hazardous condition suitable for other uses, including agriculture.

4.0 Total Costs, Estimating Methods and Assumptions

Given the long useful life of the Project, decommissioning and site restoration cost estimates at this time may be of limited relevance. However, in compliance with these rules, Attachment W-1 sets out a restoration cost estimate and unit costs in current dollars for all Project facilities, including the methods and assumptions used to estimate site restoration costs. The costs are based on the application of EFSC guidelines for wind energy facility retirement.

As shown in the final table of the Oregon Department of Energy *Cost Estimating Worksheet* provided in Attachment W-1, the total site restoration cost for the Project is $18,115,000. Wheatridge's ability to achieve the objectives of EFSC's financial assurance rules is described in Exhibit M; Attachment M-2 demonstrates an ability to secure a letter of credit for $17.5 million towards the cost of site restoration.

5.0 Monitoring Plan Unnecessary

In the event that Wheatridge elects to retire the facility, the site could be restored to a useful, non-hazardous condition consistent with site zoning, including Exclusive Farm Use zoning. The Project is not expected to cause site contamination with hazardous materials, and no contamination monitoring plan is proposed. The existing facilities could be removed without significant risk of contamination.

Hazardous materials associated with the Project would largely be limited to oils in turbine gearboxes and transformers, which would be pumped out to a specialized vehicle for recycling prior to removing the equipment. The proposed facility would not have any underground storage tanks or on-site bulk storage of hazardous materials. Small quantities of lubricants, vehicle fuel, and herbicides might be transported over and across the site during operation, and leaks, spills and improper handling of these materials could occur. Given the small amounts of such materials used on the site, soil contamination is highly unlikely and therefore a monitoring plan is unnecessary.

6.0 Submittal Requirements and Approval Standards

6.1 Submittal Requirements

Table W-1. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(w) Information about site restoration, providing evidence to support a finding by the Council as required by OAR 345-022-0050(1). The applicant shall include:	
(A) The estimated useful life of the proposed facility.	Section 2.0
(B) Specific actions and tasks to restore the site to a useful, non-hazardous condition.	Section 3.0 and Attachment W-1
(C) An estimate, in current dollars, of the total and unit costs of restoring the site to a useful, non-hazardous condition.	Section 4.0 and Attachment W-1
(D) A discussion and justification of the methods and assumptions used to estimate site restoration costs.	Section 4.0 and Attachment W-1
(E) For facilities that might produce site contamination by hazardous materials, a proposed monitoring plan, such as periodic environmental site assessment and reporting, or an explanation why a monitoring plan is unnecessary.	Section 5.0
Project Order Comments	**Location**
No substantive comments provided	N/A

6.2 Approval Standard

Table W-2. Approval Standard	
Requirement	**Location**
OAR 345-022-0050 Retirement and Financial Assurances. To issue a site certificate, the Council must find that:	
(1) The site, taking into account mitigation, can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility.	Sections 3.0, 4.0, and 5.0
(2) The applicant has a reasonable likelihood of obtaining a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition.	Section 4.0 and Exhibit M

Attachment W-1:

EFSC Retirement Calculator Worksheet

Attachment W-1: EFSC Retirement Calculator Worksheet

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2014

Prepared by

Tetra Tech, Inc.

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Example Wind Facility

COST ESTIMATE FOR FACILITY SITE RESTORATION

(Unit Costs in 2nd Quarter 2010 Dollars)

Adjustment Factor:	1.09	**Current Quarter:**	**Q1 2015**
GDP Index 2nd Quarter 2010:	**110.981**		http://www.oregon.gov/DAS/OEA/economic.shtml
GDP Index Current Quarter:	**109.6086**		

Cost Estimate Component	Quantity	Unit Cost	Extension
Turbines			
- Disconnect electrical, ready for disassembly (per turbine)	292	$212	$61,904
- Remove turbine blades, hubs and nacelles (per turbine)	292	$5,900	$1,722,800
- Remove turbine towers (per ton of steel)	57,232	$82	$4,693,024
- Remove turbine foundations (per cubic yard)	8,264	$52	$429,707
- Remove pad transformer and foundation (per turbine)	292	$2,538	$741,096
- Restore turbine site including spur road (per turbine)	292	$1,138	$332,296
Met Towers			
- Dismantle and dispose of met towers (per tower)	12	$10,393	$124,716
O&M Facilities			
- Dismantle and dispose of O&M facilities (per unit)	2	$62,886	$125,772
Substations			
- Dismantle and dispose of substations (per unit)	3	$188,094	$564,282
Transmission Lines			
- Remove aboveground single-circuit collector (per mile)	10.83	$6,459	$69,951
- Remove aboveground double-circuit collector (per mile)	0	$0	$0
- Remove aboveground 230-kV transmission lines (per mile)	63	$29,611	$1,865,493
- Junction boxes - Remove electrical to 4' below grade (per unit)	60	$51	$3,060
Access Roads			
- Road removal, grading and seeding (per mile)	37.17	$23,555	$875,539
Restore Additional Areas Disturbed by Facility Removal			
- Grading and seeding around access roads, met towers, O&M facilities and turbine turnouts (per acre)	138.4	$8,706	$1,204,802
- Seeding around collector line structures, transmission lines, crane paths and temporary laydown areas (per acre)	144.19	$3,398	$489,958
General Costs			
- Permits, mobilization, engineering, overhead			$465,536
Subtotal			**$13,769,936**
Subtotal Adjusted to Current Dollars **Q1 2015**			**$14,946,409**
Performance Bond @ 1%			$149,464
Gross Cost (Adjusted)			**$15,095,873**
Administration and Project Management @ 10%			$1,509,587
Future Developments Contingency @ 10%			$1,509,587
Total Site Restoration Cost (current dollars)			**$18,115,048**
Total Site Restoration Cost (rounded to nearest $1,000)			**$18,115,000**

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Exhibit X

Noise

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

ASC	Application for Site Certificate
DEM	Digital Elevation Model
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
m/s	meters per second
MVA	megavolt amperes
MW	Megawatts
NRO	Noise Reduced Operation
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
OR-##	Oregon State Highway ##
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator

Acoustic Terms and Definitions

Term	Definition
Noise	Unwanted sound dependent on level, character, frequency or pitch, time of day, and sensitivity and perception of the listener. This word adds the subjective response of humans to the physical phenomenon of sound and it is commonly used when negative effects on people are known to occur.
Sound Pressure Level (L_P)	Pressure fluctuations in a medium. Sound pressure is measured in decibels referenced to 20 microPascals, the approximate threshold of human perception to sound at the frequency of 1,000 Hz.
Sound Power Level (L_W)	Sound power level is not the equivalent to a sound pressure level. While both are reported in decibels, the L_W of a noise source is the total acoustic power produced measured in decibels referenced to picowatts (one trillionth of a watt). Equipment specifications are provided by equipment manufacturers as sound power as it is independent of the environment in which it is located. A sound level meter does not directly measure sound power.
A-Weighted Decibel (dBA)	Environmental sound is typically composed of acoustic energy across all frequencies (Hz). To compensate for the auditory frequency response of the human ear, an A-weighting filter is commonly used for describing environmental sound levels. Sound levels that are A-weighted are presented as dBA in this report.
Unweighted Decibels (dB/dBL)	Unweighted sound levels are referred to as linear. Linear decibels are used to determine a sound's tonality and to engineer solutions to reduce or control noise as techniques are different for low and high frequency noise. Sound levels that are linear are presented as dBL in this report.
Propagation and Attenuation	Propagation is the decrease in amplitude of an acoustic wave due to geometric spreading losses with increased distance from the source. Additional sound attenuation factors include air absorption, terrain effects, sound interaction with the ground, diffraction of sound around objects and topographical features, foliage, and meteorological conditions including wind velocity, temperature, humidity and atmospheric conditions.
Octave Bands	The audible range of humans spans from 20 to 20,000 Hertz and is typically divided into center frequencies (Hz) ranging from 31 to 8,000 Hz.
Masking	Interference in the perception of one sound by the presence of another sound.

Term	Definition
Frequency (Hz)	The rate of oscillation of a sound, measured in units of Hertz (Hz) or kilohertz (kHz). One hundred Hz is a rate of one hundred times (or cycles) per second. The frequency of a sound is the property perceived as pitch. For comparative purposes, the lowest note on a full range piano is approximately 32 Hz and middle C is 261 Hz.
Statistical L_n	The noise level exceeded during n % of the measurement period, where n is a number between 0 and 100 (e.g., L_{90}) L_n is used to describe time varying noise with the most common being the L_{90}, which is the sound level value exceeded for 90% over a time period, which can be used to further define quietest periods. The L_{50}, or median sound level is the median sound level value exceeded for 50% of a measurement time period.

Note: Compiled from multiple technical and engineering sources.

1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

In order to allow flexibility in the choice of wind turbines at the time of construction, Wheatridge has analyzed noise impacts for two layouts using two different turbine models, while limiting the total generating capacity to 500MW. This approach would allow Wheatridge to utilize different turbine models depending on availability or improvement in technology by the time the turbines are acquired, if the turbines are of no greater impact than allowed for in the Site Certificate.

Turbine layout Option 1 utilizes 292 1.7MW GE turbines with 80-meter (262-foot) hub heights and 103-meter (337-foot) rotor diameters. Turbine layout Option 1 is referred to as the GE 1.7-103 layout in the Application for Site Certificate (ASC). Turbine layout Option 2 utilizes 200 2.5MW GE Turbines with 85-meter (278-foot) hub heights and 120-meter (393-foot) rotor diameters. Turbine layout Option 2 is referred to as GE 2.5-120 layout in the ASC. This approach of analyzing impacts for two turbine types allows for the representation of a range of turbine technologies and noise impacts from the Project. Wheatridge seeks micrositing flexibility within the Site Boundary of the Project in regard to the final layouts for both the GE 1.7-103 turbine layout and GE 2.5-120 turbine layout and their associated facilities.

Exhibit X provides information regarding noise generated by construction and operation of the Project, to meet the submittal requirements of Oregon Administrative Rule (OAR) 345-021-0010(1)(x) paragraphs (A) through (D), for the purposes of demonstrating compliance with the Oregon Department of Environmental Quality's (ODEQ) noise control standards in OAR 340-35-0035. OAR 345 Division 22 does not provide an approval standard specific to Exhibit X.

The analysis area for noise impacts is defined in OAR 345-021-0010 as including those noise sensitive receptors within 1 mile of the Site Boundary. The Site Boundary is defined in detail in Exhibits B and C.

2.0 Regulatory Environment

This section presents information on the noise criteria used to evaluate the potential effects of noise from the Project.

2.1 Federal Noise Regulations

There are no federal regulatory requirements in the United States that specifically refer to wind energy facilities as noise sources.

2.2 State Noise Regulations

OAR Chapter 340, Division 35 prescribes noise regulations applicable throughout the State of Oregon, with specific requirements in OAR 340-035-0035, "Noise Control Regulations for Industry and Commerce." This standard provides guidance for new noise sources on a previously used site:

> ***OAR 340-035-0035(1)(b)(A)***
>
> *New Sources Located on Previously Used Sites. No person owning or controlling a new industrial or commercial noise source located on a previously used industrial or commercial site shall cause or permit the operation of that noise source if the statistical noise levels generated by that new source and measured at an appropriate measurement point, specified in subsection (3)(b) of this rule, exceed the levels specified in Table 8, except as otherwise provided in these rules. For noise levels generated by a wind energy facility including wind turbines of any size and any associated equipment or machinery, subparagraph (1)(b)(B)(iii) applies.*

Table X-1 gives statistical noise limits as summarized below. The noise limits apply at "appropriate measurement points" on "noise sensitive property." The appropriate measurement point is defined as whichever of the following is farther from the noise source:

- 25 feet toward the noise source from that point on the noise sensitive building nearest the noise source; or
- That point on the noise sensitive property line nearest the noise source.

"Noise sensitive property" is defined as "real property normally used for sleeping, or normally used as schools, churches, hospitals or public libraries. Property used in industrial or agricultural activities is not Noise Sensitive Property unless it meets the above criteria in more than an incidental manner."

Table X-1: New Industrial and Commercial Noise Standards[1/]		
Statistical Descriptor	Maximum Permissible Statistical Noise Levels (dBA)	
	Daytime (7:00 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
L_{50}	55	50
L_{10}	60	55
L_1	75	60

1/ from OAR 340-035-0035, Table 8

The standard also provides guidance for new noise sources on a previously unused site, which is defined in OAR 340 -035-0015(47) as property which has not been used by any industrial or commercial noise source during the 20 years immediately preceding commencement of construction of a new industrial or commercial source on that property. The standard reads as follows:

OAR 340-035-0035(1)(b)(B)(i)

No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).

OAR 340-035-0035(1)(b)(B)(ii)

The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements of section (1) of this rule, which are identified in subsections (5)(b) - (f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.

Specifically for wind energy facilities the following provision is provided at OAR 340-035-0035(1)(b)(B)(iii)(I) with regard to establishing existing conditions:

The increase in ambient statistical noise levels is based on an assumed background L50 ambient noise level of 26 dBA or the actual ambient background level. The person owning the wind energy facility may conduct measurements to determine the actual ambient L10 and L50 background level.

Further guidance specific to wind energy facilities is provided pertaining to establishing compliance with the noise standards (OAR 340-035-0035(1)(b)(B)(iii)(IV)):

For purposes of determining whether a proposed wind energy facility would satisfy the ambient noise standard where a landowner has not waived the standard, noise levels at the *appropriate measurement point are predicted assuming that all of the proposed wind facility's turbines are operating between cut-in speed and the wind speed corresponding to the maximum sound power level established by IEC 61400-11 (version 2002-12). These predictions must be compared to the highest of either the assumed ambient noise level of 26 dBA or to the actual ambient background L10 and L50 noise level, if measured. The facility complies with the noise ambient background standard if this comparison shows that the increase in noise is not more than 10 dBA over this entire range of wind speeds.*

In addition, the standards indicate that compliance of a proposed wind energy facility with the standards given in Table X-1 is determined by predicting sound levels using the turbine's maximum sound power level (as established by International Electrotechnical Commission [IEC] 61400-11; IEC 2005) and assuming all of the proposed wind facility's turbines are operating at the maximum sound power level. Further guidance is provided within the noise standards for impulse and tonal sound.

2.2.1 Exemptions to State Noise Regulations

OAR 340-035-0035(5) specifically exempts construction activity from the state noise standards and regulations, as indicated below. This section also provides an exemption for maintenance of capital equipment, the operation of aircraft (such as helicopters used in Project construction), and sounds created by activities related to timber harvest.

OAR 340-035-0035(5) Exemptions

Except as otherwise provided in subparagraph (1)(b)(B)(ii) of this rule, the rules in section (1) of this rule shall not apply to:

[section abridged for brevity]

(b) Warning devices not operating continuously for more than 5 minutes;

(g) Sounds that originate on construction sites.

(h) Sounds created in construction or maintenance of capital equipment;

(j) Sounds generated by the operation of aircraft and subject to pre-emptive federal regulation. This exception does not apply to aircraft engine testing, activity conducted at the airport that is not directly related to flight operations, and any other activity not pre-emptively regulated by the federal government or controlled under OAR 340-035-0045;

(k) Sounds created by the operation of road vehicle auxiliary equipment complying with the noise rules for such equipment as specified in OAR 340-035-0030(1)(e);

(m) Sounds created by activities related to the growing or harvesting of forest tree species on forest land as defined in subsection (1) of ORS 526.324.

2.2.2 Exceptions to State Noise Regulations

OAR 340-035-0035(6) allows for some exceptions to the state noise regulations:

> ***OAR 340-035-0035 (6) Exceptions***
>
> *Upon written request from the owner or controller of an industrial or commercial noise source, the Department may authorize exceptions to section (1) of this rule, pursuant to rule 340-035-0010, for:*
>
> *(a) Unusual and/or infrequent events;*
>
> *(b) Industrial or commercial facilities previously established in areas of new development of noise sensitive property;*
>
> *(c) Those industrial or commercial noise sources whose statistical noise levels at the appropriate measurement point are exceeded by any noise source external to the industrial or commercial noise source in question;*
>
> *(d) Noise sensitive property owned or controlled by the person who controls or owns the noise source;*
>
> *(e) Noise sensitive property located on land zoned exclusively for industrial or commercial use.*

2.2.3 Project Order Noise Requirements

The Oregon Energy Facility Siting Council issued a Project Order on May 22, 2013, establishing requirements for the Project's Application for Site Certificate. Pages 21-22 of the Project Order provide detail on what should be included in Exhibit X to demonstrate compliance with OAR 340-035-0035.

3.0 Existing Conditions

The Project area is rural with occasional farm houses and for the purposes of the acoustic analysis is considered by OAR 340-035-0035 as being lands that were previously "unused" for commercial and/or industrial uses. Existing ambient sound levels were not monitored in the vicinity of the Project; however, in accordance with OAR 340-035-0035 an assumed L_{50} ambient sound level of 26 dBA is used in the acoustic analysis.

4.0 Construction Noise

Construction noise levels were predicted using a semi-qualitative approach based on equipment sound levels provided in the Federal Highway Administration Roadway Construction Noise Model (FHWA 2006). These sound source levels are often used on major infrastructure projects such as wind energy projects.

4.1 Compliance with State Noise Regulations – OAR 345-021-0010(1)(x)(B)

OAR 340-035-0035(5)(g) specifically exempts noise emanating from construction activities from compliance with the state noise regulations.

4.2 Construction Noise Sources

Construction of the Project would involve building of access roads, excavating and forming turbine foundations, works associated with preparing the site for crane-lifting, and actual turbine assembly and commissioning. The amount of time required and the specific location of construction would vary depending on the turbine type selected; however, the construction noise analysis provides sound levels at near (50 feet) and far (2,000 feet), which are generally applicable to whatever turbine model is ultimately implemented. Typically wind energy projects are constructed in four phases consisting of the following:

- Site Clearing: The initial site mobilization phase includes the establishment of temporary site offices, workshops, stores, and other on-site facilities. Installation of erosion and sedimentation control measures will be completed as well as the preparation of initial haulage routes.
- Excavation: This phase would begin with the excavation and formation of access roads and preparation of laydown areas. Excavation for the concrete turbine foundations would also be completed.
- Foundation Work: Construction of the reinforced concrete turbine foundations would take place in addition to installation of the internal transmission network.
- Wind Turbine Installation: Delivery of the turbine components would occur followed by their installation and commissioning.

Work on these construction activities is expected to overlap. It is likely that the turbines would be erected in small groupings. Each grouping may undergo testing and commissioning prior to commencement of full commercial operation. Other construction activities include those for the supporting infrastructure such as the Substations, O&M Buildings, and overhead Intraconnection Line(s). The sound levels resulting from construction activities vary significantly depending on several factors such as the type and age of equipment, the specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers. The list of construction equipment that may be used on the Project and estimates of near and far sound source levels are presented in Table X-2.

Table X-2: Estimated L_{max} Sound Pressure Levels from Construction Equipment		
Equipment	**Estimated Sound Pressure Level at 50 feet (dBA)**	**Estimated Sound Pressure Level at 2,000 feet (dBA)**
Forklift	80	48
Backhoe	80	48
Grader	85	53
Man basket	85	53
Dozer	83 - 88	51 - 56
Loader	83 - 88	51 - 56
Scissor Lift	85	53
Truck	84	52
Welder	73	41
Compressor	80	48
Concrete Pump	77	45
Crane	85	42

Sources: Bolt, Beranek, and Newman, Inc. 1977. FHWA 1992, FHWA 2006.

5.0 Operational Noise

The Project would implement turbines with power output ranging from 1.7MW to 2.5MW. Exhibit B describes the Project in detail and Table X-3 provides a summary of the turbines being considered for the Project.

Table X-3: Potential Turbines					
Turbine	**Turbine Quantity**	**Tower Type**	**Hub Height (meters)**	**Rotor Diameter (meters)**	**Total Turbine Height (meters)**
GE 1.7-103	292	Tubular	80	103	131.5
GE 2.5-120	200	Tubular	85	120	145

Sources: Wheatridge LLC., GE 2013.

Exhibit B indicates that Wheatridge is seeking flexibility in the final layout for the Project including locations of turbine, access roads, and collector lines. Prior to constructing the Project, Wheatridge will finalize siting of the Project within the corridors. Noise analyses were conducted for turbine layouts consisting of the proposed minimum and maximum number of turbines to establish that the Project is likely to be in compliance with OAR 340-035-0035. Prior to constructing the Project, Wheatridge will submit an acoustic analysis of the final layout. Construction of the Project will not commence until ODOE is in agreement that the Project complies with the requirements of OAR 340-035-0035.

5.1 Noise Modeling

Sound generated by an operating turbine is comprised of both aerodynamic and mechanical sound with the dominant sound component from utility scale turbines being largely aerodynamic. Aerodynamic sound refers to the sound produced from air flow produced by the turbine blades and the interaction between the turbine tower structure and moving rotor blades. Mechanical sound is generated at the gearbox, generator, and cooling fan, and is radiated from the surfaces of the nacelle and machinery enclosure and by openings in the nacelle casing. Due to the improved design of turbine mechanical components and the use of improved noise damping materials within the nacelle, including elastomeric elements supporting the generator and gearbox, mechanical noise emissions have been minimized. The turbines being considered for the Project are upwind variable speed-type turbines with an active yaw and pitch regulated with power/torque control capability. Sound reduction elements designed into the GE turbines include: impact noise insulation of the gearbox and generator, sound reduced gearbox, sound reduced nacelle, and rotor blades designed to minimize noise generation.

Wind energy facilities, in comparison to conventional energy projects, are somewhat unique in that the sound generated by each individual turbine will increase as the wind speed across the site increases. Wind turbine sound is negligible when the rotor is at rest, increases as the rotor tip speed increases, and is generally constant once rated power output and maximum rotational speed is achieved. Under maximum rotational wind speed, the assumed maximum sound power level will be reached, generally occurring at approximately 7 to 9 meters per second (m/s), depending on turbine type and according to manufacturer specifications. It is important to recognize, as wind speeds increase, the background ambient sound level will likely increase as well, resulting in acoustic masking effects. The net result is that during periods of elevated wind, when higher turbine sound emissions occur, the sound produced from a turbine operating at maximum rotational speed may well be largely or fully masked due to wind generated sound in vegetation or interactions with other structures. In practical terms, this means a nearby receptor would tend to hear leaves or vegetation rustling rather than wind turbine noise. This relationship is expected to further minimize the potential for any adverse noise effects of the Project. Conversely, acoustic masking effects may be limited during periods of unusually high wind shear or at receiver locations that are particularly sheltered from prevailing winds.

5.1.1 Acoustic Modeling Software and Setup Parameters

Acoustic modeling was performed for the GE 1.7-103 and GE 2.5-120 turbine layouts dated June 23, 2014. CadnaA, the Computer Aided Noise Abatement software program, was used to calculate received sound levels at identified noise sensitive receptors within the analysis area. CadnaA conforms to the International Organization for Standardization's (ISO) standard ISO 9613-2 "Attenuation of Sound during Propagation Outdoors" (ISO 1996), which has engineering algorithms that incorporate such factors as geometric divergence, atmospheric absorption, reflection from surfaces, screening by topography and obstacles, terrain complexity and ground effects, source directivity factors, seasonal foliage effects, and meteorological conditions. CadnaA has been shown to be a highly accurate and effective acoustic modeling tool for wind energy facilities when appropriate wind turbine acoustic modeling techniques and site-specific terrain and topographical features are considered.

Topographical information was imported into the acoustic model using U.S. Geological Survey (USGS) 10 meter digital elevation models (DEM) to accurately represent terrain in three dimensions. Terrain conditions, vegetation type, ground cover, and the density and height of foliage can influence the absorption that takes place when sound waves travel over land. The ISO 9613-2 standard accounts for ground absorption rates by assigning a numerical coefficient of 0 for acoustically hard, reflective surfaces and 1 for absorptive surfaces and soft ground. If the ground is hard-packed dirt, typically found in industrial complexes, pavement, or for sound traveling over water, the absorption coefficient is defined as G=0 to account for reduced sound attenuation. In contrast, ground covered in snow (common at the Project during the winter season), vegetation, including suburban lawns, livestock and agricultural fields (both fallow with bare soil and planted with crops), will be acoustically absorptive and aid in sound attenuation, i.e., G=1.0. For the acoustic modeling analysis, a conservative ground absorption rate of 0.5 was selected, accounting for a semi-reflective ground surface. Table X-4 summarizes setup parameters used in the Project acoustic modeling analysis.

Table X-4: Acoustic Model Input Parameters

Model Input	Parameter Value
Noise Modeling Software	DataKustik CadnaA v 4.4.145
Standards	ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors
Project Layout Date Received	June 23, 2014
Number of Wind Turbines	292 GE 1.7-103 or 200 GE 2.5-120
Wind Turbine Models	GE 1.7-103 or GE 2.5-120 GE 1.7-103 L_W = 107 dBA + 2 dBA uncertainty GE 2.5-120 L_W = 106 dBA + 2 dBA uncertainty
Wind Turbine Hub Height	80 m
Receiver Height	1.52 m
Terrain Parameters	USGS digital elevation data Agricultural rough fields
Specify Vegetation Areas for Attenuation	No
Ground Absorption	0.5 (semi-reflective), spectral
Temperature	10°C (50°F)
Relative Humidity	70 %

Sound propagation in the atmosphere is not strongly dependent on temperature and humidity. The sound level variations caused by wind and temperature gradients are most pronounced for large separation distances. Calculations were completed for meteorological conditions corresponding to moderate downwind propagation (i.e. moderate downward refraction). In other words, the modeling assumes a downwind scenario in all directions. While this wind condition is an impossibility, it tends to result in a conservative assessment of received sound levels from the Project instead of assuming the predominant wind patterns in the area, such as those represented in a wind rose. Modeling using these conditions results in efficient outdoor sound propagation between a source and receptor and is consistent with the ISO 9613-2 standard. Sound attenuation through foliage and diffraction around and over existing anthropogenic structures such as buildings were ignored under all acoustic modeling scenarios. The results are therefore representative of defoliate winter time conditions.

5.1.2 Acoustic Modeling Input Data

In order to assist project developers and acoustical engineers, wind turbine manufacturers report turbine sound power data at integer wind speeds referenced to the effective hub height, ranging from cut-in to full rated power. This accepted IEC standard was developed to ensure consistent and comparable sound emission data of utility-scale turbines between manufacturers. These data are inclusive of both mechanical and aerodynamic source components. Wind turbines can be somewhat directional, radiating more sound in some directions than others. The IEC test measurement protocol requires that sound measurements are made for the maximum downwind directional location when reporting apparent sound power levels. Thus, maximum turbine directivity and sound generating efficiencies are reported in the sound source data and therefore also assumed in the development of the acoustic model.

A summary of sound power data for the selected GE 1.7-103 and 2.5-120 turbines, correlated by wind speed, are presented in Table X-5; including noise reduced operational (NRO) modes. The NRO modes for the turbines are settings provided by the manufacturer, in this case GE, to minimize sound power levels emanating from selected turbines. These are settings prescribed by the manufacturer that Wheatridge would implement on an as needed basis to avoid noise exceedances conditions. These NRO modes are established by the manufacturer using the same testing approach (e.g., IEC 61400-11) and are equally as valid as the non-NRO mode, or standard operation mode. Additionally, per the sound specification provided by the turbine manufacturer, a confidence interval of k=2 dBA was incorporated into the acoustic modeling analysis, which has been added to the nominal sound power level. This confidence interval incorporates the uncertainty in independent turbine sound power level measurements conducted, the applied probability level and standard deviation for test measurement reproducibility, and product variability. It is expected that the actual turbine model version installed for the Project will have a similar sound power profile to what was used in the acoustic modeling analysis; however, it is possible that the warranty sound data could vary slightly. Table X-6 provides octave band data including NRO for the two turbine types under consideration.

Table X-5: Broadband Sound Power Levels (dBA) Correlated to Wind Speed								
10-meter AGL Wind Speed	Turbine Lmax Sound Power Level (L_W) at Reference Wind Speed							
	3 m/s (6.7 mph)	4 m/s (9 mph)	5 m/s (11.2 mph)	6 m/s (13.4 mph)	7 m/s (15.9 mph)	8 m/s (17.9 mph)	9 m/s (20.1 mph)	10 m/s (22.4 mph)
GE 1.7-103	N/A	N/A	100.3	104.9	107.0	107.0	107.0	107.0
NRO106	*96.7*	*96.7*	*100.3*	*104.4*	*106.0*	*106.0*	*106.0*	*106.0*
NRO105	*96.7*	*96.7*	*100.3*	*104.4*	*105.0*	*105.0*	*105.0*	*105.0*
NRO104	*96.7*	*96.7*	*100.3*	*103.6*	*104.0*	*104.0*	*104.0*	*104.0*
NRO103	*96.7*	*96.7*	*100.3*	*102.5*	*103.0*	*103.0*	*103.0*	*103.0*
NRO102	*96.7*	*96.7*	*100.3*	*101.7*	*102.0*	*102.0*	*102.0*	*102.0*
NRO101	*96.7*	*96.7*	*100.3*	*100.8*	*101.0*	*101.0*	*101.0*	*101.0*
NRO100	*96.7*	*96.7*	*99.9*	*99.9*	*100.0*	*100.0*	*100.0*	*100.0*
GE 2.5-120	94.7	97.4	102.8	106.0	106.0	106.0	106.0	106.0
NRO105	*94.7*	*97.4*	*102.8*	*104.7*	*105.0*	*105.0*	*105.0*	*105.0*
NRO104	*94.7*	*97.4*	*102.8*	*104.0*	*104.0*	*104.0*	*104.0*	*104.0*
NRO103	*94.7*	*97.4*	*102.8*	*103.0*	*103.0*	*103.0*	*103.0*	*103.0*
NRO102	*94.7*	*97.4*	*102.0*	*102.0*	*102.0*	*102.0*	*102.0*	*102.0*
NRO101	*94.7*	*97.4*	*101.0*	*101.0*	*101.0*	*101.0*	*101.0*	*101.0*
NRO100	*94.7*	*97.4*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Source: GE 2013 & 2014

Table X-6: Turbine Sound Power Level by Octave Band Center Frequency									
Frequency (Hz)	Octave Band Sound Power Level (Hz) dBA								Broadband (dBA)
	31.5	63	125	250	500	1000	2000	4000	8000	
GE 1.7-103	80.7	90.5	95.7	97.7	100.3	102.6	99.6	91.4	74.1	107.0
NRO106	*75.4*	*85.2*	*93.1*	*95.8*	*97.5*	*101.3*	*100.9*	*92.9*	*75.1*	*106.0*
NRO105	*74.4*	*84.2*	*92.1*	*95.2*	*96.8*	*100.1*	*99.8*	*91.9*	*74.1*	*105.0*
NRO104	*73.4*	*83.3*	*71.2*	*94.4*	*96.1*	*98.9*	*98.8*	*91.1*	*73.1*	*104.0*
NRO103	*72.3*	*82.2*	*90.2*	*93.4*	*95.2*	*97.7*	*97.9*	*90.5*	*72.1*	*103.0*
NRO102	*71.4*	*81.2*	*89.2*	*92.4*	*94.1*	*96.7*	*96.9*	*89.3*	*71.0*	*102.0*
NRO101	*70.6*	*80.3*	*88.3*	*91.5*	*93.1*	*95.7*	*96.0*	*88.2*	*69.9*	*101.0*
NRO100	*69.6*	*79.4*	*87.3*	*90.6*	*92.1*	*94.8*	*95.0*	*86.6*	*69.0*	*100.0*

Table X-6: Turbine Sound Power Level by Octave Band Center Frequency										
Frequency (Hz)	**Octave Band Sound Power Level (Hz) dBA**									**Broadband (dBA)**
	31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
GE 2.5-120	79.0	88.4	93.6	97.2	100.9	101.3	96.9	90.2	71.6	106.0
NRO105	*78.1*	*87.4*	*92.7*	*96.7*	*100.4*	*99.8*	*95.3*	*88.8*	*70.6*	*105.0*
NRO104	*77.3*	*86.6*	*91.8*	*95.8*	*99.4*	*98.6*	*94.4*	*87.9*	*69.7*	*104.0*
NRO103	*76.4*	*85.7*	*91.0*	*95.0*	*98.4*	*97.6*	*93.6*	*87.2*	*69.0*	*103.0*
NRO102	*75.6*	*84.8*	*90.0*	*93.9*	*97.2*	*96.4*	*92.8*	*86.4*	*68.1*	*102.0*
NRO101	*74.7*	*83.9*	*89.2*	*93.0*	*96.2*	*95.4*	*91.9*	*85.5*	*66.9*	*101.0*
NRO100	*73.9*	*83.0*	*88.2*	*91.9*	*95.0*	*94.4*	*91.1*	*84.8*	*65.7*	*100.0*

Source: GE 2013 & 2014

In addition to the turbines, the Project's Substations, and more specifically the transformers, were considered in the analysis. There would be one Substation for Wheatridge East and one for Wheatridge West with the transformer for Wheatridge East being no greater than 135 megavolt ampere (MVA) and no greater than 220 MVA for the Wheatridge West transformers, of which there would be two. Table X-7 provides the sound power data used for the transformers in the acoustical analysis.

Table X-7: Transformer Sound Power Level by Octave Band Center Frequency										
Frequency (Hz)	**Octave Band Sound Power Level (Hz) dBL**									**Broadband (dBA)[1]**
	31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
Wheatridge East 135MVA Transformer	91.3	97.3	99.3	94.3	94.3	88.3	83.3	78.3	71.3	94.7
Wheatridge West 220 MVA Transformer	96.1	102.1	104.1	99.1	99.1	93.1	88.1	83.1	76.1	99.5

Note: [1]NEMA ratings were assumed to be 83.6 dBA and 86.1 dBA for the 135 MVA and 220 MVA transformers, respectively and were assessed using NEMA sound power assessment guidelines as documented in NEMA Standards Publication No. TR 1-1993 (R2000) Transformers, Regulators and Reactors, NEMA 2000.

The conceptual gen-tie line to which the Project would connect would be rated at 230kV and, as indicated in Exhibit B, would be permitted in a separate process as it would be owned and operated by other entities besides Wheatridge. Therefore, the sound levels associated with operation of the gen-tie are not included in this acoustic analysis.

5.2 Noise Modeling Results – ODEQ Regulations; OAR 345-021-0010(1)(x)(A)(B)

The Project has a design goal threshold of 10 dBA above the assumed 26 dBA L_{50} background sound level to represent the point where the audibility of Project noise might be characterized as an adverse noise impact per OAR 340-035-0035(1)(b)(B)(iii)(IV). Modeling results are presented for Wheatridge East and Wheatridge West and are provided assuming all turbines are operating concurrently. Received sound levels are also described for “participant” and “non-participant” properties. Project participants are those properties that have signed a lease with Wheatridge and, for the purposes of this Exhibit, have indicated verbally that they are willing to sign a noise waiver if needed. Non-participants represent those properties that have not signed a lease with Wheatridge and as a result are properties where measures would be taken to avoid exceeding the noise limits described in OAR 340-035-0035.

Wheatridge would operate the Project with some turbines in NRO modes to avoid exceedances at non-participants. Two approaches have been identified to achieve this and are described below as Approach1 and Approach 2.

- **Approach 1**: To operate a large number of turbines in minimal NRO modes, or less noise reduction, for both the GE 1.7-103 and GE 2.5-120 turbine layouts to avoid exceedance conditions. The modeled sound level isopleths using Approach 1 are shown on Figure X-1 for the GE 1.7-103 turbine layout and Figure X-3 for the GE 2.5-120 turbine layout. See Tables X-8 and X-9 for received sound levels utilizing this approach at sensitive receptors within 1 mile of the Site Boundary.
- **Approach 2**: To operate a small number of turbines in the maximum NRO mode, or more noise reduction, for both the GE 1.7-103 and GE-120 turbine layouts to avoid exceedance conditions. The modeled sound level isopleths using Approach 2 are shown on Figure X-2 for the GE 1.7-103 turbine layout and on Figure X-4 for the GE 2.5-120 turbine layout. See Tables X-8 and X-9 for received sound levels utilizing this approach at sensitive receptors within 1 mile of the Site Boundary.

These approaches were determined as part of the micrositing process which, generally described, is a process Wheatridge went through to minimize and avoid impacts to a variety of sensitive resources including NSRs. As a result of this effort, Wheatridge would not operate the Project as described in this Exhibit in full power mode and therefore those results are not provided because they would be extraneous information that is not representative of the Project in this ASC.

Tables X-8 and X-9 provide the received sound level at noise sensitive receptors within 1 mile of the Site Boundary under each approach. The utilization of either NRO Approach 1 or NRO Approach 2 results in no noise exceedances at non-participants. In Approach 1, a turbine operation mode applies a small reduction in noise emissions across a large number of turbines, and in Approach 2 a turbine operation mode applies a large reduction in noise emissions across a small number of turbines to achieve the same standard. The ultimate arrangement of NRO modes would be determined by Wheatridge prior to construction of the Project when the final turbine type is selected. An updated acoustical analysis would be completed using the final layout and submitted to ODOE for approval prior to construction.

Wheatridge would obtain noise waivers and/or operate the Project with turbines in NRO modes to comply with the OAR 340-035-0035 anti-degradation standard (e.g., 10 dB above the assumed baseline of 26 dBA L_{50}). Therefore no additional mitigation of operational noise would be required.

Table X-8: GE 1.7-103 Turbine Layout Received Sound Levels (dBA) at Receptors within 1 mile of Site Boundary										
Receptor ID	**Project Location**	**Status**	**UTM Zone 11N Coordinate (meters)**		**Distance to Nearest Turbine (meters)**	**NRO Approach 1**	**Increase Over Baseline**	**NRO Approach 2**	**Increase Over Baseline**
			X	**Y**					
1	Wheatridge West	Non-Participant	297198	5056533	2,654	31	6	33	8
2	Wheatridge West	Non-Participant	297174	5052532	1,804	36	10	36	10
3	Wheatridge West	Non-Participant	297486	5052485	1,920	36	10	36	10
4	Wheatridge West	Participant	295460	5052091	831	42	**16**	40	**14**
5	Wheatridge West	Non-Participant	301646	5051319	3,124	27	4	27	4
6	Wheatridge West	Participant	294319	5048581	822	42	**16**	44	**18**
7	Wheatridge West	Participant	296527	5048528	818	44	**18**	47	**21**
8	Wheatridge West	Participant	296866	5048382	905	43	**17**	45	**19**
9	Wheatridge West	Participant	296916	5048540	972	43	**17**	44	**18**
10	Wheatridge West	Participant	297165	5048599	868	43	**17**	45	**19**
11	Wheatridge West	Participant	297531	5046144	831	43	**17**	42	**16**
12	Wheatridge West	Non-Participant	294083	5044869	1,836	34	9	34	9
13	Wheatridge West	Non-Participant	294126	5044772	1,730	33	8	33	8
14	Wheatridge West	Non-Participant	294114	5044835	1,793	33	8	33	8
15	Wheatridge West	Non-Participant	295774	5044495	1,637	36	10	36	10
16	Wheatridge West	Participant	297527	5044361	806	43	**17**	42	**16**
17	Wheatridge West	Non-Participant	301242	5044356	2,821	36	10	36	10
18	Wheatridge West	Non-Participant	290799	5042272	3,952	27	4	28	4
19	Wheatridge West	Non-Participant	290722	5042252	4,032	27	4	28	4
20	Wheatridge West	Participant	292735	5042935	1,932	31	6	31	6
21	Wheatridge West	Non-Participant	302818	5043011	2,093	34	9	34	9

Table X-8: GE 1.7-103 Turbine Layout Received Sound Levels (dBA) at Receptors within 1 mile of Site Boundary										
Receptor ID	Project Location	Status	UTM Zone 11N Coordinate (meters)		Distance to Nearest Turbine (meters)	NRO Approach 1	Increase Over Baseline	NRO Approach 2	Increase Over Baseline
			X	Y					
22	Wheatridge West	Non-Participant	302808	5043078	2,154	34	9	34	9
23	Wheatridge West	Non-Participant	302688	5043008	2,053	33	8	33	8
24	Wheatridge West	Non-Participant	293061	5040169	2,557	32	7	33	8
25	Wheatridge West	Participant	298336	5041035	817	44	**18**	47	**21**
26	Wheatridge West	Participant	300223	5040833	816	45	**19**	44	**18**
27	Wheatridge West	Non-Participant	294815	5039469	847	36	10	36	10
28	Wheatridge West	Participant	299552	5039547	840	46	**20**	46	**20**
29	Wheatridge West	Participant	303481	5038732	1,841	34	9	36	10
30	Wheatridge West	Non-Participant	293814	5036416	2,529	29	5	28	4
31	Wheatridge West	Participant	299985	5036000	847	45	**19**	45	**19**
32	Wheatridge West	Participant	299897	5036003	831	45	**19**	45	**19**
33	Wheatridge West	Non-Participant	303561	5036616	1,633	36	10	36	10
34	Wheatridge West	Non-Participant	298420	5034227	1,642	36	10	36	10
35	Wheatridge West	Participant	303900	5035522	1,422	35	10	36	10
36	Wheatridge West	Participant	299132	5032884	1,963	33	8	33	8
37	Wheatridge West	Participant	301002	5032290	1,510	38	**12**	38	**12**
38	Wheatridge West	Non-Participant	300060	5031208	2,859	34	9	34	9
39	Wheatridge West	Participant	303251	5031452	922	40	**14**	40	**14**
40	Wheatridge West	Non-Participant	304662	5032234	1,659	34	9	34	9
41	Intraconnection Corridor	Participant	308029	5036987	5,799	22	1	23	2
42	Intraconnection Corridor	Non-Participant	313940	5041131	7,939	4	0	4	0
43	Intraconnection Corridor	Non-Participant	313966	5042083	7,224	14	0	14	0

Table X-8: GE 1.7-103 Turbine Layout Received Sound Levels (dBA) at Receptors within 1 mile of Site Boundary

Receptor ID	Project Location	Status	UTM Zone 11N Coordinate (meters)		Distance to Nearest Turbine (meters)	NRO Approach 1	Increase Over Baseline	NRO Approach 2	Increase Over Baseline
			X	Y					
44	Wheatridge East	Participant	318864	5046095	1,091	38	**12**	38	**12**
45	Wheatridge East	Participant	318825	5046049	1,145	38	**12**	38	**12**
46	Wheatridge East	Participant	318948	5046127	1,044	37	**11**	37	**11**
47	Wheatridge East	Participant	318940	5046039	1,133	36	10	36	10
48	Wheatridge East	Participant	321659	5059851	911	46	**20**	46	**20**

Note: ## indicates exceedance of OAR 340-035-0035 anti-degradation standard

Table X-9: GE 2.5-120 Turbine Layout Received Sound Levels (dBA) at Receptors within 1 mile of Site Boundary

Receptor ID	Project Location	Status	UTM Zone 11N Coordinate (meters)		Distance to Nearest Turbine (meters)	NRO Approach 1	Increase Over Baseline	NRO Approach 2	Increase Over Baseline
			X	Y					
1	Wheatridge West	Non-Participant	297198	5056533	2,686	31	6	31	6
2	Wheatridge West	Non-Participant	297174	5052532	1,814	36	10	36	10
3	Wheatridge West	Non-Participant	297486	5052485	1,913	36	10	36	10
4	Wheatridge West	Participant	295460	5052091	831	42	**16**	42	**16**
5	Wheatridge West	Non-Participant	301646	5051319	3,124	25	3	25	3
6	Wheatridge West	Participant	294319	5048581	822	43	**17**	43	**17**
7	Wheatridge West	Participant	296527	5048528	814	45	**19**	45	**19**
8	Wheatridge West	Participant	296866	5048382	866	44	**18**	44	**18**
9	Wheatridge West	Participant	296916	5048540	972	44	**18**	44	**18**
10	Wheatridge West	Participant	297165	5048599	868	44	**18**	44	**18**
11	Wheatridge West	Participant	297531	5046144	818	43	**17**	44	**18**
12	Wheatridge West	Non-Participant	294083	5044869	1,836	34	9	34	9
13	Wheatridge West	Non-Participant	294126	5044772	1,730	33	8	33	8
14	Wheatridge West	Non-Participant	294114	5044835	1,793	33	8	33	8
15	Wheatridge West	Non-Participant	295774	5044495	1,638	36	10	36	10
16	Wheatridge West	Participant	297527	5044361	821	44	**18**	45	**19**
17	Wheatridge West	Non-Participant	301242	5044356	2,835	35	10	35	10
18	Wheatridge West	Non-Participant	290799	5042272	3,952	28	4	27	4
19	Wheatridge West	Non-Participant	290722	5042252	4,032	27	4	27	4
20	Wheatridge West	Participant	292735	5042935	1,932	31	6	29	5
21	Wheatridge West	Non-Participant	302818	5043011	2,403	32	7	32	7

Table X-9: GE 2.5-120 Turbine Layout Received Sound Levels (dBA) at Receptors within 1 mile of Site Boundary									
Receptor ID	Project Location	Status	UTM Zone 11N Coordinate (meters)		Distance to Nearest Turbine (meters)	NRO Approach 1	Increase Over Baseline	NRO Approach 2	Increase Over Baseline
			X	Y					
22	Wheatridge West	Non-Participant	302808	5043078	2,466	31	6	31	6
23	Wheatridge West	Non-Participant	302688	5043008	2,373	31	6	31	6
24	Wheatridge West	Non-Participant	293061	5040169	2,640	32	7	32	7
25	Wheatridge West	Participant	298336	5041035	832	45	**19**	45	**19**
26	Wheatridge West	Participant	300223	5040833	819	43	**17**	43	**17**
27	Wheatridge West	Non-Participant	294815	5039469	945	36	10	36	10
28	Wheatridge West	Participant	299552	5039547	853	43	**17**	43	**17**
29	Wheatridge West	Participant	303481	5038732	1,625	34	9	34	9
30	Wheatridge West	Non-Participant	293814	5036416	2,530	27	4	27	4
31	Wheatridge West	Participant	299985	5036000	951	42	**16**	42	**16**
32	Wheatridge West	Participant	299897	5036003	978	42	**16**	42	**16**
33	Wheatridge West	Non-Participant	303561	5036616	1,630	36	10	36	10
34	Wheatridge West	Non-Participant	298420	5034227	1,640	33	8	33	8
35	Wheatridge West	Participant	303900	5035522	1,422	35	10	35	10
36	Wheatridge West	Participant	299132	5032884	1,950	31	6	31	6
37	Wheatridge West	Participant	301002	5032290	1,511	36	10	36	10
38	Wheatridge West	Non-Participant	300060	5031208	2,862	31	6	31	6
39	Wheatridge West	Participant	303251	5031452	949	38	**12**	38	**12**
40	Wheatridge West	Non-Participant	304662	5032234	1,683	32	7	33	8
41	Intraconnection Corridor	Participant	308029	5036987	5,797	20	1	20	1
42	Intraconnection Corridor	Non-Participant	313940	5041131	7,950	2	0	2	0

Table X-9: GE 2.5-120 Turbine Layout Received Sound Levels (dBA) at Receptors within 1 mile of Site Boundary

Receptor ID	Project Location	Status	UTM Zone 11N Coordinate (meters)		Distance to Nearest Turbine (meters)	NRO Approach 1	Increase Over Baseline	NRO Approach 2	Increase Over Baseline
			X	Y					
43	Intraconnection Corridor	Non-Participant	313966	5042083	7,235	11	0	11	0
44	Wheatridge East	Participant	318864	5046095	1,099	36	10	36	10
45	Wheatridge East	Participant	318825	5046049	1,153	36	10	36	10
46	Wheatridge East	Participant	318948	5046127	1,052	35	10	35	10
47	Wheatridge East	Participant	318940	5046039	1,140	34	9	34	9
48	Wheatridge East	Participant	321659	5059851	912	44	**18**	44	**18**

Note: ## indicates exceedance of OAR 340-035-0035 anti-degradation standard

6.0 Mitigation Measures – OAR 345-021-0010(1)(x)(C)

Wheatridge proposes to secure the necessary noise waivers and to operate some turbines in NRO modes to achieve compliance with OAR 340-035-0035 at all noise sensitive receptors. Additionally, to the extent possible, Wheatridge has "optimized" the layouts under consideration to minimize and/or avoid exceedances of OAR 340-035-0035. Optimization was achieved by starting with a layout where maximum power production was achieved given the area available for possible development. Refinements were made for these layouts based on restrictions from environmentally sensitive areas including those areas sensitive to noise, in this case rural residences. Refinements included eliminating a number of turbines and moving others. This process resulted in the layouts under consideration in this ASC and represents layouts that are both financially viable and those that minimize environmental effects, including effects to noise sensitive areas. Additionally, the following mitigation measures will be considered and incorporated into the Project contract specifications, as necessary and appropriate, to minimize Project noise levels to the extent practicable:

- Construction site and access road speed limits will be established and enforced during the construction period.
- Electrically-powered equipment will be used instead of pneumatic or internal combustion powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas will be located as far as practicable from noise sensitive receptors.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, will be for safety warning purposes only.
- All noise-producing construction equipment and vehicles using internal combustion engines will be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) will be equipped with shrouds and noise control features that are readily available for that type of equipment.
- Final transformer specifications and noise warranty data will be reviewed by an acoustician to ensure compliance with OAR 340-035-0035.
- All construction noise complaints will be logged within 48 hours of issuance. The construction supervisor will have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to the owner will be established prior to the start of construction that will allow for resolution of noise problems that cannot be resolved by the site supervisor in a reasonable period of time.

7.0 Monitoring – OAR 345-021-0010(1)(x)(D)

Noise monitoring is not proposed for the Project. With the mitigation measures implemented, no exceedances of the OAR 340-035-0035 anti-degradation rule or the fixed thresholds are predicted. Additionally, the legislative authority granted EFSC in OAR 345-026-0010(1) states that under ORS 469.430 "the Council has continuing authority over the site for which a site certificate is issued and may inspect, direct the Department of Energy to inspect, or ask another state agency or local government to inspect, the site at any time to ensure that the certificate holder is operating the facility in compliance with the terms and conditions of the site certificate."

8.0 Owners of Noise Sensitive Property – OAR 345-021-0010(1)(x)(E)

Tables X-8 and X-9 provide the Universal Transverse Mercator (UTM) Zone 11 North X and Y coordinates in meters and the map ID corresponding to Figures X-1 to X-4 of all noise sensitive properties within 1 mile of the Site Boundary. Confidential Attachment X-3 provides the names and addresses of the noise sensitive receptor owners detailed in Tables X-8 and X-9.

9.0 Submittal Requirements and Approval Standards

9.1 Submittal Requirements

Table X-10: Submittal Requirements Matrix

Requirement	Location
OAR 345-021-0010(1)(x) Information about noise generated by construction and operation of the proposed facility, providing evidence to support a finding by the Council that the proposed facility complies with the Oregon Department of Environmental Quality's noise control standards in OAR 340-35-0035. The applicant shall include:	
OAR 345-021-0010(1)(x)(A) Predicted noise levels resulting from construction and operation of the proposed facility	Sections 4.0 and 5.0
OAR 345-021-0010(1)(x)(B) An analysis of the proposed facility's compliance with the applicable noise regulations in OAR 340-35-0035, including a discussion and justification of the methods and assumptions used in the analysis.	Sections 4.0 and 5.0
OAR 345-021-0010(1)(x)(C) Any measures the applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility.	Section 6.0
OAR 345-021-0010(1)(x)(D) Any measures the applicant proposes to monitor noise generated by operation of the facility.	Section 7.0
OAR 345-021-0010(1)(x)(E) A list of the names and addresses of all owners of noise sensitive property, as defined in OAR 340-035-0015, within one mile of the proposed Site Boundary.	Section 8.0
Project Order Comments	**Location**

Table X-10: Submittal Requirements Matrix	
Requirement	**Location**
All paragraphs apply. The proposed facility must comply with the noise control regulations applicable to industrial facilities at OAR 340-035-0035 (ORS 467.020 and ORS 467.030 (Noise Control); and OAR Chapter 340, Division 35 (Noise Control Regulations). The application must contain a noise analysis and information to support a Council finding that the proposed facility, including any alternative support systems proposed, will comply with the requirements of OAR 340-035-0035.	Section 5.0, Tables X-8 and X-9.
Identify all noise sensitive receptors on aerial and topographic maps. Provide the distance between facility components and the nearest noise sensitive receptors (as that term is defined by ODEQ). Each noise sensitive receptor should be uniquely identified on all maps, and tables provided within Exhibit X should show the receptor identification number, an indication of the noise sources included in the analysis, the distance between the noise source(s), and the receiver, and the predicted noise levels.	Figures X-1 through X-4, Section 5.2, Tables X-8 and X-9, Confidential Attachment X-3
Provide manufacturer's warranted sound power levels and uncertainty ranges, including octave band data, for representative specific wind turbine types that might be used at the Facility. The analysis must include at least one turbine type representing the maximum sound level and octave band data that would not be exceeded by any turbine type used at the facility. Provide information on the source of the reference data and any assumptions made in using the data in the noise model, including directivity information. Provide information about all noise mitigation measures included in the modeling.	Section 5.1.2, Tables X-6 and X-7. Section 5.2
Provide predicted noise levels resulting from construction and operation of the proposed facility.	Section 4.2, Table X-2, Section 5.2, Tables X-8 and X-9
Describe any measures the Applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility.	Section 6.0
Describe any measures the Applicant proposes to monitor noise generated by operation of the facility.	Section 7.0

9.2 Approval Standard

OAR 345 Division 22 does not provide an approval standard specific to Exhibit X.

10.0 References

Bolt, Beranek and Newman, Inc. 1977. Power Plant Construction Noise Guide, prepared for the Empire State Electric Energy Research Corporation, Report No. 3321, 1977.

DataKustik GmbH. 2014. Computer-Aided Noise Abatement Model CadnaA, Version 4.4.145. Munich, Germany, 2014.

FHWA (Federal Highway Administration). 1992. "Procedures for Abatement of Highway Traffic Noise and Construction Noise". Code of Federal Regulations, Title 23, Part 772, 1992.

FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide, FHWA-HEP-05-054, January 2006.

IEC (International Electrotechnical Commission). 2005. 60076-10 “Power Transformers – Part 10: Determination of Sound Levels” May, 2005.

ISO (Organization for International Standardization). 1996. Standard ISO 9613-2 Acoustics – Attenuation of Sound During Propagation Outdoors. Part 2 General Method of Calculation. Geneva, Switzerland.

NEMA (National Electrical Manufacturers Association). 2000. NEMA Standards Publication No. TR 1-1993 (R2000) Transformers, Regulators and Reactors.

Figures

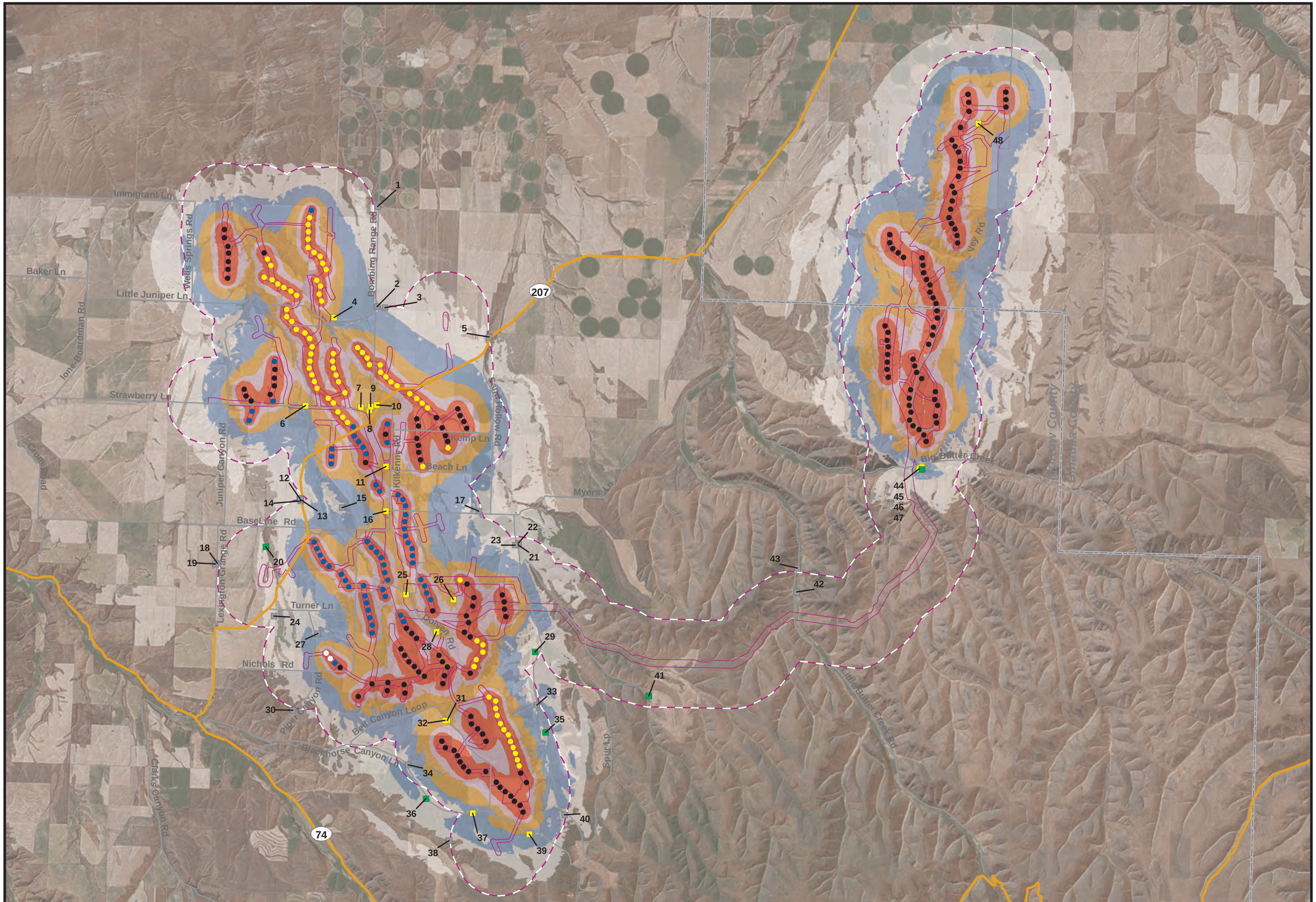

Figure X-1

Wheatridge Wind Energy Facility

Noise Exceedances
Minimum Noise Reduced Operation
GE 1.7-103 Turbine Layout

Morrow and Umatilla Counties, OR
April 2015

- Site Boundary
- Analysis Area (1 mile Buffer of Site Boundary)
- County Boundary
- State Highway
- Local Road

Turbine

Minimum Noise Reduced Operation

- None
- 3 dBA Reduction
- 4 dBA Reduction
- 6 dBA Reduction

Noise Sensitive Receptor *

- Participant - In Exceedance
- Participant - Not In Exceedance
- Non-Participant - Not In Exceedance

Sound Contour Range (dBA)

- 31 - 36
- 36 - 41
- 41 - 46
- 46 - 50
- > 50

See exhibit X, table 8 for receptor names and addresses

1:150,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: site boundary, sensitive noise receptors / ESRI: political boundaries, roads / USDA NAIP: background imagery / Tetra Tech: sound contour modeling CadnaA

TETRA TECH

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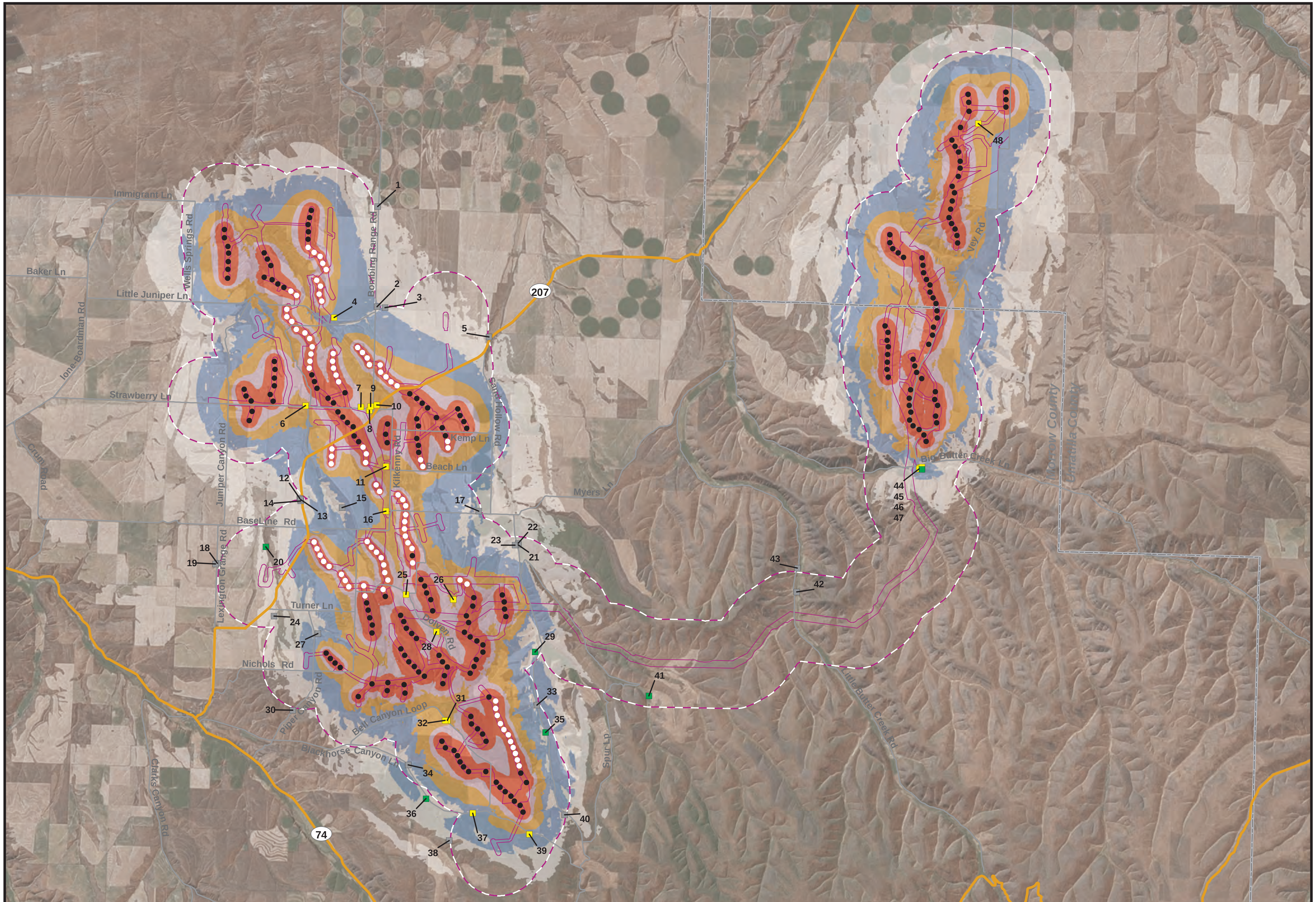

1:150,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: site boundary, sensitive noise receptors / ESRI: political boundaries, roads / USDA NAIP: background imagery / Tetra Tech: sound contour modeling CadnaA

Figure X-2

Wheatridge Wind Energy Facility

Noise Exceedances
Maximum Noise Reduced Operation
GE 1.7-103 Turbine Layout

Morrow and Umatilla Counties, OR
April 2015

- Site Boundary
- Analysis Area (1 mile Buffer of Site Boundary)
- County Boundary
- State Highway
- Local Road

Turbine

Maximum Noise Reduced Operation

- None
- 6 dBA Reduction

Noise Sensitive Receptor *

- Participant - In Exceedance
- Participant - Not In Exceedance
- Non-Participant - Not In Exceedance

Sound Contour Range (dBA)

- 31 - 36
- 36 - 41
- 41 - 46
- 46 - 50
- > 50

See exhibit X, table 8 for receptor names and addresses

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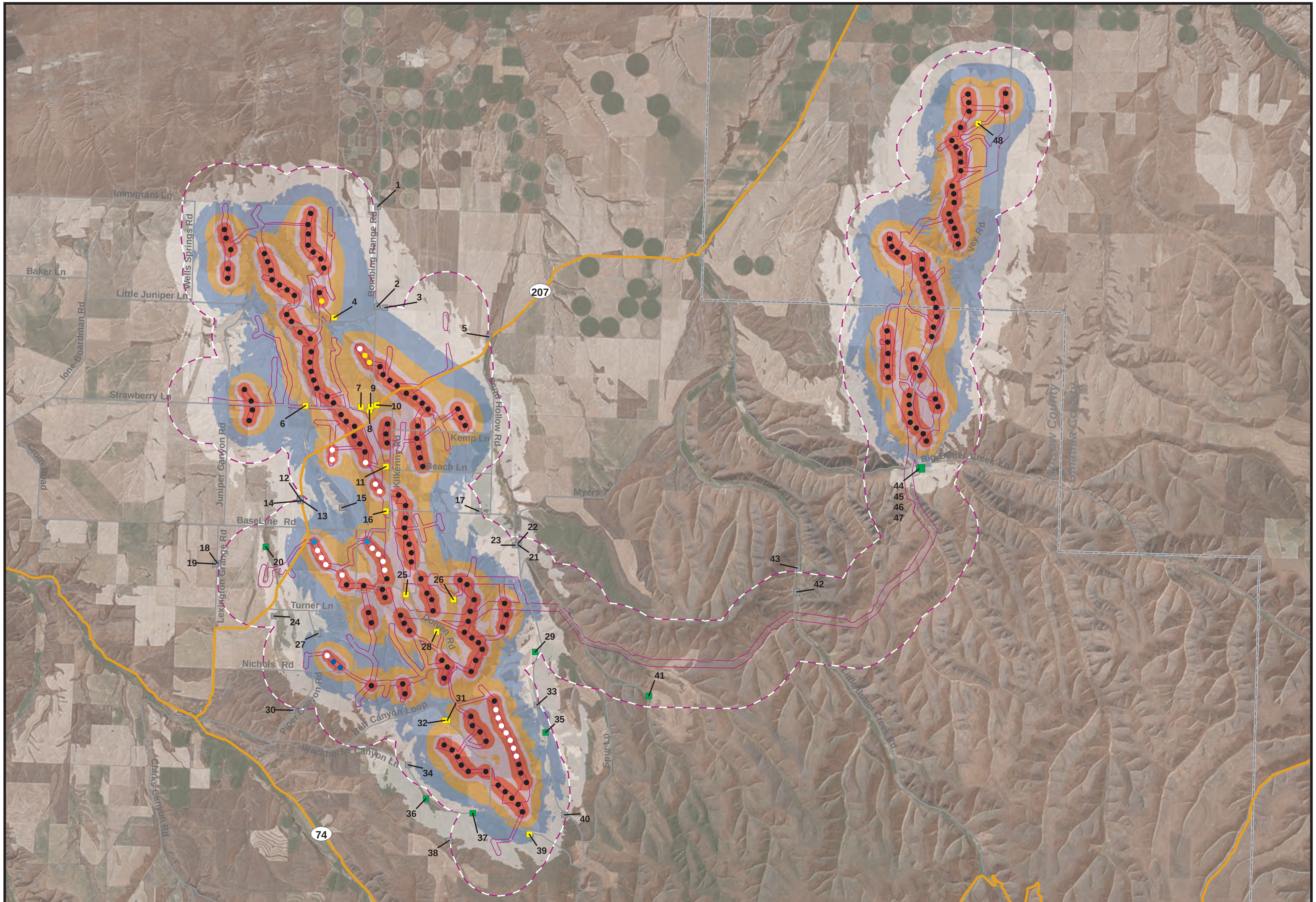

Figure X-3

Wheatridge Wind Energy Facility

Noise Exceedances
Minimum Noise Reduced Operation
GE 2.5-120 Turbine Layout

Morrow and Umatilla Counties, OR
April 2015

Site Boundary

Analysis Area (1 mile Buffer of Site Boundary)

County Boundary

State Highway

Local Road

Turbine

Minimum Noise Reduced Operation

- None
- 1 dBA Reduction
- 2 dBA Reduction
- 3 dBA Reduction
- 4 dBA Reduction

Noise Sensitive Receptor *

- Participant - In Exceedance
- Participant - Not In Exceedance
- Non-Participant - Not In Exceedance

Sound Contour Range (dBA)

- 31 - 36
- 36 - 41
- 41 - 46
- 46 - 50
- > 50

1:150,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: site boundary, sensitive noise receptors / ESRI: political boundaries, roads / USDA NAIP: background imagery / Tetra Tech: sound contour modeling CadnaA

See exhibit X, table 8 for receptor names and addresses

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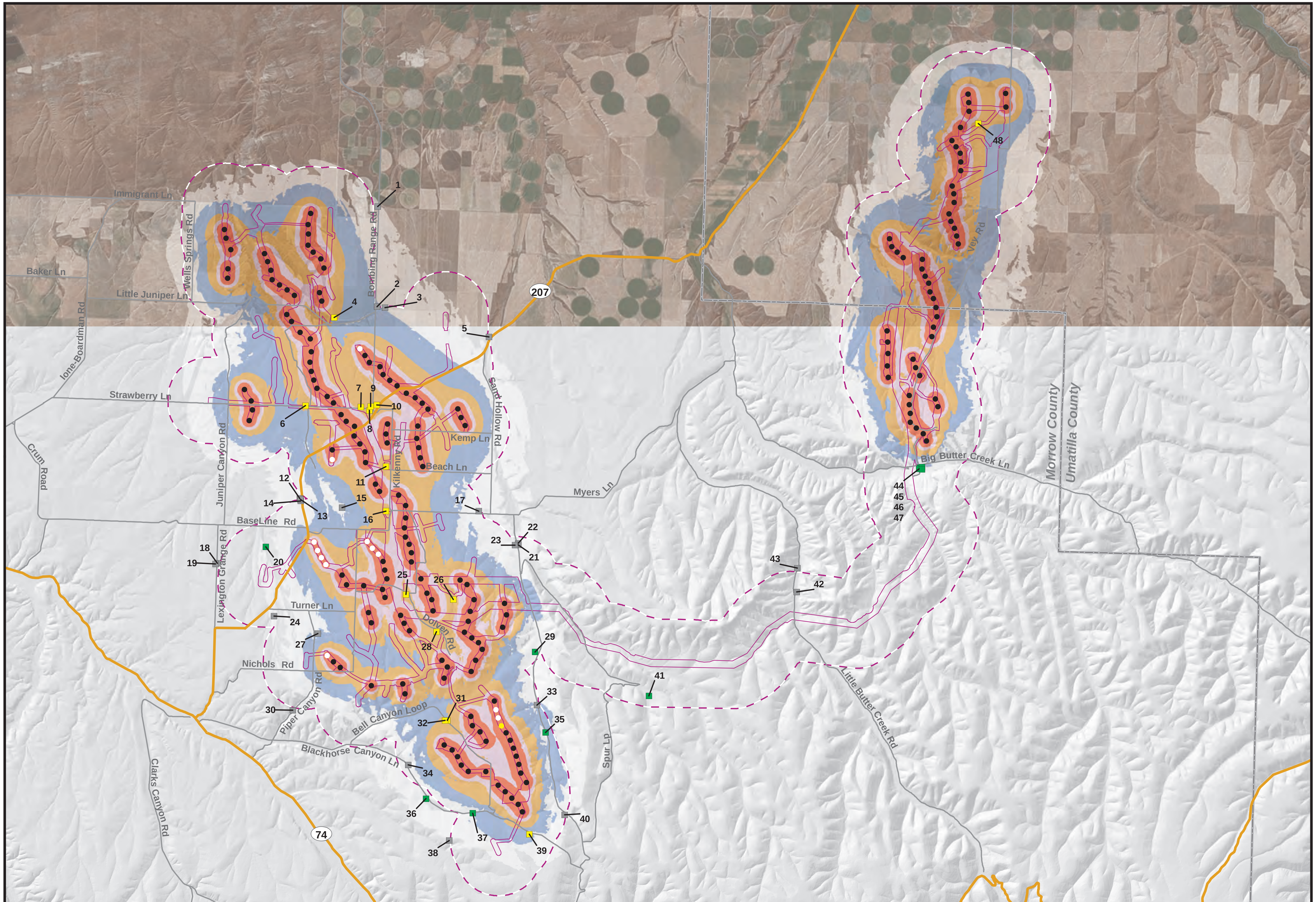
Figure X-4

Wheatridge Wind Energy Facility

Noise Exceedances
Maximum Noise Reduced Operation
GE 2.5-120 Turbine Layout

Morrow and Umatilla Counties, OR
April 2015



- Site Boundary
- Analysis Area (1 mile Buffer of Site Boundary)
- County Boundary
- State Highway
- Local Road

Turbine

Maximum Noise Reduced Operation
- None
- 4 dBA Reduction
- 6 dBA Reduction

Noise Sensitive Receptor *
- Participant - In Exceedance
- Participant - Not In Exceedance
- Non-Participant - Not In Exceedance

Sound Contour Range (dBA)
- 31 - 36
- 36 - 41
- 41 - 46
- 46 - 50
- > 50

See exhibit X, table 8 for receptor names and addresses

1:150,000 WGS84 UTM 11

0 1 2 4 6 8 10 12 14 16 18 20 Miles

Data Sources Wheatridge Wind Energy: site boundary, sensitive noise receptors / ESRI: political boundaries, roads / USDA NAIP: background imagery / Tetra Tech: sound contour modeling CadnaA

TETRA TECH

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Attachment X-1:

GE Sound Power Technical Documentation (Confidential and Not for Public Distribution)

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Attachment X-2:

Predicted Sound Levels by Turbine for Sensitive Noise Receptors within the Analysis Area

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GE 1.7-103 Minimum Noise Reduced Operation																																								
			Noise Sensitive Receptor Received Sound Levels (dBA)																																					
Turbine ID	X	Y	1	2	3	5	6	13	14	15	16	22	23	24	67	68	69	76	77	78	79	80	81	82	83	84	85	89	91	93	98	99	100	119	124	125	126	127	173	174
1-West	291075.67	5055610.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	13	12	15	0	0	0	0	0	0	0	0	0	0	0	0	0
1-East	322291.58	5061096.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0
2-West	291075.85	5055283.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	13	12	15	0	0	0	0	0	0	0	0	0	0	0	0	0
2-East	322298.4	5060803.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0
3-West	291220.16	5054938.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	13	13	16	0	0	0	0	0	0	0	0	0	0	0	0	0
3-East	322294.99	5060503.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0
4-West	291236.93	5054672.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	13	13	16	0	0	0	0	0	0	0	0	0	0	0	0	0
4-East	320780.96	5061011.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0	0
5-West	291234.7	5054332.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	11	0	0	14	13	17	0	0	0	0	0	0	0	0	0	0	0	0	0
5-East	320815.06	5060697.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0
6-West	291219.26	5054020.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	11	4	0	14	13	17	0	0	0	0	4	0	0	0	0	0	0	0	0
6-East	320821.04	5060339.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0
7-West	291205.82	5053670.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	12	5	0	14	13	17	0	0	0	0	5	4	0	0	0	0	0	0	0
7-East	320474.77	5059685.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0
8-West	292663.57	5054690.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	12	5	0	16	15	19	0	0	0	0	5	5	0	0	0	0	0	0	0
8-East	320131.33	5059175.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0
9-West	292787.35	5054428.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	1	0	12	11	16	0	0	0	0	1	1	0	0	0	0	0	0	0
9-East	320263.58	5058946.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0
10-West	292938.25	5054171.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	1	0	12	12	17	0	0	0	0	2	1	0	0	0	0	0	0	0
10-East	320407.71	5058707.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0
11-West	292666.89	5053701.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	2	0	12	11	17	0	0	0	0	2	2	0	0	0	0	0	0	0
11-East	320468.38	5058344.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0
12-West	292976.9	5053611.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	2	0	13	12	18	0	0	0	0	3	4	0	0	0	0	0	0	0
12-East	320469.41	5058062.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0
13-West	293209.19	5053446.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	9	3	0	14	13	19	0	0	0	0	3	5	0	0	0	0	0	0	0
13-East	320392.41	5057733.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0
14-West	293455.69	5053298.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	10	4	0	15	14	21	0	0	0	0	4	6	0	0	0	0	0	0	0
14-East	320150.85	5057337.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0
15-West	293728.06	5053153.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	10	4	-1	16	15	22	0	0	0	0	5	7	0	0	0	0	0	0	0
15-East	320241.43	5057088.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0
16-West	293957.65	5052984.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	11	5	0	17	15	24	0	0	0	0	5	7	0	0	0	0	0	0	0
16-East	320153.87	5056752.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0
17-West	294547.12	5056378.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	11	10	12	0	0	0	0	0	0	0	0	0	0	0	0	0
17-East	320079.89	5056421.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0
18-West	294479.22	5056098.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0	13	12	14	0	0	0	0	0	5	0	0	0	0	0	0	0
18-East	320016.48	5056095.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0
19-West	294423.76	5055817.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	0	0	13	12	14	0	0	0	0	0	6	0	0	0	0	0	0	0
19-East	320120.65	5055853.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0
20-West	294432.72	5055525.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	0	0	14	13	15	0	0	0	0	1	6	0	0	0	0	0	0	0
20-East	320264.08	5055634.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
21-West	294414.8	5055225.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	1	0	14	14	16	0	0	0	0	1	7	0	0	0	0	0	0	0
21-East	320334.06	5055373.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0
22-West	294419.28	5054898.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	2	0	15	14	18	0	0	0	0	2	7	0	0	0	0	0	0	0
22-East	320360.08	5055082.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0
23-West	294656.82	5054701.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	2	0	16	15	19	0	0	0	0	2	8	0	0	0	0	0	0	0
23-East	317660.83	5055404.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0
24-West	294903.31	5054539.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	3	0	17	16	20	0	0	0	0	3	8	0	0	0	0	0	0	0
24-East	317655.99	5055091.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
25-West	295005.46	5054269.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	3	0	19	17	21	0	0	0	0	4	9	0	0	0	0	0	0	0
25-East	317774.91	5054853.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
26-West	295136.37	5054015.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	4	0	20	18	23	0	0	0	0	4	9	0	0	0	0	0	0	0
26-East	317990.44	5054682.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
27-West	294759.32	5053594.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	10	5	5	19	18	25	0	0	0	0	5	10	0	0	0	0	0	0	0
27-East	318205.97	5054508.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
28-West	294916.76	5053356.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	11	5	6	20	19	27	0	0	0	0	6	11	0	0	0	0	0	0	0
28-East	318938.05	5054486.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
29-West	294865.41	5053034.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	6	6	20	19	30	0	0	0	0	6	11	0	0	0	0	0	0	0
29-East	318974.9	5054190.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
30-West	294963.02	5052758.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	13	13	7	7	21	20	33	0	0	0	0	7	12	0	0	0	0	0	0	5
30-East	318999.47	5053879.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	5	4	5	4	0	0
31-West	293566.43	5052419.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	14	11	6	1	15	14	23	0	0	0	0	6	8	0	0	0	0	0	6	1
31-East	319122.32	5053621.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	5	5	5	5	0	0
32-West	293562.55	5052134.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	15	12	6	1	15	14	23	0	0	0	0	6	8	0	0	0	0	0	6	2
32-East	319255.22	5053398.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	5	5	5	5	0	0
33-West	293768.58	5051940.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	16	13	7	2	16	15	25	0	0	0	0	7	9	0	0	0	0	0	7	7
33-East	319261.34	5053107.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	0	0
34-West	293948.69	5051624.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	0	17	14	8	2	16	15	26	0	0	0	0	8	10	0	0	0	0	0	7	7
34-East	319380.26	5052876.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	0	0
35-West	294296.74	5051481.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	0	18	15	9	3	17	16	28	0	0	0	0	9	14	0	0	0	0	0	7	8
35-East	319506.6	5052649.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	7	7	7	7	0	0
36-West	294483.37	5051258.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	0	19	16	10	4	18	17	28	0	0	0	0	10	15	0	0	0	0	0	8	8
36-East	319541.82	5052373.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	7	7	7	7	0	0
37-West	294587.45	5050930.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	2	1	20	17	11	5	17	16	27	0	0	0	0	12	16	0	0	0	0	0	9	9
37-East	319552.48	5052082.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	8	8	8	0	0
38-West	294530.15	5050640.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	3	2	22	18	12	5	17	16	25	0	0	0	0	12	16	0	0	0	0	0	9	9
38-East	319398.53	5051711.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	9	9	0	0
39-West	294491.95	5050356.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4	2	24	19	13	6	16	15	23	0	0	0	0	13	17	0	0	0	0	0	10	10

39-East	319365.93	5051400.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	0	0
40-West	294470.74	5050072.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	4	3	26	19	13	6	15	14	21	0	0	0	0	14	17	0	0	0	0	0	10	11
40-East	319211.37	5051024.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	0	0
41-West	294576.83	5049809.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	5	3	29	21	14	7	15	14	20	0	0	0	0	15	18	0	0	0	0	0	11	11
41-East	317470.19	5051765.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	8	8	0	0
42-West	294674.44	5049541.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	6	4	31	22	16	8	14	14	19	0	0	0	0	16	19	0	0	0	0	0	12	12
42-East	317585.39	5051512.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	9	9	0	0
43-West	294767.8	5049270.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	7	4	34	23	17	9	14	13	18	0	0	0	0	17	20	0	0	0	0	0	12	13
43-East	317551.11	5051198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	8	10	10	0	0
44-West	295216.28	5048885.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	8	6	32	28	20	11	14	13	17	0	6	0	0	20	23	0	0	0	0	0	8	9
44-East	317591.08	5050923.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	9	10	10	0	0
45-West	295433.33	5048695.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	7	30	30	22	12	13	13	16	0	7	0	0	22	24	0	0	0	0	0	9	9
45-East	317569.76	5050619.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	0	0
46-West	295611.08	5048332.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	8	28	32	24	13	13	12	15	0	7	0	0	23	26	0	0	0	0	0	10	10
46-East	317561.77	5050321.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12	12	12	0	0
47-West	295797.18	5048116.72	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	10	11	9	26	33	25	15	12	12	14	0	8	0	0	25	27	0	0	0	0	0	15	10
47-East	317548.22	5050018.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0
48-West	295991.74	5047909.47	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	15	11	10	24	34	31	16	12	12	13	0	8	0	0	30	28	0	0	0	0	0	11	15
48-East	317596.53	5049725.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	14	0	0
49-West	296215.9	5047736.06	0	0	0	0	0	0	0	0	0	0	0	0	-2	2	0	14	11	10	21	32	31	21	10	10	12	0	8	0	0	29	27	0	0	0	0	0	10	14
49-East	318584.76	5050433.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	11	12	12	0	0
50-West	296258.2	5047368.1	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	2	0	15	13	11	20	28	28	23	10	10	11	0	8	0	0	27	25	0	0	0	0	0	11	15
50-East	318649.06	5050169.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	11	13	13	0	0
51-West	296435.84	5047143.93	0	0	0	0	0	0	0	0	0	-1	-1	-1	0	3	-1	15	13	12	14	26	27	25	9	9	10	0	9	0	0	25	24	0	0	0	0	0	11	11
51-East	318721.02	5049905.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	14	0	0
52-West	296617.71	5046924	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-1	16	14	13	13	24	25	28	9	9	9	-2	9	0	0	24	23	0	0	0	0	0	11	11
52-East	318926.54	5049655.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	14	15	0	0
53-West	296748.13	5046662.77	0	0	0	0	0	0	0	0	0	0	0	0	1	4	-1	16	16	15	12	22	23	31	8	8	9	-1	10	0	0	22	22	0	0	0	0	0	11	11
53-East	318489.17	5049207.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	15	16	16	0	0
54-West	296715.93	5046308.59	0	0	0	0	0	0	0	0	0	6	6	6	7	11	6	22	23	22	16	26	26	37	14	14	14	5	16	0	0	25	25	0	0	0	0	0	17	17
54-East	318428.63	5048881.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	17	18	18	0	0
55-West	295371.53	5046848.18	0	0	0	0	0	0	0	0	0	0	0	0	-1	2	0	19	19	11	21	21	16	16	8	8	10	0	7	0	0	16	19	0	0	0	0	0	19	19
55-East	318427.87	5048586.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	19	19	19	0	0
56-West	295361.3	5046554.67	0	0	0	0	0	0	0	0	0	0	0	0	-1	2	0	21	21	12	20	20	15	16	7	7	9	0	7	0	0	14	18	0	0	0	0	0	21	21
56-East	318493.91	5048322.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	21	20	0	0
57-West	295347.79	5046258.86	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	22	23	13	19	18	14	16	7	7	8	-1	7	0	0	13	17	0	0	0	0	0	22	22
57-East	318452.91	5048004.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	22	23	22	0	0
58-West	293077.23	5050342.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	7	-1	16	13	7	2	11	10	17	0	0	0	0	7	7	0	0	0	0	0	9	4
58-East	318583.15	5047777.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	28	24	24	0	0
59-West	293093.58	5050025.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	14	6	23	20	13	8	17	16	22	0	0	0	0	13	12	0	0	0	0	0	15	10
59-East	318829.15	5047618.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	26	25	0	0
60-West	293065.77	5049686.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	14	6	25	20	13	9	16	16	21	0	0	0	0	13	13	0	0	0	0	0	16	11
60-East	319019.69	5047413.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	31	27	27	0	0
61-West	293070.25	5049376.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	15	7	26	20	14	9	16	15	20	0	0	0	0	14	13	0	0	0	0	0	17	12
61-East	319105.2	5047159.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	33	34	33	0	0
62-West	292913.25	5049023.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	15	7	26	20	13	9	15	15	19	0	0	0	0	13	13	0	0	0	0	0	18	13
62-East	319469.44	5049141.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	15	16	0	0
63-West	293023.59	5048760.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	10	2	22	15	9	5	9	8	13	0	0	0	0	9	8	0	0	0	0	0	13	9
63-East	319451.21	5048834.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18	17	18	0	0
64-West	291861.18	5049240.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	14	5	19	17	10	7	14	13	17	0	0	0	0	10	10	0	0	0	0	0	10	11
64-East	319566.06	5048591.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	19	19	19	0	0
65-West	291941.41	5048964.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	14	6	20	17	11	8	13	13	17	0	0	0	0	11	10	0	0	0	0	0	11	11
65-East	319484.31	5048160.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	22	21	0	0
66-West	292149.36	5048769.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	15	6	21	18	11	8	14	13	17	0	0	0	0	11	10	0	0	0	0	0	12	12
66-East	319525.83	5047888.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	22	23	23	0	0
67-West	292187.28	5048346.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	10	1	16	12	6	3	7	6	10	0	0	0	0	6	5	0	0	0	0	0	8	8
68-West	292066.08	5047984.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	10	1	15	12	6	3	6	6	9	0	0	0	0	5	5	0	0	0	0	0	9	9
69-West	295417.46	5050664.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	2	21	20	14	11	19	19	27	0	0	0	0	15	19	0	0	0	0	0	4	4
70-West	295397.27	5050356.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	3	22	22	16	12	18	18	24	0	0	0	0	16	20	0	0	0	0	0	4	4
71-West	295434.09	5050072.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3	24	23	17	13	18	17	23	0	0	0	0	17	21	0	0	0	0	0	5	5
72-West	295540.47	5049800.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	4	25	25	19	14	17	16	21	0	5	0	0	19	22	0	0	0	0	0	6	6
73-West	295637.79	5049533.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	5	25	28	20	14	16	16	19	0	6	0	0	21	24	0	0	0	0	0	6	6
74-West	295894.77	5049100.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	6	25	33	24	16	15	15	17	0	7	0	0	29	27	0	0	0	0	0	7	7
75-West	296395.35	5050904.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	17	20	15	11	24	23	26	0	0	0	0	20	20	0	0	0	0	0	2	3
76-West	296593.36	5050701.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	17	22	21	12	23	23	24	0	5	0	0	22	22	0	0	0	0	0	3	3
77-West	296778.43	5050485.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	17	23	22	13	22	22	22	0	6	0	0	23	23	0	0	0	0	0	3	3
78-West	296868.5	5050216.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	17	25	24	14	21	21	21	0	6	0	0	25	25	0	0	0	0	0	3	4
79-West	297297.8	5050206.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	9	11	24	23	14	21	21	19	0	7	0	0	25	25	0	0	0	0	0	3	3
80-West	297314.23	5049922.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	10	16	26	25	15	19	19	18	0	7	0	0	27	28	0	0	0	0	0	3	4
81-West	297526.47	5049733.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	10	16	26	26	15	18	19	17	0	8	0	0	28	29	0	0	0	0	0	4	4
82-West	297736.13	5049531.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	11	15	26	27	16	17	18	16	0	8	0	0	28	30	0	0	0	0	0	4	4
83-West	297978.14	5049381.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	11	10	25	26	12	17	17	15	0	9	0	0	28	30	0	0	0	0	0	4	4
84-West	298476.51	5049061.62	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	3	5	12	9	23	24	13	15	15	13	0	10	0	0	25	27	0	0	0	0	0	3	3
85-West	298764.15	5048873.75	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	3	5	12	8	21	23	13	14	15	12	0	11	0	0	23	25	0	0	0	0	0	3	3
86-West	298973.54	5048679.24	0	0	0	0	0	0	0	0	0	2	2	2	0	2	0	3	5	12	7	20	22	13	13	14	11	0	12	0	0	22	24	0	0	0	0	0	3	3
87-West	299196.03	5048491.98	0	0	0	0	0	0	0	0	0	2	2	3	4	2	0	3	5	13	6	19	21	14	12	13	11	0	12	0	0	21	22	0	0	0	0	0	3	3
88-West	299552.62	5048104.64	0	0	0	0	0	0	0	0	0	8	8	8	10	7	0	7	10	18	10	22	23	18	16	17	15	0	18	0	0	23	24	0	0	0	0	0	7	7
89-West	299773.26	5047695.32	0	0	0	0	0	0	0	0	0	9	9	9	11	8	0	7	10	19	9	21	22	18	15	15	14	0	20	0	0	22	23	0	0	0	0	0	7	7
90-West	299906.17	5047386.2	0	0	0	0	0	0	0	0	0	10	10	10	11	7	0	7	10	19	9	20	21	19	14	15	13	4	21	0	0	21	22	0	0	0	0	0	7	7
91-West	299996.47	5047152.06	0	0	0	0	0	0	0	0	0	10	11	11	12	7	0	7	11	20	8	20	21	19	14	14	13	5	22	0	0	21	21	0	0	0	0	0	7	7

92-West	300000.29	5046890.04	0	0	0	0	0	0	0	0	0	7	7	7	8	3	0	3	7	16	4	15	16	15	8	9	7	1	18	0	0	16	16	0	0	0	0	0	3	3
93-West	300398.89	5048455.08	0	0	0	0	0	0	0	0	0	14	9	8	9	5	0	5	8	16	8	19	20	15	16	16	14	0	18	0	0	20	21	0	0	0	0	0	5	6
94-West	300483.48	5048184.39	0	0	0	0	0	0	0	0	0	15	9	9	10	5	0	6	8	17	8	19	20	15	15	16	13	0	19	0	0	20	21	0	0	0	0	0	6	6
95-West	300638.03	5047944.36	0	0	0	0	0	0	0	0	0	15	10	10	10	5	0	6	8	17	7	18	19	15	15	15	13	0	20	0	0	19	20	0	0	0	0	0	6	6
96-West	300749.93	5047681.08	0	0	0	0	0	0	0	0	0	16	11	11	11	6	0	6	8	17	7	18	19	15	14	14	12	0	21	0	0	19	20	0	0	0	0	0	6	6
97-West	297593.6	5047844.66	0	0	0	0	0	0	0	0	0	0	0	0	-1	2	0	11	9	15	11	27	31	24	11	11	11	0	10	0	0	31	32	0	0	0	0	0	6	6
98-West	297521.24	5047428.6	0	0	0	0	0	0	0	0	0	6	6	6	6	9	0	18	16	22	16	31	33	32	16	16	16	0	17	0	0	32	33	0	0	0	0	0	12	13
99-West	297579.15	5047107.73	0	0	0	0	0	0	0	0	0	1	1	1	1	4	0	8	11	18	10	23	26	31	9	9	9	-1	11	0	0	25	25	0	0	0	0	0	8	8
100-West	298766.3	5048057.51	0	0	0	0	0	0	0	0	0	7	7	7	5	8	0	9	11	19	12	25	27	21	17	17	16	0	18	0	0	27	29	0	0	0	0	0	9	9
101-West	298827.22	5047764.41	0	0	0	0	0	0	0	0	0	8	8	8	6	8	0	9	12	20	12	24	27	22	16	16	15	0	18	0	0	26	28	0	0	0	0	0	9	9
102-West	298762.07	5047266.59	0	0	0	0	0	0	0	0	0	8	8	9	7	9	0	10	13	21	12	24	26	24	15	15	14	5	19	0	0	25	26	0	0	0	0	0	10	10
103-West	298821.28	5046987.44	0	0	0	0	0	0	0	0	0	9	9	9	7	10	0	10	14	22	11	23	25	25	14	15	14	5	20	0	0	24	25	0	0	0	0	0	10	10
104-West	298838.2	5046704.06	0	0	0	0	0	0	0	0	0	9	10	10	8	11	0	10	14	23	11	22	24	26	14	14	13	6	21	0	0	23	24	0	0	0	0	0	10	10
105-West	298910.1	5046420.69	0	0	0	0	0	0	0	0	0	10	10	10	9	12	0	10	15	24	10	21	23	26	13	14	13	6	22	0	0	22	23	0	0	0	0	0	10	10
106-West	299003.15	5046150	0	0	0	0	0	0	0	0	0	6	6	7	5	8	0	6	11	21	5	16	17	22	8	8	7	2	18	0	0	17	17	0	0	0	0	0	6	6
107-West	297131.02	5045410.63	0	0	0	0	0	0	0	0	0	2	2	2	4	8	2	12	20	29	7	16	17	32	6	6	6	2	12	0	0	16	16	0	0	0	0	0	12	12
108-West	297270.18	5045156.73	0	0	0	0	0	0	0	0	0	3	3	3	5	9	2	11	20	32	7	15	16	30	5	5	6	2	13	0	0	15	10	0	0	0	0	0	11	11
109-West	298012.46	5045023.55	0	0	0	0	0	0	0	0	0	5	5	5	6	11	2	8	15	33	5	14	14	28	5	5	5	3	15	0	0	14	9	0	0	0	0	0	9	9
110-West	298197.68	5044824.81	0	0	0	0	0	0	0	0	0	5	5	6	7	12	2	8	15	33	4	13	14	25	5	5	5	4	16	0	0	13	9	0	0	0	0	0	8	8
111-West	298313.85	5044581.18	0	0	0	0	0	0	0	0	-1	6	6	6	8	13	2	7	14	33	3	12	13	23	0	4	0	5	17	0	0	12	8	0	0	0	0	0	8	8
112-West	298319.07	5044220.95	0	0	0	0	0	0	0	0	-1	6	6	7	9	14	3	7	14	33	3	11	12	21	0	0	0	6	17	0	0	11	7	0	0	0	0	0	7	7
113-West	298275.48	5043940.4	0	0	0	0	0	0	0	0	0	6	6	7	9	17	3	7	14	32	2	10	11	20	0	0	0	6	17	0	0	11	6	0	0	0	0	0	7	7
114-West	298260.13	5043656.46	0	0	0	0	0	-1	0	0	0	6	6	7	10	18	4	7	14	30	2	10	10	18	0	0	0	7	16	0	-1	10	5	0	0	0	0	0	7	7
115-West	298306.17	5043372.53	0	0	0	0	0	-1	0	0	1	7	7	7	11	20	5	7	13	27	1	9	10	17	0	0	0	8	16	0	-1	9	4	0	0	0	0	0	7	7
116-West	298409.77	5043107.77	0	0	0	0	0	0	0	0	1	7	7	7	12	21	5	6	12	25	1	8	9	16	0	0	0	9	16	0	0	9	3	0	0	0	0	0	6	6
117-West	298567.09	5042869.88	0	0	0	0	0	0	0	0	2	7	7	8	14	23	5	5	11	23	0	8	8	15	0	0	0	10	16	0	0	8	3	0	0	0	0	0	6	6
118-West	298578.6	5042585.94	0	0	0	0	0	1	0	-1	2	7	7	8	15	25	5	5	12	21	0	7	8	14	0	0	0	11	16	0	1	7	2	0	0	0	0	0	5	5
119-West	298593.11	5042299.29	0	0	0	0	0	2	0	-1	2	7	7	8	16	27	6	5	14	20	-1	7	7	13	0	0	0	12	15	0	2	7	2	0	0	0	0	0	5	5
120-West	294657.18	5043126.96	0	0	0	0	0	0	0	0	0	0	0	0	3	7	14	23	23	12	9	4	3	8	0	0	0	8	6	0	0	3	3	0	0	0	0	0	23	23
121-West	294776.12	5042866.04	0	0	0	0	0	0	0	0	0	0	0	-1	3	8	15	21	22	11	8	4	3	7	0	0	0	8	7	0	0	2	2	0	0	0	0	0	21	21
122-West	294902.75	5042608.96	0	0	0	0	0	0	0	0	0	-1	-1	-1	4	9	16	19	21	11	8	3	2	7	0	0	0	9	7	0	0	2	2	0	0	0	0	0	20	19
123-West	295044.71	5042355.72	0	0	0	0	0	0	0	0	0	-1	-1	-1	4	10	17	18	20	11	7	7	2	6	0	0	0	9	7	0	0	2	1	0	0	0	0	0	18	18
124-West	295259.59	5042167.71	0	0	0	0	0	-1	0	0	0	-1	-1	-1	5	11	18	17	19	11	7	7	2	6	0	0	0	10	7	0	-1	7	1	0	0	0	0	0	17	17
125-West	295754.56	5041841.56	0	0	0	0	0	0	0	0	0	0	0	0	6	13	14	15	18	12	6	6	1	6	0	0	0	12	8	0	0	6	1	0	0	0	0	0	15	15
126-West	295903.74	5041592.92	0	0	0	-1	0	1	0	0	0	0	0	1	7	14	15	14	17	11	6	6	1	6	0	0	0	12	3	0	1	6	0	0	0	0	0	0	14	14
127-West	296041.88	5041344.28	0	0	0	-1	0	1	0	0	-1	0	0	1	7	15	16	13	16	11	5	6	0	5	0	0	0	13	3	0	1	5	0	0	0	0	0	0	13	13
128-West	296642.96	5041385.1	0	0	0	0	0	2	0	0	0	2	2	2	9	19	14	12	16	12	5	6	6	11	0	0	0	15	9	0	2	6	0	0	0	0	0	0	7	12
129-West	296691.35	5040979.21	0	0	0	0	0	3	0	0	0	2	2	2	9	20	15	11	14	15	4	5	5	10	0	0	0	16	9	0	3	5	-1	0	0	0	0	0	11	11
130-West	296749.11	5040697.82	0	0	0	1	0	3	0	-2	0	1	1	2	10	20	16	10	13	14	0	4	5	9	0	0	0	16	8	0	3	4	-1	0	0	0	0	0	11	10
131-West	296814.8	5040412	0	0	-1	2	0	4	0	-1	0	1	1	2	10	20	16	10	12	13	0	0	4	8	0	0	0	17	8	0	4	0	0	0	0	0	0	0	10	10
132-West	296885.42	5040111.52	0	0	-1	2	0	5	0	-1	0	1	1	1	10	19	16	9	11	12	0	0	0	8	0	0	0	18	8	0	5	0	0	0	0	0	0	0	9	9
133-West	296979.1	5039814.12	0	0	0	3	0	6	0	0	1	1	1	1	10	23	16	8	11	11	0	0	0	7	0	0	0	18	7	0	6	0	0	0	0	0	0	0	8	8
134-West	296968.42	5039502.02	0	0	0	4	0	6	0	0	1	1	1	1	10	17	16	8	10	10	0	0	0	7	0	0	0	18	7	0	6	0	0	0	0	0	0	0	8	8
135-West	296779.04	5043157.65	0	0	0	0	0	-1	0	0	0	2	3	3	8	14	8	16	24	26	8	9	10	16	0	0	0	6	11	0	-1	9	4	0	0	0	0	0	12	11
136-West	296951.71	5042931.27	0	0	0	0	0	-1	0	0	-1	3	3	3	9	15	8	15	22	25	7	9	9	15	0	0	0	7	11	0	-1	9	3	0	0	0	0	0	10	10
137-West	297155.07	5042720.23	0	0	0	0	0	0	0	0	-1	3	3	4	10	17	8	9	20	24	1	8	9	15	0	0	0	8	12	0	0	8	3	0	0	0	0	0	9	9
138-West	297345.08	5042503.67	0	0	0	0	0	0	0	0	0	4	4	4	11	22	8	8	19	22	1	8	8	14	0	0	0	9	12	0	0	8	2	0	0	0	0	0	8	8
139-West	297439.01	5042210.06	0	0	0	0	0	1	0	0	0	4	4	4	11	25	9	7	17	21	6	7	7	13	0	0	0	10	12	0	1	7	2	0	0	0	0	0	8	7
140-West	297482.85	5041906.49	0	0	0	-1	0	2	0	0	1	4	4	4	12	28	10	7	16	19	5	6	7	12	0	0	0	11	12	0	2	7	1	0	0	0	0	0	7	7
141-West	297607.87	5041613.87	0	0	0	-1	0	2	0	-1	1	4	4	4	13	31	10	6	15	18	5	6	6	11	0	0	0	17	11	0	2	6	0	0	0	0	0	0	6	6
142-West	297419.2	5041238.69	0	0	0	0	0	3	0	-1	1	3	3	4	12	31	11	10	14	16	4	5	6	10	0	0	0	18	10	0	3	5	0	0	0	0	0	0	6	5
143-West	297506.08	5040951.99	0	0	0	1	0	4	0	-1	1	3	3	4	12	32	12	10	13	15	0	5	5	10	0	0	0	19	10	0	4	5	-1	0	0	0	0	0	5	5
144-West	298119.39	5040206.07	0	0	0	3	0	6	-1	1	3	4	4	4	14	32	10	7	10	12	0	0	0	8	0	0	0	25	10	0	6	0	0	0	0	0	0	0	2	2
145-West	298237.7	5039947.86	0	0	0	3	0	7	0	2	3	4	4	4	15	29	10	7	10	12	0	0	0	7	0	0	0	26	9	0	7	0	0	0	0	0	0	0	2	2
146-West	298340.4	5039681.17	0	4	6	9	0	13	6	8	8	9	9	9	20	32	15	13	15	17	0	0	0	13	0	0	0	33	15	0	14	0	0	0	0	0	0	0	7	7
147-West	298555.89	5039487.78	0	5	7	10	0	14	7	9	9	9	9	9	20	30	14	12	15	16	0	0	0	13	0	0	0	35	15	0	14	0	0	0	0	0	0	0	6	6
148-West	298754.8	5039277.82	0	5	7	10	0	15	7	9	9	9	9	9	20	28	14	12	14	16	0	0	0	12	0	0	0	37	15	0	15	0	0	0	0	0	0	0	6	6
149-West	298122.04	5038860.55	0	6	8	11	4	16	7	8	9	7	7	8	17	26	16	12	14	15	0	0	0	12	0	0	0	29	13	0	16	0	0	0	0	0	0	0	6	12
150-West	298280.41	5038611.51	0	6	9	12	5	17	7	9	9	7	7	8	17	24	15	11	13	14	0	0	0	11	0	0	0	25	13	0	17	0	0	0	0	0	0	0	5	12
151-West	298439.85	5038355.1	0	7	9	13	12	18	8	9	10	7	7	7	17	23	14	11	13	14	0	0	0	11	0	0	0	25	13	0	18	0	0	0	0	0	0	0	5	11
152-West	298655.34	5038167.24	0	7	15	14	12	24	8	10	10	7	7	7	17	22	13	0	12	13	0	0	0	0	0	0	0	25	13	0	24	0	0	0	0	0	0	0	0	0
153-West	298832.15	5037940.7	4	8	16	14	13	25	9	11	11	7	7	7	16	22	13	0	12	13	0	0	0	0	0	0	0	24	13	0	26	0	0	0	0	0	0	0	0	0
154-West	299065.85	5037771.44	5	8	16	15	13	27	10	11	11	7	7	7	16	21	12	0	12	13	0	0	0	0	0	0	0	23	12	4	27	0	0	0	0	0	0	0	0	0
155-West	295146	5038690.48	0	0	-2	2	0	2	0	0	0	0	0	0	2	6	30	5	6	0	0	0	0	-3	0	0	0	5	0	0	2	0	0	0	0	0	0	0	6	5
156-West	295308.18	5038485.06	0	0	-1	2	0	2	0	0	0	0	0	0	2	6	27	5	6	0	0	0	0	-3	0	0	0	5	0	0	3	0	0	0	0	0	0	0	5	5
157-West	295500.74	5038299.5	0	0	1	5	0	5	0	0	0	0	0	0	4	8	26	6	7	2	0	0	0	0	0	0	0	7	0	0	5	0	0	0	0	0	0	0	7	6
158-West	295702.5	5038128.78	0	4	7	11	0	11	0	4	4	0	0	0	10	14	29	12	13	7	0	0	0	0	0	0	0	13	0	0	11	0	0	0	0	0	0	0	13	12
159-West	296428.59	5036953.04	0	7	16	21	13	20	5	6	5	0	0	0	9	12	17	0	11	12	0	0	0	0	0	0	0	13	0	0	20	0	0	0	0	0	0	0	0	0
160-West	296965.62	5037460.84	0	7	16	20	12	16	6	7	7	0	0	4	11	19	17	11	12	12	0	0	0	0	0	0	0	16	0	0	21	0	0	0	0	0	0	0	11	11
161-West	297610.55	5037515.77	0	8	16	16	13	23	7	8	8	5	5	5	13	20	16	0	12	13	0	0	0	0	0	0	0	18	11	0	23	0	0	0	0	0	0	0	0	0
162-West	297576.13	5037196.2	0	8	17	22	13	23	7	8	8	4	4	5	12	19	15	0	11	12	0	0	0	0	0	0	0	17	0	0	24	0	0	0	0	0	0	0	0	0
163-West	298258.88	5037435.27	11	8	17	16	13	25	8	10	9	6	6	6	14	20	14	0	12	12	0	0	0	0	0	0	0	20	11	0	26	0	0	0	0	0	0	0	0	0
164-West	298286.33	5037092.1	11	9	18	18	14	27	8	10	9	5	5	5	13	19	13	0	11	12	0	0	0	0	0	0	0	18	11	0	27	0	0	0	0	0	0	0	0	0
165-West	298930.42	5041632.97	0	0	0	-1	0	3	-1	1	4	8	8	8	20	32	6	3	12	16	0	5	6	11	0	0	0	16	14	0	3	6	0	0	0	0	0	0	3	3
166-West	299160.43	5041098.27	0	0	0	1	0	5	0	2	5	8	8	8	22	32	6	2	11	14	0	4	5	9	0	0	0	20	13	0	5	5	-1	0	0	0	0	0	2	2
167-West	299325.89	5040835.17	0	0	-2	1	0	5	0	3	6	8	8	8	25	30	6	1	10	13	0	0	4	9	0	0	0	22	13	0	6	0	0	0	0	0	0	0	1	1
168-West	299392.94	5040388.13	0	0	5	8	0	12	7	9	12	12	12	13	31	33	11	6	15	18	0	0	0	14	0	0	0	37	18	0	12	0	0	0	0	0	0	0	6	6
169-West	299655.42	5038603.74	4	7	9	12	12	24	10	12	13	9	9	10	21	23	11	0	12	14	0	0	0	11	0	0	0	36	14	0	24	0	0	0	0	0	0	0	0	0
170-West	299788.03	5038349.57	5	8	9	12	12	25	11	13	14	9	9	9	19	22	10	0	12	13	0	0	0	0	0	0	0	33	14	4	25	0	0	0	0	0	0	0	0	0
171-West	299975.73	5038137.25	5	8	10	13	12	26	11	14	15	9	9	9	18	21	10	0	11	13	0	0	0	0	0	0	0	31	13	5	26	0	0	0	0	0	0	0	0	0

172-West	299868.5	5037797.71	6	9	11	14	13	28	12	14	13	8	8	8	17	20	10	0	11	12	0	0	0	0	0	0	0	24	7	5	28	0	0	0	0	0	0	0	0	0
173-West	299802.19	5037474.01	6	10	12	15	14	30	12	14	13	7	7	8	16	19	10	0	0	6	0	0	0	0	0	0	0	22	6	6	31	0	0	0	0	0	0	0	0	0
174-West	299077.93	5041375.03	0	0	0	0	0	4	-1	1	5	8	8	8	21	33	6	2	11	15	0	5	5	10	0	0	0	18	14	0	4	5	-1	0	0	0	0	0	3	2
175-West	301131.08	5038436.53	1	3	4	6	6	15	14	17	20	11	11	7	15	10	3	0	0	7	0	0	0	0	0	0	0	23	9	7	19	0	0	0	0	0	0	0	0	0
176-West	300493.98	5041622.03	0	0	0	0	0	4	1	4	9	14	14	15	33	17	3	1	5	14	0	5	6	10	0	0	0	16	18	0	4	6	6	0	0	0	0	0	1	1
177-West	300765.02	5041450.72	0	0	0	5	0	9	7	9	14	19	19	20	37	20	7	5	9	18	0	0	11	15	0	0	0	21	22	0	9	0	0	0	0	0	0	0	5	5
178-West	301034.96	5040902.23	0	0	0	6	0	10	8	11	16	23	23	19	37	19	7	0	8	16	0	0	0	13	0	0	0	22	20	0	10	0	0	0	0	0	0	0	4	4
179-West	301000.58	5040572.11	0	0	4	6	0	11	8	11	17	22	22	18	32	19	7	0	13	16	0	0	0	13	0	0	0	24	19	0	11	0	0	0	0	0	0	0	0	0
180-West	300743.9	5040178.45	0	4	5	7	0	13	9	12	17	20	20	16	37	24	8	0	13	16	0	0	0	13	0	0	0	27	18	0	13	0	0	0	0	0	0	0	0	0
181-West	300837.99	5039910.92	0	5	6	8	0	13	10	13	18	20	20	15	34	23	8	0	13	15	0	0	0	12	0	0	0	32	17	0	13	0	0	0	0	0	0	0	0	0
182-West	300668.22	5039531.16	0	6	6	9	0	15	10	13	17	18	18	14	31	23	8	0	12	14	0	0	0	12	0	0	0	34	16	0	15	0	0	0	0	0	0	0	0	0
183-West	300898.61	5039344.13	0	6	7	9	0	15	11	14	19	18	18	13	25	22	8	0	12	14	0	0	0	11	0	0	0	31	16	0	15	0	0	0	0	0	0	0	0	0
184-West	301159.66	5039173.75	0	2	2	4	0	11	12	16	16	13	13	9	19	11	3	0	6	8	0	0	0	5	0	0	0	25	11	6	11	0	0	0	0	0	0	0	0	0
185-West	301400.91	5039021.85	0	2	2	4	5	12	13	17	22	13	13	13	17	15	2	0	5	8	0	0	0	0	0	0	0	23	10	6	11	0	0	0	0	0	0	0	0	0
186-West	301399.33	5038729.51	0	3	3	5	6	13	14	17	22	12	12	13	16	10	2	0	0	7	0	0	0	0	0	0	0	22	10	6	17	0	0	0	0	0	0	0	0	0
187-West	301048.54	5038158.4	1	4	5	7	7	20	14	18	20	11	11	6	14	9	3	0	0	7	0	0	0	0	0	0	0	22	8	7	20	0	0	0	0	0	0	0	0	0
188-West	300892.43	5037898.52	6	9	10	12	13	26	19	22	18	9	9	9	17	19	7	0	0	12	0	0	0	0	0	0	0	26	13	13	26	0	0	0	0	0	0	0	0	0
189-West	302180.48	5041018.29	0	0	0	5	0	8	9	12	19	26	26	26	22	14	5	0	5	15	0	0	0	12	0	0	0	17	20	0	9	0	0	0	0	0	0	0	0	0
190-West	302258.71	5040737.43	0	0	0	5	0	8	9	12	20	25	25	25	21	14	5	0	5	14	0	0	0	12	0	0	0	17	19	0	10	0	0	0	0	0	0	0	0	0
191-West	302268.88	5040443.66	0	0	0	5	0	9	10	13	22	24	23	24	21	14	5	0	5	14	0	0	0	12	0	0	0	18	19	0	10	0	0	0	0	0	0	0	0	0
192-West	302318.61	5040161.87	0	4	4	6	0	11	16	14	23	22	22	23	21	13	5	0	5	13	0	0	0	11	0	0	0	18	18	0	11	0	0	0	0	0	0	0	0	0
193-West	299759.29	5035184.18	16	17	20	29	19	37	13	13	10	0	0	0	9	8	7	0	0	0	0	0	0	0	0	0	0	12	0	9	37	0	0	0	0	0	0	0	0	0
194-West	299908.58	5034917.18	17	18	21	29	20	34	13	13	10	0	0	0	8	7	6	0	0	0	0	0	0	0	0	0	0	11	0	9	34	0	0	0	0	0	0	0	0	0
195-West	300246.09	5034804.19	17	19	21	23	20	33	14	14	10	0	0	0	8	7	6	0	0	0	0	0	0	0	0	0	0	11	0	10	33	0	0	0	0	0	0	0	0	0
196-West	300382.28	5034593.71	18	20	22	22	21	31	15	14	10	0	0	0	8	6	5	0	0	0	0	0	0	0	0	0	0	10	0	11	30	0	0	0	0	0	0	0	0	0
197-West	300485.46	5034358.47	19	21	22	22	21	29	15	14	10	0	0	0	7	6	5	0	0	0	0	0	0	0	0	0	0	10	0	11	29	0	0	0	0	0	0	0	0	0
198-West	300634.03	5034147.99	19	23	22	21	22	27	15	14	9	0	0	0	7	5	4	0	0	0	0	0	0	0	0	0	0	9	0	12	27	0	0	0	0	0	0	0	0	0
199-West	300833.22	5033960.97	20	24	22	20	23	26	15	14	9	0	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	9	0	13	25	0	0	0	0	0	0	0	0	0
200-West	301523.89	5033954.05	17	24	19	17	17	24	18	16	10	0	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	8	0	15	24	0	0	0	0	0	0	0	0	0
201-West	301932.01	5033535.97	24	25	18	15	21	22	18	15	9	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	17	21	0	0	0	0	0	0	0	0	0
202-West	302091.78	5033335.48	26	26	17	14	21	21	18	15	9	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	18	20	0	0	0	0	0	0	0	0	0
203-West	302295.4	5033163.18	27	30	16	13	22	20	18	15	9	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6	0	19	20	0	0	0	0	0	0	0	0	0
204-West	302514.69	5032981.49	29	29	16	13	22	19	18	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	21	19	0	0	0	0	0	0	0	0	0
205-West	302661.92	5032774.73	31	29	15	12	22	18	17	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	22	18	0	0	0	0	0	0	0	0	0
206-West	300918.6	5036173.68	10	14	14	17	16	36	17	19	15	6	6	6	11	9	6	0	0	0	0	0	0	0	0	0	0	15	0	9	35	0	0	0	0	0	0	0	0	0
207-West	302887.47	5032614.97	33	27	14	11	21	17	17	13	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	23	17	0	0	0	0	0	0	0	0	0
208-West	300947.24	5035867.2	11	15	15	17	17	35	17	18	14	5	5	5	10	9	6	0	0	0	0	0	0	0	0	0	0	14	0	10	34	0	0	0	0	0	0	0	0	0
209-West	303005.46	5032341.85	36	27	14	11	19	17	16	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	24	17	0	0	0	0	0	0	0	0	0
210-West	301190.46	5035676.15	11	16	15	17	17	33	18	19	14	5	5	5	10	8	5	0	0	0	0	0	0	0	0	0	0	13	0	11	32	0	0	0	0	0	0	0	0	0
211-West	301385.36	5035462.24	12	16	16	16	12	30	19	20	14	5	5	5	9	7	5	0	0	0	0	0	0	0	0	0	0	12	0	12	30	0	0	0	0	0	0	0	0	0
212-West	301531.29	5035176.45	13	17	16	16	13	28	20	20	13	4	0	4	9	7	4	0	0	0	0	0	0	0	0	0	0	11	0	13	28	0	0	0	0	0	0	0	0	0
213-West	301643.62	5036941.48	4	7	7	8	4	19	19	19	15	3	3	3	9	5	1	0	0	0	0	0	0	0	0	0	0	12	1	5	18	0	0	0	0	0	0	0	0	0
214-West	301907.22	5036776.72	5	7	7	8	4	18	20	20	20	3	3	3	8	5	0	0	0	0	0	0	0	0	0	0	0	10	0	10	17	0	0	0	0	0	0	0	0	0
215-West	301915.04	5036487.21	6	8	7	9	5	18	21	21	19	2	2	2	7	4	0	0	0	0	0	0	0	0	0	0	0	9	0	11	18	0	0	0	0	0	0	0	0	0
216-West	301980.9	5036203.11	6	9	8	9	5	18	22	25	18	2	2	2	6	3	0	0	0	0	0	0	0	0	0	0	0	9	0	12	18	0	0	0	0	0	0	0	0	0
217-West	302100.25	5035876.9	7	10	8	9	6	17	19	25	17	1	1	1	5	3	0	0	0	0	0	0	0	0	0	0	0	8	0	13	17	0	0	0	0	0	0	0	0	0
218-West	302241.44	5035630.51	8	11	9	9	6	17	20	25	16	1	0	1	5	2	0	0	0	0	0	0	0	0	0	0	0	7	0	13	16	0	0	0	0	0	0	0	0	0
219-West	302420.31	5035428.1	9	11	9	9	7	15	22	25	16	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	6	0	14	15	0	0	0	0	0	0	0	0	0
220-West	302514.46	5035171.55	10	12	9	9	7	15	22	24	15	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	5	0	15	14	0	0	0	0	0	0	0	0	0
221-West	302606.25	5034929.13	11	13	9	8	8	14	22	23	14	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	5	0	16	18	0	0	0	0	0	0	0	0	0
222-West	302698.04	5034689.06	12	13	9	8	8	13	22	22	14	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	17	17	0	0	0	0	0	0	0	0	0
223-West	302778.06	5034432.52	13	14	9	8	9	12	21	21	13	0	0	0	2	-1	0	0	0	0	0	0	0	0	0	0	0	3	0	18	16	0	0	0	0	0	0	0	0	0
224-West	302851.03	5034183.03	14	15	9	8	9	11	20	20	12	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	19	16	0	0	0	0	0	0	0	0	0
225-West	302909.87	5033912.37	20	19	14	12	14	15	23	23	16	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	24	20	0	0	0	0	0	0	0	0	0
226-West	303142.65	5033524.8	22	20	13	11	14	13	21	22	16	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6	0	27	18	0	0	0	0	0	0	0	0	0

GE 1.7-103 Maximum Noise Reduced Operation																																							
			Noise Sensitive Receptor Received Sound Levels (dBA)																																				
Turbine ID	X	Y	1	2	3	5	6	13	14	15	16	22	23	24	67	68	69	76	77	78	79	80	81	82	83	84	85	89	91	93	98	99	100	119	124	125	126	127	174
1-West	291075.67	5055610.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	13	12	15	0	0	0	0	0	0	0	0	0	0	0	0
1-East	322291.58	5061096.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0
2-West	291075.85	5055283.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	13	13	16	0	0	0	0	0	0	0	0	0	0	0	0
2-East	322298.4	5060803.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0
3-West	291220.16	5054938.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	14	13	16	0	0	0	0	0	0	0	0	0	0	0	0
3-East	322294.99	5060503.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0
4-West	291236.93	5054672.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	14	13	17	0	0	0	0	0	0	0	0	0	0	0	0
4-East	320780.96	5061011.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0
5-West	291234.7	5054332.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	11	0	0	14	13	17	0	0	0	0	0	0	0	0	0	0	0	0
5-East	320815.06	5060697.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0
6-West	291219.26	5054020.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	12	4	0	14	14	17	0	0	0	0	4	0	0	0	0	0	0	0
6-East	320821.04	5060339.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0
7-West	291205.82	5053670.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	12	5	0	14	14	17	0	0	0	0	5	4	0	0	0	0	0	0
7-East	320474.77	5059685.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	0	0	0	0	0
8-West	292663.57	5054690.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	12	5	0	16	16	20	0	0	0	0	5	5	0	0	0	0	0	0
8-East	320131.33	5059175.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0
9-West	292787.35	5054428.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0
9-East	320263.58	5058946.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	13	5	0	17	16	21	0	0	0	0	6	5	0	0	0	0	0	0
10-West	292938.25	5054171.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0
10-East	320407.71	5058707.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	13	6	0	18	17	21	0	0	0	0	6	6	0	0	0	0	0	0
11-West	292666.89	5053701.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0
11-East	320468.38	5058344.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	14	6	0	17	17	22	0	0	0	0	7	6	0	0	0	0	0	0
12-West	292976.9	5053611.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0
12-East	320469.41	5058062.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	14	7	0	18	17	23	0	0	0	0	7	9	0	0	0	0	0	0
13-West	293209.19	5053446.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0
13-East	320392.41	5057733.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	15	8	0	19	18	24	0	0	0	0	8	9	0	0	0	0	0	0
14-West	293455.69	5053298.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0
14-East	320150.85	5057337.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	15	8	0	20	19	25	0	0	0	0	8	10	0	0	0	0	0	0
15-West	293728.06	5053153.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0
15-East	320241.43	5057088.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	8	1	-3	13	12	20	0	0	0	0	2	4	0	0	0	0	0	0
16-West	293957.65	5052984.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0
16-East	320153.87	5056752.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	8	2	-3	14	13	22	0	0	0	0	2	4	0	0	0	0	0	0
17-West	294547.12	5056378.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0
17-East	320079.89	5056421.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	17	17	18	0	0	0	0	0	0	0	0	0	0	0	0
18-West	294479.22	5056098.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0
18-East	320016.48	5056095.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	11	0	0	18	17	19	0	0	0	0	4	11	0	0	0	0	0	0
19-West	294423.76	5055817.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0
19-East	320120.65	5055853.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12	4	0	18	17	20	0	0	0	0	5	12	0	0	0	0	0	0
20-West	294432.72	5055525.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0
20-East	320264.08	5055634.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	5	0	19	18	21	0	0	0	0	5	12	0	0	0	0	0	0
21-West	294414.8	5055225.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0
21-East	320334.06	5055373.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	5	0	19	19	22	0	0	0	0	6	12	0	0	0	0	0	0
22-West	294419.28	5054898.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0
22-East	320360.08	5055082.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	-2	0	13	12	15	0	0	0	0	-1	5	0	0	0	0	0	0
23-West	294656.82	5054701.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
23-East	317660.83	5055404.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	-1	0	14	13	16	0	0	0	0	-1	5	0	0	0	0	0	0
24-West	294903.31	5054539.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
24-East	317655.99	5055091.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	0	0	15	14	17	0	0	0	0	0	6	0	0	0	0	0	0
25-West	295005.46	5054269.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
25-East	317774.91	5054853.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	0	0	16	15	19	0	0	0	0	1	6	0	0	0	0	0	0
26-West	295136.37	5054015.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
26-East	317990.44	5054682.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	1	0	17	15	20	0	0	0	0	1	7	0	0	0	0	0	0
27-West	294759.32	5053594.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
27-East	318205.97	5054508.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	2	3	16	15	22	0	0	0	0	2	7	0	0	0	0	0	0
28-West	294916.76	5053356.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
28-East	318938.05	5054486.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	2	3	17	16	25	0	0	0	0	3	8	0	0	0	0	0	0
29-West	294865.41	5053034.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
29-East	318974.9	5054190.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	9	3	3	18	16	27	0	0	0	0	3	8	0	0	0	0	0	0
30-West	294963.02	5052758.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	5	4	5	4	0
30-East	318999.47	5053879.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	11	10	4	4	18	17	31	0	0	0	0	4	9	0	0	0	0	0	3
31-West	293566.43	5052419.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	5	5	5	5	0
31-East	319122.32	5053621.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	12	9	3	-2	12	11	20	0	0	0	0	3	5	0	0	0	0	0	-2
32-West	293562.55	5052134.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	5	5	5	5	0
32-East	319255.22	5053398.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-3	0	12	10	3	-2	12	11	20	0	0	0	0	3	5	0	0	0	0	0	-1
33-West	293768.58	5051940.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	0
33-East	319261.34	5053107.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-3	0	13	11	4	-1	13	12	22	0	0	0	0	4	6	0	0	0	0	0	4
34-West	293948.69	5051624.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	0
34-East	319380.26	5052876.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-2	0	14	12	5	-1	13	12	23	0	0	0	0	5	8	0	0	0	0	0	4
35-West	294296.74	5051481.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	7	7	7	7	0
35-East	319506.6	5052649.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	-2	-3	15	13	6	0	14	13	25	0	0	0	0	6	11	0	0	0	0	0	5
36-West	294483.37	5051258.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	7	7	7	7	0
36-East	319541.82	5052373.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-1	-3	16	14	7	1	15	14	25	0	0	0	0	8	12	0	0	0	0	0	5
37-West	294587.45	5050930.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	8	8	8	0
37-East	319552.48	5052082.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-1	-2	18	15	8	2	14	14	24	0	0	0	0	9	13	0	0	0	0	0	6

38-West	294530.15	5050640.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	9	9	0
38-East	319398.53	5051711.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	-2	20	15	9	2	14	13	22	0	0	0	0	9	14	0	0	0	0	0	7
39-West	294491.95	5050356.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	0
39-East	319365.93	5051400.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	-1	21	16	10	3	13	12	20	0	0	0	0	10	14	0	0	0	0	0	7
40-West	294470.74	5050072.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	0
40-East	319211.37	5051024.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	-1	24	17	10	3	12	12	18	0	0	0	0	11	15	0	0	0	0	0	8
41-West	294576.83	5049809.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	8	8	0
41-East	317470.19	5051765.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	9	8	33	25	19	11	20	19	25	0	0	0	0	19	23	0	0	0	0	0	16
42-West	294674.44	5049541.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	9	9	0
42-East	317585.39	5051512.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	10	8	35	27	20	12	19	19	24	0	0	0	0	20	24	0	0	0	0	0	17
43-West	294767.8	5049270.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	8	10	10	0
43-East	317551.11	5051198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	11	9	38	28	21	13	19	18	23	0	0	0	0	21	24	0	0	0	0	0	17
44-West	295216.28	5048885.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	9	10	10	0
44-East	317591.08	5050923.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	12	10	36	32	24	15	19	18	22	0	12	0	0	24	27	0	0	0	0	0	13
45-West	295433.33	5048695.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	0
45-East	317569.76	5050619.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	11	34	34	26	16	18	18	21	0	12	0	0	26	29	0	0	0	0	0	13
46-West	295611.08	5048332.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12	12	12	0
46-East	317561.77	5050321.23	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	14	14	12	32	36	28	18	18	18	20	0	13	0	0	27	30	0	0	0	0	0	14
47-West	295797.18	5048116.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0
47-East	317548.22	5050018.97	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	15	15	13	30	37	29	19	17	17	19	0	13	0	0	29	31	0	0	0	0	0	15
48-West	295991.74	5047909.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	14	0
48-East	317596.53	5049725.4	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	20	16	14	28	38	35	20	17	17	19	0	14	0	0	34	32	0	0	0	0	0	20
49-West	296215.9	5047736.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	11	12	12	0
49-East	318584.76	5050433.64	0	0	0	0	0	0	0	0	0	0	0	0	4	7	0	20	16	15	27	37	36	27	17	17	18	0	14	0	0	35	32	0	0	0	0	0	20
50-West	296258.2	5047368.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	11	13	13	0
50-East	318649.06	5050169.33	0	0	0	0	0	0	0	0	0	4	4	5	5	8	0	21	18	16	25	33	33	29	16	16	17	0	15	0	0	32	30	0	0	0	0	0	21
51-West	296435.84	5047143.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	14	0
51-East	318721.02	5049905.5	0	0	0	0	0	0	0	0	0	5	5	5	5	8	4	21	19	17	19	32	32	31	15	15	16	0	15	0	0	31	30	0	0	0	0	0	16
52-West	296617.71	5046924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	14	15	0
52-East	318926.54	5049655.81	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	2	-3	14	12	11	11	23	24	26	7	7	8	-3	8	0	0	22	21	0	0	0	0	0	9
53-West	296748.13	5046662.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	15	16	16	0
53-East	318489.17	5049207.29	0	0	0	0	0	0	0	0	0	-2	-2	-2	-1	2	-3	14	14	13	10	21	22	29	6	6	7	-3	8	0	0	21	20	0	0	0	0	0	9
54-West	296715.93	5046308.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	17	18	18	0
54-East	318428.63	5048881.8	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	3	-2	15	16	15	9	19	19	31	6	6	7	-2	8	0	0	18	18	0	0	0	0	0	10
55-West	295371.53	5046848.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	19	19	19	0
55-East	318427.87	5048586.36	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	18	18	9	20	20	14	14	6	6	8	0	5	0	0	14	17	0	0	0	0	0	18
56-West	295361.3	5046554.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	21	20	0
56-East	318493.91	5048322.61	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	-2	19	19	10	18	18	13	14	6	6	8	0	6	0	0	12	16	0	0	0	0	0	19
57-West	295347.79	5046258.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	22	23	22	0
57-East	318452.91	5048004.25	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	-1	21	21	11	17	17	12	14	5	5	7	-3	6	0	0	11	15	0	0	0	0	0	21
58-West	293077.23	5050342.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	29	24	24	0
58-East	318583.15	5047777.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	13	5	22	19	13	8	17	17	22	0	0	0	0	13	12	0	0	0	0	0	10
59-West	293093.58	5050025.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	14	6	23	20	13	8	17	16	22	0	0	0	0	13	12	0	0	0	0	0	10
59-East	318829.15	5047618.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	26	25	0
60-West	293065.77	5049686.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	14	6	25	20	13	9	16	16	21	0	0	0	0	13	13	0	0	0	0	0	11
60-East	319019.69	5047413.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	31	27	27	0
61-West	293070.25	5049376.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	15	7	26	20	14	9	16	16	20	0	0	0	0	14	13	0	0	0	0	0	12
61-East	319105.2	5047159.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	34	35	34	0
62-West	292913.25	5049023.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	15	7	26	20	13	9	15	15	19	0	0	0	0	13	13	0	0	0	0	0	13
62-East	319469.44	5049141.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	15	16	0
63-West	293023.59	5048760.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18	17	18	0
63-East	319451.21	5048834.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	16	7	27	21	14	10	15	15	19	0	0	0	0	14	13	0	0	0	0	0	14
64-West	291861.18	5049240.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	14	5	19	17	10	7	14	13	18	0	0	0	0	10	10	0	0	0	0	0	11
64-East	319566.06	5048591.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	19	19	19	0
65-West	291941.41	5048964.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	14	6	20	18	11	8	14	13	17	0	0	0	0	11	10	0	0	0	0	0	11
65-East	319484.31	5048160.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	22	21	0
66-West	292149.36	5048769.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	15	6	21	18	11	8	14	13	17	0	0	0	0	11	10	0	0	0	0	0	12
66-East	319525.83	5047888.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	22	23	23	0
67-West	292187.28	5048346.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	16	7	21	18	11	9	13	13	17	0	0	0	0	11	11	0	0	0	0	0	14
68-West	292066.08	5047984.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	16	7	20	18	11	9	13	13	16	0	0	0	0	11	10	0	0	0	0	0	14
69-West	295417.46	5050664.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-1	18	18	11	9	17	16	24	0	0	0	0	12	16	0	0	0	0	0	1
70-West	295397.27	5050356.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	20	19	13	9	16	15	22	0	0	0	0	13	17	0	0	0	0	0	1
71-West	295434.09	5050072.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	21	21	14	10	15	14	20	0	0	0	0	14	18	0	0	0	0	0	2
72-West	295540.47	5049800.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1	22	23	16	11	14	14	18	0	3	0	0	16	20	0	0	0	0	0	3
73-West	295637.79	5049533.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	23	25	17	12	13	13	17	0	3	0	0	18	21	0	0	0	0	0	3
74-West	295894.77	5049100.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12	10	30	37	28	21	20	20	22	0	12	0	0	34	32	0	0	0	0	0	12
75-West	296395.35	5050904.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	15	17	12	9	21	20	23	0	0	0	0	17	17	0	0	0	0	0	-1
76-West	296593.36	5050701.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	19	18	9	20	20	21	0	3	0	0	19	19	0	0	0	0	0	0
77-West	296778.43	5050485.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	20	19	10	19	19	19	0	3	0	0	20	20	0	0	0	0	0	0
78-West	296868.5	5050216.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	15	22	21	11	18	18	18	0	4	0	0	22	22	0	0	0	0	0	1
79-West	297297.8	5050206.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	9	21	21	11	18	18	16	0	4	0	0	22	23	0	0	0	0	0	0
80-West	297314.23	5049922.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	7	14	23	23	12	16	17	16	0	5	0	0	24	25	0	0	0	0	0	1
81-West	297526.47	5049733.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	8	13	23	23	13	16	16	15	0	5	0	0	25	26	0	0	0	0	0	1
82-West	297736.13	5049531.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	8	13	23	24	14	15	15	14	0	6	0	0	25	27	0	0	0	0	0	1
83-West	297978.14	5049381.64	0	0	0	0	0	0	0	0	0	0	-3	-3	0	0	0	1	2	8	7	22	23	9	14	14	13	0	6	0	0	25	27	0	0	0	0	0	1
84-West	298476.51	5049061.62	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	8	10	17	13	27	29	17	20	20	19	0	15	0	0	29	31	0	0	0	0	0	8
85-West	298764.15	5048873.75	0	0	0	0	0	0	0	0	0	6	6	6	0	6	0	8	10	17	12	25	27	17	19	19	18	0	16	0	0	28	30	0	0	0	0	0	8

86-West	298973.54	5048679.24	0	0	0	0	0	0	0	0	0	6	6	6	4	6	0	8	10	18	11	24	26	18	18	19	17	0	17	0	0	27	28	0	0	0	0	0	8
87-West	299196.03	5048491.98	0	0	0	0	0	0	0	0	0	7	7	7	9	7	0	7	10	18	11	23	25	18	17	18	16	0	18	0	0	25	27	0	0	0	0	0	8
88-West	299552.62	5048104.64	0	0	0	0	0	0	0	0	0	8	8	8	10	7	0	7	10	18	10	22	23	18	16	17	15	0	19	0	0	24	25	0	0	0	0	0	7
89-West	299773.26	5047695.32	0	0	0	0	0	0	0	0	0	9	9	9	11	8	0	7	10	19	9	21	22	18	15	16	15	0	20	0	0	22	23	0	0	0	0	0	7
90-West	299906.17	5047386.2	0	0	0	0	0	0	0	0	0	10	10	10	11	7	0	7	10	20	9	20	22	19	15	15	14	4	21	0	0	22	22	0	0	0	0	0	7
91-West	299996.47	5047152.06	0	0	0	0	0	0	0	0	0	3	3	4	4	0	0	0	3	12	1	12	14	12	6	7	5	-3	14	0	0	13	14	0	0	0	0	0	0
92-West	300000.29	5046890.04	0	0	0	0	0	0	0	0	0	4	4	4	5	0	0	0	4	13	1	12	13	12	6	6	5	-2	15	0	0	13	14	0	0	0	0	0	0
93-West	300398.89	5048455.08	0	0	0	0	0	0	0	0	0	14	9	8	9	5	0	5	8	17	8	19	20	15	16	16	14	0	18	0	0	21	21	0	0	0	0	0	6
94-West	300483.48	5048184.39	0	0	0	0	0	0	0	0	0	15	9	9	10	5	0	6	8	17	8	19	20	15	15	16	13	0	19	0	0	20	21	0	0	0	0	0	6
95-West	300638.03	5047944.36	0	0	0	0	0	0	0	0	0	15	10	10	10	5	0	6	8	17	7	19	20	15	15	15	13	0	20	0	0	20	21	0	0	0	0	0	6
96-West	300749.93	5047681.08	0	0	0	0	0	0	0	0	0	16	11	11	11	6	0	6	8	18	7	18	19	15	14	15	13	0	21	0	0	19	20	0	0	0	0	0	6
97-West	297593.6	5047844.66	0	0	0	0	0	0	0	0	0	6	6	6	5	8	0	17	14	21	16	33	36	29	17	17	17	0	16	0	0	36	37	0	0	0	0	0	12
98-West	297521.24	5047428.6	0	0	0	0	0	0	0	0	0	6	6	6	6	9	0	18	16	22	16	31	34	33	16	16	16	0	17	0	0	33	33	0	0	0	0	0	13
99-West	297579.15	5047107.73	0	0	0	0	0	0	0	0	0	7	7	7	6	9	0	13	16	23	15	29	31	36	16	16	15	5	17	0	0	30	30	0	0	0	0	0	13
100-West	298766.3	5048057.51	0	0	0	0	0	0	0	0	0	7	7	7	5	8	0	9	11	19	12	25	27	21	17	17	16	0	18	0	0	28	29	0	0	0	0	0	9
101-West	298827.22	5047764.41	0	0	0	0	0	0	0	0	0	8	8	8	6	8	0	9	12	20	12	25	27	22	16	17	16	0	18	0	0	27	28	0	0	0	0	0	9
102-West	298762.07	5047266.59	0	0	0	0	0	0	0	0	0	8	8	9	7	9	0	10	13	22	12	24	26	24	15	16	15	5	19	0	0	26	27	0	0	0	0	0	10
103-West	298821.28	5046987.44	0	0	0	0	0	0	0	0	0	9	9	9	7	10	0	10	14	23	11	23	25	25	15	15	14	5	20	0	0	25	25	0	0	0	0	0	10
104-West	298838.2	5046704.06	0	0	0	0	0	0	0	0	0	9	10	10	8	11	0	10	14	24	11	23	24	26	14	15	14	6	21	0	0	24	24	0	0	0	0	0	10
105-West	298910.1	5046420.69	0	0	0	0	0	0	0	0	0	3	3	3	1	4	0	3	7	17	3	14	16	20	6	6	5	-1	14	0	0	15	16	0	0	0	0	0	3
106-West	299003.15	5046150	0	0	0	0	0	0	0	0	0	3	4	4	2	5	-3	3	8	18	2	13	15	19	5	5	5	-1	15	0	0	14	15	0	0	0	0	0	3
107-West	297131.02	5045410.63	0	0	0	0	0	0	0	0	0	0	0	1	2	6	0	10	18	27	5	14	15	31	4	4	5	0	11	0	0	14	14	0	0	0	0	0	10
108-West	297270.18	5045156.73	0	0	0	0	0	0	0	0	0	1	1	1	3	7	0	9	18	31	5	13	14	28	4	4	4	1	11	0	0	13	8	0	0	0	0	0	9
109-West	298012.46	5045023.55	0	0	0	0	0	0	0	0	0	3	3	3	4	9	0	6	13	31	3	12	13	26	3	3	3	1	14	0	0	12	8	0	0	0	0	0	7
110-West	298197.68	5044824.81	0	0	0	0	0	0	0	0	0	3	3	4	5	10	0	6	13	31	2	11	12	24	3	3	3	2	14	0	0	12	7	0	0	0	0	0	6
111-West	298313.85	5044581.18	0	0	0	0	0	0	0	0	-3	4	4	4	6	11	0	5	12	31	1	10	11	22	0	3	0	3	15	0	0	11	6	0	0	0	0	0	6
112-West	298319.07	5044220.95	0	0	0	0	0	0	0	0	-3	4	4	5	7	12	1	5	12	31	1	9	10	19	0	0	0	4	15	0	0	10	5	0	0	0	0	0	5
113-West	298275.48	5043940.4	0	0	0	0	0	0	0	0	-2	4	4	5	7	15	2	5	12	30	0	9	10	18	0	0	0	4	15	0	0	9	4	0	0	0	0	0	5
114-West	298260.13	5043656.46	0	0	0	0	0	-3	0	0	-2	4	4	5	8	17	2	5	12	28	0	8	9	17	0	0	0	5	14	0	-3	9	3	0	0	0	0	0	5
115-West	298306.17	5043372.53	0	0	0	0	0	-3	0	0	-2	5	5	5	9	18	3	5	11	26	-1	7	8	15	0	0	0	6	14	0	-3	8	2	0	0	0	0	0	5
116-West	298409.77	5043107.77	0	0	0	0	0	-2	0	0	-1	5	5	5	10	19	3	4	10	23	-1	7	8	14	0	0	0	7	14	0	-2	7	2	0	0	0	0	0	4
117-West	298567.09	5042869.88	0	0	0	0	0	-2	0	0	0	5	5	6	12	21	3	3	10	21	-2	6	7	14	0	0	0	8	14	0	-2	7	1	0	0	0	0	0	4
118-West	298578.6	5042585.94	0	0	0	0	0	7	0	5	8	13	13	13	20	30	11	10	17	27	5	14	14	20	0	0	0	16	21	0	7	14	8	0	0	0	0	0	11
119-West	298593.11	5042299.29	0	0	0	0	0	0	0	-3	1	5	5	6	14	25	4	3	13	18	-3	5	6	12	0	0	0	10	13	0	0	6	0	0	0	0	0	0	3
120-West	294657.18	5043126.96	0	0	0	0	0	0	0	0	0	0	0	0	1	5	12	21	21	10	7	2	1	6	0	0	0	6	5	0	0	1	1	0	0	0	0	0	21
121-West	294776.12	5042866.04	0	0	0	0	0	0	0	0	0	0	0	-3	1	6	13	19	20	10	7	2	1	5	0	0	0	7	5	0	0	1	0	0	0	0	0	0	19
122-West	294902.75	5042608.96	0	0	0	0	0	0	0	0	0	-3	-3	-3	2	7	14	17	19	9	6	1	0	5	0	0	0	8	5	0	0	0	0	0	0	0	0	0	18
123-West	295044.71	5042355.72	0	0	0	0	0	0	0	0	0	-3	-3	-3	2	8	15	16	18	9	6	5	0	5	0	0	0	8	5	0	0	0	-1	0	0	0	0	0	16
124-West	295259.59	5042167.71	0	0	0	0	0	-3	0	0	0	-3	-3	-3	3	9	16	15	17	9	5	5	0	4	0	0	0	9	5	0	-3	5	-1	0	0	0	0	0	15
125-West	295754.56	5041841.56	0	0	0	0	0	-2	0	0	0	-2	-2	-2	4	11	12	13	16	10	4	5	-1	4	0	0	0	10	6	0	-2	5	-1	0	0	0	0	0	13
126-West	295903.74	5041592.92	0	0	0	-3	0	-1	0	0	0	-2	-2	-1	5	12	13	12	15	9	4	4	-1	4	0	0	0	11	1	0	-1	4	-2	0	0	0	0	0	12
127-West	296041.88	5041344.28	0	0	0	-3	0	-1	0	0	-3	-2	-2	-1	5	13	14	11	14	9	3	4	-2	3	0	0	0	12	1	0	-1	4	-2	0	0	0	0	0	11
128-West	296642.96	5041385.1	0	0	0	-2	0	0	0	0	-2	0	0	0	7	17	12	10	14	10	3	4	4	9	0	0	0	13	7	0	0	4	-2	0	0	0	0	0	10
129-West	296691.35	5040979.21	0	0	0	-2	0	1	0	0	-2	0	0	0	8	18	13	9	12	13	3	4	4	8	0	0	0	14	7	0	1	3	-3	0	0	0	0	0	9
130-West	296749.11	5040697.82	0	0	0	7	0	9	0	4	6	7	7	7	15	25	21	17	19	20	0	11	12	15	0	0	0	22	15	0	9	11	4	0	0	0	0	0	17
131-West	296814.8	5040412	0	0	4	7	0	9	0	5	6	7	7	7	15	25	21	16	18	19	0	0	11	15	0	0	0	23	14	0	10	0	0	0	0	0	0	0	16
132-West	296885.42	5040111.52	0	0	5	8	0	10	0	5	6	7	7	7	15	24	21	15	18	18	0	0	0	14	0	0	0	23	14	0	10	0	0	0	0	0	0	0	16
133-West	296979.1	5039814.12	0	0	6	9	0	11	0	5	6	7	7	7	15	28	21	15	17	18	0	0	0	14	0	0	0	24	14	0	11	0	0	0	0	0	0	0	15
134-West	296968.42	5039502.02	0	0	6	9	0	12	4	6	6	6	6	7	15	22	21	14	16	17	0	0	0	13	0	0	0	23	13	0	12	0	0	0	0	0	0	0	14
135-West	296779.04	5043157.65	0	0	0	0	0	-3	0	0	0	1	1	1	6	12	6	14	22	24	6	8	8	15	0	0	0	4	9	0	-3	8	2	0	0	0	0	0	9
136-West	296951.71	5042931.27	0	0	0	0	0	-3	0	0	-3	1	1	1	7	13	6	13	20	23	6	7	8	14	0	0	0	5	10	0	-3	7	1	0	0	0	0	0	8
137-West	297155.07	5042720.23	0	0	0	0	0	-2	0	0	-3	1	1	2	8	15	6	7	18	22	-1	7	7	13	0	0	0	6	10	0	-2	7	1	0	0	0	0	0	7
138-West	297345.08	5042503.67	0	0	0	0	0	-2	0	0	-2	2	2	2	9	20	6	6	17	21	-1	6	6	12	0	0	0	7	10	0	-2	6	0	0	0	0	0	0	6
139-West	297439.01	5042210.06	0	0	0	0	0	-1	0	0	-2	2	2	2	10	24	7	5	16	19	4	6	6	12	0	0	0	8	10	0	-1	6	0	0	0	0	0	0	5
140-West	297482.85	5041906.49	0	0	0	-3	0	0	0	0	-1	2	2	2	10	26	8	5	15	17	4	5	5	11	0	0	0	9	10	0	0	5	-1	0	0	0	0	0	5
141-West	297607.87	5041613.87	0	0	0	-2	0	0	0	-3	-1	2	2	2	11	29	8	4	13	16	3	5	5	10	0	0	0	15	10	0	1	4	-2	0	0	0	0	0	4
142-West	297419.2	5041238.69	0	0	0	-2	0	1	0	-3	-1	1	1	2	10	29	9	8	12	14	3	4	4	9	0	0	0	16	9	0	1	4	-2	0	0	0	0	0	4
143-West	297506.08	5040951.99	0	0	0	6	0	9	0	5	7	9	9	9	17	37	17	16	19	21	0	12	12	16	0	0	0	24	16	0	9	12	5	0	0	0	0	0	10
144-West	298119.39	5040206.07	0	0	5	8	0	12	5	7	8	9	9	10	19	37	16	14	17	18	0	0	0	14	0	0	0	30	16	0	12	0	0	0	0	0	0	0	8
145-West	298237.7	5039947.86	0	0	6	9	0	12	6	7	8	9	9	9	20	34	15	13	16	18	0	0	0	14	0	0	0	32	16	0	13	0	0	0	0	0	0	0	7
146-West	298340.4	5039681.17	0	4	6	9	0	13	6	8	8	9	9	9	20	32	15	13	16	17	0	0	0	13	0	0	0	33	15	0	14	0	0	0	0	0	0	0	7
147-West	298555.89	5039487.78	0	5	7	10	0	14	7	9	9	9	9	9	20	30	14	13	15	16	0	0	0	13	0	0	0	35	15	0	14	0	0	0	0	0	0	0	6
148-West	298754.8	5039277.82	0	5	7	10	0	15	7	9	9	9	9	9	20	28	14	12	15	16	0	0	0	13	0	0	0	37	15	0	15	0	0	0	0	0	0	0	6
149-West	298122.04	5038860.55	0	6	8	11	4	16	7	8	9	7	7	8	17	26	16	12	14	15	0	0	0	12	0	0	0	29	14	0	16	0	0	0	0	0	0	0	12
150-West	298280.41	5038611.51	0	6	9	12	5	17	7	9	9	7	7	8	17	25	15	12	14	15	0	0	0	12	0	0	0	25	13	0	17	0	0	0	0	0	0	0	12
151-West	298439.85	5038355.1	0	7	9	13	12	18	8	9	10	7	7	7	17	24	14	11	13	14	0	0	0	11	0	0	0	25	13	0	18	0	0	0	0	0	0	0	11
152-West	298655.34	5038167.24	0	7	16	14	12	24	8	10	10	7	7	7	17	23	13	0	13	14	0	0	0	0	0	0	0	25	13	0	24	0	0	0	0	0	0	0	0
153-West	298832.15	5037940.7	4	8	16	14	13	25	9	11	11	7	7	7	16	22	13	0	12	13	0	0	0	0	0	0	0	24	13	0	26	0	0	0	0	0	0	0	0
154-West	299065.85	5037771.44	5	8	16	15	13	27	10	11	11	7	7	7	16	21	12	0	12	13	0	0	0	0	0	0	0	23	13	4	27	0	0	0	0	0	0	0	0
155-West	295146	5038690.48	0	0	-2	2	0	2	0	0	0	0	0	0	2	6	30	5	6	0	0	0	0	-3	0	0	0	5	0	0	2	0	0	0	0	0	0	0	6
156-West	295308.18	5038485.06	0	0	-1	2	0	2	0	0	0	0	0	0	2	6	27	5	6	0	0	0	0	-3	0	0	0	5	0	0	3	0	0	0	0	0	0	0	5
157-West	295500.74	5038299.5	0	0	1	5	0	5	0	0	0	0	0	0	4	8	27	7	8	2	0	0	0	0	0	0	0	7	0	0	5	0	0	0	0	0	0	0	7
158-West	295702.5	5038128.78	0	-3	0	4	0	4	0	0	-3	0	0	0	2	7	23	4	5	-1	0	0	0	0	0	0	0	6	0	0	4	0	0	0	0	0	0	0	4
159-West	296428.59	5036953.04	0	7	16	21	13	20	5	6	5	0	0	0	9	12	17	0	12	12	0	0	0	0	0	0	0	13	0	0	20	0	0	0	0	0	0	0	0
160-West	296965.62	5037460.84	0	7	16	20	12	16	6	7	7	0	0	4	11	19	17	11	12	13	0	0	0	0	0	0	0	16	0	0	21	0	0	0	0	0	0	0	11
161-West	297610.55	5037515.77	0	8	17	16	13	23	7	8	8	5	5	5	13	20	16	0	12	13	0	0	0	0	0	0	0	18	11	0	23	0	0	0	0	0	0	0	0
162-West	297576.13	5037196.2	0	8	17	22	13	23	7	8	8	4	4	5	12	19	15	0	12	12	0	0	0	0	0	0	0	17	0	0	24	0	0	0	0	0	0	0	0

163-West	298258.88	5037435.27	11	8	17	16	13	25	8	10	9	6	6	6	14	21	14	0	12	13	0	0	0	0	0	0	0	20	12	0	26	0	0	0	0	0	0	0	0
164-West	298286.33	5037092.1	12	9	18	18	14	27	8	10	9	5	5	5	13	20	13	0	11	12	0	0	0	0	0	0	0	18	11	0	27	0	0	0	0	0	0	0	0
165-West	298930.42	5041632.97	0	0	0	5	0	9	4	6	9	13	13	13	25	37	11	8	18	22	0	12	13	18	0	0	0	21	20	0	9	13	6	0	0	0	0	0	9
166-West	299160.43	5041098.27	0	0	0	6	0	10	5	7	11	13	13	13	27	37	12	7	17	20	0	11	12	16	0	0	0	25	19	0	10	12	5	0	0	0	0	0	7
167-West	299325.89	5040835.17	0	0	4	7	0	11	6	8	11	13	13	13	30	35	11	7	16	19	0	0	11	16	0	0	0	27	19	0	11	0	0	0	0	0	0	0	7
168-West	299392.94	5040388.13	0	0	5	8	0	12	7	9	12	12	12	13	31	33	11	6	15	18	0	0	0	15	0	0	0	37	18	0	12	0	0	0	0	0	0	0	6
169-West	299655.42	5038603.74	4	7	9	12	12	24	10	12	13	9	9	10	21	23	11	0	12	14	0	0	0	11	0	0	0	36	14	0	24	0	0	0	0	0	0	0	0
170-West	299788.03	5038349.57	5	8	9	12	12	25	11	13	14	9	9	9	19	22	10	0	12	13	0	0	0	0	0	0	0	33	14	4	25	0	0	0	0	0	0	0	0
171-West	299975.73	5038137.25	5	8	10	13	13	26	11	14	15	9	9	9	18	21	10	0	12	13	0	0	0	0	0	0	0	31	14	5	26	0	0	0	0	0	0	0	0
172-West	299868.5	5037797.71	6	9	11	14	13	28	12	14	13	8	8	8	17	20	10	0	11	13	0	0	0	0	0	0	0	24	7	5	28	0	0	0	0	0	0	0	0
173-West	299802.19	5037474.01	6	10	12	15	14	31	12	14	13	7	7	8	16	19	10	0	0	6	0	0	0	0	0	0	0	22	6	6	31	0	0	0	0	0	0	0	0
174-West	299077.93	5041375.03	0	0	0	6	0	9	5	7	10	13	13	14	26	38	11	8	18	21	0	12	12	17	0	0	0	23	20	0	9	12	5	0	0	0	0	0	8
175-West	301131.08	5038436.53	5	8	8	10	12	19	19	22	25	17	17	11	19	14	7	0	0	13	0	0	0	0	0	0	0	27	15	12	23	0	0	0	0	0	0	0	0
176-West	300493.98	5041622.03	0	0	0	-3	0	2	-2	1	6	11	11	12	31	14	0	-2	2	11	0	2	3	7	0	0	0	13	15	0	2	3	3	0	0	0	0	0	-2
177-West	300765.02	5041450.72	0	0	0	-3	0	2	-1	2	7	12	12	13	31	13	0	-3	1	10	0	0	3	7	0	0	0	14	15	0	2	0	0	0	0	0	0	0	-3
178-West	301034.96	5040902.23	0	0	0	6	0	10	8	11	16	23	23	19	37	19	7	0	8	17	0	0	0	14	0	0	0	22	21	0	10	0	0	0	0	0	0	0	4
179-West	301000.58	5040572.11	0	0	4	6	0	11	8	11	17	22	22	18	32	19	7	0	13	16	0	0	0	13	0	0	0	24	20	0	11	0	0	0	0	0	0	0	0
180-West	300743.9	5040178.45	0	4	5	7	0	13	9	12	17	20	20	16	37	24	8	0	13	16	0	0	0	13	0	0	0	27	18	0	13	0	0	0	0	0	0	0	0
181-West	300837.99	5039910.92	0	5	6	8	0	13	10	13	18	20	20	15	34	23	8	0	13	15	0	0	0	12	0	0	0	32	18	0	13	0	0	0	0	0	0	0	0
182-West	300668.22	5039531.16	0	6	6	9	0	15	10	13	17	19	19	14	32	23	8	0	13	15	0	0	0	12	0	0	0	34	17	0	15	0	0	0	0	0	0	0	0
183-West	300898.61	5039344.13	0	6	7	9	0	15	11	14	19	18	18	13	25	22	8	0	12	14	0	0	0	12	0	0	0	32	16	0	15	0	0	0	0	0	0	0	0
184-West	301159.66	5039173.75	4	6	7	9	0	16	17	20	20	18	18	13	23	16	7	0	12	14	0	0	0	11	0	0	0	29	16	11	16	0	0	0	0	0	0	0	0
185-West	301400.91	5039021.85	5	6	7	9	11	16	18	21	26	18	18	18	21	20	7	0	11	13	0	0	0	0	0	0	0	28	15	12	16	0	0	0	0	0	0	0	0
186-West	301399.33	5038729.51	5	7	7	9	12	17	19	22	26	18	17	18	20	14	7	0	0	13	0	0	0	0	0	0	0	27	15	12	22	0	0	0	0	0	0	0	0
187-West	301048.54	5038158.4	6	8	9	11	13	25	19	22	24	16	16	10	18	14	7	0	0	12	0	0	0	0	0	0	0	27	14	13	24	0	0	0	0	0	0	0	0
188-West	300892.43	5037898.52	6	9	10	12	13	26	19	22	18	9	9	9	17	19	7	0	0	12	0	0	0	0	0	0	0	26	14	13	26	0	0	0	0	0	0	0	0
189-West	302180.48	5041018.29	0	0	0	5	0	8	9	12	19	26	26	27	22	14	5	0	5	15	0	0	0	12	0	0	0	17	20	0	9	0	0	0	0	0	0	0	0
190-West	302258.71	5040737.43	0	0	0	5	0	8	9	12	20	25	25	25	21	14	5	0	5	14	0	0	0	12	0	0	0	17	20	0	10	0	0	0	0	0	0	0	0
191-West	302268.88	5040443.66	0	0	0	5	0	9	10	13	22	24	23	24	21	14	5	0	5	14	0	0	0	12	0	0	0	18	19	0	10	0	0	0	0	0	0	0	0
192-West	302318.61	5040161.87	0	4	4	6	0	11	16	14	23	23	22	23	21	13	5	0	5	14	0	0	0	11	0	0	0	18	18	0	11	0	0	0	0	0	0	0	0
193-West	299759.29	5035184.18	16	17	20	29	19	37	13	13	10	0	0	0	9	8	7	0	0	0	0	0	0	0	0	0	0	12	0	9	37	0	0	0	0	0	0	0	0
194-West	299908.58	5034917.18	17	18	21	29	20	34	13	13	10	0	0	0	8	7	6	0	0	0	0	0	0	0	0	0	0	11	0	9	34	0	0	0	0	0	0	0	0
195-West	300246.09	5034804.19	18	19	21	23	20	33	14	14	10	0	0	0	8	7	6	0	0	0	0	0	0	0	0	0	0	11	0	10	33	0	0	0	0	0	0	0	0
196-West	300382.28	5034593.71	18	20	22	22	21	31	15	14	10	0	0	0	8	6	5	0	0	0	0	0	0	0	0	0	0	10	0	11	31	0	0	0	0	0	0	0	0
197-West	300485.46	5034358.47	19	21	22	22	22	29	15	14	10	0	0	0	7	6	5	0	0	0	0	0	0	0	0	0	0	10	0	11	29	0	0	0	0	0	0	0	0
198-West	300634.03	5034147.99	20	23	22	21	22	27	15	14	9	0	0	0	7	5	4	0	0	0	0	0	0	0	0	0	0	9	0	12	27	0	0	0	0	0	0	0	0
199-West	300833.22	5033960.97	20	24	22	20	23	26	15	14	9	0	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	9	0	13	26	0	0	0	0	0	0	0	0
200-West	301523.89	5033954.05	17	24	19	17	17	24	18	16	10	0	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	8	0	15	24	0	0	0	0	0	0	0	0
201-West	301932.01	5033535.97	25	25	18	15	21	22	18	15	9	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	17	22	0	0	0	0	0	0	0	0
202-West	302091.78	5033335.48	26	26	17	14	21	21	18	15	9	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	18	21	0	0	0	0	0	0	0	0
203-West	302295.4	5033163.18	28	30	16	13	22	20	18	15	9	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6	0	19	20	0	0	0	0	0	0	0	0
204-West	302514.69	5032981.49	29	29	16	13	22	19	18	14	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	21	19	0	0	0	0	0	0	0	0
205-West	302661.92	5032774.73	31	29	15	12	22	19	17	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	22	18	0	0	0	0	0	0	0	0
206-West	300918.6	5036173.68	10	14	14	17	16	36	17	19	15	6	6	6	11	9	6	0	0	0	0	0	0	0	0	0	0	15	0	9	35	0	0	0	0	0	0	0	0
207-West	302887.47	5032614.97	33	28	14	11	22	18	17	13	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	23	18	0	0	0	0	0	0	0	0
208-West	300947.24	5035867.2	11	15	15	17	17	36	17	18	14	5	5	5	10	9	6	0	0	0	0	0	0	0	0	0	0	14	0	10	35	0	0	0	0	0	0	0	0
209-West	303005.46	5032341.85	36	27	14	11	20	17	16	12	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	24	17	0	0	0	0	0	0	0	0
210-West	301190.46	5035676.15	11	16	15	17	17	33	18	19	14	5	5	5	10	8	5	0	0	0	0	0	0	0	0	0	0	13	0	11	32	0	0	0	0	0	0	0	0
211-West	301385.36	5035462.24	12	16	16	16	12	31	19	20	14	5	5	5	9	7	5	0	0	0	0	0	0	0	0	0	0	12	0	12	30	0	0	0	0	0	0	0	0
212-West	301531.29	5035176.45	13	17	16	16	13	29	20	20	13	4	0	4	9	7	4	0	0	0	0	0	0	0	0	0	0	11	0	13	28	0	0	0	0	0	0	0	0
213-West	301643.62	5036941.48	9	11	11	13	8	23	24	23	19	8	8	8	13	10	5	0	0	0	0	0	0	0	0	0	0	16	5	9	22	0	0	0	0	0	0	0	0
214-West	301907.22	5036776.72	9	12	11	12	8	22	25	24	24	7	7	7	12	9	5	0	0	0	0	0	0	0	0	0	0	15	5	16	21	0	0	0	0	0	0	0	0
215-West	301915.04	5036487.21	10	13	12	13	9	22	26	24	23	7	7	7	11	9	5	0	0	0	0	0	0	0	0	0	0	14	4	16	22	0	0	0	0	0	0	0	0
216-West	301980.9	5036203.11	3	6	5	6	2	15	19	22	15	-1	-1	-1	3	1	-3	0	0	0	0	0	0	0	0	0	0	6	0	9	15	0	0	0	0	0	0	0	0
217-West	302100.25	5035876.9	4	7	6	6	3	14	16	22	14	-2	-2	-2	2	0	0	0	0	0	0	0	0	0	0	0	0	5	0	10	14	0	0	0	0	0	0	0	0
218-West	302241.44	5035630.51	5	8	6	6	3	14	17	22	13	-2	-3	-2	2	-1	0	0	0	0	0	0	0	0	0	0	0	4	0	11	13	0	0	0	0	0	0	0	0
219-West	302420.31	5035428.1	6	8	6	6	4	12	19	22	13	-3	-3	-3	1	-1	0	0	0	0	0	0	0	0	0	0	0	3	0	12	12	0	0	0	0	0	0	0	0
220-West	302514.46	5035171.55	7	9	6	6	4	12	19	21	12	-3	-3	-3	0	-2	0	0	0	0	0	0	0	0	0	0	0	2	0	12	11	0	0	0	0	0	0	0	0
221-West	302606.25	5034929.13	8	10	6	5	5	11	19	20	11	0	0	0	0	-3	0	0	0	0	0	0	0	0	0	0	0	2	0	13	15	0	0	0	0	0	0	0	0
222-West	302698.04	5034689.06	9	10	6	5	5	10	19	19	11	0	0	0	-1	-3	0	0	0	0	0	0	0	0	0	0	0	1	0	14	15	0	0	0	0	0	0	0	0
223-West	302778.06	5034432.52	15	16	11	10	10	14	23	23	15	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	5	0	20	19	0	0	0	0	0	0	0	0
224-West	302851.03	5034183.03	11	12	6	5	6	8	17	17	9	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	13	0	0	0	0	0	0	0	0
225-West	302909.87	5033912.37	20	19	14	12	14	15	23	23	17	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	25	20	0	0	0	0	0	0	0	0
226-West	303142.65	5033524.8	22	20	13	11	14	13	21	22	16	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6	0	27	19	0	0	0	0	0	0	0	0

GE 2.5-120 Minimum Noise Reduced Operation																																		
			Noise Sensitive Receptor Received Sound Levels (dBA)																															
Turbine ID	**X**	**Y**	**1**	**2**	**5**	**13**	**14**	**15**	**16**	**67**	**68**	**69**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**89**	**91**	**98**	**99**	**100**	**119**	**124**	**125**	**126**	**127**	**173**	**174**
1-West	294524.64	5056257.41	0	0	0	0	0	0	0	0	0	0	0	0	0	10	9	0	0	16	15	17	0	0	0	0	0	0	0	0	0	0	0	0
1-East	322281.62	5061046.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0
2-West	294424.4	5055816.38	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	3	0	16	16	18	0	0	0	3	10	0	0	0	0	0	0	0
2-East	322296.06	5060502.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0
3-West	294426.23	5055430.01	0	0	0	0	0	0	0	0	0	0	0	0	0	11	10	3	0	17	16	19	0	0	0	4	10	0	0	0	0	0	0	0
3-East	320780.1	5061020.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0
4-West	294411.98	5054992.94	0	0	0	0	0	0	0	0	0	0	0	0	0	12	11	4	0	18	17	21	0	0	0	4	11	0	0	0	0	0	0	0
4-East	320813.95	5060686.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0
5-West	294618.63	5054710.27	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12	5	0	19	18	22	0	0	0	5	11	0	0	0	0	0	0	0
5-East	320822.1	5060338.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0
6-West	294927.43	5054439.48	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	6	0	21	20	23	0	0	0	6	12	0	0	0	0	0	0	0
6-East	320474.87	5059690.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0
7-West	295058.9	5054077.72	0	0	0	0	0	0	0	0	0	0	0	0	0	14	13	6	0	22	21	26	0	0	0	7	13	0	0	0	0	0	0	0
7-East	320132.39	5059174.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0
8-West	294870.42	5053095.03	0	0	0	0	0	0	0	0	0	0	0	0	0	16	15	9	10	23	22	33	0	0	0	9	14	0	0	0	0	0	0	0
8-East	320300	5058914.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0
9-West	294963.02	5052758.49	0	0	0	0	0	0	0	0	0	0	9	0	0	17	15	9	10	24	22	36	0	0	0	10	15	0	0	0	0	0	0	9
9-East	320467.45	5058655.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0
10-West	291078.67	5055617.22	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	11	10	13	0	0	0	0	0	0	0	0	0	0	0	0
10-East	320489.07	5058319.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0
11-West	291136.93	5055272.29	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	11	11	14	0	0	0	0	0	0	0	0	0	0	0	0
11-East	320486.37	5057966.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0
12-West	291328.04	5054810.84	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	12	11	15	0	0	0	0	0	0	0	0	0	0	0	0
12-East	320153.37	5057350.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0
13-West	291216.17	5054053.4	0	0	0	0	0	0	0	0	0	0	0	0	0	6	9	2	0	12	12	16	0	0	0	2	0	0	0	0	0	0	0	0
13-East	320217.58	5057042.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0
14-West	291205.82	5053670.49	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	3	0	12	12	16	0	0	0	3	3	0	0	0	0	0	0	0
14-East	320224.34	5056694.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0
15-West	292672.78	5054650.03	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	3	0	15	14	18	0	0	0	3	3	0	0	0	0	0	0	0
15-East	320021.58	5056238.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
16-West	292803.29	5054323.75	0	0	0	0	0	0	0	0	0	0	0	0	0	6	11	4	0	15	14	19	0	0	0	4	5	0	0	0	0	0	0	0
16-East	320099.31	5055937.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0
17-West	292931.47	5053988.14	0	0	0	0	0	0	0	0	0	0	0	0	0	7	12	4	0	16	15	20	0	0	0	5	6	0	0	0	0	0	0	0
17-East	320231.1	5055663.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0
18-West	292976.9	5053611.5	0	0	0	0	0	0	0	0	0	0	0	0	0	8	12	5	0	16	16	21	0	0	0	5	7	0	0	0	0	0	0	0
18-East	320325.72	5055363.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0
19-West	293269.41	5053400.84	0	0	0	0	0	0	0	0	0	0	0	0	0	10	13	6	0	17	16	23	0	0	0	6	8	0	0	0	0	0	0	0
19-East	320387.73	5055042.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0
20-West	293574.71	5053195.75	0	0	0	0	0	0	0	0	0	0	0	0	0	16	13	7	0	18	17	25	0	0	0	7	9	0	0	0	0	0	0	0
20-East	317644.28	5055239.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0
21-West	293870.7	5052988.32	0	0	0	0	0	0	0	0	0	0	0	0	0	16	14	8	3	20	18	27	0	0	0	8	10	0	0	0	0	0	0	0
21-East	317735.34	5054932.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
22-West	293568.96	5052219.58	0	0	0	0	0	0	0	0	0	0	10	0	0	18	15	9	4	18	17	26	0	0	0	9	11	0	0	0	0	0	10	4
22-East	317947.69	5054709.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
23-West	293757.94	5051946.24	0	0	0	0	0	0	0	0	0	0	10	3	0	19	16	10	4	19	18	28	0	0	0	10	15	0	0	0	0	0	10	10
23-East	318197.86	5054496.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
24-West	294095.39	5051514.29	0	0	0	0	0	0	0	0	0	0	11	4	2	21	18	11	5	20	19	29	0	0	0	12	17	0	0	0	0	0	11	11
24-East	318959.86	5054415.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0
25-West	294507.09	5051240.95	0	0	0	0	0	0	0	0	0	0	12	4	3	22	19	13	6	21	20	31	0	0	0	13	18	0	0	0	0	0	12	12
25-East	318946.39	5054041.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	2	2	2	0	0
26-West	294547.59	5050734.76	0	0	0	0	0	0	0	0	0	0	13	6	4	25	21	15	8	20	19	28	0	0	0	15	19	0	0	0	0	0	12	13
26-East	319068.35	5053745.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	3	3	3	0	0
27-West	294496.97	5050316.32	0	0	0	0	0	0	0	0	0	0	13	6	5	28	22	16	8	19	18	26	0	0	0	16	20	0	0	0	0	0	13	13
27-East	319213.86	5053467.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	3	3	3	0	0
28-West	294544.21	5049948.49	0	0	0	0	0	0	0	0	0	0	14	7	6	30	23	17	9	18	18	24	0	0	0	17	21	0	0	0	0	0	14	14
28-East	319259.79	5053126.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	0	0
29-West	294648.82	5049611.03	0	0	0	0	0	0	0	0	0	0	15	8	6	33	25	18	10	18	17	22	0	0	0	18	22	0	0	0	0	0	15	15
29-East	319400.15	5052854.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	5	5	4	0	0
30-West	294767.8	5049270.05	0	0	0	0	0	0	0	0	0	0	16	9	7	36	27	19	11	17	17	21	0	0	0	19	23	0	0	0	0	0	16	16
30-East	319501.86	5052497.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	5	5	5	0	0
31-West	295182.01	5048942.87	0	0	0	0	0	0	0	0	0	0	17	10	8	35	30	22	13	17	17	20	0	10	0	22	26	0	0	0	0	0	11	11
31-East	319534.19	5052137.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	6	6	6	0	0
32-West	295433.33	5048695.12	0	0	0	0	0	0	0	0	0	0	12	11	9	33	33	25	15	17	16	19	0	10	0	25	28	0	0	0	0	0	11	12
32-East	319399.6	5051710.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7	0	0
33-West	295741.38	5048220.85	0	0	0	0	0	0	0	0	4	0	13	13	11	30	36	28	17	16	16	18	0	11	0	32	30	0	0	0	0	0	18	13
33-East	319341.59	5051328.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	0	0
34-West	295939.49	5047953.4	0	0	0	0	0	0	0	0	5	0	19	14	12	28	36	34	19	15	15	17	0	12	0	33	30	0	0	0	0	0	18	19

34-East	317546.92	5051559.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	7	7	0	0
35-West	296266.7	5047757.5	0	0	0	0	0	0	0	2	5	0	19	15	13	25	37	36	26	15	15	16	0	12	0	34	32	0	0	0	0	0	13	19
35-East	317568.71	5051120.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	8	8	0	0
36-West	296258.2	5047368.1	0	0	0	0	0	0	0	3	6	0	20	17	15	24	32	32	28	14	14	15	0	13	0	31	29	0	0	0	0	0	14	20
36-East	317577.47	5050654.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	9	9	9	0	0
37-West	296484.59	5047056.48	0	0	0	0	0	0	0	4	7	3	20	18	16	17	30	30	30	13	13	14	0	13	0	29	28	0	0	0	0	0	15	15
37-East	317553.77	5050169.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	0	0
38-West	296693.81	5046732.52	0	0	0	0	0	0	0	4	8	3	20	20	18	16	27	28	34	13	13	13	3	14	0	27	26	0	0	0	0	0	15	15
38-East	317592.5	5049701.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	12	12	0	0
39-West	296715.93	5046308.59	0	0	0	0	0	0	0	3	7	2	18	21	19	13	22	23	34	10	10	11	2	12	0	22	22	0	0	0	0	0	14	14
39-East	318585.83	5050432.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	9	11	11	0	0
40-West	295384.48	5046810.14	0	0	0	0	0	0	0	1	4	1	21	21	13	23	23	18	18	10	10	12	0	9	0	22	21	0	0	0	0	0	21	21
40-East	318691.87	5050099.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	10	12	12	0	0
41-West	295384.48	5046428.81	0	0	0	0	0	0	0	1	4	2	23	24	14	21	21	17	18	10	10	11	0	10	0	20	19	0	0	0	0	0	23	23
41-East	318858.23	5049782.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0
42-West	291874.92	5049219.58	0	0	0	0	0	0	0	0	0	0	9	12	3	18	15	9	5	12	11	16	0	0	0	9	8	0	0	0	0	0	9	9
42-East	318435.16	5048984.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	15	16	16	0	0
43-West	292149.36	5048769.28	0	0	0	0	0	0	0	0	0	0	11	13	4	20	16	10	6	12	11	15	0	0	0	10	9	0	0	0	0	0	10	11
43-East	318436.35	5048620.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	17	17	17	0	0
44-West	292198.88	5048406.31	0	0	0	0	0	0	0	0	0	0	12	14	5	20	16	10	7	11	11	15	0	0	0	10	9	0	0	0	0	0	12	12
44-East	318468.61	5048268.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	19	20	19	0	0
45-West	292066.08	5047984.93	0	0	0	0	0	0	0	0	0	0	18	14	5	19	16	9	7	11	10	14	0	0	0	9	8	0	0	0	0	0	13	13
45-East	318471.54	5047912.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	22	22	21	0	0
46-West	296487.97	5050852.87	0	0	0	0	0	0	0	0	0	0	3	3	3	18	22	21	13	25	24	26	0	0	0	21	21	0	0	0	0	0	3	3
46-East	318709.19	5047694.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28	24	23	0	0
47-West	296693.81	5050586.28	0	0	0	0	0	0	0	0	0	0	6	6	6	20	25	24	16	25	25	26	0	9	0	25	25	0	0	0	0	0	5	5
47-East	318995.61	5047461.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	30	26	25	0	0
48-West	296865.92	5050299.44	0	0	0	0	0	0	0	0	0	0	6	6	6	20	27	26	17	24	24	24	0	10	0	27	27	0	0	0	0	0	6	6
48-East	319114.88	5047165.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	32	33	32	0	0
49-West	297284.37	5050134.09	0	0	0	0	0	0	0	0	0	0	6	7	13	19	27	27	18	23	24	22	0	11	0	28	29	0	0	0	0	0	6	6
49-East	319475.9	5048844.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	16	16	0	0
50-West	297419.35	5049823.63	0	0	0	0	0	0	0	0	0	0	6	7	14	20	29	29	19	22	22	21	0	11	0	30	32	0	0	0	0	0	6	6
50-East	319571.71	5048538.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18	18	18	0	0
51-West	297679.19	5049587.41	0	0	0	0	0	0	0	0	0	0	6	8	14	19	29	30	19	21	21	20	0	12	0	31	33	0	0	0	0	0	6	6
52-West	297978.14	5049381.64	0	0	0	0	0	0	0	0	0	0	6	8	15	18	28	29	15	20	20	19	0	12	0	31	33	0	0	0	0	0	6	6
53-West	298347.36	5049074.47	0	0	0	0	0	0	0	0	0	0	6	8	15	12	26	28	16	18	19	17	0	13	0	29	31	0	0	0	0	0	6	6
54-West	298701.69	5048899	0	0	0	0	0	0	0	0	4	0	6	8	15	11	24	26	16	17	18	16	0	14	0	27	29	0	0	0	0	0	6	6
55-West	298973.54	5048679.24	0	0	0	0	0	0	0	3	5	0	6	8	16	10	23	25	16	16	17	15	0	15	0	25	27	0	0	0	0	0	6	6
56-West	299211.25	5048436.68	0	0	0	0	0	0	0	7	5	0	6	8	16	9	22	24	17	16	16	15	0	16	0	24	25	0	0	0	0	0	6	6
57-West	300398.89	5048455.08	0	0	0	0	0	0	0	8	3	0	4	6	15	6	18	19	13	14	15	12	0	17	0	19	20	0	0	0	0	0	4	4
58-West	300527.33	5048112.72	0	0	0	0	0	0	0	8	3	0	4	6	15	6	17	18	13	13	14	11	0	18	0	18	19	0	0	0	0	0	4	4
59-West	300689.31	5047788.76	0	0	0	0	0	0	0	9	4	0	4	7	16	5	17	18	14	13	13	11	0	19	0	18	18	0	0	0	0	0	4	4
60-West	298798.64	5047758.37	0	0	0	0	0	0	0	4	7	0	7	10	19	10	23	26	21	15	15	14	0	17	0	25	27	0	0	0	0	0	7	7
61-West	298762.07	5047266.59	0	0	0	0	0	0	0	5	8	0	8	12	20	10	23	25	23	14	14	13	3	18	0	24	25	0	0	0	0	0	8	8
62-West	298833.29	5046904.62	0	0	0	0	0	0	0	6	9	0	8	12	21	9	22	23	24	13	13	12	3	19	0	23	24	0	0	0	0	0	8	8
63-West	298900.79	5046499.67	0	0	0	0	0	0	0	7	10	0	9	13	23	9	20	22	25	12	12	11	4	20	0	21	22	0	0	0	0	0	9	9
64-West	299003.15	5046150	0	0	0	0	0	0	0	8	11	2	9	13	24	8	19	21	25	11	12	11	5	21	0	20	21	0	0	0	0	0	9	9
65-West	297593.6	5047844.66	0	0	0	0	0	0	0	3	6	0	16	13	19	14	31	35	28	15	16	15	0	15	0	35	36	0	0	0	0	0	10	10
66-West	297523.96	5047444.55	0	0	0	0	0	0	0	4	7	0	16	14	20	14	30	33	31	14	15	14	0	15	0	32	32	0	0	0	0	0	11	11
67-West	297577.95	5047093.6	0	0	0	0	0	0	0	5	8	0	17	15	22	13	27	30	35	14	14	14	3	16	0	29	29	0	0	0	0	0	11	11
68-West	297108.89	5045443.43	0	0	0	0	0	0	0	5	10	3	14	21	30	9	18	19	34	8	8	9	4	14	0	18	18	0	0	0	0	0	14	14
69-West	297277.62	5045156.59	0	0	0	0	0	0	0	6	12	4	13	21	34	8	17	18	31	8	8	8	4	15	0	17	17	0	0	0	0	0	13	13
70-West	298040.27	5045004.74	0	0	0	0	0	0	0	10	15	5	12	19	36	8	18	19	32	10	10	10	7	20	0	18	18	0	0	0	0	0	12	12
71-West	298313.61	5044593.04	0	0	0	0	0	0	3	11	17	6	11	18	36	7	16	17	28	0	9	0	8	21	0	17	11	0	0	0	0	0	11	11
72-West	298316.98	5044093.6	0	0	0	0	0	0	3	13	21	7	11	18	36	6	15	16	25	0	0	0	10	21	0	16	10	0	0	0	0	0	11	11
73-West	298269.74	5043698.78	0	0	0	2	0	0	4	14	22	8	11	18	34	6	14	15	23	0	0	0	11	20	3	15	9	0	0	0	0	0	11	11
74-West	298306.86	5043337.7	0	0	0	3	0	0	4	15	24	8	10	17	31	5	14	14	21	0	0	0	12	20	3	14	8	0	0	0	0	0	11	10
75-West	298462.09	5043040.74	0	0	0	4	0	0	5	17	26	9	10	16	29	4	13	13	20	0	0	0	13	20	4	13	7	0	0	0	0	0	10	10
76-West	298543.08	5042706.65	0	0	0	4	0	2	6	18	28	9	9	16	26	4	12	13	19	0	0	0	14	20	4	13	6	0	0	0	0	0	9	9
77-West	298549.83	5042335.45	0	0	0	5	0	3	6	19	31	10	8	19	24	3	12	12	18	0	0	0	16	19	5	12	5	0	0	0	0	0	9	9
78-West	294657.18	5043126.96	0	0	0	0	0	0	0	3	8	15	23	24	12	10	5	4	8	0	0	0	9	8	0	4	3	0	0	0	0	0	24	24
79-West	294793.93	5042804.52	0	0	0	0	0	0	0	5	10	17	22	24	13	11	6	5	9	0	0	0	11	9	0	4	4	0	0	0	0	0	23	23
80-West	294949.16	5042507.55	0	0	0	0	0	0	0	6	11	18	21	22	13	10	10	4	9	0	0	0	12	9	0	4	3	0	0	0	0	0	21	21
81-West	295128.01	5042224.09	0	0	0	0	0	0	0	6	12	19	19	21	13	9	9	3	8	0	0	0	12	9	1	9	3	0	0	0	0	0	20	19
82-West	295772.56	5041805.64	0	0	0	2	0	0	0	8	15	16	17	20	13	8	9	3	8	0	0	0	14	10	2	9	2	0	0	0	0	0	17	17
83-West	295954.78	5041431.07	0	0	3	5	0	0	2	11	19	19	18	20	14	10	10	4	9	0	0	0	17	6	5	10	4	0	0	0	0	0	18	18
84-West	296642.96	5041385.1	0	0	3	6	0	0	3	13	23	17	16	20	20	9	10	11	15	0	0	0	19	14	6	10	4	0	0	0	0	0	11	16
85-West	296831.08	5040309.81	0	0	6	8	0	3	4	14	28	20	14	16	17	0	0	0	13	0	0	0	22	12	8	0	0	0	0	0	0	0	14	14
86-West	296944.86	5039907.2	0	0	7	9	0	3	4	14	27	20	13	15	16	0	0	0	12	0	0	0	22	12	9	0	0	0	0	0	0	0	13	13
87-West	296779.04	5043157.65	0	0	0	-1	0	0	0	8	14	8	17	24	26	9	11	11	17	0	0	0	7	12	-1	11	5	0	0	0	0	0	12	12

88-West	296980.65	5042888.88	0	0	0	1	0	0	1	11	17	10	17	23	26	10	11	11	18	0	0	0	9	14	1	11	5	0	0	0	0	0	12	12
89-West	297223.62	5042642.54	0	0	0	2	0	0	1	12	22	10	11	21	25	9	11	11	17	0	0	0	11	14	2	11	5	0	0	0	0	0	11	11
90-West	297409.22	5042355.7	0	0	0	2	0	0	2	13	26	10	9	20	23	9	10	10	16	0	0	0	12	14	3	10	4	0	0	0	0	0	10	10
91-West	297483.46	5042014.87	0	0	1	3	0	0	3	14	29	11	9	19	21	8	9	10	15	0	0	0	13	14	3	9	3	0	0	0	0	0	9	9
92-West	297571.2	5041674.04	0	0	3	6	0	3	5	16	34	14	15	20	22	10	11	11	16	0	0	0	21	16	6	11	4	0	0	0	0	0	10	10
93-West	297388.98	5041242.09	0	0	4	7	0	3	5	16	35	15	15	18	20	9	10	11	15	0	0	0	22	15	7	10	3	0	0	0	0	0	9	9
94-West	297496.96	5040918.13	0	0	5	8	0	3	5	16	36	16	14	17	19	0	10	10	14	0	0	0	23	14	8	10	3	0	0	0	0	0	9	8
95-West	298119.39	5040206.07	0	0	6	10	3	5	6	18	36	14	12	15	17	0	0	0	12	0	0	0	29	14	10	0	0	0	0	0	0	0	6	6
96-West	298256.65	5039886.3	0	0	7	11	4	6	6	18	33	14	12	14	16	0	0	0	12	0	0	0	31	14	11	0	0	0	0	0	0	0	5	5
97-West	298472.79	5039581.16	0	3	8	12	5	7	7	19	30	13	11	14	15	0	0	0	11	0	0	0	33	13	12	0	0	0	0	0	0	0	5	5
98-West	298929	5041668.22	0	0	3	7	2	4	8	24	36	10	7	17	21	0	10	11	16	0	0	0	20	19	7	11	4	0	0	0	0	0	7	7
99-West	299164.77	5041084.84	0	0	4	8	4	6	9	27	36	10	6	15	19	0	9	10	14	0	0	0	24	18	9	10	3	0	0	0	0	0	6	6
100-West	299354.38	5040832.02	0	0	5	9	4	6	10	29	34	10	5	14	18	0	0	9	14	0	0	0	26	17	9	0	0	0	0	0	0	0	5	5
101-West	299413.42	5040389.59	0	0	6	11	5	7	11	30	31	10	4	14	17	0	0	0	13	0	0	0	36	16	11	0	0	0	0	0	0	0	4	4
102-West	300771.48	5041440.77	0	0	3	8	5	7	13	37	18	6	3	7	16	0	0	9	13	0	0	0	19	21	8	0	0	0	0	0	0	0	3	3
103-West	300493.98	5041622.03	0	0	3	7	4	7	11	36	20	6	4	8	17	0	9	9	14	0	0	0	19	21	7	9	9	0	0	0	0	0	4	4
104-West	301051.73	5040830.36	0	0	4	9	6	9	15	36	17	5	0	6	15	0	0	0	12	0	0	0	21	19	9	0	0	0	0	0	0	0	2	0
105-West	300893.72	5040358.41	0	0	5	10	7	10	16	31	22	6	0	11	14	0	0	0	11	0	0	0	24	17	10	0	0	0	0	0	0	0	0	0
106-West	300818.04	5039967.53	0	3	6	12	8	11	16	34	22	6	0	11	14	0	0	0	11	0	0	0	31	16	12	0	0	0	0	0	0	0	0	0
107-West	300669.99	5039533.81	0	4	7	13	8	12	16	30	22	7	0	11	13	0	0	0	10	0	0	0	33	15	13	0	0	0	0	0	0	0	0	0
108-West	300958.2	5039311.93	0	4	7	14	9	13	18	23	20	6	0	10	12	0	0	0	10	0	0	0	30	15	14	0	0	0	0	0	0	0	0	0
109-West	301223.6	5039116.34	2	5	7	14	16	19	24	21	19	5	0	10	12	0	0	0	9	0	0	0	28	14	14	0	0	0	0	0	0	0	0	0
110-West	301383.53	5038849.24	3	5	8	15	17	20	25	19	13	5	0	9	11	0	0	0	0	0	0	0	26	13	20	0	0	0	0	0	0	0	0	0
111-West	301113.09	5038398.32	4	6	9	22	17	20	23	18	12	5	0	0	11	0	0	0	0	0	0	0	26	13	22	0	0	0	0	0	0	0	0	0
112-West	300927.31	5037957.18	4	7	10	25	18	21	17	16	17	6	0	0	10	0	0	0	0	0	0	0	25	12	24	0	0	0	0	0	0	0	0	0
113-West	302270.07	5040672.35	0	0	3	7	8	11	19	20	12	3	0	3	12	0	0	0	10	0	0	0	16	18	8	0	0	0	0	0	0	0	0	0
114-West	302344.92	5040223.27	0	0	4	9	15	13	22	19	12	3	0	3	12	0	0	0	9	0	0	0	16	16	9	0	0	0	0	0	0	0	0	0
115-West	302189.17	5039720.29	0	3	5	11	16	19	23	19	12	3	0	3	11	0	0	0	9	0	0	0	17	15	11	0	0	0	0	0	0	0	0	0
116-West	299766.31	5038409.6	3	6	11	23	9	11	12	18	21	9	0	10	12	0	0	0	0	0	0	0	32	12	23	0	0	0	0	0	0	0	0	0
117-West	299975.73	5038137.25	3	6	11	25	10	12	13	17	19	8	0	10	11	0	0	0	0	0	0	0	30	12	25	0	0	0	0	0	0	0	0	0
118-West	299858.8	5037692.22	4	7	13	28	10	12	12	15	18	8	0	9	10	0	0	0	0	0	0	0	22	5	28	0	0	0	0	0	0	0	0	0
119-West	298205.46	5037465.41	9	7	15	24	6	8	8	12	19	12	0	10	11	0	0	0	0	0	0	0	18	10	24	0	0	0	0	0	0	0	0	0
120-West	298294.72	5037073.17	10	8	16	26	7	8	8	11	18	11	0	9	10	0	0	0	0	0	0	0	17	9	26	0	0	0	0	0	0	0	0	0
121-West	296944.21	5037397.43	0	5	19	19	4	5	5	10	18	16	0	10	11	0	0	0	0	0	0	0	14	0	20	0	0	0	0	0	0	0	9	9
122-West	295702.5	5038128.78	0	1	9	8	0	1	1	7	11	27	9	10	4	0	0	0	0	0	0	0	11	0	9	0	0	0	0	0	0	0	10	9
123-West	295434.94	5038357.71	0	0	8	8	0	0	0	7	11	30	10	11	4	0	0	0	0	0	0	0	10	0	8	0	0	0	0	0	0	0	10	10
124-West	295182.28	5038599.1	0	0	6	6	0	0	0	6	10	32	9	10	4	0	0	0	0	0	0	0	9	0	6	0	0	0	0	0	0	0	10	9
125-West	301864.13	5036781	8	10	11	21	23	23	23	10	7	3	0	0	0	0	0	0	0	0	0	0	13	3	20	0	0	0	0	0	0	0	0	0
126-West	301922.76	5036433.54	7	9	10	19	22	26	19	8	5	1	0	0	0	0	0	0	0	0	0	0	10	0	18	0	0	0	0	0	0	0	0	0
127-West	302013.97	5036101.28	8	10	10	19	23	26	18	7	4	0	0	0	0	0	0	0	0	0	0	0	9	0	23	0	0	0	0	0	0	0	0	0
128-West	302137.75	5035786.39	9	11	10	18	25	26	18	6	3	0	0	0	0	0	0	0	0	0	0	0	8	0	22	0	0	0	0	0	0	0	0	0
129-West	302328.86	5035508.41	10	12	10	17	22	26	17	5	3	0	0	0	0	0	0	0	0	0	0	0	7	0	16	0	0	0	0	0	0	0	0	0
130-West	302493.91	5035210.9	11	13	9	16	23	25	16	4	2	0	0	0	0	0	0	0	0	0	0	0	6	0	15	0	0	0	0	0	0	0	0	0
131-West	302619.86	5034900.35	12	14	9	14	23	24	15	3	1	0	0	0	0	0	0	0	0	0	0	0	5	0	19	0	0	0	0	0	0	0	0	0
132-West	302734.96	5034581.11	13	14	9	13	22	22	14	3	1	0	0	0	0	0	0	0	0	0	0	0	5	0	18	0	0	0	0	0	0	0	0	0
133-West	302834.86	5034253.19	17	17	11	14	23	23	16	4	0	0	0	0	0	0	0	0	0	0	0	0	6	0	19	0	0	0	0	0	0	0	0	0
134-West	302909.87	5033912.37	18	18	10	13	22	22	15	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	18	0	0	0	0	0	0	0	0	0
135-West	303142.65	5033524.8	21	18	9	12	20	20	14	3	0	0	0	0	0	0	0	0	0	0	0	0	4	0	17	0	0	0	0	0	0	0	0	0
136-West	300918.6	5036173.68	8	12	15	35	16	17	13	10	8	4	0	0	0	0	0	0	0	0	0	0	13	0	34	0	0	0	0	0	0	0	0	0
137-West	300986.77	5035795.07	9	14	16	34	16	17	12	9	7	4	0	0	0	0	0	0	0	0	0	0	12	0	33	0	0	0	0	0	0	0	0	0
138-West	301295.15	5035549.67	10	15	15	30	18	18	12	8	6	3	0	0	0	0	0	0	0	0	0	0	11	0	30	0	0	0	0	0	0	0	0	0
139-West	301531.29	5035176.45	12	16	15	28	19	18	12	7	5	2	0	0	0	0	0	0	0	0	0	0	9	0	27	0	0	0	0	0	0	0	0	0
140-West	299851	5035026.3	15	16	28	34	12	12	8	7	6	5	0	0	0	0	0	0	0	0	0	0	10	0	34	0	0	0	0	0	0	0	0	0
141-West	300165.89	5034822.17	16	17	27	32	13	12	9	6	5	4	0	0	0	0	0	0	0	0	0	0	10	0	32	0	0	0	0	0	0	0	0	0
142-West	300391.74	5034552.88	17	19	21	29	13	13	8	6	5	3	0	0	0	0	0	0	0	0	0	0	9	0	29	0	0	0	0	0	0	0	0	0
143-West	300543.76	5034229.31	18	21	20	27	13	12	8	5	4	3	0	0	0	0	0	0	0	0	0	0	8	0	27	0	0	0	0	0	0	0	0	0
144-West	300817.39	5033968.71	19	23	19	25	14	13	8	4	3	0	0	0	0	0	0	0	0	0	0	0	7	0	25	0	0	0	0	0	0	0	0	0
145-West	301523.89	5033954.05	16	23	15	22	16	14	8	4	3	0	0	0	0	0	0	0	0	0	0	0	6	0	22	0	0	0	0	0	0	0	0	0
146-West	302018.31	5033408.42	24	24	13	20	16	13	7	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	19	0	0	0	0	0	0	0	0	0
147-West	302295.4	5033163.18	26	29	12	18	16	13	7	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	18	0	0	0	0	0	0	0	0	0
148-West	302559.06	5032902.42	29	28	11	17	16	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	17	0	0	0	0	0	0	0	0	0
149-West	302806.63	5032654.85	31	27	10	16	15	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	0	0	0	0	0	0	0	0	0
150-West	302982.53	5032363.85	35	26	9	16	15	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	15	0	0	0	0	0	0	0	0	0

GE 2.5-120 Maximum Noise Reduced Operation																																
			Noise Sensitive Receptor Received Sound Levels (dBA)																													
Turbine ID	**X**	**Y**	**1**	**2**	**5**	**13**	**14**	**15**	**16**	**67**	**68**	**69**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**89**	**91**	**98**	**99**	**100**	**119**	**124**	**125**	**126**	**127**
1-West	294524.64	5056257.41	0	0	0	0	0	0	0	0	0	0	0	0	0	10	9	0	0	16	15	17	0	0	0	0	0	0	0	0	0	0
1-East	322281.62	5061046.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0
2-West	294424.4	5055816.38	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	3	0	16	16	18	0	0	0	3	10	0	0	0	0	0
2-East	322296.06	5060502.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0
3-West	294426.23	5055430.01	0	0	0	0	0	0	0	0	0	0	0	0	0	11	10	3	0	17	16	19	0	0	0	4	10	0	0	0	0	0
3-East	320780.1	5061020.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0
4-West	294411.98	5054992.94	0	0	0	0	0	0	0	0	0	0	0	0	0	12	11	4	0	18	17	21	0	0	0	4	11	0	0	0	0	0
4-East	320813.95	5060686.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0
5-West	294618.63	5054710.27	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12	5	0	19	18	22	0	0	0	5	11	0	0	0	0	0
5-East	320822.1	5060338.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0
6-West	294927.43	5054439.48	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	6	0	21	20	23	0	0	0	6	12	0	0	0	0	0
6-East	320474.87	5059690.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0
7-West	295058.9	5054077.72	0	0	0	0	0	0	0	0	0	0	0	0	0	14	13	6	0	22	21	26	0	0	0	7	13	0	0	0	0	0
7-East	320132.39	5059174.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0
8-West	294870.42	5053095.03	0	0	0	0	0	0	0	0	0	0	0	0	0	16	15	9	10	23	22	33	0	0	0	9	14	0	0	0	0	0
8-East	320300	5058914.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0
9-West	294963.02	5052758.49	0	0	0	0	0	0	0	0	0	0	9	0	0	17	16	10	10	24	23	36	0	0	0	10	15	0	0	0	0	0
9-East	320467.45	5058655.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0
10-West	291078.67	5055617.22	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	11	10	13	0	0	0	0	0	0	0	0	0	0
10-East	320489.07	5058319.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0
11-West	291136.93	5055272.29	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	11	11	14	0	0	0	0	0	0	0	0	0	0
11-East	320486.37	5057966.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0
12-West	291328.04	5054810.84	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	12	11	15	0	0	0	0	0	0	0	0	0	0
12-East	320153.37	5057350.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0
13-West	291216.17	5054053.4	0	0	0	0	0	0	0	0	0	0	0	0	0	6	9	2	0	12	12	16	0	0	0	2	0	0	0	0	0	0
13-East	320217.58	5057042.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0
14-West	291205.82	5053670.49	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	3	0	12	12	16	0	0	0	3	3	0	0	0	0	0
14-East	320224.34	5056694.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0
15-West	292672.78	5054650.03	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	3	0	15	14	18	0	0	0	3	3	0	0	0	0	0
15-East	320021.58	5056238.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0
16-West	292803.29	5054323.75	0	0	0	0	0	0	0	0	0	0	0	0	0	6	11	4	0	15	14	19	0	0	0	4	5	0	0	0	0	0
16-East	320099.31	5055937.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0
17-West	292931.47	5053988.14	0	0	0	0	0	0	0	0	0	0	0	0	0	7	12	4	0	16	15	20	0	0	0	5	6	0	0	0	0	0
17-East	320231.1	5055663.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0
18-West	292976.9	5053611.5	0	0	0	0	0	0	0	0	0	0	0	0	0	8	12	5	0	16	16	21	0	0	0	5	7	0	0	0	0	0
18-East	320325.72	5055363.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0
19-West	293269.41	5053400.84	0	0	0	0	0	0	0	0	0	0	0	0	0	10	13	6	0	17	16	23	0	0	0	6	8	0	0	0	0	0
19-East	320387.73	5055042.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0
20-West	293574.71	5053195.75	0	0	0	0	0	0	0	0	0	0	0	0	0	16	13	7	0	18	17	25	0	0	0	7	9	0	0	0	0	0
20-East	317644.28	5055239.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
21-West	293870.7	5052988.32	0	0	0	0	0	0	0	0	0	0	0	0	0	16	14	8	3	20	18	27	0	0	0	8	10	0	0	0	0	0
21-East	317735.34	5054932.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
22-West	293568.96	5052219.58	0	0	0	0	0	0	0	0	0	0	10	0	0	18	15	9	4	18	17	26	0	0	0	9	11	0	0	0	0	0
22-East	317947.69	5054709.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
23-West	293757.94	5051946.24	0	0	0	0	0	0	0	0	0	0	10	3	0	19	16	10	4	19	18	28	0	0	0	10	15	0	0	0	0	0
23-East	318197.86	5054496.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
24-West	294095.39	5051514.29	0	0	0	0	0	0	0	0	0	0	11	4	2	21	18	11	5	20	19	29	0	0	0	12	17	0	0	0	0	0
24-East	318959.86	5054415.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
25-West	294507.09	5051240.95	0	0	0	0	0	0	0	0	0	0	12	4	3	22	19	13	6	21	20	31	0	0	0	13	18	0	0	0	0	0
25-East	318946.39	5054041.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	2	2	2
26-West	294547.59	5050734.76	0	0	0	0	0	0	0	0	0	0	13	6	4	25	21	15	8	20	19	28	0	0	0	15	19	0	0	0	0	0
26-East	319068.35	5053745.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	3	3	3
27-West	294496.97	5050316.32	0	0	0	0	0	0	0	0	0	0	13	6	5	28	22	16	8	19	18	26	0	0	0	16	20	0	0	0	0	0
27-East	319213.86	5053467.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	3	3	3
28-West	294544.21	5049948.49	0	0	0	0	0	0	0	0	0	0	14	7	6	30	23	17	9	18	18	24	0	0	0	17	21	0	0	0	0	0
28-East	319259.79	5053126.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4
29-West	294648.82	5049611.03	0	0	0	0	0	0	0	0	0	0	15	8	6	33	25	18	10	18	17	22	0	0	0	18	22	0	0	0	0	0
29-East	319400.15	5052854.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	5	5	4
30-West	294767.8	5049270.05	0	0	0	0	0	0	0	0	0	0	16	9	7	36	27	19	11	17	17	21	0	0	0	19	23	0	0	0	0	0
30-East	319501.86	5052497.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	5	5	5
31-West	295182.01	5048942.87	0	0	0	0	0	0	0	0	0	0	17	10	8	35	30	22	13	17	17	20	0	10	0	22	26	0	0	0	0	0
31-East	319534.19	5052137.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	6	6	6
32-West	295433.33	5048695.12	0	0	0	0	0	0	0	0	0	0	12	11	9	33	33	25	15	17	16	19	0	10	0	25	28	0	0	0	0	0

32-East	319399.6	5051710.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7
33-West	295741.38	5048220.85	0	0	0	0	0	0	0	0	4	0	13	13	11	30	36	28	17	16	16	18	0	11	0	32	30	0	0	0	0	0
33-East	319341.59	5051328.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8
34-West	295939.49	5047953.4	0	0	0	0	0	0	0	0	5	0	19	14	12	28	36	34	19	15	15	17	0	12	0	33	30	0	0	0	0	0
34-East	317546.92	5051559.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	7	7
35-West	296266.7	5047757.5	0	0	0	0	0	0	0	2	5	0	19	15	13	25	37	36	26	15	15	16	0	12	0	34	32	0	0	0	0	0
35-East	317568.71	5051120.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	8	8
36-West	296258.2	5047368.1	0	0	0	0	0	0	0	3	6	0	20	17	15	24	32	32	28	14	14	15	0	13	0	31	29	0	0	0	0	0
36-East	317577.47	5050654.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	9	9	9
37-West	296484.59	5047056.48	0	0	0	0	0	0	0	4	7	3	20	18	16	17	30	30	30	13	13	14	0	13	0	29	28	0	0	0	0	0
37-East	317553.77	5050169.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11
38-West	296693.81	5046732.52	0	0	0	0	0	0	0	4	8	3	20	20	18	16	27	28	34	13	13	13	3	14	0	27	26	0	0	0	0	0
38-East	317592.5	5049701.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	12	12
39-West	296715.93	5046308.59	0	0	0	0	0	0	0	5	9	4	21	23	21	15	25	25	36	12	12	13	4	15	0	24	24	0	0	0	0	0
39-East	318585.83	5050432.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	9	11	11
40-West	295384.48	5046810.14	0	0	0	0	0	0	0	3	5	3	24	24	15	25	25	20	20	13	12	14	0	12	0	24	23	0	0	0	0	0
40-East	318691.87	5050099.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	10	12	12
41-West	295384.48	5046428.81	0	0	0	0	0	0	0	-2	1	-1	20	20	11	18	18	13	15	7	7	8	0	7	0	17	16	0	0	0	0	0
41-East	318858.23	5049782.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13
42-West	291874.92	5049219.58	0	0	0	0	0	0	0	0	0	0	9	12	3	18	15	9	5	12	11	16	0	0	0	9	8	0	0	0	0	0
42-East	318435.16	5048984.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	15	16	16
43-West	292149.36	5048769.28	0	0	0	0	0	0	0	0	0	0	11	13	4	20	16	10	6	12	11	15	0	0	0	10	9	0	0	0	0	0
43-East	318436.35	5048620.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	17	17	17
44-West	292198.88	5048406.31	0	0	0	0	0	0	0	0	0	0	12	14	5	20	16	10	7	11	11	15	0	0	0	10	9	0	0	0	0	0
44-East	318468.61	5048268.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	19	20	19
45-West	292066.08	5047984.93	0	0	0	0	0	0	0	0	0	0	18	14	5	19	16	9	7	11	10	14	0	0	0	9	8	0	0	0	0	0
45-East	318471.54	5047912.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	22	22	21
46-West	296487.97	5050852.87	0	0	0	0	0	0	0	0	0	0	0	1	0	15	18	18	10	21	21	23	0	0	0	18	18	0	0	0	0	0
46-East	318709.19	5047694.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28	24	23
47-West	296693.81	5050586.28	0	0	0	0	0	0	0	0	0	0	6	6	6	20	25	24	16	26	25	26	0	10	0	25	26	0	0	0	0	0
47-East	318995.61	5047461.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	30	26	25
48-West	296865.92	5050299.44	0	0	0	0	0	0	0	0	0	0	6	7	6	20	27	26	17	24	24	24	0	10	0	27	28	0	0	0	0	0
48-East	319114.88	5047165.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	32	33	32
49-West	297284.37	5050134.09	0	0	0	0	0	0	0	0	0	0	6	7	13	19	27	27	18	23	24	22	0	11	0	28	29	0	0	0	0	0
49-East	319475.9	5048844.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	16	16
50-West	297419.35	5049823.63	0	0	0	0	0	0	0	0	0	0	6	7	14	20	29	29	19	22	22	21	0	11	0	30	32	0	0	0	0	0
50-East	319571.71	5048538.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18	18	18
51-West	297679.19	5049587.41	0	0	0	0	0	0	0	0	0	0	6	8	14	19	29	30	19	21	21	20	0	12	0	31	33	0	0	0	0	0
52-West	297978.14	5049381.64	0	0	0	0	0	0	0	0	0	0	6	8	15	18	28	29	15	20	20	19	0	12	0	31	33	0	0	0	0	0
53-West	298347.36	5049074.47	0	0	0	0	0	0	0	0	0	0	6	8	15	12	26	28	16	18	19	17	0	13	0	29	31	0	0	0	0	0
54-West	298701.69	5048899	0	0	0	0	0	0	0	0	4	0	6	8	15	11	24	26	16	17	18	16	0	14	0	27	29	0	0	0	0	0
55-West	298973.54	5048679.24	0	0	0	0	0	0	0	3	5	0	6	8	16	10	23	25	16	16	17	15	0	15	0	25	27	0	0	0	0	0
56-West	299211.25	5048436.68	0	0	0	0	0	0	0	7	5	0	6	8	16	9	22	24	17	16	16	15	0	16	0	24	25	0	0	0	0	0
57-West	300398.89	5048455.08	0	0	0	0	0	0	0	8	3	0	4	6	15	6	18	19	13	14	15	12	0	17	0	19	20	0	0	0	0	0
58-West	300527.33	5048112.72	0	0	0	0	0	0	0	8	3	0	4	6	15	6	17	18	13	13	14	11	0	18	0	18	19	0	0	0	0	0
59-West	300689.31	5047788.76	0	0	0	0	0	0	0	9	4	0	4	7	16	5	17	18	14	13	13	11	0	19	0	18	18	0	0	0	0	0
60-West	298798.64	5047758.37	0	0	0	0	0	0	0	4	7	0	7	10	19	10	23	26	21	15	15	14	0	17	0	25	27	0	0	0	0	0
61-West	298762.07	5047266.59	0	0	0	0	0	0	0	5	8	0	8	12	20	10	23	25	23	14	14	13	3	18	0	24	25	0	0	0	0	0
62-West	298833.29	5046904.62	0	0	0	0	0	0	0	6	9	0	8	12	21	9	22	23	24	13	13	12	3	19	0	23	24	0	0	0	0	0
63-West	298900.79	5046499.67	0	0	0	0	0	0	0	7	10	0	9	13	23	9	20	22	25	12	12	11	4	20	0	21	22	0	0	0	0	0
64-West	299003.15	5046150	0	0	0	0	0	0	0	8	11	2	9	13	24	8	19	21	25	11	12	11	5	21	0	20	21	0	0	0	0	0
65-West	297593.6	5047844.66	0	0	0	0	0	0	0	3	6	0	16	13	19	14	31	35	28	15	16	15	0	15	0	35	36	0	0	0	0	0
66-West	297523.96	5047444.55	0	0	0	0	0	0	0	4	7	0	16	14	20	14	30	33	31	14	15	14	0	15	0	32	32	0	0	0	0	0
67-West	297577.95	5047093.6	0	0	0	0	0	0	0	5	8	0	17	15	22	13	27	30	35	14	14	14	3	16	0	29	29	0	0	0	0	0
68-West	297108.89	5045443.43	0	0	0	0	0	0	0	7	12	5	15	23	33	11	20	21	36	10	10	11	5	16	0	20	20	0	0	0	0	0
69-West	297277.62	5045156.59	0	0	0	0	0	0	0	8	13	6	15	23	36	10	19	20	34	10	10	10	6	17	0	19	19	0	0	0	0	0
70-West	298040.27	5045004.74	0	0	0	0	0	0	0	10	15	5	12	19	36	8	18	19	32	10	10	10	7	20	0	18	18	0	0	0	0	0
71-West	298313.61	5044593.04	0	0	0	0	0	0	3	11	17	6	11	18	36	7	16	17	28	0	9	0	8	21	0	17	11	0	0	0	0	0
72-West	298316.98	5044093.6	0	0	0	0	0	0	3	13	21	7	11	18	36	6	15	16	25	0	0	0	10	21	0	16	10	0	0	0	0	0
73-West	298269.74	5043698.78	0	0	0	2	0	0	4	14	22	8	11	18	34	6	14	15	23	0	0	0	11	20	3	15	9	0	0	0	0	0
74-West	298306.86	5043337.7	0	0	0	3	0	0	4	15	24	8	10	17	31	5	14	14	21	0	0	0	12	20	3	14	8	0	0	0	0	0
75-West	298462.09	5043040.74	0	0	0	4	0	0	5	17	26	9	10	16	29	4	13	13	20	0	0	0	13	20	4	13	7	0	0	0	0	0
76-West	298543.08	5042706.65	0	0	0	4	0	2	6	18	28	9	9	16	26	4	12	13	19	0	0	0	14	20	4	13	6	0	0	0	0	0
77-West	298549.83	5042335.45	0	0	0	5	0	3	6	19	31	10	8	19	24	3	12	12	18	0	0	0	16	19	5	12	5	0	0	0	0	0
78-West	294657.18	5043126.96	0	0	0	0	0	0	0	1	6	13	21	22	10	8	3	2	6	0	0	0	7	6	0	2	1	0	0	0	0	0
79-West	294793.93	5042804.52	0	0	0	0	0	0	0	2	7	14	19	21	10	8	3	2	6	0	0	0	8	6	0	1	1	0	0	0	0	0

80-West	294949.16	5042507.55	0	0	0	0	0	0	0	3	8	15	18	19	10	7	7	1	6	0	0	0	9	6	0	1	0	0	0	0	0	0
81-West	295128.01	5042224.09	0	0	0	-3	0	0	0	3	9	16	16	18	10	6	6	1	5	0	0	0	10	6	-2	6	0	0	0	0	0	0
82-West	295772.56	5041805.64	0	0	0	4	0	0	0	10	17	18	19	22	15	11	11	5	10	0	0	0	16	12	4	11	4	0	0	0	0	0
83-West	295954.78	5041431.07	0	0	3	5	0	0	2	11	19	19	18	20	14	10	10	4	9	0	0	0	17	6	5	10	4	0	0	0	0	0
84-West	296642.96	5041385.1	0	0	3	6	0	0	3	13	23	17	16	20	20	9	10	11	15	0	0	0	19	14	6	10	4	0	0	0	0	0
85-West	296831.08	5040309.81	0	0	6	8	0	3	4	14	28	20	14	16	17	0	0	0	13	0	0	0	22	12	8	0	0	0	0	0	0	0
86-West	296944.86	5039907.2	0	0	7	9	0	3	4	14	27	20	13	15	16	0	0	0	12	0	0	0	22	12	9	0	0	0	0	0	0	0
87-West	296779.04	5043157.65	0	0	0	-2	0	0	0	6	12	6	15	22	24	7	9	9	15	0	0	0	5	10	-2	9	3	0	0	0	0	0
88-West	296980.65	5042888.88	0	0	0	-2	0	0	-2	8	14	7	14	20	23	7	8	9	14	0	0	0	6	11	-2	8	2	0	0	0	0	0
89-West	297223.62	5042642.54	0	0	0	-1	0	0	-2	9	19	7	7	18	22	6	8	8	14	0	0	0	7	11	-1	8	2	0	0	0	0	0
90-West	297409.22	5042355.7	0	0	0	4	0	0	4	15	29	12	11	22	26	11	12	12	18	0	0	0	14	16	5	12	6	0	0	0	0	0
91-West	297483.46	5042014.87	0	0	3	5	0	0	4	16	31	13	11	21	24	10	12	12	17	0	0	0	15	16	5	11	5	0	0	0	0	0
92-West	297571.2	5041674.04	0	0	3	6	0	3	5	16	34	14	15	20	22	10	11	11	16	0	0	0	21	16	6	11	4	0	0	0	0	0
93-West	297388.98	5041242.09	0	0	4	7	0	3	5	16	35	15	15	18	20	9	10	11	15	0	0	0	22	15	7	10	3	0	0	0	0	0
94-West	297496.96	5040918.13	0	0	5	8	0	3	5	16	36	16	14	17	19	0	10	10	14	0	0	0	23	14	8	10	3	0	0	0	0	0
95-West	298119.39	5040206.07	0	0	6	10	3	5	6	18	36	14	12	15	17	0	0	0	12	0	0	0	29	14	10	0	0	0	0	0	0	0
96-West	298256.65	5039886.3	0	0	7	11	4	6	6	18	33	14	12	14	16	0	0	0	12	0	0	0	31	14	11	0	0	0	0	0	0	0
97-West	298472.79	5039581.16	0	3	8	12	5	7	7	19	30	13	11	14	15	0	0	0	11	0	0	0	33	13	12	0	0	0	0	0	0	0
98-West	298929	5041668.22	0	0	3	7	2	4	8	24	36	10	7	17	21	0	10	11	16	0	0	0	20	19	7	11	4	0	0	0	0	0
99-West	299164.77	5041084.84	0	0	4	8	4	6	9	27	36	10	6	15	19	0	9	10	14	0	0	0	24	18	9	10	3	0	0	0	0	0
100-West	299354.38	5040832.02	0	0	5	9	4	6	10	29	34	10	5	14	18	0	0	9	14	0	0	0	26	17	9	0	0	0	0	0	0	0
101-West	299413.42	5040389.59	0	0	6	11	5	7	11	30	31	10	4	14	17	0	0	0	13	0	0	0	36	16	11	0	0	0	0	0	0	0
102-West	300771.48	5041440.77	0	0	3	8	5	7	13	37	18	6	3	7	16	0	0	9	13	0	0	0	19	21	8	0	0	0	0	0	0	0
103-West	300493.98	5041622.03	0	0	3	7	4	7	11	36	20	6	4	8	17	0	9	9	14	0	0	0	19	21	7	9	9	0	0	0	0	0
104-West	301051.73	5040830.36	0	0	4	9	6	9	15	36	17	5	0	6	15	0	0	0	12	0	0	0	21	19	9	0	0	0	0	0	0	0
105-West	300893.72	5040358.41	0	0	5	10	7	10	16	31	22	6	0	11	14	0	0	0	11	0	0	0	24	17	10	0	0	0	0	0	0	0
106-West	300818.04	5039967.53	0	3	6	12	8	11	16	34	22	6	0	11	14	0	0	0	11	0	0	0	31	16	12	0	0	0	0	0	0	0
107-West	300669.99	5039533.81	0	4	7	13	8	12	16	30	22	7	0	11	13	0	0	0	10	0	0	0	33	15	13	0	0	0	0	0	0	0
108-West	300958.2	5039311.93	0	4	7	14	9	13	18	23	20	6	0	10	12	0	0	0	10	0	0	0	30	15	14	0	0	0	0	0	0	0
109-West	301223.6	5039116.34	2	5	7	14	16	19	24	21	19	5	0	10	12	0	0	0	9	0	0	0	28	14	14	0	0	0	0	0	0	0
110-West	301383.53	5038849.24	3	5	8	15	17	20	25	19	13	5	0	9	11	0	0	0	0	0	0	0	26	13	20	0	0	0	0	0	0	0
111-West	301113.09	5038398.32	4	6	9	22	17	20	23	18	12	5	0	0	11	0	0	0	0	0	0	0	26	13	22	0	0	0	0	0	0	0
112-West	300927.31	5037957.18	4	7	10	25	18	21	17	16	17	6	0	0	10	0	0	0	0	0	0	0	25	12	24	0	0	0	0	0	0	0
113-West	302270.07	5040672.35	0	0	3	7	8	11	19	20	12	3	0	3	12	0	0	0	10	0	0	0	16	18	8	0	0	0	0	0	0	0
114-West	302344.92	5040223.27	0	0	4	9	15	13	22	19	12	3	0	3	12	0	0	0	9	0	0	0	16	16	9	0	0	0	0	0	0	0
115-West	302189.17	5039720.29	0	3	5	11	16	19	23	19	12	3	0	3	11	0	0	0	9	0	0	0	17	15	11	0	0	0	0	0	0	0
116-West	299766.31	5038409.6	3	6	11	23	9	11	12	18	21	9	0	10	12	0	0	0	0	0	0	0	32	12	23	0	0	0	0	0	0	0
117-West	299975.73	5038137.25	3	6	11	25	10	12	13	17	19	8	0	10	11	0	0	0	0	0	0	0	30	12	25	0	0	0	0	0	0	0
118-West	299858.8	5037692.22	4	7	13	28	10	12	12	15	18	8	0	9	10	0	0	0	0	0	0	0	22	5	28	0	0	0	0	0	0	0
119-West	298205.46	5037465.41	9	7	15	24	6	8	8	12	19	12	0	10	11	0	0	0	0	0	0	0	18	10	24	0	0	0	0	0	0	0
120-West	298294.72	5037073.17	10	8	16	26	7	8	8	11	18	11	0	9	10	0	0	0	0	0	0	0	17	9	26	0	0	0	0	0	0	0
121-West	296944.21	5037397.43	0	5	19	19	4	5	5	10	18	16	0	10	11	0	0	0	0	0	0	0	14	0	20	0	0	0	0	0	0	0
122-West	295702.5	5038128.78	0	2	10	9	0	2	3	8	12	29	11	12	5	0	0	0	0	0	0	0	12	0	10	0	0	0	0	0	0	0
123-West	295434.94	5038357.71	0	0	9	9	0	0	0	8	12	31	11	12	6	0	0	0	0	0	0	0	11	0	9	0	0	0	0	0	0	0
124-West	295182.28	5038599.1	0	0	3	3	0	0	0	3	7	29	6	7	1	0	0	0	-3	0	0	0	5	0	3	0	0	0	0	0	0	0
125-West	301864.13	5036781	8	10	11	21	23	23	23	10	7	3	0	0	0	0	0	0	0	0	0	0	13	3	20	0	0	0	0	0	0	0
126-West	301922.76	5036433.54	4	6	7	16	19	22	16	5	2	-2	0	0	0	0	0	0	0	0	0	0	7	-3	15	0	0	0	0	0	0	0
127-West	302013.97	5036101.28	4	7	7	16	20	23	15	4	1	-3	0	0	0	0	0	0	0	0	0	0	6	0	20	0	0	0	0	0	0	0
128-West	302137.75	5035786.39	7	10	9	17	24	25	16	5	2	0	0	0	0	0	0	0	0	0	0	0	7	0	21	0	0	0	0	0	0	0
129-West	302328.86	5035508.41	11	14	12	19	24	28	19	7	5	0	0	0	0	0	0	0	0	0	0	0	9	0	18	0	0	0	0	0	0	0
130-West	302493.91	5035210.9	13	15	11	17	25	27	18	6	4	0	0	0	0	0	0	0	0	0	0	0	8	0	17	0	0	0	0	0	0	0
131-West	302619.86	5034900.35	14	15	11	16	25	26	17	5	3	0	0	0	0	0	0	0	0	0	0	0	7	0	21	0	0	0	0	0	0	0
132-West	302734.96	5034581.11	15	16	11	15	24	24	17	5	3	0	0	0	0	0	0	0	0	0	0	0	7	0	20	0	0	0	0	0	0	0
133-West	302834.86	5034253.19	17	17	11	14	23	23	16	4	0	0	0	0	0	0	0	0	0	0	0	0	6	0	19	0	0	0	0	0	0	0
134-West	302909.87	5033912.37	18	18	10	13	22	22	15	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	18	0	0	0	0	0	0	0
135-West	303142.65	5033524.8	21	18	9	12	20	20	14	3	0	0	0	0	0	0	0	0	0	0	0	0	4	0	17	0	0	0	0	0	0	0
136-West	300918.6	5036173.68	8	12	15	35	16	17	13	10	8	4	0	0	0	0	0	0	0	0	0	0	13	0	34	0	0	0	0	0	0	0
137-West	300986.77	5035795.07	9	14	16	34	16	17	12	9	7	4	0	0	0	0	0	0	0	0	0	0	12	0	33	0	0	0	0	0	0	0
138-West	301295.15	5035549.67	10	15	15	30	18	18	12	8	6	3	0	0	0	0	0	0	0	0	0	0	11	0	30	0	0	0	0	0	0	0
139-West	301531.29	5035176.45	12	16	15	28	19	18	12	7	5	2	0	0	0	0	0	0	0	0	0	0	9	0	27	0	0	0	0	0	0	0
140-West	299851	5035026.3	15	16	28	34	12	12	8	7	6	5	0	0	0	0	0	0	0	0	0	0	10	0	34	0	0	0	0	0	0	0
141-West	300165.89	5034822.17	16	17	27	32	13	12	9	6	5	4	0	0	0	0	0	0	0	0	0	0	10	0	32	0	0	0	0	0	0	0
142-West	300391.74	5034552.88	17	19	21	29	13	13	8	6	5	3	0	0	0	0	0	0	0	0	0	0	9	0	29	0	0	0	0	0	0	0
143-West	300543.76	5034229.31	18	21	20	27	13	12	8	5	4	3	0	0	0	0	0	0	0	0	0	0	8	0	27	0	0	0	0	0	0	0
144-West	300817.39	5033968.71	19	23	19	25	14	13	8	4	3	0	0	0	0	0	0	0	0	0	0	0	7	0	25	0	0	0	0	0	0	0
145-West	301523.89	5033954.05	16	23	15	22	16	14	8	4	3	0	0	0	0	0	0	0	0	0	0	0	6	0	22	0	0	0	0	0	0	0

146-West	302018.31	5033408.42	24	24	13	20	16	13	7	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	19	0	0	0	0	0	0	0
147-West	302295.4	5033163.18	26	29	12	18	16	13	7	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	18	0	0	0	0	0	0	0
148-West	302559.06	5032902.42	29	28	11	17	16	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	17	0	0	0	0	0	0	0
149-West	302806.63	5032654.85	31	27	10	16	15	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16	0	0	0	0	0	0	0
150-West	302982.53	5032363.85	35	26	9	16	15	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	15	0	0	0	0	0	0	0

Attachment X-3:

List of Names and Addresses of Noise Sensitive Receptor Owners within 1 mile of the Site (Confidential and Not for Public Distribution)

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Exhibit Y

Carbon Dioxide Emissions

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Oregon Administrative Rule (OAR) 345-021-0010(1)(y) requires proponents to provide information demonstrating that any proposed facilities that emit carbon dioxide (CO_2), such as a base load gas plant or a fossil fuel-burning power plant, will comply with applicable carbon dioxide emissions standards.

The Wheatridge Wind Energy Facility (Project) does not include any proposal to construct any CO_2 emitting facilities, therefore the Project is exempt from the requirements of OAR 345-021-0010(1)(y).

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Exhibit Z

Evaporative Cooling Towers

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Oregon Administrative Rule (OAR) 345-021-0010(1)(z) requires proponents to provide information about cooling tower plumes, if the proposed project includes an evaporative cooling tower.

The Wheatridge Wind Energy Facility (Project) is exempt from the requirements of OAR 345-021-0010(1)(z), since the Project does not include the development or use of evaporative cooling towers.

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Exhibit AA

Electric and Magnetic Fields

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Attachments

Terms and Definitions

Collector Line	An underground or overhead electrical 34.5 kV line transmitting power from the turbines to a Substation
Construction Yard	The temporary area for construction activities and Project component storage prior to installation
Design Configuration	For the purposes of Exhibit AA, five potential structural configurations for supporting one or two, single or double-circuit, overhead 230kV intraconnection transmission lines
GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines

Wheatridge West	The western group of turbines

Acronyms and Abbreviations

AC	Alternating current
CAFE	Corona and Field Effect Program, Version 3
dB	Decibels
EFSC	Energy Facility Siting Council
EMF	Electromagnetic fields
Hz	Hertz
kcmil	thousand circular mil
kV	Kilovolt
kV/m	Kilovolts per meter
m/sec	meters per second
mG	Milligauss
MVA	Megavolt amperes
MW	Megawatt
NESC	National Electrical Safety Code
OAR	Oregon Administrative Rule
OR-##	Oregon State Highway ##

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1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located entirely within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit AA provides information on electric and magnetic fields, collectively called electromagnetic fields (EMF), associated with the operation of the Project, to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(1)(aa) paragraphs (A) and (B). Pursuant to the Project Order, "all paragraphs apply to any transmission line, regardless of size, that is a related or supporting facility, including collector lines." This exhibit therefore provides an analysis of EMF associated with the proposed 230kV Intraconnection Line(s) between Wheatridge East and Wheatridge West, as well as EMF associated with the 34.5kV electrical collection system.

For the Project, there are four Intraconnection Line routing options under consideration. Intraconnection Line routing options are referred to in the ASC as: Options 1, 2, 3, and 4 (See Exhibits B and C). For the purposes of Exhibit AA, the EMF of five Design Configurations (A, B, C, D, and E) are evaluated, i.e. five different structural configurations designed to support an overhead 230kV transmission line(s) (Table AA-3), which will be located in any of the four different routing options. Within Exhibit AA, the discussion focuses solely on the five structural Design Configurations and their respective EMF profiles under consideration..

Although the Energy Facility Siting Council (EFSC) does not have a specific EMF Standard, it does have a statutory mandate to adopt conditions needed to ensure public health and safety. Two such health and safety standards are found in OAR 345-024-0090, Siting Standards for Transmission Lines, under which EFSC must find that Wheatridge:

(1) *Can design, construct, and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public; and*

(2) *Can design, construct, and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.*

1.1 EMF Background Information

EMF occur both naturally and as a result of the generation, transmission, and use of electric power. The earth itself generates steady-state EMF. EMF are present around any conductors or devices that transmit or use electrical energy; as a result, exposure to EMF is common from an array of electrical appliances and equipment, building wiring, and electric distribution and transmission lines. The electrical power system in the United States is an alternating current (AC) system operating at a frequency of 60 hertz (Hz)[1], resulting in "power frequency" or "extremely low frequency" EMF[2]. While electric and magnetic fields are often referred to and thought of collectively, each arises through a different mechanism and can have differing effects.

Electric fields around transmission lines are produced by the presence of an electric charge, measured as voltage, on the energized conductor. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. The strength of the electric field is inversely proportional to the distance from the conductors; the electric field strength declines as the distance from the conductor increases. The strength of the electric field is measured in units of kilovolts per meter (kV/m). Electric fields are readily weakened or blocked by conductive objects such as trees or buildings, or by earth. The direction of force within the electric field alternates at a frequency of 60 Hz, in direct relation to the charge on each conductor. However, the overall transmission line voltage, and therefore the overall strength and reach of the electric field, remains practically steady and is not affected by the common daily and seasonal fluctuations in the amount of electricity generated by the turbines.

Magnetic fields around transmission lines are produced by the movement of electrical charge, measured in terms of amperage, through the conductors. Like the electric field, the direction of force within the magnetic field alternates at a frequency of 60 Hz in direct relation to the charge on each conductor. Magnetic field strength is expressed in units of milligauss (mG)[3]. The magnetic field strength is directly proportional to the amperage; that is, increased current flow produces a

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[1] Hertz is a measure of cycles per second. In a 60 Hz transmission system, the charge and direction of current flow on each conductor will cycle from positive to negative and back to positive 60 times per second. The direction of force in the electric and magnetic fields will also cycle in direct relation to the charge and direction of flow on the conductor.

[2] The electric transmission system in the U.S. operates at 60 Hz, while in Europe and other parts of the world, the systems operate at 50 Hz; both produce fields that are referred to as "power frequency" or "extremely low frequency" EMF.

stronger magnetic field. As with electric fields, the magnetic field is inversely proportional to the distance from the conductors, declining in strength as the distance from the conductor increases. Magnetic fields are not blocked or shielded by most materials. Unlike voltage, the amperage and the resulting magnetic field around a transmission line fluctuate daily and seasonally as the amount of electricity generated and the amount of current flow varies.

Both the Intraconnection Line(s) and the electrical collection system would be constructed as AC three-phase systems. Each AC three-phase circuit carries power over three conductors; one phase of the circuit is carried by each of the three conductors. The AC voltage and current in each phase conductor is out of sync with the other two phases by 120 degrees, or one-third of the 360-degree cycle. The fields from these conductors tend to cancel out because of this phase difference. However, when a person stands under a transmission line, one conductor is significantly closer and will contribute a net uncanceled field at that person's location.

1.2 EMF Standards

No federal regulations or guidelines apply directly to the EMF levels for the Project's proposed Intraconnection Line(s). The National Institute of Environmental Health Sciences performed an extensive review of field related issues in the 1990s that resulted in the decision that regulatory actions are unwarranted (NIEHS 1999).

Although there are no federal regulations on power-frequency EMF in the United States, international recommendations and guidelines exist. Table AA-1 lists power-frequency EMF guidelines recommended by the European Union (EU 1999), the International Committee on Electromagnetic Safety (ICES 2002), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP 2010), an affiliate of the World Health Organization.

Transmission line projects in Oregon must comply with the electric field standard found in OAR 345-024-0090, which requires the design, construction, and operation the proposed transmission line so that AC electric fields do not exceed 9 kV/m at 1 meter above the ground surface in areas accessible to the public. There is no similar Oregon design standard for magnetic fields.

Six other states also have adopted limits for electric field strength, either at the edge or within the right-of-way of the transmission line corridor (Table AA-2). Only Florida and New York currently limit magnetic fields levels from transmission lines. The magnetic field levels set in those two states only apply at the edge of the right-of-way and were developed to prevent magnetic fields from increasing beyond levels currently experienced by the public.

In the fall of 2009, EFSC commissioned a review of existing information to prepare for the review of several transmission lines under discussion at that time. That review was conducted by Dr. Kara Warner and presented to EFSC on November 20, 2009 during a regular meeting. The prevailing conclusions indicated a need to continue to monitor the science on EMF; that low cost, prudent

[3] Magnetic field strength may also be measured in terms of the Tesla, an International System unit of measurement. 1 Gauss = 0.0001 Tesla, or 1 Tesla = 10,000 Gauss. 1 Gauss = 1,000 mG.

avoidance measures of public EMF exposure are appropriate; and that health-based limits are not appropriate given the scientific data available (EFSC 2009).

Table AA-1. International Guidelines for AC Power-frequency EMF Levels

Agency	Exposure	Electric Field (kV/m)	Magnetic Field (mG)
EU	General public	4.2	833
ICES[1/]	Occupational General public General public within right-of-way	20 5 10	27,100 9,040 NA
ICNIRP	Occupational General public	8.3 4.2	10,000 2,000

1/ ICES recommendations have been adopted as standards by the Institute of Electrical and Electronics Engineers; see Standard C95.6 -2002 (R2007).
Magnetic fields are measured in gauss (G) and milligauss (mG). 1 G = 1,000 mG.
EU = European Union;
ICES = International Committee on Electromagnetic Safety;
ICNIRP = International Commission on Non-Ionizing Radiation Protection

Table AA-2. Other State AC Power-frequency EMF Standards

State	Location	Electric Field (kV/m)	Magnetic Field (mG)
Florida 230 to 500kV lines	Within right-of-way Edge of right-of-way	10 2	NA 200 [1/]
230kV or less	Within right-of-way Edge of right-of-way	8 2	NA 150
Minnesota	Within right-of-way	8	NA
Montana	Within right-of-way–road crossing Edge of right-of-way	7 1 [2/]	NA NA
New Jersey	Within right-of-way Edge of right-of-way	NA 3	NA NA
New York	Within right-of-way–open Within right-of-way–public road Edge of right-of-way	11.8 7 1.6	NA NA 200
North Dakota	Within right-of-way Edge of right-of-way	9 NA	NA NA
Oregon	Within right-of-way Edge of right-of-way	9 NA	NA NA

1/ Magnetic field strength is limited to 250 mG for new double-circuit 500 kV lines constructed on a previously-existing right-of-way.
2/ Can be waived by landowner.
kV/m = kilovolt per meter
mG = milligauss
NA = Not Applicable. No requirements.

2.0 Project EMF

The Project will include up to two, parallel, overhead transmission lines (the Intraconnection Line[s]), along a route spanning up to approximately 35 miles in length. Several Design Configurations are under consideration, as described below in Section 2.2. The 230kV circuit(s) will be strung along either a single set of transmission line poles or two side-by-side sets of transmission line poles. The transmission line poles will be either H-frame or monopole configuration. The Intraconnection Line(s) would be approximately centered within a 100, 150 or 200 foot-wide right-of-way, depending on the Design Configuration ultimately constructed.

The Project would also include up to approximately 88 miles of 34.5kV electrical Collector Lines as part of the electrical collection system, carrying power from the turbines to a Project Substation. There is no specific right-of-way width defined for the 34.5kV Collector Lines. The collection system Collector Lines and any overhead collector cables will occupy private land pursuant to leases or easements with landowners; the leases will authorize placement of the cables and restrict inconsistent or competing uses of the property, but will not contain any defined right-of-way with a fixed width. Therefore, no new right-of-way will be required and no existing right-of-way will be widened.

2.1 EMF Modeling Methods

Wheatridge contracted TriAxis Engineering in Corvallis, Oregon to conduct an EMF study for the Project. Analyses were conservatively conducted using peak electrical currents to produce the highest possible electromagnetic fields.

The software tool program used for analyses, the Corona and Field Effect Program, Version 3 (CAFE), was developed by the Bonneville Power Administration and is based on the methods and equations of the Transmission Line Reference Book (EPRI 1987). This program and others like it have been used to predict electric and magnetic field levels for many years. The predicted values of field strength from these programs have been consistently confirmed by field measurements.

As required by OAR 345-021-0010(1) and OAR 345-024-0090(1), the CAFE modeling tool was used to compute EMF strength at a height of 1 meter (3.3 feet) above the ground surface throughout the entire right-of-way, and extending outward to 60.96 meters (200 feet) to each side of the Intraconnection Line's centerline. To estimate the maximum magnetic fields for the 34.5kV underground collector circuit, calculations are performed at the center of the underground trench, 1 meter (3.3 feet) above the ground.

2.2 Modeling Assumptions

The strength of the magnetic field depends on the current in the conductor, the geometry of the construction, the degree of cancellation from other conductors, and the distance from the conductors or cables. This section describes the pertinent design factors and assumptions used in the CAFE model to compute EMF levels.

2.2.1 230kV Intraconnection Line

There are five Intraconnection Line Design Configurations under consideration; the design that is ultimately implemented would depend on the phasing of Project construction and the location and timing of construction of the Gen-Tie Line by UEC or UEC/CB and interconnection facilities by the Bonneville Power Administration (BPA).

The five potential Design Configurations are described in Table AA-3. Design Configurations A and B are single-circuit designs; Design Configurations C and D are double-circuit designs strung on a single set of poles; and Design Configuration E consists of two separate, parallel single-circuit lines to create a double-circuit intraconnection system.

If the Project uses a single 230kV circuit, then there will be either a single set of H-frame poles or a single set of monopoles carrying the circuit. For Design Configuration A, Figure AA-1A illustrates the typical overhead 230kV single circuit H-frame structure. For Design Configuration B, Figure AA-1B illustrates the typical overhead 230kV single circuit monopole structure. For both possible structure configurations with one circuit, each of the three conductors in the circuit would be a twin-bundled configuration using two 954 thousand circular mils (kcmil), aluminum conductors, steel reinforced (ACSR), trade named “Cardinal” with a diameter of approximately 1.2 inches.

If the Project uses two 230kV circuits, then there will be either a single set of monopoles carrying two circuits or two sets of monopoles side-by-side each carrying one circuit. If the Project uses two 230kV circuits, then both circuits may be constructed at the time of initial construction or at different times. In the case where the Project uses a single set of monopoles to ultimately carry two circuits, then the monopoles may be initially constructed with only one circuit until the second circuit is installed. For Design Configuration C, Figure AA-1C illustrates the typical overhead 230kV double circuit monopole structure. For Design Configuration D, Figure AA-1D illustrates the typical overhead 230kV double circuit monopole structure, with only one circuit installed first before the second circuit is added later. For Design Configuration E, Figure AA-1E illustrates the typical configuration of two side-by-side overhead 230kV single circuit monopole structures. For all the possible structure configurations with two circuits, each of the three conductors in each circuit would be one 1272 kcmil aluminum conductor, steel reinforced (ACSR), trade named “Pheasant” with a diameter of approximately 1.4 inches.

All five potential Intraconnection Line Design Configurations share a number of similarities in their designs. All are designed as three-phase, 230kV circuits, with one shield wire per circuit for the entire length of the Intraconnection Line. Regardless of the Design Configuration utilized, the 230kV Intraconnection Line(s) would have a nominal voltage of 230kV measured from phase to phase. The Intraconnection Line(s) would be supported by H-frames or monopoles, as indicated in Table AA-3. Poles would be spaced approximately 800 feet apart on average. H-frames are typically constructed of wood, while monopoles are typically hollow tubular steel, but may be constructed of wood or reinforced concrete; however, the materials for the support poles do not affect EMF generation.

EMF strength is dependent on the voltage and current on the conductors. As noted above, the electric field depends upon line voltage, which remains nearly constant for a transmission line in normal operation. The magnetic field is proportional to the amount of current passing through the conductors, which varies as power generation fluctuates with the intensity of the wind. Maximum magnetic fields are produced at the maximum (peak) conductor currents. The peak line loading values as shown in Table AA-3 are intentionally conservative, using an overpower situation in which both the voltage and current flow are higher than would occur under typical operating conditions, and result in higher EMF levels on the ground than would normally occur.

A minimum line height of 30 feet was used, consistent with The National Electrical Safety Code (NESC) requirements for conductor-to-ground clearance. This produces an intentionally conservative model, in that the modeled conductor height is based on the mid-span height, or the lowest point of the catenary, whereas for most of the Intraconnection Line(s) the conductors would be higher than this minimum required clearance, and resulting EMF levels on the ground would be lower than indicated. In addition, this minimum clearance must be maintained under the worst conditions of extreme heat or excessive current that would cause greater conductor sag, so the conductor-to-ground clearance would be somewhat higher (and on-the-ground EMF levels somewhat lower) under typical operating conditions without extreme ambient temperatures or overpower situations.

The CAFE program default environmental parameters of 1 inch per hour precipitation and 2.0 miles per hour (mph) wind speed were used to model wet-weather conditions. While weather conditions do not affect EMF levels, they do affect corona discharge and the resulting audible noise and radio interference levels.

Table AA-3. Intraconnection Line Design Configurations											
Design Configuration	**Configuration**	**Total MW Rating**	**Each Circuit MW Rating**	**Conductor**	**Conductor Configuration**	**Shield Wire**	**Peak Loading per Phase**	**Right-of-way Width (ft)**	**Figure**	**EMF Results Graphs**	**EMF Results Data Attachment**
A	Single-Circuit, 2-pole, wooden H-Frame	500	500	954 kcmil ACSR "Cardinal"	Twin bundled	2	1280 A	150	Figure AA-1A	Figures AA-5A-M and AA-5A-E	Att. AA-1
B	Single-Circuit, Steel monopole	500	500	954 kcmil ACSR "Cardinal"	Twin bundled	1	1280 A	100	Figure AA-1B	Figures AA-5B-M and AA-5B-E	Att. AA-2
C	Double-Circuit, Steel monopole, install both circuits	500	300	1272 kcmil ACSR "Pheasant"	Single	2	770A	100	Figure AA-1C	Figures AA-5C-M and AA-5C-E	Att. AA-3
D	Double-Circuit, Steel monopole, Install one circuit initially, second circuit in future	500	300	1272 kcmil ACSR "Pheasant"	Single	1	770A	100	Figure AA-1D	Figures AA-5D-M and AA-5D-E	Att. AA-4
E	Two separate single-circuit structure lines on Steel monopoles, 100 feet apart	500	300	1272 kcmil ACSR "Pheasant"	Single	2	770A	200	Figure AA-1E	Figures AA-5D-M and AA-5D-E	Att. AA-5

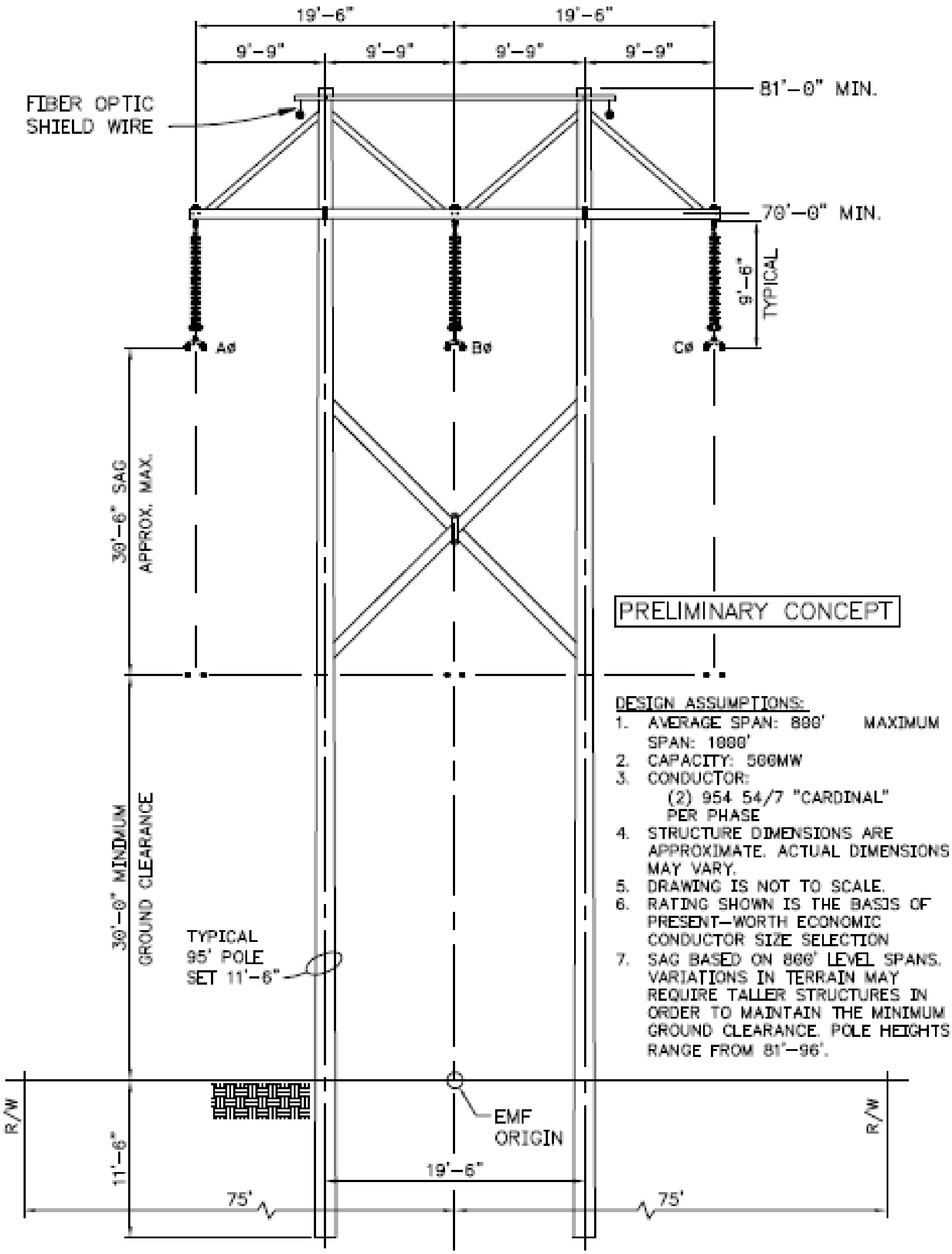


Figure AA-1A. Intraconnection Line Design Configuration A: Typical Overhead 230kV Single-Circuit Wood, H-Frame Structure

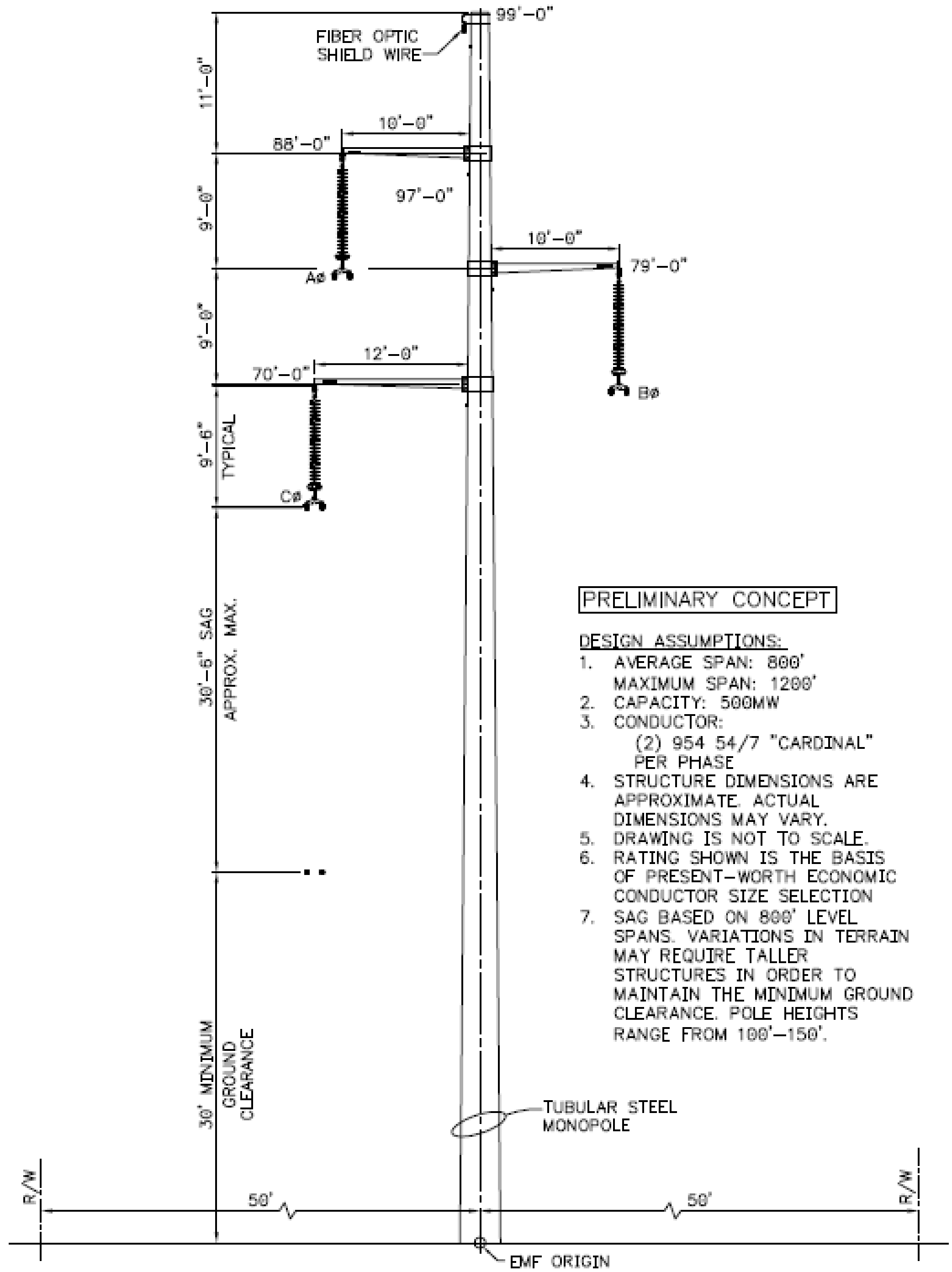


Figure AA-1B. Intraconnection Line Design Configuration B: Typical Overhead 230kV Single-Circuit Steel, Monopole Structure

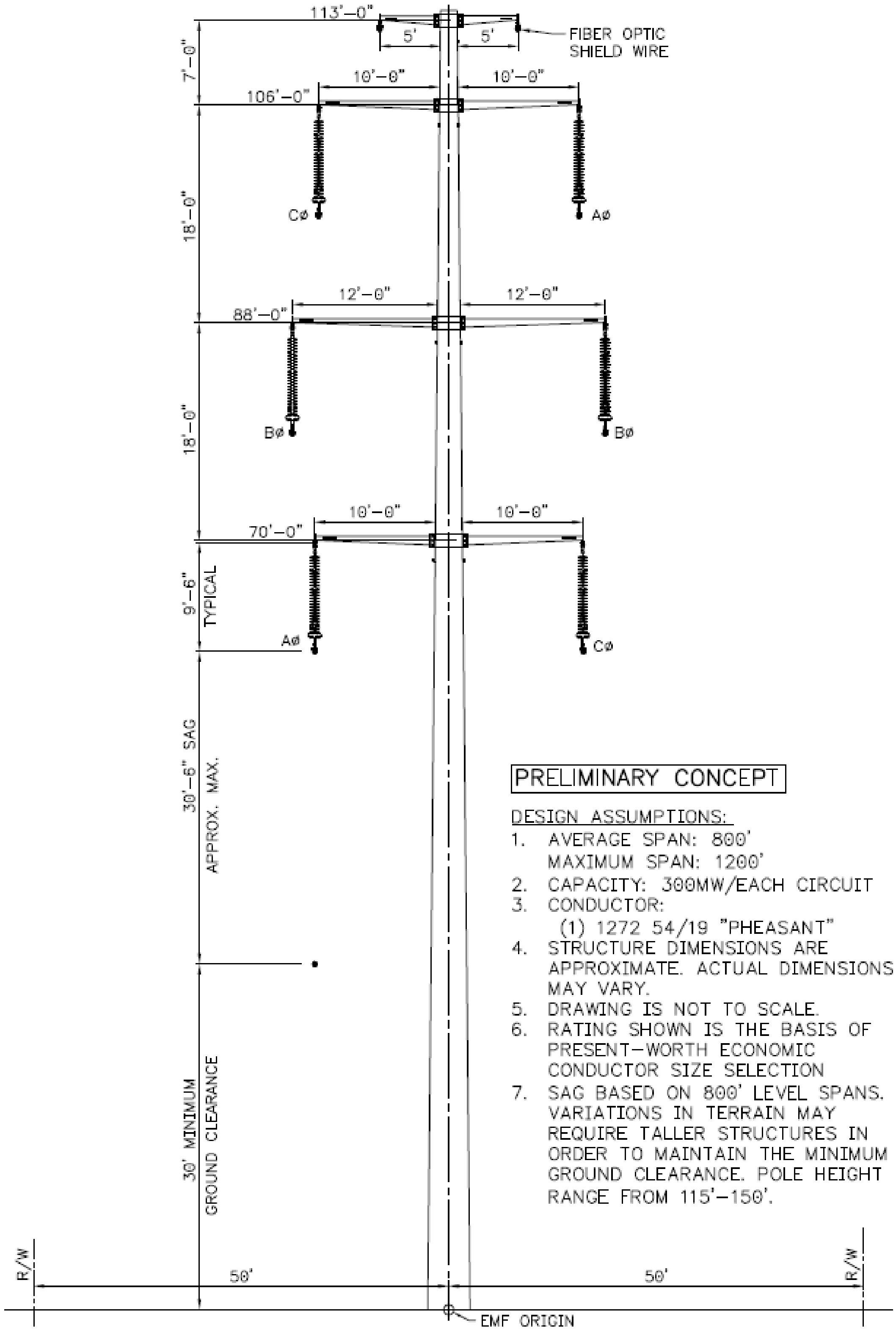


Figure AA-1C. Intraconnection Line Design Configuration C: Typical Overhead 230kV Double-Circuit Steel, Monopole Structure

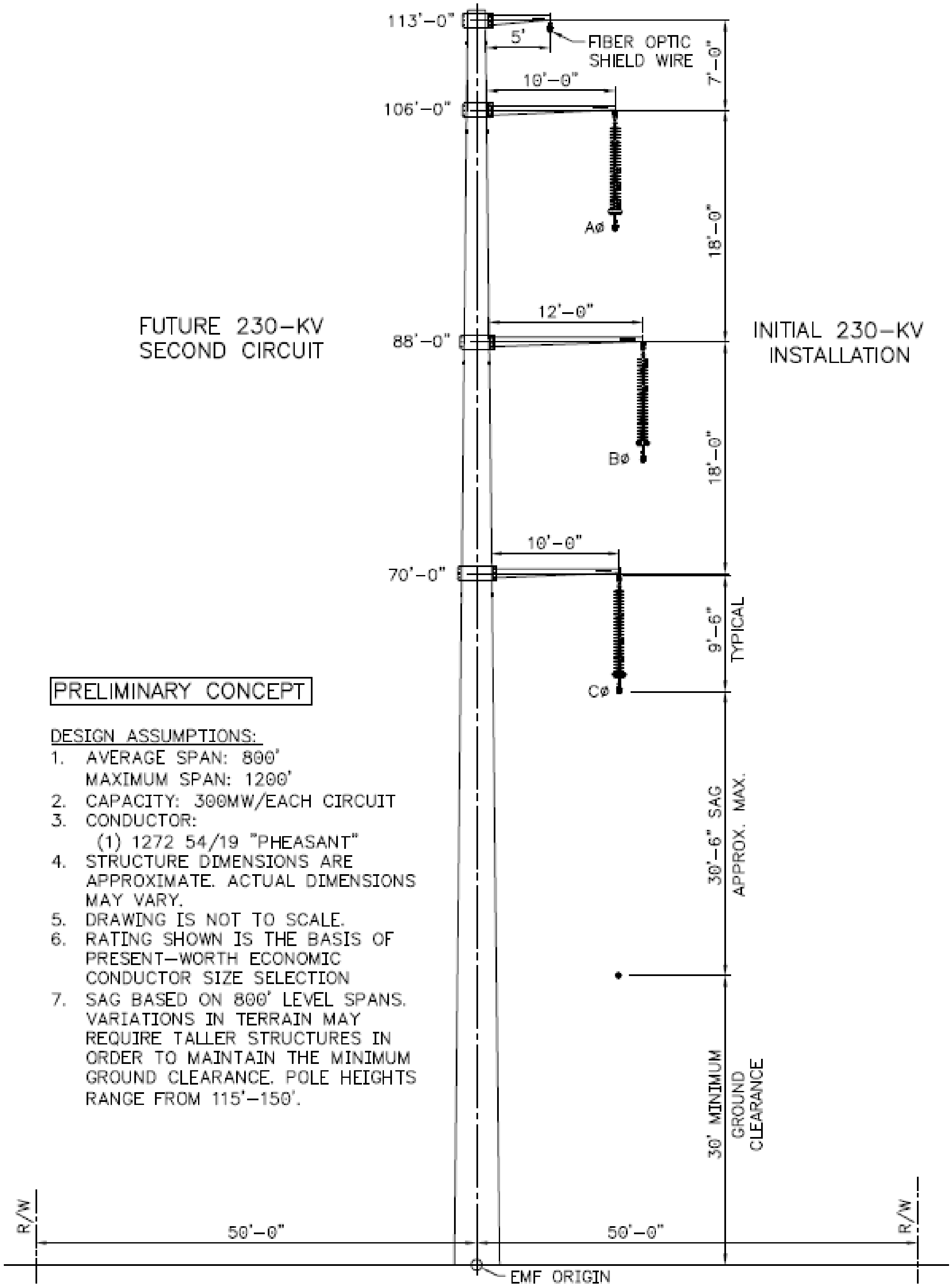


Figure AA-1D. Intraconnection Line Design Configuration D: Typical Overhead 230kV Double-Circuit Steel, Monopole Structure, One Circuit Installed

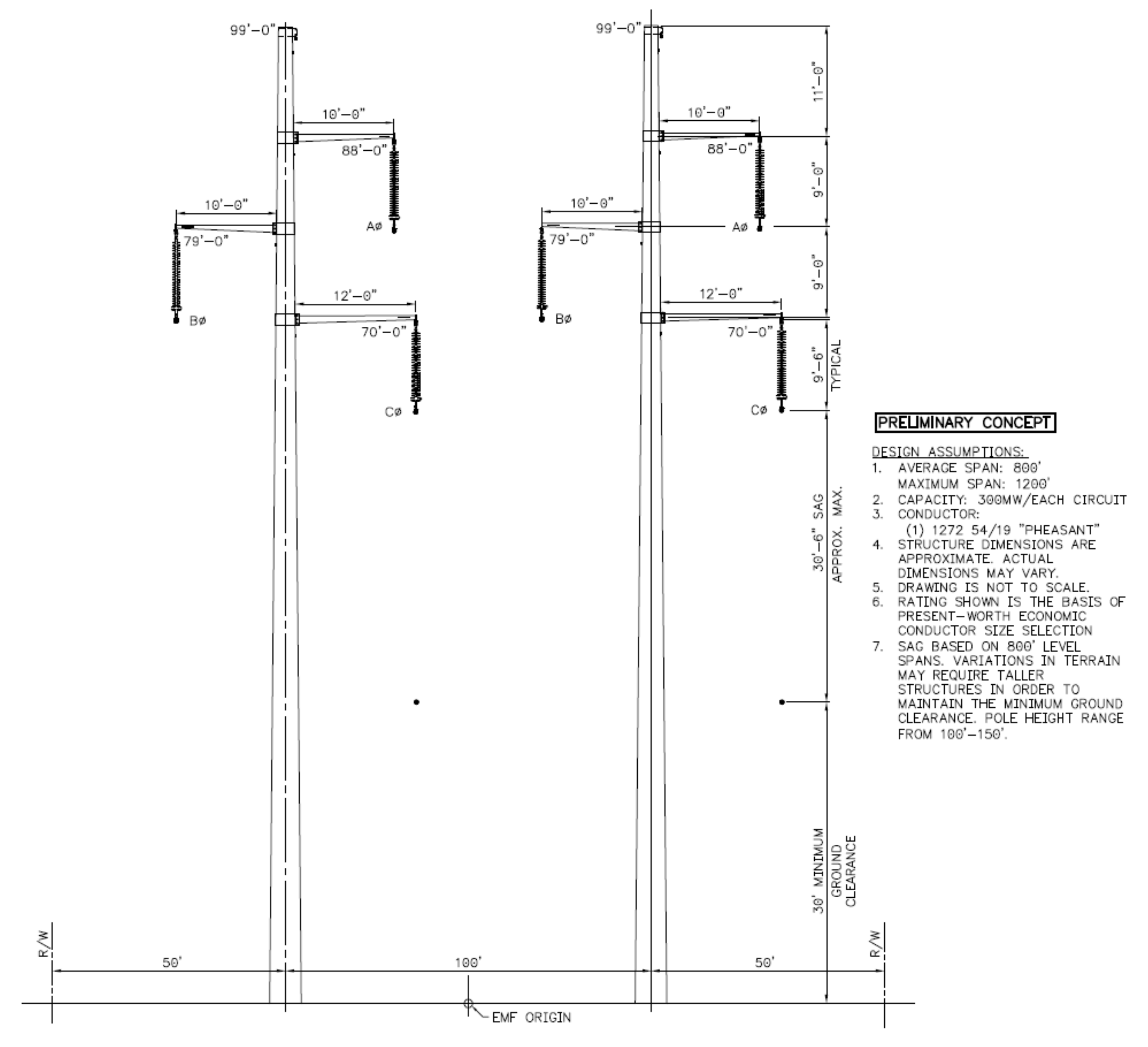


Figure AA-1E. Intraconnection Line Design Configuration E: Typical Overhead 230kV (2) Single-Circuit Steel, Monopole Structures, Side by Side

2.2.2 34.5kV Collector Lines

The Collector Lines would generally be buried in a trench, typically not less than 3 feet deep; however, it is possible that some of the Collector Lines will need to be run overhead in some locations where a buried cable would be infeasible or would create unnecessary impacts, such as at stream or canyon crossings. Collector lines may be constructed in single- or double-circuit configurations, depending on specific location within the Project. Consequently, this analysis looks at three Collector Line configurations: underground single-circuit, above-ground single-circuit, and above-ground double-circuit.

As with the Intraconnection Line(s), the modeling assumptions related to the 34.5kV Collector Lines are intentionally conservative, producing worst-case EMF results. EMF levels under normal operating conditions would be lower than indicated by this analysis. The CAFE program default environmental parameters of 1 inch per hour precipitation and 2.0 miles per hour wind speed were used to model wet-weather conditions. Other modeling assumptions are as follows.

Underground Collector Lines

The entire 34.5kV underground collector system is rated for a nominal voltage of 34.5kV measured phase to phase. The peak line loading value assumed for each circuit is 50 megavolt amperes (MVA), or approximately 700 amperes per phase cable for each underground collector circuit. The underground 34.5kV Collector Lines would consist of an insulated, stranded aluminum or copper conductor in a size range of 1/0 American wire gauge to 1,000 kcmils. The total diameter of the Collector Line cable is less than 3 inches. Figure AA-2 illustrates the typical underground configuration of the 34.5kV distribution Collector Line.

For an underground 34.5kV circuit, the electric field is totally contained within the insulation of the cable and the soil over the line. Each cable has a semiconducting insulation shield and a grounded concentric neutral, made up of multiple strands of copper wire that encircle the cable just under the outer jacket. This means that the cable jacket has no measurable voltage to ground, or between other cable jackets. Because the electric field is contained within the buried cables or shielded by the earth, no electric field is measurable at the surface of the ground.

Underground cables and the soil in which they are buried do not shield the magnetic fields generated in the conductors. Therefore, the net magnetic field of buried cables is measurable on the surface of the ground above the cables.

Overhead Collector Lines

Although the entire 34.5kV collector system is designed to be installed underground, there may be some areas where it would be constructed as an above-ground line to avoid unnecessary environmental impacts. Potential above-ground sections would also be rated for a nominal voltage of 34.5kV measured phase to phase. The peak line loading value assumed for each overhead circuit is 60 MVA, or approximately 1,000 amperes per phase conductor for each overhead collector circuit. This value is used for both the single and double circuits. The conductor for both types of support structures is assumed to be a single conductor per phase of 1,590 kcmil aluminum alloy conductor "Coreopsis" with a diameter of 1.453 inches. The minimum conductor-to-ground clearance for the aboveground 34.5kV Collector Lines is assumed to be 25 feet. Figure AA-3 illustrates the typical proposed monopole overhead structural configuration of the 34.5kV single-circuit Collector Line with a shield wire. Figure AA-4 illustrates the typical proposed monopole overhead structural configuration of the 34.5kV double-circuit Collector Line with a shield wire. For this configuration, the phase positions are reversed on one side of the structure compared to those on the other side of the structure; the placement of different phases opposite one another reduces the composite electric and magnetic fields.

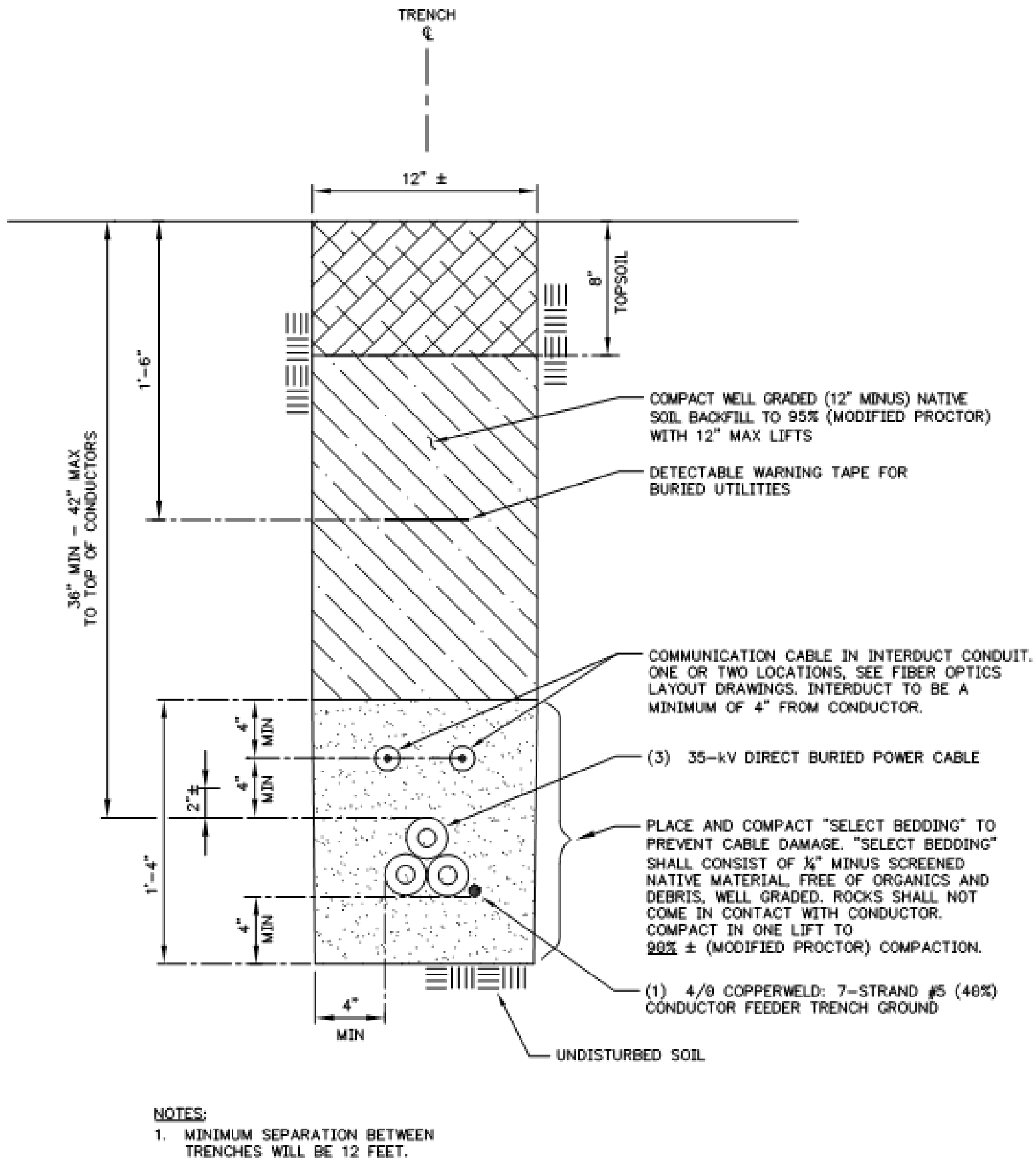


Figure AA-2. Typical Single-circuit Underground 34.5kV Collector Line Trench

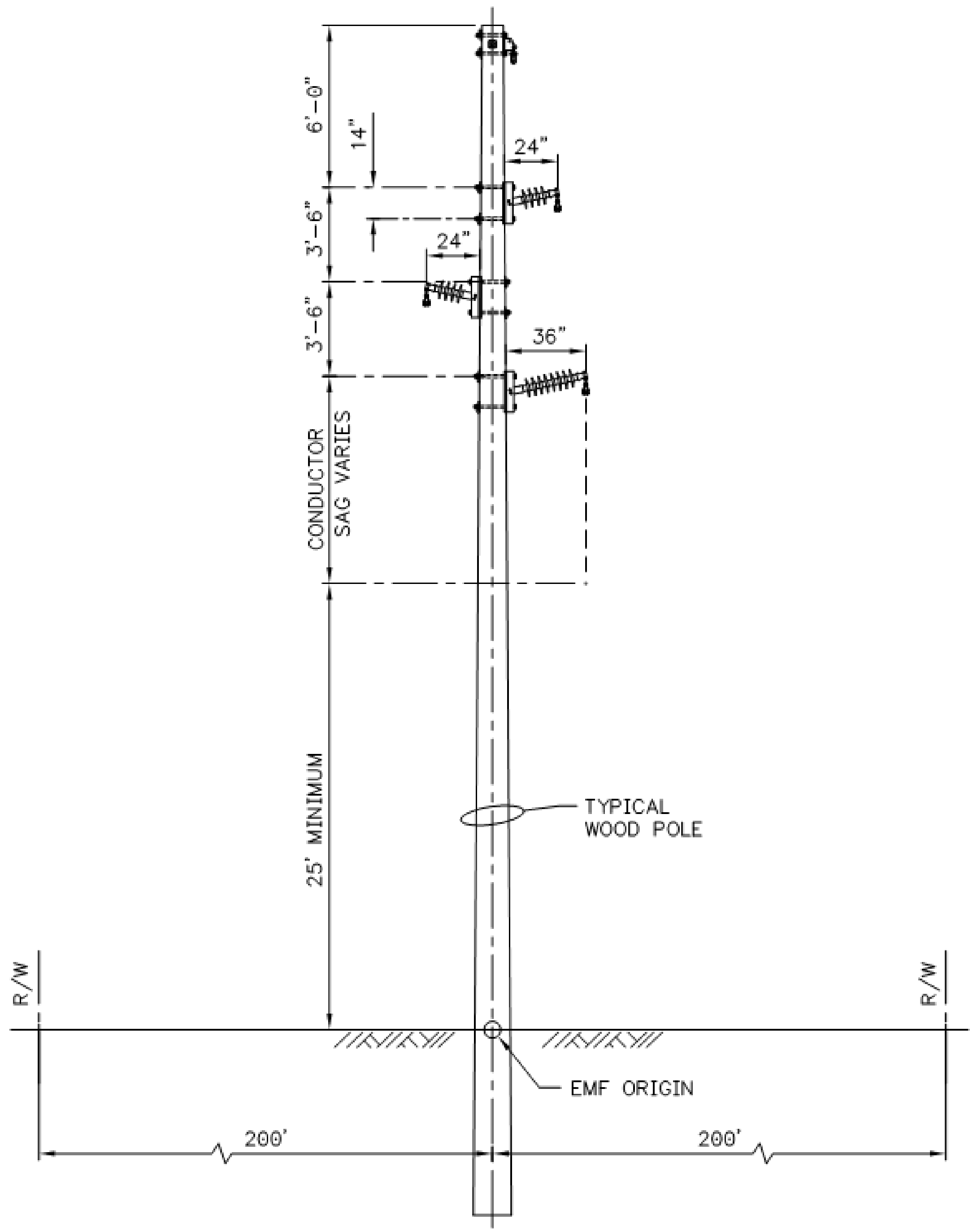


Figure AA-3. 34.5kV Collection System, Typical Overhead Single-Circuit, Monopole Structure

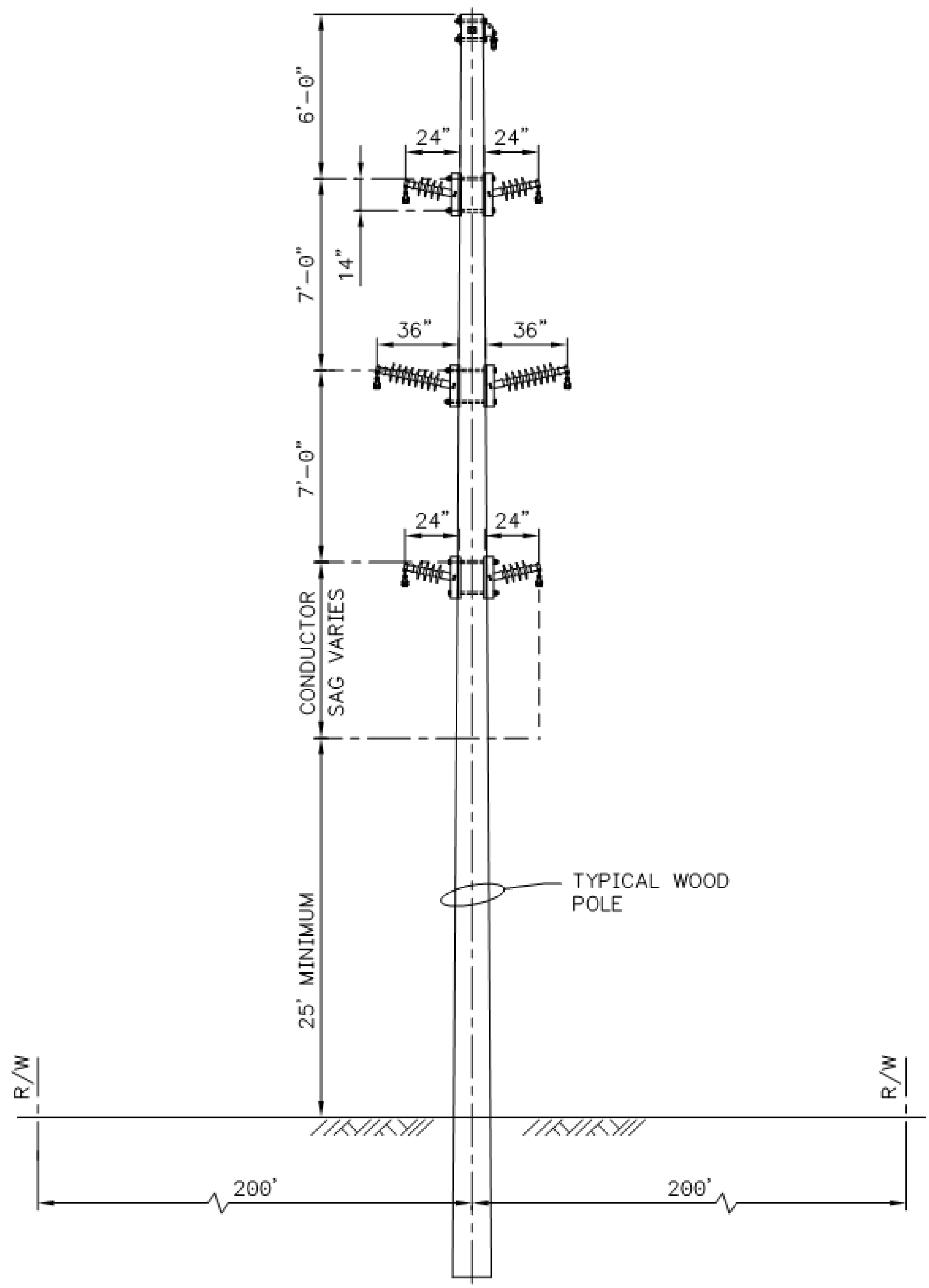


Figure AA-4. 34.5kV Collection System, Typical Overhead Double-Circuit, Monopole Structure

2.3 Identification of Receptors

There are no known occupied buildings, residences, or other sensitive receptors within 200 feet on either side of the centerline of the widest Intraconnection Line(s) right-of-way (200 foot right-of-way for Design Configuration E). The nearest residence is located approximately 260 feet from the Intraconnection Line routes.

2.4 Modeled EMF Levels

2.4.1 230kV Intraconnection Line

The analysis results of the CAFE model for the 230kV Intraconnection Line Design Configurations A through E are provided in Attachments AA-1 through AA-5, respectively. The results are summarized in Tables AA-4 for electric field values and in Table AA-5 for magnetic field values. Tables AA-4 and AA-5 give the calculated EMF values for each Intraconnection Line Design Configuration at the edge of right-of-way and at 200 feet either side of the right-of-way centerline, as well as the peak EMF values within the right-of-way.

The results of the CAFE model presented in Table AA-4 demonstrate that the proposed Intraconnection Line(s) can be constructed and operated such that the AC electric field would not exceed 9 kV/m at one meter above the ground surface for any of the considered Design Configurations, as required by OAR 345-024-0090(1). As represented in Table AA-4 and shown in the figures, the strength of the electric field would peak under the conductors at less than 4 kV/m. As represented in Table AA-5, magnetic field strength for all Design Configurations would be lower than adopted standards from other states, and lower than international guidelines as presented in Tables AA-2 and AA-1, respectively.

Table AA-4. Calculated Electric Field Values (kV/m) for 230kV Intraconnection Line

Design Configuration	200 feet Left of Centerline	Left Edge of ROW 1/	Peak Value	Right Edge of ROW 1/	200 feet Right of Centerline
Configuration A	0.05	0.77	3.75	0.77	0.05
Configuration B	0.06	1.06	3.39	1.14	0.06
Configuration C	0.01	0.19	1.48	0.19	0.01
Configuration D	0.03	0.11	2.17	0.30	0.04
Configuration E	0.04 2/	1.44	2.35	1.44	0.08 2/

NOTES:

1/ Right-of-way widths are as indicated in Table AA-3: 150 feet for Design Configuration A, 100 feet for Design Configurations B, C and D, and 200 feet for Design Configuration E.

2/ Because Design Configuration E consists of two parallel single-circuit transmission lines within a 200 foot ROW, the electric field values reported here are taken at 200 feet left and right of each line, 250 feet from the ROW centerline.

Table AA-5. Calculated Magnetic Field Values (mG) for 230kV Intraconnection Line					
Design Configuration	**200 feet Left of Centerline**	**Left Edge of ROW [1/]**	**Peak Value**	**Right Edge of ROW [1/]**	**200 feet Right of Centerline**
Configuration A	7.04	47.31	259.25	47.31	7.04
Configuration B	4.39	56.10	164.30	49.93	4.42
Configuration C	0.38	13.66	65.84	13.66	0.38
Configuration D	1.73	15.70	66.92	28.52	2.14
Configuration E	3.13 [2/]	51.24	126.86	51.24	3.13 [2/]

NOTES:

1/ Right-of-way widths are as indicated in Table AA-3: 150 feet for Design Configuration A, 100 feet for Design Configurations B, C and D, and 200 feet for Design Configuration E.

2/ Because Design Configuration E consists of two parallel single-circuit transmission lines within a 200 foot ROW, the magnetic field values reported here are taken at 200 feet left and right of each line, 250 feet from the ROW centerline.

The magnetic and electric field profiles for each of the Intraconnection Line Design Configurations are shown in the following figures AA-5A through AA-5E.

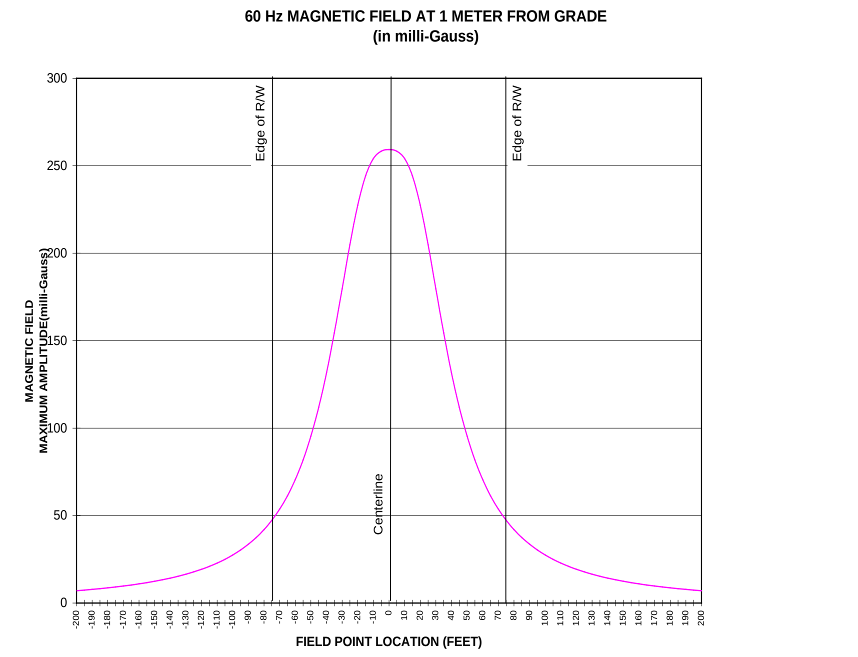


Figure AA-5A-M. Magnetic Field Profile, Intraconnection Line Design Configuration A

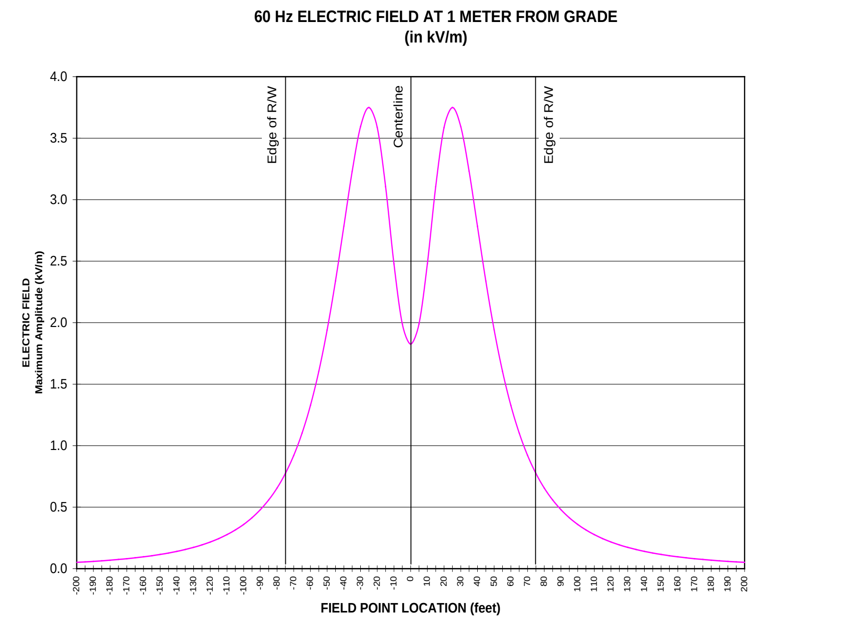
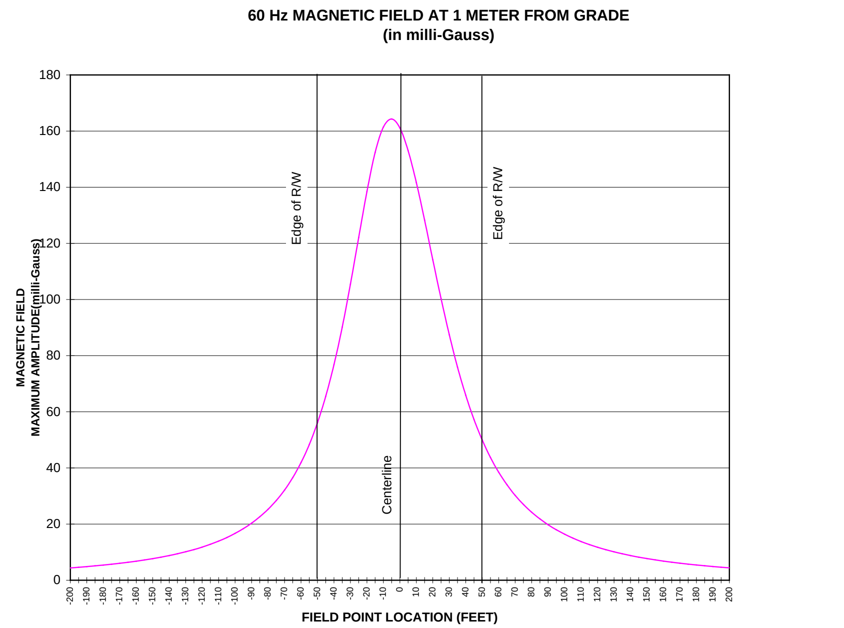


Figure AA-5A-E. Electric Field Profile, Intraconnection Line Design Configuration A



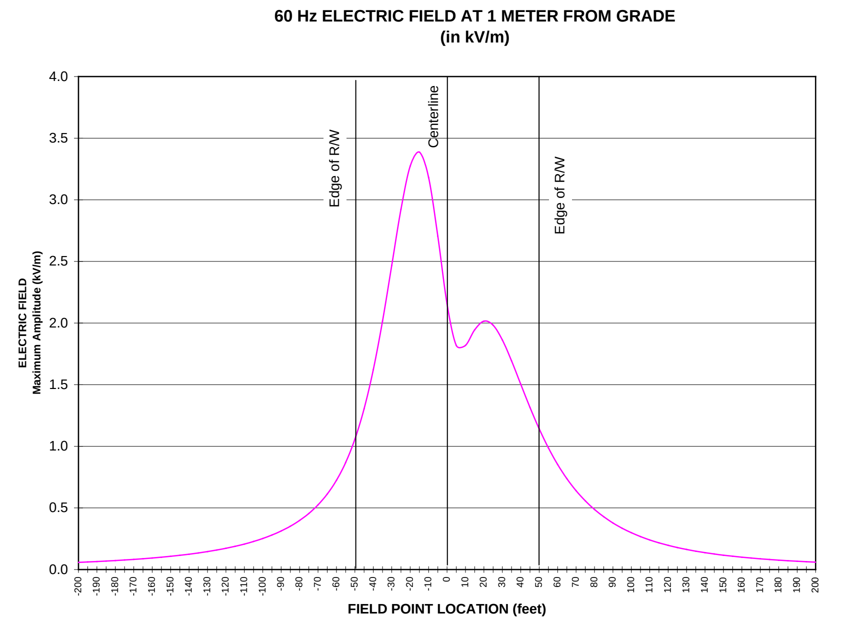


Figure AA-5B-M. Magnetic Field Profile, Intraconnection Line Design Configuration B

Figure AA-5B-E. Electric Field Profile, Intraconnection Line Design Configuration B

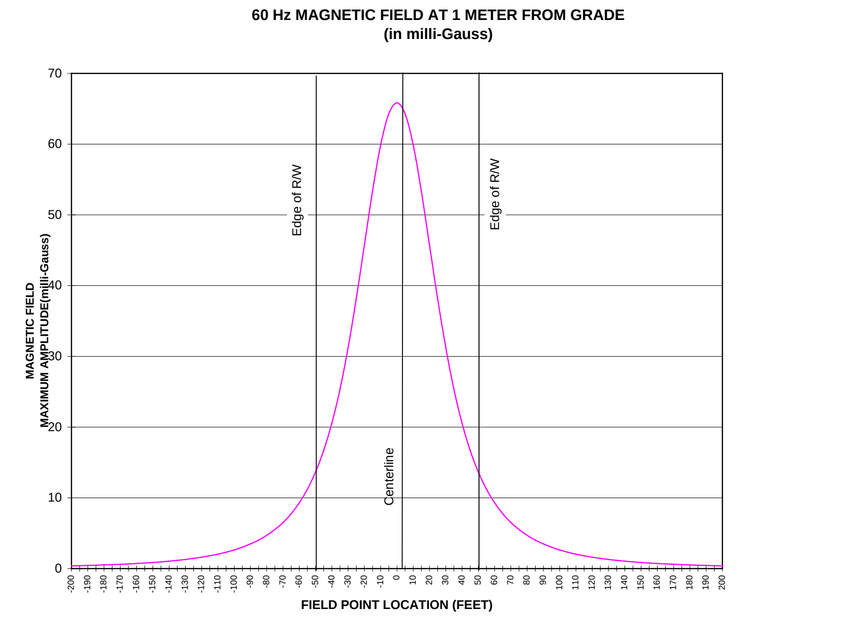


Figure AA-5C-M. Magnetic Field Profile Intraconnection Line Design Configuration C

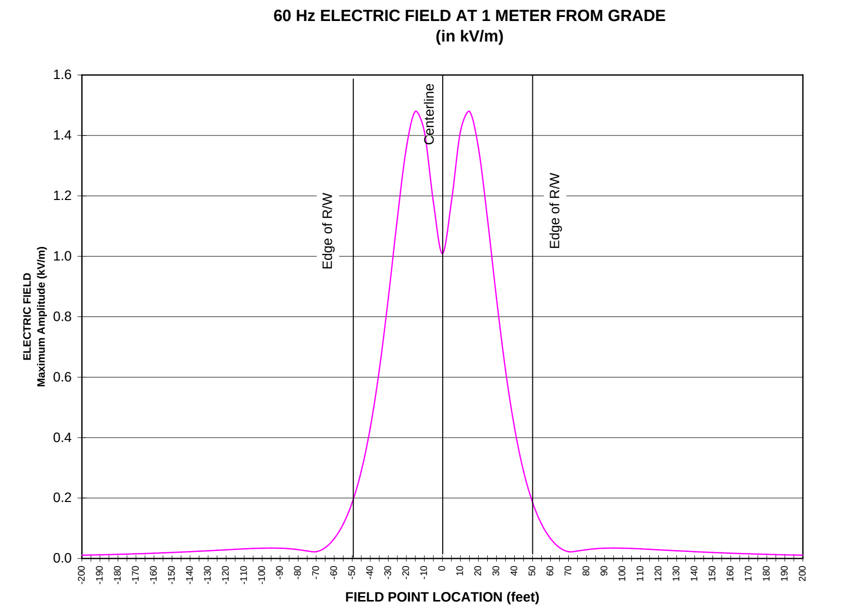
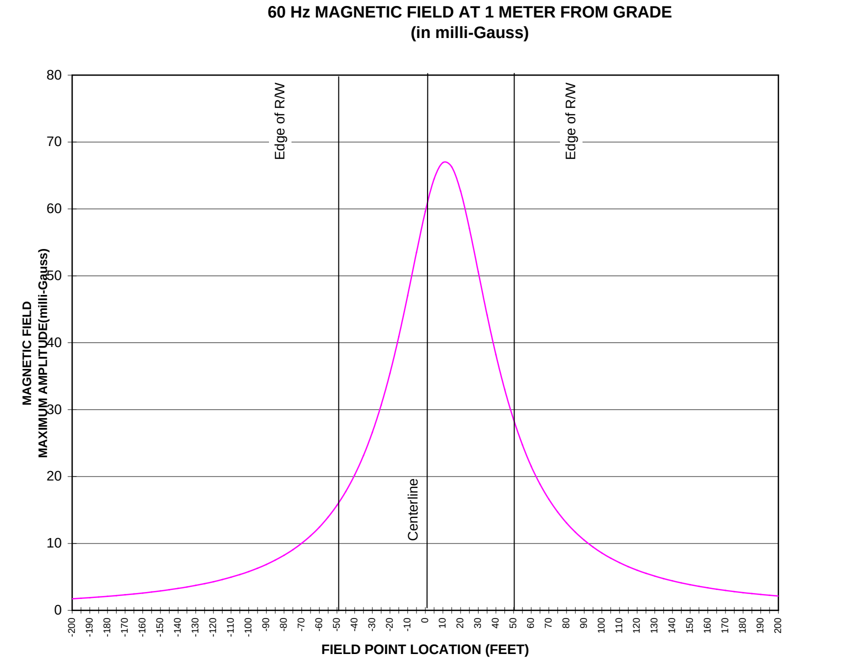


Figure AA-5C-E. Electric Field Profile, Intraconnection Line Design Configuration C



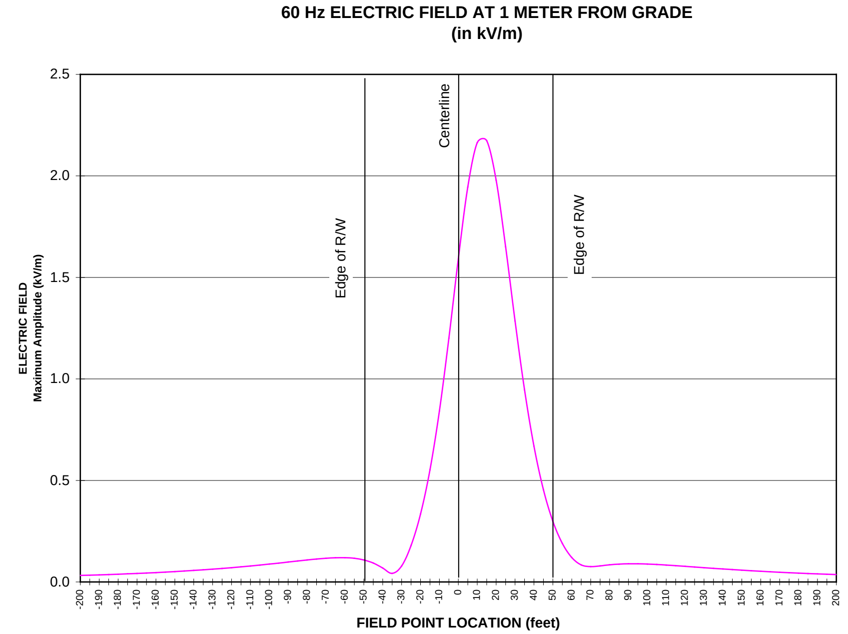
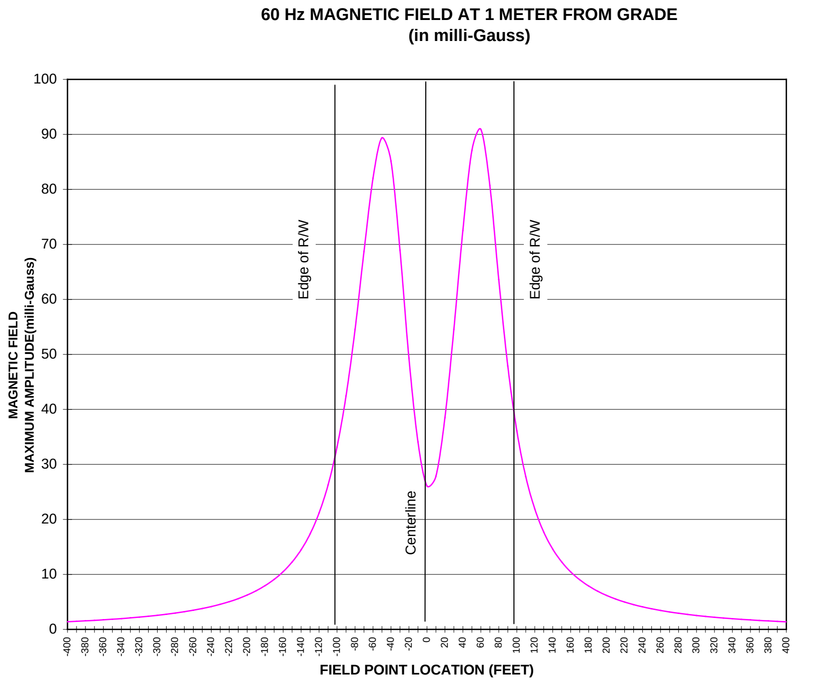


Figure AA-5D-M. Magnetic Field Profile, Intraconnection Line Design Configuration D, One Circuit Initially Installed	**Figure AA-5D-E. Electric Field Profile, Intraconnection Line Design Configuration D, One Circuit Initially Installed**



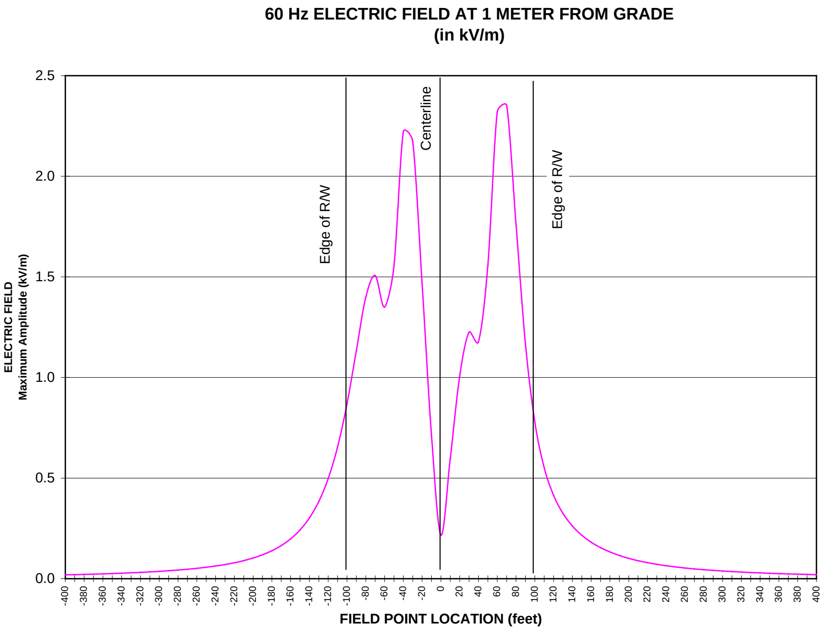


Figure AA-5E-M. Magnetic Field Profile, Intraconnection Line Design Configuration E

Figure AA-5E-E. Electric Field Profile, Intraconnection Line Design Configuration E

2.4.2 34.5 kV Collector Lines

The analysis results of the BPA CAFE model for the underground Collector Lines and overhead single- and double-circuit Collector Line configurations are provided in Attachments AA-6, AA-7 and AA-8, respectively. The results are summarized in Tables AA-6 for electric field values and in Table AA-7 for magnetic field values. Tables AA-6 and AA-7 provide the calculated EMF values of the 34.5kV Collector Lines at the centerline, at 75 and 200 feet to either side of the centerline, and the peak value for the projected maximum currents during peak load at minimum conductor ground clearances. The levels shown represent the highest magnetic fields expected for the proposed project. Average fields along the ground between poles, and over a year's time would be considerably less than the peak or even the typical values shown.

Table AA-6. Calculated Electric Field Values for 34.5kV Collector Lines

Line Description	Figure	Electric Field (kV/m)				
		200 feet Left	75 feet Left	Peak Value	75 feet Right	200 feet Right
34.5kV Underground	AA-2	See Note 1 and Note 2				
34.5kV OH Single-Circuit	AA-3	0.00	0.02	0.34	0.02	0.00
34.5kV OH Double-Circuit	AA-4	0.00	0.00	0.23	0.00	0.00

Note 1: 34.5kV collector circuits are located within the boundaries of the Project and do not have specific rights-of-way defined for each circuit.
Note 2: Underground cable configuration such that all electric fields are shielded within the cable and are not externally detectable.

Table AA-7. Calculated Magnetic Field Values for 34.5kV Collector Lines

Line Description	Figure	Magnetic Field (mG)				
		200 feet Left	75 feet Left	Peak Value	75 feet Right	200 feet Right
34.5kV Underground	AA-2	0.0	Note 1	6.95	Note 1	0.0
34.5kV OH Single-Circuit	AA-3	1.00	6.40	73.30	7.09	1.05
34.5kV OH Double-Circuit	AA-4	0.21	2.20	38.19	2.20	0.21

Note 1: 34.5kV collector circuits are located within the boundaries of the Project and do not have specific rights-of-way defined for each circuit.

The results of the CAFE model presented above in Table AA-6 demonstrate that the proposed electrical collection system Collector Lines can be constructed and operated such that the AC electric field would not exceed 9 kV/m at one meter above the ground surface, as required by OAR

345-024-0090(1). As represented in Table AA-6 and shown in the following figures, the strength of the electric field would peak under the conductors at less than 0.4 kV/m for either above ground configuration. There would be no measurable electric field associated with the underground Collector Lines. Magnetic field strength would be lower than adopted standards from other states, and lower than international guidelines as presented in Tables AA-2 and AA-1, respectively.

For a typical 34.5kV underground collector circuit, see Figure AA-6 for the magnetic field profile graph. No electric field is present for the underground circuit. For a typical 34.5kV single-circuit, monopole support structure, see Figure AA-7-M for the magnetic field profile graph and Figure AA-7-E for the electric field profile graph. For a typical 34.5kV double-circuit, monopole support structure, see Figure AA-8-M for the magnetic field profile graph and Figure AA-8-E for the electric field profile graph.

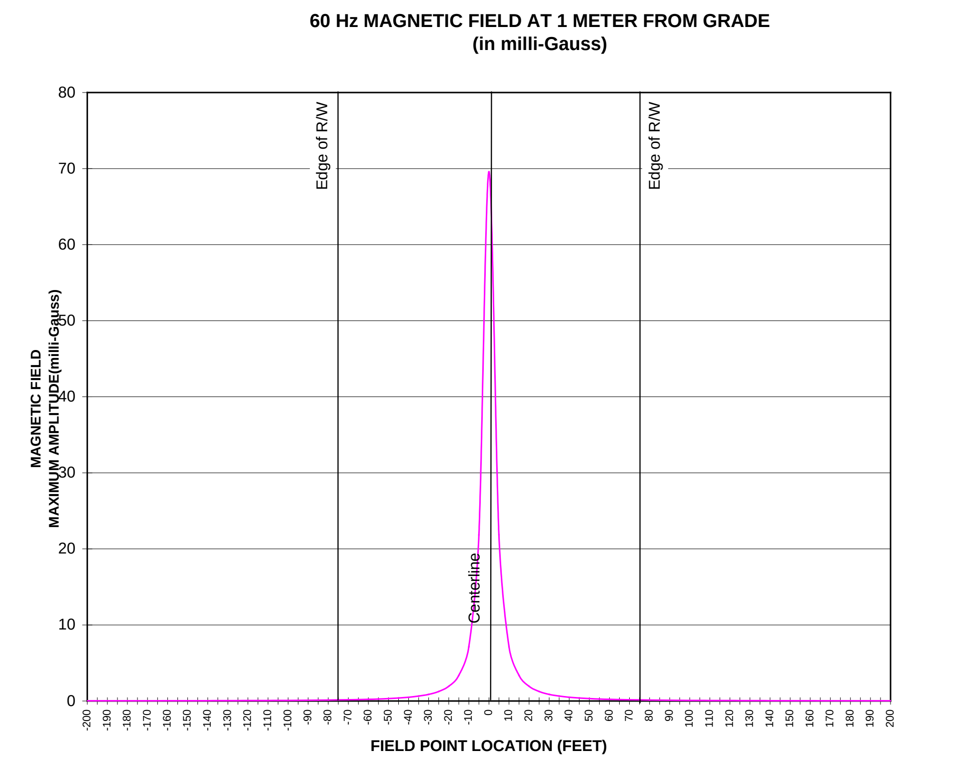


Figure AA-6. Magnetic Field Profile for 34.5kV Underground Circuit

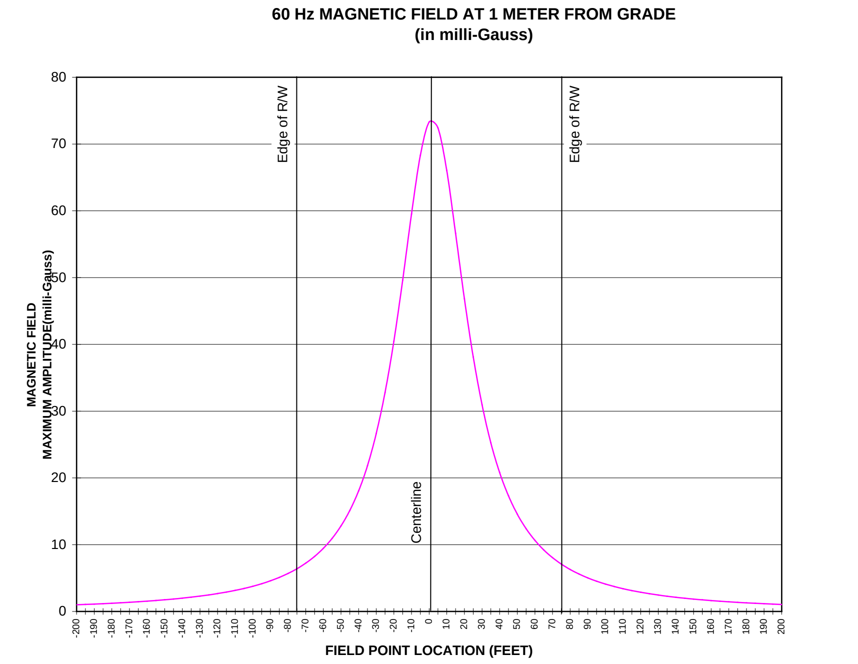


Figure AA-7-M. Magnetic Field Profile for 34.5kV Single-Circuit, Monopole Structure

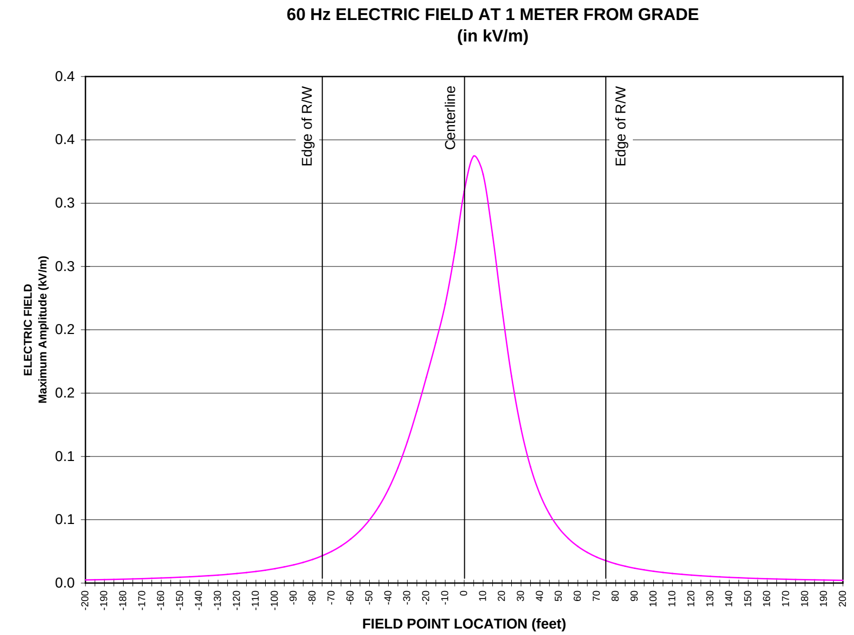
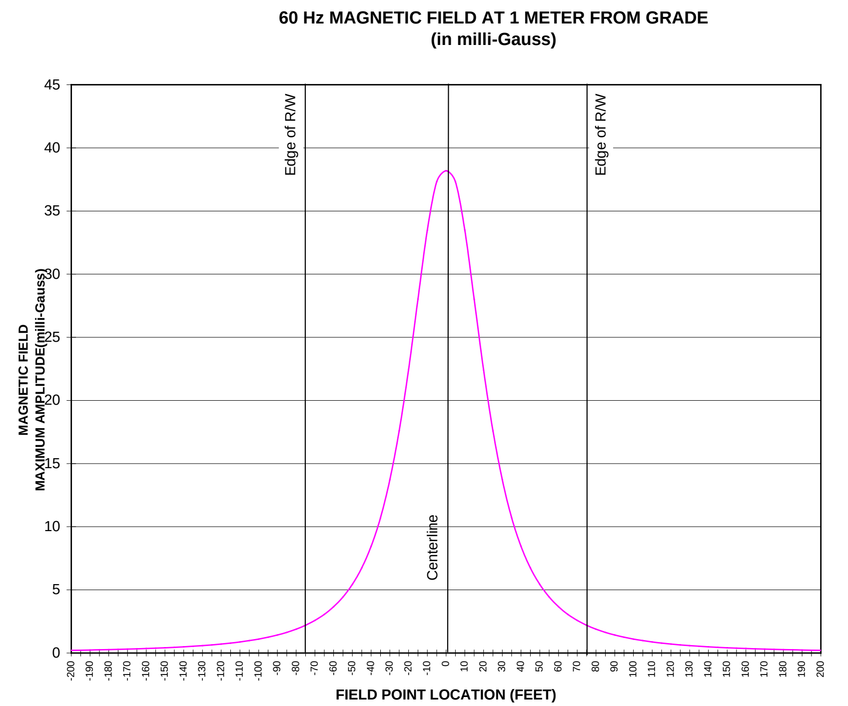


Figure AA-7-E. Electric Field Profile for 34.5kV Single-Circuit, Monopole Structure



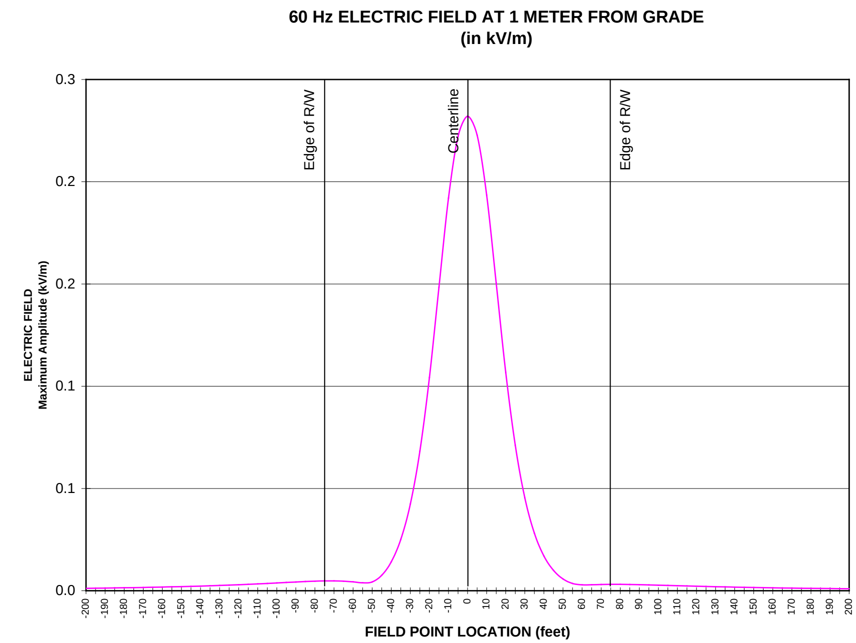


Figure AA-8-M. Magnetic Field Profile for 34.5kV Double-Circuit, Monopole Structure	Figure AA-8-E. Electric Field Profile for 34.5kV Double-Circuit, Monopole Structure

2.5 Mitigation and Monitoring

The primary mitigation measure to limit EMF impacts is routing of the Intraconnection Line(s) to avoid occupied structures; the line(s) would be located no closer than approximately 260 feet from occupied buildings. Support structure heights and spacing can be adjusted based on field conditions to increase conductor-to-ground clearance if needed in specific locations.

No program for monitoring actual EMF levels before or after construction is proposed at this time.

3.0 Radio and TV Interference

OAR 345-021-0010(1)(aa)(B) requires "an evaluation of alternate methods and costs of reducing radio interference likely to be caused by the transmission line in the primary reception area near interstate, U.S. and state highways."

Due to the strong electric field at the surface of the conductor wires, the overhead 230kV transmission line(s) can exhibit corona activity, which in turn produces broadband (primarily radio-frequency) electromagnetic radiation that may be perceived as interference with some communication signals. The level of potential interference with communications signals is highly location-dependent. Interference effects would be most pronounced directly under the transmission line(s) and would rapidly decrease with increasing distance from the line(s). The lower voltage 34.5kV overhead Collector Lines would have much lower electric field strength, and would not exhibit corona activity or generate electromagnetic interference. In addition, there are no occupied buildings or residences within 200 feet on either side of the proposed centerline of the overhead Intraconnection Line(s) or Collector Lines. Therefore, 230kV overhead Intraconnection Line(s) and overhead 34.5kV Collector Lines are not expected to generate any radio or TV interference at any occupied building.

Radio noise is measured in units of decibels (dB) based on its field strength referenced to a signal level of 1 microvolt per meter (IEEE 1986). Corona-induced radio noise is calculated to be approximately 47 decibels (dB-1 microvolt per meter) at the edge of the right-of-way. This is considered an acceptable level (IEEE 1971). Where an Intraconnection Line passes over public roadways such as OR-207, radio interference may be experienced for short distances while in close proximity to the line(s).

Radio and TV interference results are included in Attachment AA-1 through AA-5 for each of the five considered 230kV Intraconnection Line Design Configurations, and in Attachment AA-6 for 34.5kV overhead Collector Lines. The 34.5kV underground Collector Lines are located under the soil surface and would not generate radio or television interference.

4.0 Induced Voltage and Current

OAR 345-024-0090(2) requires a demonstration that Wheatridge "can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable."

The flow of electricity in a transmission line can induce a small electric charge, or voltage, in nearby conductive objects. An induced electric charge can flow, or become electric current, when a path to ground is presented. Induced current can be observed as a continuous flow of electricity or, under some circumstances as a sudden discharge, commonly known as a 'nuisance shock.' The amount of current flow, or the magnitude of the nuisance shock, is determined by the level of charge that can be induced and the nature (conductivity or impedance) of the path to ground. Metallic roofs, vehicles, equipment, or wire fences are examples of metallic objects in the vicinity of the Project in which a small electric charge could be induced.

Factors to consider when assessing the potential hazards and mitigation measures for induced voltage include the characteristics of nearby objects, and the degree and nature of grounding of those objects. More conductive materials accumulate greater charge than less conductive materials while large objects, such as a tractor-trailer, will accumulate a greater charge than smaller objects such as a pick-up truck (EPRI 2005). A linear object that is parallel to the transmission line would be more greatly affected than one that is perpendicular to the line. An object passing quickly under the transmission line would be minimally affected compared to a stationary object. A grounded or partially grounded object will accumulate charge that could be discharged as a nuisance shock, while continuous current would occur in a grounded object. The total amount of charge that can be induced in a perfectly non-grounded object is limited by the strength of the magnetic field and the nature of the object; after a time the field and the induced charge in the object will reach equilibrium (steady-state), and the induced charge would stop building.

Continuous induced current may occur if a metallic object is partially grounded or grounded some distance from the transmission line. Continuous induced current may occur in linear objects that are parallel to the transmission line, such as some fences, railroads, pipelines, irrigation piping, or other transmission or power distribution lines.

A sudden discharge can occur if a non-grounded, inductively charged object is presented with a path to ground. The most common example of this is when a vehicle, which is insulated from grounding by its tires, is parked under a transmission line for sufficient time to build up a charge. A person touching such a charged vehicle could become a conducting path for the current and can feel a momentary shock if the available electrical charge is sufficient, generally above 1 milliamperes (Dalziel and Mansfield 1950).

Nuisance shocks and induced currents can be reduced or eliminated by proper grounding of metallic objects near the transmission line, shielding them from the electric field, or positioning the transmission line farther from the objects. Grounding an object will reduce the induced potential to essentially zero and eliminate the object as a source of shocks or currents.

During final engineering and construction of the Project, Wheatridge will identify wire fences, pipelines, irrigation lines, metal roofs, and other objects near the Intraconnection Line(s) and Collector Lines in which a current could be induced. Such objects will be properly grounded within or as close as practicable to the right-of-way, in order to prevent induced current and nuisance shocks.

Unlike fences or buildings, mobile equipment such as vehicles and agricultural machinery cannot be permanently grounded. The NESC requires that for high-voltage power lines, sufficient conductor clearance to the ground be maintained to limit the short-circuit current induced in the largest anticipated vehicle under the line to 5 milliamperes or less (NESC 2007). If found to be necessary during final engineering, this can be accomplished at locations where large vehicles are anticipated by increasing the Intraconnection Line height, shielding the electric field, or by limiting access. Exhibit B provides specific examples of criteria for determining line height.

Wheatridge has used line configurations that provide a reasonable balance of economy and public safety in relation to electric and magnetic field strength and impacts. The predicted electric fields and thus potential induced currents from the Project Intraconnection Line(s) and Collector Lines are comparable to those for other similar lines in operation, and comply with the Oregon 9 kV/m siting standard for transmission lines. In addition to line design, induced currents and potentials will be reduced or eliminated by Wheatridge by following proper grounding practices and adherence to the NESC. Wheatridge's use of line designs and proper grounding practices will keep anticipated induced currents and potentials to a safe and reasonable level.

5.0 Conclusion

Based on the above information, the Wheatridge has satisfied the requirement of OAR 345-021-0010(1)(aa), and EFSC may find that the standards contained in OAR 345-024-0090 have been satisfied.

6.0 Submittal Requirements and Approval Standards

Tables AA-10 and AA-11 provide cross references between Exhibit submittal requirements of OAR 345-021-0010 and the EFSC's approval standards of OAR 345-022-0000 and where discussion can be found in this Exhibit.

6.1 Submittal Requirements

Table AA-8. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)((aa) Exhibit AA. If the proposed energy facility is a transmission line or has, as a related or supporting facility, a transmission line of any size:	
(A) Information about the expected electric and magnetic fields, including:	
(i) The distance in feet from the proposed center line of each proposed transmission line to the edge of the right-of-way;	Section 2.3, Table AA-3, Figures AA-1A through AA-1E
(ii) The type of each occupied structure, including but not limited to residences, commercial establishments, industrial facilities, schools, daycare centers and hospitals, within 200 feet on each side of the proposed center line of each proposed transmission line;	Section 2.3
(iii) The approximate distance in feet from the proposed center line to each structure identified in (A);	Section 2.3
(iv) At representative locations along each proposed transmission line, a graph of the predicted electric and magnetic fields levels from the proposed center line to 200 feet on each side of the proposed center line;	Section 2.4, Figures AA-5A through AA-5E
(v) Any measures the applicant proposes to reduce electric or magnetic field levels;	Section 2.5
(vi) The assumptions and methods used in the electric and magnetic field analysis, including the current in amperes on each proposed transmission line; and	Section 2.2
(vii) The applicant's proposed monitoring program, if any, for actual electric and magnetic field levels; and	Section 2.5
(B) An evaluation of alternate methods and costs of reducing radio interference likely to be caused by the transmission line in the primary reception area near interstate, U.S. and state highways;	Section 2.5
Project Order Comments	**Location**
None	NA

6.2 Approval Standard

OAR 345 Division 22 does not provide an approval standard specific to Exhibit AA.

7.0 References

EU (Council of the European Union). Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields. Official Journal of the European Communities. 1999/199/59. Available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:199:0059:0070:EN:PDF

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EFSC (Oregon Energy Facility Siting Council), 2009. EMF Report: A Review of the Current Scientific Literature on Health Effects of Electric and Magnetic Fields. Oregon Department of Energy, Salem, OR.

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EPRI. 2005. EPRI AC Transmission Line Reference Book, 200 kV and Above, Third Edition, Electric Power Research Institute, Palo Alto, California.

ICES (International Committee on Electromagnetic Safety). 2002. IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 3 kHz C95. 6-2002. Piscataway, New Jersey.

ICNIRP (International Commission on Non-Ionizing Radiation Protection). 2010. Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Physics, 2010.

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IEEE (Institute of Electrical and Electronics Engineers). 1971. *Radio Noise Design Guide for High Voltage Transmission Lines*. IEEE Radio Noise Subcommittee Report-Working Group No. 3. Paper 70TP631-PWR.

IEEE. 1986. IEEE Standard Procedures for Measurement of Radio Noise from Overhead Power Lines and Substations. ANSI/IEEE Std. 430-1986, New York, NY. (see also)
IEEE Committee Report. March/April 1971. Radio Noise Design Guide for High Voltage Transmission Lines. *IEEE Transactions on Power Apparatus and Systems, PAS-90* (No. 2, March/April):833-842.

NESC (National Electric Safety Code). 2007. National Electrical Safety Code. 2007 ed. Institute of Electrical and Electronics Engineers, Inc., New York, NY. 287 pages.

NIEHS. 1999. Health effects from exposure to powerline frequency electric and magnetic fields. NIH; National Institute of Health; NIH No. 99-4493; Research Triangle Park, North Carolina.

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Attachments

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Attachment AA-1:

Results of the BPA CAFE Modeling Program for Intraconnection Line Design Configuration A

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Û      C O R O N A   A N D   F I E L D      Û
Û E F F E C T S   P R O G R A M   V E R. 3   Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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******************WHEATRIDGE WIND FARM *******************
FIG AA-1A 230-KV H-FRAME (2)954 KCMIL ACSR CARDINAL500 MW-1280A
1,0, 3, 5,0.0,   2.00,   1.00,    .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  5 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
'PHA-1   ','A',  -19.50,   30.00, 2,   1.196,  18.000, 140.000,    .000,   1.280,    .000
'PHB-1   ','A',     .00,   30.00, 2,   1.196,  18.000, 140.000,-120.000,   1.280,    .000
'PHC-1   ','A',   19.50,   30.00, 2,   1.196,  18.000, 140.000, 120.000,   1.280,    .000
'GND1    ','A',   -9.75,   45.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
'GND2    ','A',    9.75,   45.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
 40 -200.0    5.0
 41     .0    5.0
  0     .0     .0
```

1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD

******************WHEATRIDGE WIND FARM *******************

FIG AA-1A 230-KV H-FRAME (2)954 KCMIL ACSR CARDINAL500 MW-1280A

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
PHA-1	-19.50	30.00	11.00	1.20	2	18.00	140.00	.00	1.28	1.252
PHB-1	.00	30.00	12.01	1.20	2	18.00	140.00	-120.00	1.28	2.223
PHC-1	19.50	30.00	11.00	1.20	2	18.00	140.00	120.00	1.28	1.252
GND1	-9.75	45.00	4.53	.36	1	.00	.00	.00	.00	.000
GND2	9.75	45.00	4.53	.36	1	.00	.00	.00	.00	.000

AN MICROPHONE HT.= 5.0 FT, RI ANT. HT.= 5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=   .0 FT

RI FREQ= 1.000 MHZ, TV FREQ= 75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M

E-FIELD TRANSDUCER HT.= 3.3FT, B-FIELD TRANSDUCER HT.= 3.3FT

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	22.6	-2.4	23.4	6.4	-6.0	.000000	.051	.00704
-195.0	22.7	-2.3	23.7	6.7	-5.7	.000000	.055	.00740
-190.0	22.9	-2.1	24.0	7.0	-5.5	.000000	.059	.00780
-185.0	23.0	-2.0	24.3	7.3	-5.3	.000000	.064	.00822
-180.0	23.1	-1.9	24.6	7.6	-5.0	.000000	.069	.00868
-175.0	23.3	-1.7	25.0	8.0	-4.8	.000000	.075	.00918
-170.0	23.4	-1.6	25.3	8.3	-4.6	.000000	.081	.00972
-165.0	23.6	-1.4	25.7	8.7	-4.3	.000000	.088	.01031
-160.0	23.7	-1.3	26.1	9.1	-4.0	.000000	.096	.01096
-155.0	23.9	-1.1	26.5	9.5	-3.8	.000000	.105	.01166
-150.0	24.0	-1.0	26.9	9.9	-3.5	.000000	.115	.01244
-145.0	24.2	-.8	27.4	10.4	-3.2	.000000	.127	.01330

-140.0	24.4	-.6	27.8	10.8	-2.9	.000000	.140	.01425
-135.0	24.5	-.5	28.3	11.3	-2.6	.000000	.156	.01531
-130.0	24.7	-.3	28.8	11.8	-2.3	.000000	.173	.01649
-125.0	24.9	-.1	29.3	12.3	-1.9	.000000	.193	.01780
-120.0	25.1	.1	29.9	12.9	-1.6	.000000	.217	.01928
-115.0	25.3	.3	30.4	13.4	-1.2	.000000	.244	.02095
-110.0	25.5	.5	31.0	14.0	-.9	.000000	.277	.02284
-105.0	25.8	.8	31.7	14.7	-.5	.000000	.315	.02500
-100.0	26.0	1.0	32.4	15.4	-.1	.000000	.360	.02746
-95.0	26.2	1.2	33.1	16.1	.4	.000000	.414	.03031
-90.0	26.5	1.5	33.8	16.8	.8	.000000	.480	.03360
-85.0	26.8	1.8	34.6	17.6	1.3	.000000	.559	.03745
-80.0	27.0	2.0	35.5	18.5	1.8	.000000	.656	.04196
-75.0	27.3	2.3	36.4	19.4	2.3	.000000	.774	.04731
-70.0	27.7	2.7	37.4	20.4	2.9	.000000	.921	.05368
-65.0	28.0	3.0	38.6	21.6	3.5	.000000	1.102	.06133
-60.0	28.4	3.4	40.0	23.0	4.1	.000000	1.327	.07056
-55.0	28.7	3.7	41.5	24.5	4.8	.000000	1.604	.08177
-50.0	29.1	4.1	43.2	26.2	5.5	.000000	1.941	.09540
-45.0	29.6	4.6	44.8	27.8	6.3	.000000	2.339	.11190
-40.0	30.0	5.0	46.5	29.5	7.1	.000000	2.783	.13160
-35.0	30.4	5.4	48.1	31.1	8.0	.000000	3.231	.15446
-30.0	30.9	5.9	49.5	32.5	9.0	.000000	3.595	.17959
-25.0	31.3	6.3	50.5	33.5	10.0	.000000	3.749	.20493
-20.0	31.7	6.7	51.3	34.3	11.1	.000000	3.587	.22742
-15.0	32.0	7.0	52.9	35.9	12.2	.000000	3.106	.24418
-10.0	32.3	7.3	54.3	37.3	13.1	.000302	2.479	.25408
-5.0	32.4	7.4	55.2	38.2	13.8	.004066	1.990	.25829
.0	32.5	7.5	55.5	38.5	14.1	.009522	1.826	.25925
5.0	32.4	7.4	55.2	38.2	13.8	.013431	1.990	.25829
10.0	32.3	7.3	54.3	37.3	13.1	.016561	2.479	.25408
15.0	32.0	7.0	52.9	35.9	12.2	.026288	3.106	.24418
20.0	31.7	6.7	51.3	34.3	11.1	.037913	3.587	.22742
25.0	31.3	6.3	50.5	33.5	10.0	.045604	3.749	.20493
30.0	30.9	5.9	49.5	32.5	9.0	.050109	3.595	.17959
35.0	30.4	5.4	48.1	31.1	8.0	.055884	3.231	.15446
40.0	30.0	5.0	46.5	29.5	7.1	.060968	2.783	.13160
45.0	29.6	4.6	44.8	27.8	6.3	.063486	2.339	.11190
50.0	29.1	4.1	43.2	26.2	5.5	.063914	1.941	.09540
55.0	28.7	3.7	41.5	24.5	4.8	.063059	1.604	.08177
60.0	28.4	3.4	40.0	23.0	4.1	.061505	1.327	.07056
65.0	28.0	3.0	38.6	21.6	3.5	.059607	1.102	.06133
70.0	27.7	2.7	37.4	20.4	2.9	.057570	.921	.05368
75.0	27.3	2.3	36.4	19.4	2.3	.055511	.774	.04731
80.0	27.0	2.0	35.5	18.5	1.8	.053494	.656	.04196
85.0	26.8	1.8	34.6	17.6	1.3	.051553	.559	.03745
90.0	26.5	1.5	33.8	16.8	.8	.049704	.480	.03360
95.0	26.2	1.2	33.1	16.1	.4	.047955	.414	.03031
100.0	26.0	1.0	32.4	15.4	-.1	.046304	.360	.02746
105.0	25.8	.8	31.7	14.7	-.5	.044751	.315	.02500
110.0	25.5	.5	31.0	14.0	-.9	.043289	.277	.02284
115.0	25.3	.3	30.4	13.4	-1.2	.041914	.244	.02095
120.0	25.1	.1	29.9	12.9	-1.6	.040620	.217	.01928
125.0	24.9	-.1	29.3	12.3	-1.9	.039401	.193	.01780
130.0	24.7	-.3	28.8	11.8	-2.3	.038252	.173	.01649
135.0	24.5	-.5	28.3	11.3	-2.6	.037168	.156	.01531
140.0	24.4	-.6	27.8	10.8	-2.9	.036143	.140	.01425
145.0	24.2	-.8	27.4	10.4	-3.2	.035175	.127	.01330
150.0	24.0	-1.0	26.9	9.9	-3.5	.034257	.115	.01244
155.0	23.9	-1.1	26.5	9.5	-3.8	.033388	.105	.01166
160.0	23.7	-1.3	26.1	9.1	-4.0	.032562	.096	.01096
165.0	23.6	-1.4	25.7	8.7	-4.3	.031778	.088	.01031
170.0	23.4	-1.6	25.3	8.3	-4.6	.031032	.081	.00972
175.0	23.3	-1.7	25.0	8.0	-4.8	.030321	.075	.00918
180.0	23.1	-1.9	24.6	7.6	-5.0	.029644	.069	.00868
185.0	23.0	-2.0	24.3	7.3	-5.3	.028997	.064	.00822
190.0	22.9	-2.1	24.0	7.0	-5.5	.028379	.059	.00780
195.0	22.7	-2.3	23.7	6.7	-5.7	.027788	.055	.00740
200.0	22.6	-2.4	23.4	6.4	-6.0	.027223	.051	.00704

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Attachment AA-2:

Results of the BPA CAFE Modeling Program for Intraconnection Line Design Configuration B

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Û       C O R O N A   A N D   F I E L D       Û
Û E F F E C T S   P R O G R A M   V E R. 3   Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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 ******************WHEATRIDGE WIND FARM *******************
 FIGURE AA-1B 230-KV (2)954 KCMIL ACSR CARDINAL 500 MW-1280A
 1,0, 3, 4,0.0,   2.00,   1.00,    .00

 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  4 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

 OPTIONS: 'COMB'
   5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
 'PHA-1   ','A',  -10.00,   48.00, 2,   1.196,  18.000, 140.000,    .000,   1.280,    .000
 'PHB-1   ','A',   10.00,   39.00, 2,   1.196,  18.000, 140.000,-120.000,   1.280,    .000
 'PHC-1   ','A',  -12.50,   30.00, 2,   1.196,  18.000, 140.000, 120.000,   1.280,    .000
 'GND1    ','A',   -1.00,   65.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
  40 -200.0    5.0
  41     .0    5.0
   0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 ******************WHEATRIDGE WIND FARM *******************
 FIGURE AA-1B 230-KV (2)954 KCMIL ACSR CARDINAL 500 MW-1280A
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
PHA-1	-10.00	48.00	11.60	1.20	2	18.00	140.00	.00	1.28	1.767
PHB-1	10.00	39.00	11.10	1.20	2	18.00	140.00	-120.00	1.28	1.327
PHC-1	-12.50	30.00	11.72	1.20	2	18.00	140.00	120.00	1.28	1.890
GND1	-1.00	65.00	5.30	.36	1	.00	.00	.00	.00	.000

AN MICROPHONE HT.= 5.0 FT, RI ANT. HT.= 5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=   .0 FT
RI FREQ= 1.000 MHZ, TV FREQ= 75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.= 3.3FT, B-FIELD TRANSDUCER HT.= 3.3FT

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	23.0	-2.0	26.0	9.0	-6.7	.000000	.058	.00439
-195.0	23.1	-1.9	26.3	9.3	-6.5	.000000	.061	.00461
-190.0	23.2	-1.8	26.6	9.6	-6.2	.000000	.065	.00485
-185.0	23.3	-1.7	27.0	10.0	-6.0	.000000	.069	.00511
-180.0	23.5	-1.5	27.3	10.3	-5.7	.000000	.073	.00539
-175.0	23.6	-1.4	27.7	10.7	-5.5	.000000	.077	.00570
-170.0	23.8	-1.2	28.0	11.0	-5.2	.000000	.082	.00603
-165.0	23.9	-1.1	28.4	11.4	-4.9	.000000	.088	.00639
-160.0	24.1	-.9	28.8	11.8	-4.7	.000000	.094	.00678
-155.0	24.2	-.8	29.2	12.2	-4.4	.000000	.100	.00721
-150.0	24.4	-.6	29.7	12.7	-4.1	.000000	.107	.00768
-145.0	24.6	-.4	30.1	13.1	-3.7	.000000	.116	.00820
-140.0	24.7	-.3	30.6	13.6	-3.4	.000000	.124	.00878
-135.0	24.9	-.1	31.0	14.0	-3.1	.000000	.134	.00942
-130.0	25.1	.1	31.5	14.5	-2.7	.000000	.146	.01012
-125.0	25.3	.3	32.1	15.1	-2.4	.000000	.158	.01092

-120.0	25.5	.5	32.6	15.6	-2.0	.000000	.172	.01180
-115.0	25.7	.7	33.2	16.2	-1.6	.000000	.188	.01280
-110.0	25.9	.9	33.8	16.8	-1.2	.000000	.207	.01393
-105.0	26.1	1.1	34.4	17.4	-.7	.000000	.228	.01522
-100.0	26.4	1.4	35.1	18.1	-.3	.000000	.252	.01669
-95.0	26.6	1.6	35.8	18.8	.2	.000000	.280	.01838
-90.0	26.9	1.9	36.5	19.5	.7	.000000	.313	.02033
-85.0	27.1	2.1	37.2	20.2	1.3	.000000	.352	.02260
-80.0	27.4	2.4	38.0	21.0	1.9	.000000	.398	.02526
-75.0	27.7	2.7	38.9	21.9	2.5	.000000	.455	.02840
-70.0	28.0	3.0	39.7	22.7	3.1	.000000	.525	.03212
-65.0	28.3	3.3	40.6	23.6	3.8	.000000	.612	.03656
-60.0	28.7	3.7	41.5	24.5	4.6	.000000	.724	.04189
-55.0	29.0	4.0	42.7	25.7	5.4	.000000	.869	.04832
-50.0	29.4	4.4	44.2	27.2	6.2	.000000	1.058	.05610
-45.0	29.8	4.8	45.8	28.8	7.2	.000000	1.305	.06550
-40.0	30.2	5.2	47.5	30.5	8.2	.000000	1.622	.07680
-35.0	30.6	5.6	49.2	32.2	9.2	.000000	2.016	.09015
-30.0	30.9	5.9	50.8	33.8	10.3	.000000	2.468	.10546
-25.0	31.3	6.3	52.3	35.3	11.4	.000000	2.923	.12206
-20.0	31.6	6.6	53.5	36.5	12.2	.000000	3.273	.13846
-15.0	31.8	6.8	54.1	37.1	12.7	.000000	3.387	.15237
-10.0	31.8	6.8	54.1	37.1	12.7	.000000	3.181	.16143
-5.0	31.8	6.8	53.5	36.5	12.2	.000036	2.704	.16429
.0	31.6	6.6	52.3	35.3	11.4	.003537	2.156	.16111
5.0	31.4	6.4	50.8	33.8	10.3	.012825	1.819	.15307
10.0	31.1	6.1	49.2	32.2	9.2	.021799	1.819	.14164
15.0	30.8	5.8	48.2	31.2	8.2	.028976	1.945	.12826
20.0	30.5	5.5	47.7	30.7	7.2	.034358	2.016	.11415
25.0	30.1	5.1	46.9	29.9	6.2	.038758	1.982	.10032
30.0	29.8	4.8	45.9	28.9	5.4	.043659	1.863	.08745
35.0	29.4	4.4	44.8	27.8	4.6	.048214	1.693	.07593
40.0	29.1	4.1	43.6	26.6	3.8	.051475	1.503	.06588
45.0	28.7	3.7	42.3	25.3	3.1	.053356	1.315	.05726
50.0	28.4	3.4	41.1	24.1	2.5	.054135	1.142	.04993
55.0	28.1	3.1	40.0	23.0	1.9	.054129	.987	.04372
60.0	27.8	2.8	38.8	21.8	1.3	.053598	.853	.03846
65.0	27.5	2.5	37.7	20.7	.7	.052728	.738	.03401
70.0	27.2	2.2	36.7	19.7	.2	.051649	.640	.03023
75.0	26.9	1.9	35.8	18.8	-.3	.050449	.558	.02699
80.0	26.7	1.7	35.1	18.1	-.7	.049189	.488	.02422
85.0	26.4	1.4	34.4	17.4	-1.2	.047907	.428	.02183
90.0	26.2	1.2	33.8	16.8	-1.6	.046630	.378	.01976
95.0	26.0	1.0	33.2	16.2	-2.0	.045376	.335	.01796
100.0	25.8	.8	32.6	15.6	-2.4	.044153	.299	.01639
105.0	25.5	.5	32.1	15.1	-2.7	.042970	.267	.01500
110.0	25.3	.3	31.5	14.5	-3.1	.041830	.240	.01378
115.0	25.1	.1	31.0	14.0	-3.4	.040734	.217	.01270
120.0	25.0	.0	30.6	13.6	-3.7	.039684	.196	.01173
125.0	24.8	-.2	30.1	13.1	-4.1	.038678	.179	.01087
130.0	24.6	-.4	29.7	12.7	-4.4	.037715	.163	.01010
135.0	24.4	-.6	29.2	12.2	-4.7	.036793	.149	.00941
140.0	24.3	-.7	28.8	11.8	-4.9	.035912	.137	.00878
145.0	24.1	-.9	28.4	11.4	-5.2	.035070	.126	.00822
150.0	24.0	-1.0	28.0	11.0	-5.5	.034264	.117	.00770
155.0	23.8	-1.2	27.7	10.7	-5.7	.033492	.108	.00723
160.0	23.7	-1.3	27.3	10.3	-6.0	.032754	.100	.00681
165.0	23.5	-1.5	27.0	10.0	-6.2	.032046	.093	.00641
170.0	23.4	-1.6	26.6	9.6	-6.5	.031368	.087	.00606
175.0	23.3	-1.7	26.3	9.3	-6.7	.030718	.082	.00573
180.0	23.1	-1.9	26.0	9.0	-6.9	.030094	.076	.00542
185.0	23.0	-2.0	25.7	8.7	-7.2	.029495	.072	.00514
190.0	22.9	-2.1	25.4	8.4	-7.4	.028920	.068	.00488
195.0	22.8	-2.2	25.1	8.1	-7.6	.028366	.064	.00464
200.0	22.6	-2.4	24.9	7.9	-7.8	.027834	.060	.00442

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Attachment AA-3:

Results of the BPA CAFE Modeling Program for Intraconnection Line Design Configuration C

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Û      C O R O N A   A N D   F I E L D      Û
Û E F F E C T S   P R O G R A M   V E R. 3   Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ


                             INPUT DATA LIST


              11/14/2014          13:19:59
 ******************WHEATRIDGE WIND FARM *******************
 FIGURE AA-1C 230-KV (1)1272 KCMIL ACSR PHEASANT 300 MW-770A
 1,0, 6, 8,0.0,   2.00,   1.00,    .00

 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  8 CONDUCTORS, OF WHICH  6 ARE ENERGIZED PHASES

 OPTIONS: 'COMB'
   5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
 'PHA-1   ','A',  -10.00,   30.00, 1,   1.382,    .000, 140.000,    .000,    .770,    .000
 'PHB-1   ','A',  -12.00,   39.00, 1,   1.382,    .000, 140.000,-120.000,    .770,    .000
 'PHC-1   ','A',  -10.00,   48.00, 1,   1.382,    .000, 140.000, 120.000,    .770,    .000
 'PHA-2   ','A',   10.00,   48.00, 1,   1.382,    .000, 140.000,    .000,    .770,    .000
 'PHB-2   ','A',   12.00,   39.00, 1,   1.382,    .000, 140.000,-120.000,    .770,    .000
 'PHC-2   ','A',   10.00,   30.00, 1,   1.382,    .000, 140.000, 120.000,    .770,    .000
 'GND1    ','A',   -5.00,   65.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
 'GND2    ','A',    5.00,   65.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
  40 -200.0    5.0
  41     .0    5.0
   0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 ******************WHEATRIDGE WIND FARM *******************
 FIGURE AA-1C 230-KV (1)1272 KCMIL ACSR PHEASANT 300 MW-770A



              DIST. FROM            MAXIMUM  SUBCON   NO. OF      SUBCON   VOLTAGE  PHASE    CURRENT  CORONA
           CENTER OF TOWER  HEIGHT   GRADIENT  DIAM.   SUBCON      SPACING    L-N    ANGLE             LOSSES
                (FEET)      (FEET)   (KV/CM)   (IN)                (IN)      (KV)  (DEGREES)  (kAmps)  (KW/MI)

 PHA-1          -10.00       30.00    15.32     1.38       1         .00    140.00      .00       .77    7.811
 PHB-1          -12.00       39.00    16.12     1.38       1         .00    140.00  -120.00       .77   10.900
 PHC-1          -10.00       48.00    15.29     1.38       1         .00    140.00   120.00       .77    7.707
 PHA-2           10.00       48.00    15.29     1.38       1         .00    140.00      .00       .77    7.707
 PHB-2           12.00       39.00    16.12     1.38       1         .00    140.00  -120.00       .77   10.900
 PHC-2           10.00       30.00    15.32     1.38       1         .00    140.00   120.00       .77    7.811
 GND1            -5.00       65.00     1.97      .36       1         .00       .00      .00       .00     .000
 GND2             5.00       65.00     1.97      .36       1         .00       .00      .00       .00     .000
 AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=      .0 FT
 RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
 E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT

 LATERAL DIST       AUDIBLE NOISE   RADIO INTERFERENCE        TVI             OZONE
     FROM          (RAIN)   (FAIR)   (RAIN)   (FAIR)        TOTAL        FOR RAIN RATE OF        ELECTRIC     MAGNETIC
   REFERENCE        L50      L50      L50      L50          RAIN    1.00 IN/HR AT 0. FT LEVEL     FIELD       FIELD
    (FEET)          DBA      DBA     DBUV/M   DBUV/M       DBUV/M             PPB                  KV/M        GAUSS
    -200.0          45.2     20.2     44.1     27.1          12.4           .000000                .011      .00038
    -195.0          45.4     20.4     44.5     27.5          12.6           .000000                .011      .00040
    -190.0          45.5     20.5     44.8     27.8          12.8           .000000                .012      .00044
    -185.0          45.6     20.6     45.1     28.1          13.1           .000000                .013      .00047
    -180.0          45.8     20.8     45.5     28.5          13.3           .000000                .014      .00051
    -175.0          45.9     20.9     45.9     28.9          13.6           .000000                .014      .00055
    -170.0          46.0     21.0     46.2     29.2          13.8           .000000                .015      .00060
    -165.0          46.2     21.2     46.6     29.6          14.1           .000000                .016      .00066
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-160.0	46.3	21.3	47.1	30.1	14.4	.000000	.017	.00072
-155.0	46.5	21.5	47.5	30.5	14.7	.000000	.019	.00078
-150.0	46.6	21.6	47.9	30.9	15.0	.000000	.020	.00086
-145.0	46.8	21.8	48.4	31.4	15.3	.000000	.021	.00095
-140.0	47.0	22.0	48.9	31.9	15.6	.000000	.023	.00105
-135.0	47.1	22.1	49.4	32.4	15.9	.000000	.024	.00116
-130.0	47.3	22.3	50.0	33.0	16.3	.000000	.026	.00129
-125.0	47.5	22.5	50.5	33.5	16.6	.000000	.027	.00144
-120.0	47.7	22.7	51.1	34.1	17.0	.000000	.029	.00161
-115.0	47.9	22.9	51.7	34.7	17.4	.000000	.030	.00181
-110.0	48.1	23.1	52.4	35.4	17.8	.000000	.032	.00204
-105.0	48.3	23.3	53.1	36.1	18.2	.000000	.033	.00231
-100.0	48.5	23.5	53.8	36.8	18.6	.000000	.034	.00264
-95.0	48.7	23.7	54.6	37.6	19.1	.000000	.034	.00302
-90.0	49.0	24.0	55.4	38.4	19.6	.000000	.034	.00348
-85.0	49.2	24.2	56.2	39.2	20.1	.000000	.032	.00403
-80.0	49.5	24.5	57.1	40.1	20.6	.000000	.029	.00470
-75.0	49.8	24.8	58.1	41.1	21.1	.000000	.025	.00552
-70.0	50.0	25.0	59.1	42.1	21.7	.000000	.022	.00652
-65.0	50.3	25.3	60.1	43.1	22.3	.000000	.036	.00776
-60.0	50.7	25.7	61.2	44.2	23.0	.000000	.066	.00930
-55.0	51.0	26.0	62.4	45.4	23.7	.000000	.114	.01123
-50.0	51.3	26.3	63.6	46.6	24.4	.000000	.186	.01366
-45.0	51.7	26.7	64.8	47.8	25.1	.000000	.289	.01672
-40.0	52.0	27.0	66.0	49.0	25.8	.000000	.433	.02057
-35.0	52.4	27.4	67.2	50.2	26.6	.000000	.624	.02537
-30.0	52.8	27.8	68.3	51.3	27.3	.000000	.862	.03123
-25.0	53.1	28.1	69.2	52.2	27.9	.000000	1.125	.03812
-20.0	53.4	28.4	69.9	52.9	28.4	.000000	1.359	.04573
-15.0	53.7	28.7	70.4	53.4	29.0	.000000	1.479	.05335
-10.0	53.9	28.9	70.7	53.7	29.3	.000000	1.412	.05989
-5.0	54.0	29.0	70.4	53.4	29.0	.000000	1.180	.06429
.0	54.0	29.0	69.4	52.4	28.3	.007483	1.009	.06584
5.0	54.0	29.0	70.4	53.4	29.0	.083796	1.180	.06429
10.0	53.9	28.9	70.7	53.7	29.3	.210514	1.412	.05989
15.0	53.7	28.7	70.4	53.4	29.0	.329841	1.479	.05335
20.0	53.4	28.4	69.9	52.9	28.4	.426282	1.359	.04573
25.0	53.1	28.1	69.2	52.2	27.9	.542390	1.125	.03812
30.0	52.8	27.8	68.3	51.3	27.3	.684955	.862	.03123
35.0	52.4	27.4	67.2	50.2	26.6	.824818	.624	.02537
40.0	52.0	27.0	66.0	49.0	25.8	.934314	.433	.02057
45.0	51.7	26.7	64.8	47.8	25.1	1.006779	.289	.01672
50.0	51.3	26.3	63.6	46.6	24.4	1.047655	.186	.01366
55.0	51.0	26.0	62.4	45.4	23.7	1.065104	.114	.01123
60.0	50.7	25.7	61.2	44.2	23.0	1.066307	.066	.00930
65.0	50.3	25.3	60.1	43.1	22.3	1.056686	.036	.00776
70.0	50.0	25.0	59.1	42.1	21.7	1.040085	.022	.00652
75.0	49.8	24.8	58.1	41.1	21.1	1.019153	.025	.00552
80.0	49.5	24.5	57.1	40.1	20.6	.995693	.029	.00470
85.0	49.2	24.2	56.2	39.2	20.1	.970922	.032	.00403
90.0	49.0	24.0	55.4	38.4	19.6	.945654	.034	.00348
95.0	48.7	23.7	54.6	37.6	19.1	.920430	.034	.00302
100.0	48.5	23.5	53.8	36.8	18.6	.895603	.034	.00264
105.0	48.3	23.3	53.1	36.1	18.2	.871399	.033	.00231
110.0	48.1	23.1	52.4	35.4	17.8	.847956	.032	.00204
115.0	47.9	22.9	51.7	34.7	17.4	.825353	.030	.00181
120.0	47.7	22.7	51.1	34.1	17.0	.803628	.029	.00161
125.0	47.5	22.5	50.5	33.5	16.6	.782791	.027	.00144
130.0	47.3	22.3	50.0	33.0	16.3	.762834	.026	.00129
135.0	47.1	22.1	49.4	32.4	15.9	.743735	.024	.00116
140.0	47.0	22.0	48.9	31.9	15.6	.725468	.023	.00105
145.0	46.8	21.8	48.4	31.4	15.3	.707998	.021	.00095
150.0	46.6	21.6	47.9	30.9	15.0	.691292	.020	.00086
155.0	46.5	21.5	47.5	30.5	14.7	.675311	.019	.00078
160.0	46.3	21.3	47.1	30.1	14.4	.660020	.017	.00072
165.0	46.2	21.2	46.6	29.6	14.1	.645383	.016	.00066
170.0	46.0	21.0	46.2	29.2	13.8	.631365	.015	.00060
175.0	45.9	20.9	45.9	28.9	13.6	.617933	.014	.00055
180.0	45.8	20.8	45.5	28.5	13.3	.605055	.014	.00051
185.0	45.6	20.6	45.1	28.1	13.1	.592700	.013	.00047
190.0	45.5	20.5	44.8	27.8	12.8	.580842	.012	.00044

195.0	45.4	20.4	44.5	27.5	12.6	.569451	.011	.00040
200.0	45.2	20.2	44.1	27.1	12.4	.558504	.011	.00038

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Attachment AA-4:

Results of the BPA CAFE Modeling Program for Intraconnection Line Design Configuration D

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ÛßßßÛ
Û   C O R O N A   A N D   F I E L D   Û
Û E F F E C T S   P R O G R A M   V E R. 3   Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÛ

INPUT DATA LIST

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                11/14/2014          13:21:18
 ******************WHEATRIDGE WIND FARM *******************
 FIGURE AA-1D 230-KV (1)1272 KCMIL ACSR PHEASANT 300 MW-770A
 1,0, 3, 4,0.0,   2.00,   1.00,    .00

 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  4 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

 OPTIONS: 'COMB'
   5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
 'PHA-1   ','A',   10.00,   48.00, 1,   1.382,    .000, 140.000,    .000,    .770,    .000
 'PHB-1   ','A',   10.00,   39.00, 1,   1.382,    .000, 140.000,-120.000,    .770,    .000
 'PHC-1   ','A',   12.00,   30.00, 1,   1.382,    .000, 140.000, 120.000,    .770,    .000
 'GND1    ','A',    5.00,   65.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
  40 -200.0    5.0
  41     .0    5.0
   0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 ******************WHEATRIDGE WIND FARM *******************
 FIGURE AA-1D 230-KV (1)1272 KCMIL ACSR PHEASANT 300 MW-770A
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	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
PHA-1	10.00	48.00	14.85	1.38	1	.00	140.00	.00	.77	6.400
PHB-1	10.00	39.00	16.15	1.38	1	.00	140.00	-120.00	.77	11.030
PHC-1	12.00	30.00	15.00	1.38	1	.00	140.00	120.00	.77	6.830
GND1	5.00	65.00	4.39	.36	1	.00	.00	.00	.00	.000

AN MICROPHONE HT.= 5.0 FT, RI ANT. HT.= 5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=   .0 FT
RI FREQ= 1.000 MHZ, TV FREQ= 75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.= 3.3FT, B-FIELD TRANSDUCER HT.= 3.3FT

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	41.4	16.4	42.9	25.9	11.5	.000000	.032	.00173
-195.0	41.5	16.5	43.2	26.2	11.7	.000000	.033	.00181
-190.0	41.7	16.7	43.5	26.5	11.9	.000000	.035	.00190
-185.0	41.8	16.8	43.8	26.8	12.2	.000000	.036	.00199
-180.0	41.9	16.9	44.1	27.1	12.4	.000000	.038	.00209
-175.0	42.0	17.0	44.4	27.4	12.6	.000000	.040	.00220
-170.0	42.2	17.2	44.8	27.8	12.8	.000000	.042	.00232
-165.0	42.3	17.3	45.1	28.1	13.1	.000000	.044	.00245
-160.0	42.4	17.4	45.4	28.4	13.3	.000000	.046	.00259
-155.0	42.6	17.6	45.8	28.8	13.6	.000000	.049	.00274
-150.0	42.7	17.7	46.2	29.2	13.8	.000000	.051	.00291
-145.0	42.9	17.9	46.6	29.6	14.1	.000000	.054	.00308
-140.0	43.0	18.0	47.0	30.0	14.4	.000000	.057	.00328
-135.0	43.2	18.2	47.4	30.4	14.7	.000000	.060	.00350
-130.0	43.3	18.3	47.9	30.9	14.9	.000000	.063	.00373
-125.0	43.5	18.5	48.3	31.3	15.2	.000000	.067	.00399

-120.0	43.7	18.7	48.8	31.8	15.6	.000000	.070	.00428
-115.0	43.9	18.9	49.3	32.3	15.9	.000000	.074	.00460
-110.0	44.1	19.1	49.8	32.8	16.2	.000000	.079	.00496
-105.0	44.2	19.2	50.4	33.4	16.6	.000000	.083	.00535
-100.0	44.4	19.4	51.0	34.0	16.9	.000000	.088	.00580
-95.0	44.7	19.7	51.6	34.6	17.3	.000000	.093	.00630
-90.0	44.9	19.9	52.2	35.2	17.7	.000000	.098	.00686
-85.0	45.1	20.1	52.9	35.9	18.1	.000000	.103	.00750
-80.0	45.3	20.3	53.6	36.6	18.5	.000000	.108	.00823
-75.0	45.6	20.6	54.4	37.4	19.0	.000000	.113	.00907
-70.0	45.8	20.8	55.1	38.1	19.5	.000000	.117	.01003
-65.0	46.1	21.1	56.0	39.0	19.9	.000000	.119	.01114
-60.0	46.4	21.4	56.9	39.9	20.5	.000000	.119	.01243
-55.0	46.7	21.7	57.8	40.8	21.0	.000000	.116	.01393
-50.0	47.0	22.0	58.8	41.8	21.6	.000000	.108	.01570
-45.0	47.3	22.3	59.8	42.8	22.2	.000000	.093	.01778
-40.0	47.6	22.6	60.9	43.9	22.8	.000000	.069	.02023
-35.0	48.0	23.0	62.0	45.0	23.5	.000000	.042	.02314
-30.0	48.3	23.3	63.2	46.2	24.2	.000000	.078	.02659
-25.0	48.7	23.7	64.4	47.4	24.9	.000000	.180	.03066
-20.0	49.1	24.1	65.6	48.6	25.6	.000000	.334	.03543
-15.0	49.5	24.5	66.8	49.8	26.4	.000000	.553	.04092
-10.0	49.8	24.8	68.0	51.0	27.1	.000000	.843	.04704
-5.0	50.1	25.1	69.0	52.0	27.8	.000000	1.201	.05348
.0	50.4	25.4	69.8	52.8	28.3	.000000	1.592	.05962
5.0	50.6	25.6	70.3	53.3	28.7	.000000	1.946	.06447
10.0	50.7	25.7	70.5	53.5	28.8	.000000	2.164	.06692
15.0	50.7	25.7	70.3	53.3	28.7	.000000	2.174	.06627
20.0	50.5	25.5	69.8	52.8	28.3	.000678	1.979	.06267
25.0	50.3	25.3	69.0	52.0	27.8	.038838	1.652	.05707
30.0	49.9	24.9	68.0	51.0	27.1	.146299	1.286	.05061
35.0	49.6	24.6	66.8	49.8	26.4	.265227	.948	.04415
40.0	49.2	24.2	65.6	48.6	25.6	.360003	.669	.03822
45.0	48.8	23.8	64.4	47.4	24.9	.424905	.455	.03300
50.0	48.4	23.4	63.2	46.2	24.2	.464976	.299	.02852
55.0	48.1	23.1	62.0	45.0	23.5	.486929	.190	.02474
60.0	47.7	22.7	60.9	43.9	22.8	.496400	.120	.02155
65.0	47.4	22.4	59.8	42.8	22.2	.497534	.084	.01887
70.0	47.0	22.0	58.8	41.8	21.6	.493222	.075	.01661
75.0	46.7	21.7	57.8	40.8	21.0	.485437	.079	.01469
80.0	46.4	21.4	56.9	39.9	20.5	.475509	.084	.01307
85.0	46.2	21.2	56.0	39.0	19.9	.464336	.088	.01168
90.0	45.9	20.9	55.1	38.1	19.5	.452518	.090	.01049
95.0	45.6	20.6	54.4	37.4	19.0	.440454	.090	.00947
100.0	45.4	20.4	53.6	36.6	18.5	.428411	.088	.00858
105.0	45.1	20.1	52.9	35.9	18.1	.416560	.086	.00780
110.0	44.9	19.9	52.2	35.2	17.7	.405013	.083	.00712
115.0	44.7	19.7	51.6	34.6	17.3	.393836	.080	.00653
120.0	44.5	19.5	51.0	34.0	16.9	.383068	.077	.00600
125.0	44.3	19.3	50.4	33.4	16.6	.372727	.074	.00553
130.0	44.1	19.1	49.8	32.8	16.2	.362816	.070	.00512
135.0	43.9	18.9	49.3	32.3	15.9	.353333	.067	.00474
140.0	43.7	18.7	48.8	31.8	15.6	.344266	.064	.00441
145.0	43.5	18.5	48.3	31.3	15.2	.335601	.061	.00411
150.0	43.4	18.4	47.9	30.9	14.9	.327323	.058	.00384
155.0	43.2	18.2	47.4	30.4	14.7	.319412	.055	.00359
160.0	43.0	18.0	47.0	30.0	14.4	.311853	.053	.00337
165.0	42.9	17.9	46.6	29.6	14.1	.304626	.050	.00316
170.0	42.7	17.7	46.2	29.2	13.8	.297714	.048	.00298
175.0	42.6	17.6	45.8	28.8	13.6	.291100	.046	.00281
180.0	42.5	17.5	45.4	28.4	13.3	.284768	.043	.00265
185.0	42.3	17.3	45.1	28.1	13.1	.278702	.041	.00251
190.0	42.2	17.2	44.8	27.8	12.8	.272887	.040	.00237
195.0	42.0	17.0	44.4	27.4	12.6	.267310	.038	.00225
200.0	41.9	16.9	44.1	27.1	12.4	.261957	.036	.00214

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Attachment AA-5:

Results of the BPA CAFE Modeling Program for Intraconnection Line Design Configuration E

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 Û      C O R O N A   A N D   F I E L D      Û
 Û E F F E C T S   P R O G R A M   V E R. 3   Û
 Û   Source: Bonneville Power Administration   Û
 ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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INPUT DATA LIST

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 ******************WHEATRIDGE WIND FARM *******************
 FIG AA-1E 230-KV (1)1272 KCMIL ACSR PHEASANT 300 MW-770A
 1,0, 6, 8,0.0,   2.00,   1.00,    .00

 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  8 CONDUCTORS, OF WHICH  6 ARE ENERGIZED PHASES

 OPTIONS: 'COMB'
   5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
 'PHA-1   ','A',  -60.00,   48.00, 1,   1.382,    .000, 140.000,    .000,    .770,    .000
 'PHB-1   ','A',  -40.00,   39.00, 1,   1.382,    .000, 140.000,-120.000,    .770,    .000
 'PHC-1   ','A',  -72.50,   30.00, 1,   1.382,    .000, 140.000, 120.000,    .770,    .000
 'PHA-2   ','A',   60.00,   48.00, 1,   1.382,    .000, 140.000,    .000,    .770,    .000
 'PHB-2   ','A',   40.00,   39.00, 1,   1.382,    .000, 140.000,-120.000,    .770,    .000
 'PHC-2   ','A',   72.50,   30.00, 1,   1.382,    .000, 140.000, 120.000,    .770,    .000
 'GND1    ','A',  -50.00,   65.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
 'GND2    ','A',   50.00,   65.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
  40 -400.0   10.0
  41     .0   10.0
   0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 ******************WHEATRIDGE WIND FARM *******************
 FIG AA-1E 230-KV (1)1272 KCMIL ACSR PHEASANT 300 MW-770A
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	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
PHA-1	-60.00	48.00	13.58	1.38	1	.00	140.00	.00	.77	3.566
PHB-1	-40.00	39.00	12.94	1.38	1	.00	140.00	-120.00	.77	2.610
PHC-1	-72.50	30.00	13.37	1.38	1	.00	140.00	120.00	.77	3.222
PHA-2	60.00	48.00	13.58	1.38	1	.00	140.00	.00	.77	3.566
PHB-2	40.00	39.00	12.94	1.38	1	.00	140.00	-120.00	.77	2.610
PHC-2	72.50	30.00	13.37	1.38	1	.00	140.00	120.00	.77	3.222
GND1	-50.00	65.00	4.31	.36	1	.00	.00	.00	.00	.000
GND2	50.00	65.00	4.31	.36	1	.00	.00	.00	.00	.000

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 AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=      .0 FT
 RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
 E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT

 LATERAL DIST       AUDIBLE NOISE   RADIO INTERFERENCE        TVI              OZONE
     FROM          (RAIN)   (FAIR)   (RAIN)    (FAIR)         TOTAL        FOR RAIN RATE OF        ELECTRIC     MAGNETIC
   REFERENCE        L50      L50      L50       L50           RAIN    1.00 IN/HR AT 0. FT LEVEL     FIELD       FIELD
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(FEET)	DBA	DBA	DBUV/M	DBUV/M	DBUV/M	PPB	KV/M	GAUSS
-400.0	33.6	8.6	30.5	13.5	-1.7	.000000	.015	.00107
-390.0	33.8	8.8	30.8	13.8	-1.4	.000000	.015	.00113
-380.0	33.9	8.9	31.1	14.1	-1.2	.000000	.016	.00119
-370.0	34.0	9.0	31.4	14.4	-.9	.000000	.017	.00127
-360.0	34.2	9.2	31.7	14.7	-.6	.000000	.018	.00135
-350.0	34.3	9.3	32.1	15.1	-.3	.000000	.019	.00143
-340.0	34.5	9.5	32.5	15.5	.0	.000000	.021	.00153
-330.0	34.6	9.6	32.8	15.8	.3	.000000	.022	.00163
-320.0	34.8	9.8	33.2	16.2	.6	.000000	.023	.00175
-310.0	35.0	10.0	33.7	16.7	.9	.000000	.025	.00188
-300.0	35.1	10.1	34.1	17.1	1.3	.000000	.027	.00203
-290.0	35.3	10.3	34.6	17.6	1.6	.000000	.029	.00220
-280.0	35.5	10.5	35.1	18.1	2.0	.000000	.031	.00238
-270.0	35.7	10.7	35.6	18.6	2.4	.000000	.034	.00260
-260.0	35.9	10.9	36.2	19.2	2.8	.000000	.037	.00284
-250.0	36.1	11.1	36.7	19.7	3.3	.000000	.041	.00313
-240.0	36.4	11.4	37.4	20.4	3.7	.000000	.046	.00346
-230.0	36.6	11.6	38.0	21.0	4.2	.000000	.051	.00386
-220.0	36.8	11.8	38.8	21.8	4.7	.000000	.058	.00432
-210.0	37.1	12.1	39.5	22.5	5.3	.000000	.066	.00489
-200.0	37.4	12.4	40.4	23.4	6.0	.000000	.077	.00558
-190.0	37.7	12.7	41.3	24.3	6.7	.000000	.091	.00643
-180.0	38.0	13.0	42.3	25.3	7.4	.000000	.109	.00750
-170.0	38.3	13.3	43.4	26.4	8.2	.000000	.134	.00887
-160.0	38.7	13.7	44.5	27.5	9.1	.000000	.170	.01066
-150.0	39.1	14.1	45.8	28.8	10.1	.000000	.223	.01304
-140.0	39.5	14.5	47.2	30.2	11.2	.000000	.301	.01630
-130.0	40.0	15.0	48.8	31.8	12.5	.000000	.424	.02084
-120.0	40.6	15.6	50.7	33.7	13.9	.000000	.619	.02738
-110.0	41.2	16.2	53.6	36.6	15.6	.000000	.937	.03698
-100.0	41.8	16.8	56.8	39.8	17.6	.000000	1.438	.05124
-90.0	42.5	17.5	60.2	43.2	19.7	.000000	2.132	.07172
-80.0	43.1	18.1	62.9	45.9	21.6	.000000	2.743	.09705
-70.0	43.5	18.5	63.5	46.5	22.1	.000000	2.597	.11851
-60.0	43.5	18.5	61.7	44.7	20.7	.007848	1.535	.12686
-50.0	43.3	18.3	58.8	41.8	18.6	.046018	.907	.12341
-40.0	43.1	18.1	58.9	41.9	17.2	.064652	1.621	.11248
-30.0	42.8	17.8	58.2	41.2	16.8	.081376	1.978	.09745
-20.0	42.6	17.6	56.4	39.4	15.6	.101854	1.952	.08300
-10.0	42.4	17.4	54.1	37.1	14.1	.122522	1.816	.07312
.0	42.3	17.3	51.7	34.7	12.6	.130601	1.753	.06968
10.0	42.4	17.4	54.1	37.1	14.1	.130386	1.816	.07312
20.0	42.6	17.6	56.4	39.4	15.6	.126352	1.952	.08300
30.0	42.8	17.8	58.2	41.2	16.8	.120829	1.978	.09745
40.0	43.1	18.1	58.9	41.9	17.2	.114907	1.621	.11248
50.0	43.3	18.3	58.8	41.8	18.6	.109105	.907	.12341
60.0	43.5	18.5	61.7	44.7	20.7	.112503	1.535	.12686
70.0	43.5	18.5	63.5	46.5	22.1	.123918	2.597	.11851
80.0	43.1	18.1	62.9	45.9	21.6	.130867	2.743	.09705
90.0	42.5	17.5	60.2	43.2	19.7	.172585	2.132	.07172
100.0	41.8	16.8	56.8	39.8	17.6	.211426	1.438	.05124
110.0	41.2	16.2	53.6	36.6	15.6	.221599	.937	.03698
120.0	40.6	15.6	50.7	33.7	13.9	.218656	.619	.02738
130.0	40.0	15.0	48.8	31.8	12.5	.210795	.424	.02084
140.0	39.5	14.5	47.2	30.2	11.2	.201389	.301	.01630
150.0	39.1	14.1	45.8	28.8	10.1	.191816	.223	.01304
160.0	38.7	13.7	44.5	27.5	9.1	.182635	.170	.01066
170.0	38.3	13.3	43.4	26.4	8.2	.174052	.134	.00887
180.0	38.0	13.0	42.3	25.3	7.4	.166119	.109	.00750
190.0	37.7	12.7	41.3	24.3	6.7	.158822	.091	.00643

200.0	37.4	12.4	40.4	23.4	6.0	.152116	.077	.00558
210.0	37.1	12.1	39.5	22.5	5.3	.145952	.066	.00489
220.0	36.8	11.8	38.8	21.8	4.7	.140275	.058	.00432
230.0	36.6	11.6	38.0	21.0	4.2	.135037	.051	.00386
240.0	36.4	11.4	37.4	20.4	3.7	.130192	.046	.00346
250.0	36.1	11.1	36.7	19.7	3.3	.125699	.041	.00313
260.0	35.9	10.9	36.2	19.2	2.8	.121523	.037	.00284
270.0	35.7	10.7	35.6	18.6	2.4	.117633	.034	.00260
280.0	35.5	10.5	35.1	18.1	2.0	.113999	.031	.00238
290.0	35.3	10.3	34.6	17.6	1.6	.110598	.029	.00220
300.0	35.1	10.1	34.1	17.1	1.3	.107408	.027	.00203
310.0	35.0	10.0	33.7	16.7	.9	.104410	.025	.00188
320.0	34.8	9.8	33.2	16.2	.6	.101587	.023	.00175
330.0	34.6	9.6	32.8	15.8	.3	.098923	.022	.00163
340.0	34.5	9.5	32.5	15.5	.0	.096407	.021	.00153
350.0	34.3	9.3	32.1	15.1	-.3	.094024	.019	.00143
360.0	34.2	9.2	31.7	14.7	-.6	.091766	.018	.00135
370.0	34.0	9.0	31.4	14.4	-.9	.089622	.017	.00127
380.0	33.9	8.9	31.1	14.1	-1.2	.087583	.016	.00119
390.0	33.8	8.8	30.8	13.8	-1.4	.085642	.015	.00113
400.0	33.6	8.6	30.5	13.5	-1.7	.083792	.015	.00107

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Attachment AA-6:

Results of the BPA CAFE Modeling Program for 34.5 kV Underground Collector Lines

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Û      C O R O N A   A N D   F I E L D      Û
Û E F F E C T S   P R O G R A M   V E R. 3   Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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INPUT DATA LIST

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                11/ 1/2013         13:40:56
******************WHEATRIDGE WIND FARM *******************
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FIGURE AA-2 34.5 kV UG 1000 KCMIL 50 MW-700A

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1,0, 3, 3,0.0,   2.00,   1.00,    .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  3 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,   .000,  1.000, 75.000, -3.280,  2.000,  3.280
'PHA-1   ','A',    -.10,     .10, 1,   1.453,    .000,  19.900,    .000,    .700,    .000
'PHB-1   ','A',     .00,     .10, 1,   1.453,    .000,  19.900,-120.000,    .700,    .000
'PHC-1   ','A',     .10,     .10, 1,   1.453,    .000,  19.900, 120.000,    .700,    .000
 40 -200.0    5.0
 41     .0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
******************WHEATRIDGE WIND FARM *******************
FIGURE AA-2 34.5 kV UG 1000 KCMIL 50 MW-700A
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
PHA-1	-.10	.10	29.76	1.45	1	.00	19.90	.00	.70	715.020
PHB-1	.00	.10	46.26	1.45	1	.00	19.90	-120.00	.70	********
PHC-1	.10	.10	29.76	1.45	1	.00	19.90	120.00	.70	715.019

```
AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=      .0 FT
RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.= -3.3FT
```

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	95.3	70.3	47.6	30.6	67.7	.000000	.000	.00002
-195.0	95.4	70.4	47.9	30.9	68.2	.000000	.000	.00002
-190.0	95.6	70.6	48.2	31.2	68.6	.000000	.000	.00002
-185.0	95.7	70.7	48.5	31.5	69.1	.000000	.000	.00002
-180.0	95.8	70.8	48.8	31.8	69.5	.000000	.000	.00002

-175.0	96.0	71.0	49.2	32.2	70.0	.000000	.000	.00003
-170.0	96.1	71.1	49.6	32.6	70.5	.000000	.000	.00003
-165.0	96.3	71.3	49.9	32.9	71.1	.000000	.000	.00003
-160.0	96.4	71.4	50.3	33.3	71.6	.000000	.000	.00003
-155.0	96.6	71.6	50.8	33.8	72.1	.000000	.000	.00003
-150.0	96.7	71.7	51.2	34.2	72.7	.000000	.000	.00004
-145.0	96.9	71.9	51.6	34.6	73.3	.000000	.001	.00004
-140.0	97.1	72.1	52.1	35.1	73.9	.000000	.001	.00004
-135.0	97.2	72.2	52.6	35.6	74.5	.000000	.001	.00004
-130.0	97.4	72.4	53.1	36.1	75.2	.000000	.001	.00005
-125.0	97.6	72.6	53.7	36.7	75.8	.000000	.001	.00005
-120.0	97.8	72.8	54.2	37.2	76.6	.000000	.001	.00006
-115.0	98.0	73.0	54.9	37.9	77.3	.000000	.001	.00006
-110.0	98.3	73.3	55.5	38.5	78.1	.000000	.001	.00007
-105.0	98.5	73.5	56.2	39.2	78.9	.000000	.001	.00007
-100.0	98.7	73.7	56.9	39.9	79.7	.000000	.001	.00008
-95.0	99.0	74.0	57.7	40.7	80.6	.000000	.001	.00009
-90.0	99.3	74.3	58.5	41.5	81.5	.000000	.001	.00010
-85.0	99.5	74.5	59.3	42.3	82.5	.000000	.002	.00011
-80.0	99.8	74.8	60.3	43.3	83.5	.000000	.002	.00012
-75.0	100.2	75.2	61.3	44.3	84.6	.000000	.002	.00014
-70.0	100.5	75.5	62.4	45.4	85.8	.000000	.002	.00016
-65.0	100.9	75.9	63.6	46.6	87.1	.000000	.003	.00019
-60.0	101.3	76.3	64.8	47.8	88.4	.000000	.003	.00022
-55.0	101.7	76.7	66.3	49.3	89.9	.000000	.004	.00026
-50.0	102.1	77.1	67.8	50.8	91.5	.000000	.004	.00032
-45.0	102.7	77.7	69.6	52.6	93.2	.000000	.005	.00039
-40.0	103.2	78.2	71.5	54.5	95.2	.000000	.007	.00049
-35.0	103.9	78.9	73.7	56.7	97.3	.000000	.009	.00064
-30.0	104.6	79.6	76.3	59.3	99.8	.000000	.012	.00087
-25.0	105.5	80.5	79.3	62.3	102.6	.000000	.017	.00125
-20.0	106.6	81.6	83.0	66.0	105.8	.000000	.027	.00193
-15.0	107.9	82.9	87.6	70.6	109.6	.000000	.046	.00337
-10.0	109.6	84.6	93.6	76.6	113.8	.000000	.099	.00714
-5.0	111.9	86.9	101.6	84.6	118.0	.000000	.307	.02184
.0	113.7	88.7	107.8	90.8	120.0	.000000	1.000	.06958
5.0	111.9	86.9	101.6	84.6	118.0	**********	.307	.02184
10.0	109.6	84.6	93.6	76.6	113.8	**********	.099	.00714
15.0	107.9	82.9	87.6	70.6	109.6	**********	.046	.00337
20.0	106.6	81.6	83.0	66.0	105.8	**********	.027	.00193
25.0	105.5	80.5	79.3	62.3	102.6	**********	.017	.00125
30.0	104.6	79.6	76.3	59.3	99.8	**********	.012	.00087
35.0	103.9	78.9	73.7	56.7	97.3	**********	.009	.00064
40.0	103.2	78.2	71.5	54.5	95.2	**********	.007	.00049
45.0	102.7	77.7	69.6	52.6	93.2	**********	.005	.00039
50.0	102.1	77.1	67.8	50.8	91.5	**********	.004	.00032
55.0	101.7	76.7	66.3	49.3	89.9	**********	.004	.00026
60.0	101.3	76.3	64.8	47.8	88.4	**********	.003	.00022
65.0	100.9	75.9	63.6	46.6	87.1	**********	.003	.00019
70.0	100.5	75.5	62.4	45.4	85.8	**********	.002	.00016
75.0	100.2	75.2	61.3	44.3	84.6	**********	.002	.00014
80.0	99.8	74.8	60.3	43.3	83.5	**********	.002	.00012
85.0	99.5	74.5	59.3	42.3	82.5	**********	.002	.00011
90.0	99.3	74.3	58.5	41.5	81.5	**********	.001	.00010
95.0	99.0	74.0	57.7	40.7	80.6	**********	.001	.00009
100.0	98.7	73.7	56.9	39.9	79.7	**********	.001	.00008
105.0	98.5	73.5	56.2	39.2	78.9	**********	.001	.00007
110.0	98.3	73.3	55.5	38.5	78.1	**********	.001	.00007

115.0	98.0	73.0	54.9	37.9	77.3	**********	.001	.00006
120.0	97.8	72.8	54.2	37.2	76.6	**********	.001	.00006
125.0	97.6	72.6	53.7	36.7	75.8	**********	.001	.00005
130.0	97.4	72.4	53.1	36.1	75.2	**********	.001	.00005
135.0	97.2	72.2	52.6	35.6	74.5	**********	.001	.00004
140.0	97.1	72.1	52.1	35.1	73.9	**********	.001	.00004
145.0	96.9	71.9	51.6	34.6	73.3	**********	.001	.00004
150.0	96.7	71.7	51.2	34.2	72.7	**********	.000	.00004
155.0	96.6	71.6	50.8	33.8	72.1	**********	.000	.00003
160.0	96.4	71.4	50.3	33.3	71.6	**********	.000	.00003
165.0	96.3	71.3	49.9	32.9	71.1	**********	.000	.00003
170.0	96.1	71.1	49.6	32.6	70.5	**********	.000	.00003
175.0	96.0	71.0	49.2	32.2	70.0	**********	.000	.00003
180.0	95.8	70.8	48.8	31.8	69.5	**********	.000	.00002
185.0	95.7	70.7	48.5	31.5	69.1	**********	.000	.00002
190.0	95.6	70.6	48.2	31.2	68.6	**********	.000	.00002
195.0	95.4	70.4	47.9	30.9	68.2	**********	.000	.00002
200.0	95.3	70.3	47.6	30.6	67.7	**********	.000	.00002

Attachment AA-7:

Results of the BPA CAFE Modeling Program for 34.5 kV Overhead Single-Circuit Collector Lines

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Û      C O R O N A   A N D   F I E L D      Û
Û E F F E C T S   P R O G R A M   V E R. 3  Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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INPUT DATA LIST

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               11/ 5/2013         13:17:13
******************WHEATRIDGE WIND FARM *******************
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FIGURE AA-3 34.5 kV (1) 1590 KCMIL 60 MW-1000A

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1,0, 3, 4,0.0,   2.00,   1.00,    .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  4 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
'PHA-1   ','A',    2.50,   32.00, 1,   1.453,    .000,  23.000,    .000,   1.000,    .000
'PHB-1   ','A',   -2.50,   28.50, 1,   1.453,    .000,  23.000,-120.000,   1.000,    .000
'PHC-1   ','A',    3.50,   25.00, 1,   1.453,    .000,  23.000, 120.000,   1.000,    .000
'GND1    ','A',    1.00,   36.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
 40 -200.0    5.0
 41     .0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
******************WHEATRIDGE WIND FARM *******************
FIGURE AA-3 34.5 kV (1) 1590 KCMIL 60 MW-1000A
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
PHA-1	2.50	32.00	2.75	1.45	1	.00	23.00	.00	1.00	.000
PHB-1	-2.50	28.50	2.67	1.45	1	.00	23.00	-120.00	1.00	.000
PHC-1	3.50	25.00	2.61	1.45	1	.00	23.00	120.00	1.00	.000
GND1	1.00	36.00	1.31	.36	1	.00	.00	.00	.00	.000

AN MICROPHONE HT.= 5.0 FT, RI ANT. HT.= 5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=   .0 FT
RI FREQ= 1.000 MHZ, TV FREQ= 75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.= 3.3FT, B-FIELD TRANSDUCER HT.= 3.3FT

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	-48.4	-73.4	-49.7	-66.7	-79.6	.000000	.002	.00100
-195.0	-48.3	-73.3	-49.5	-66.5	-79.4	.000000	.003	.00105
-190.0	-48.2	-73.2	-49.1	-66.1	-79.1	.000000	.003	.00110
-185.0	-48.1	-73.1	-48.8	-65.8	-78.9	.000000	.003	.00116
-180.0	-47.9	-72.9	-48.5	-65.5	-78.7	.000000	.003	.00123

-175.0	-47.8	-72.8	-48.2	-65.2	-78.4	.000000	.003	.00130
-170.0	-47.7	-72.7	-47.8	-64.8	-78.2	.000000	.003	.00137
-165.0	-47.5	-72.5	-47.5	-64.5	-78.0	.000000	.004	.00145
-160.0	-47.4	-72.4	-47.1	-64.1	-77.7	.000000	.004	.00154
-155.0	-47.2	-72.2	-46.7	-63.7	-77.4	.000000	.004	.00164
-150.0	-47.1	-72.1	-46.3	-63.3	-77.2	.000000	.005	.00175
-145.0	-46.9	-71.9	-45.8	-62.8	-76.9	.000000	.005	.00186
-140.0	-46.7	-71.7	-45.4	-62.4	-76.6	.000000	.005	.00199
-135.0	-46.6	-71.6	-44.9	-61.9	-76.3	.000000	.006	.00214
-130.0	-46.4	-71.4	-44.5	-61.5	-76.0	.000000	.006	.00230
-125.0	-46.2	-71.2	-43.9	-60.9	-75.6	.000000	.007	.00248
-120.0	-46.0	-71.0	-43.4	-60.4	-75.3	.000000	.008	.00268
-115.0	-45.8	-70.8	-42.9	-59.9	-75.0	.000000	.008	.00290
-110.0	-45.6	-70.6	-42.3	-59.3	-74.6	.000000	.009	.00316
-105.0	-45.4	-70.4	-41.7	-58.7	-74.2	.000000	.010	.00345
-100.0	-45.1	-70.1	-41.0	-58.0	-73.8	.000000	.011	.00377
-95.0	-44.9	-69.9	-40.3	-57.3	-73.4	.000000	.013	.00415
-90.0	-44.7	-69.7	-39.6	-56.6	-73.0	.000000	.014	.00459
-85.0	-44.4	-69.4	-38.8	-55.8	-72.5	.000000	.016	.00510
-80.0	-44.1	-69.1	-38.0	-55.0	-72.0	.000000	.019	.00569
-75.0	-43.8	-68.8	-37.1	-54.1	-71.5	.000000	.022	.00640
-70.0	-43.5	-68.5	-36.2	-53.2	-71.0	.000000	.025	.00723
-65.0	-43.2	-68.2	-35.2	-52.2	-70.4	.000000	.029	.00824
-60.0	-42.9	-67.9	-34.2	-51.2	-69.8	.000000	.035	.00946
-55.0	-42.5	-67.5	-33.1	-50.1	-69.2	.000000	.041	.01095
-50.0	-42.1	-67.1	-31.9	-48.9	-68.5	.000000	.050	.01281
-45.0	-41.7	-66.7	-30.6	-47.6	-67.8	.000000	.061	.01513
-40.0	-41.3	-66.3	-29.3	-46.3	-67.0	.000000	.074	.01807
-35.0	-40.8	-65.8	-27.8	-44.8	-66.2	.000000	.091	.02182
-30.0	-40.3	-65.3	-26.3	-43.3	-65.3	.000000	.112	.02664
-25.0	-39.8	-64.8	-24.5	-41.5	-64.3	.000000	.136	.03278
-20.0	-39.3	-64.3	-22.7	-39.7	-63.1	.000000	.162	.04047
-15.0	-38.8	-63.8	-21.1	-38.1	-62.0	.000000	.190	.04963
-10.0	-38.4	-63.4	-19.8	-36.8	-61.0	.000000	.220	.05952
-5.0	-38.1	-63.1	-19.0	-36.0	-60.4	.000000	.261	.06831
.0	-37.9	-62.9	-18.6	-35.6	-59.8	.000000	.309	.07330
5.0	-37.9	-62.9	-18.4	-35.4	-59.6	.000000	.337	.07242
10.0	-38.2	-63.2	-19.2	-36.2	-60.3	.000001	.323	.06604
15.0	-38.6	-63.6	-20.4	-37.4	-61.5	.000003	.275	.05664
20.0	-39.1	-64.1	-21.7	-38.7	-62.4	.000006	.216	.04683
25.0	-39.6	-64.6	-23.2	-40.2	-63.4	.000008	.163	.03811
30.0	-40.1	-65.1	-24.8	-41.8	-64.3	.000010	.122	.03095
35.0	-40.6	-65.6	-26.3	-43.3	-65.3	.000010	.092	.02526
40.0	-41.1	-66.1	-27.8	-44.8	-66.2	.000010	.070	.02081
45.0	-41.5	-66.5	-29.3	-46.3	-67.0	.000010	.055	.01733
50.0	-41.9	-66.9	-30.6	-47.6	-67.8	.000010	.043	.01458
55.0	-42.3	-67.3	-31.9	-48.9	-68.5	.000010	.035	.01240
60.0	-42.7	-67.7	-33.1	-50.1	-69.2	.000009	.029	.01064
65.0	-43.1	-68.1	-34.2	-51.2	-69.8	.000009	.024	.00922
70.0	-43.4	-68.4	-35.2	-52.2	-70.4	.000009	.020	.00806
75.0	-43.7	-68.7	-36.2	-53.2	-71.0	.000008	.018	.00709
80.0	-44.0	-69.0	-37.1	-54.1	-71.5	.000008	.015	.00628
85.0	-44.3	-69.3	-38.0	-55.0	-72.0	.000008	.013	.00560
90.0	-44.5	-69.5	-38.8	-55.8	-72.5	.000007	.012	.00503
95.0	-44.8	-69.8	-39.6	-56.6	-73.0	.000007	.010	.00453
100.0	-45.0	-70.0	-40.3	-57.3	-73.4	.000007	.009	.00410
105.0	-45.3	-70.3	-41.0	-58.0	-73.8	.000007	.008	.00373
110.0	-45.5	-70.5	-41.7	-58.7	-74.2	.000006	.008	.00341

115.0	-45.7	-70.7	-42.3	-59.3	-74.6	.000006	.007	.00313
120.0	-45.9	-70.9	-42.9	-59.9	-75.0	.000006	.006	.00288
125.0	-46.1	-71.1	-43.4	-60.4	-75.3	.000006	.006	.00266
130.0	-46.3	-71.3	-43.9	-60.9	-75.6	.000006	.005	.00246
135.0	-46.5	-71.5	-44.5	-61.5	-76.0	.000005	.005	.00228
140.0	-46.6	-71.6	-44.9	-61.9	-76.3	.000005	.005	.00212
145.0	-46.8	-71.8	-45.4	-62.4	-76.6	.000005	.004	.00198
150.0	-47.0	-72.0	-45.8	-62.8	-76.9	.000005	.004	.00185
155.0	-47.1	-72.1	-46.3	-63.3	-77.2	.000005	.004	.00174
160.0	-47.3	-72.3	-46.7	-63.7	-77.4	.000005	.003	.00163
165.0	-47.4	-72.4	-47.1	-64.1	-77.7	.000005	.003	.00153
170.0	-47.6	-72.6	-47.5	-64.5	-78.0	.000005	.003	.00145
175.0	-47.7	-72.7	-47.8	-64.8	-78.2	.000004	.003	.00136
180.0	-47.9	-72.9	-48.2	-65.2	-78.4	.000004	.003	.00129
185.0	-48.0	-73.0	-48.5	-65.5	-78.7	.000004	.003	.00122
190.0	-48.1	-73.1	-48.8	-65.8	-78.9	.000004	.002	.00116
195.0	-48.3	-73.3	-49.1	-66.1	-79.1	.000004	.002	.00110
200.0	-48.4	-73.4	-49.5	-66.5	-79.4	.000004	.002	.00105

1

Attachment AA-8:

Results of the BPA CAFE Modeling Program for 34.5 kV Overhead Double-Circuit Collector Lines

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ÛßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßÛ
Û      C O R O N A   A N D   F I E L D      Û
Û E F F E C T S   P R O G R A M   V E R. 3  Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
```

INPUT DATA LIST

```
               11/ 5/2013         13:17:28
******************WHEATRIDGE WIND FARM *******************
```

FIGURE AA-4 34.5 kV (1) 1590 KCMIL 60 MW-1000A

```
1,0, 6, 7,0.0,   2.00,   1.00,    .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  7 CONDUCTORS, OF WHICH  6 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
'PHA-1   ','A',   -2.50,   39.00, 1,   1.453,    .000,  23.000,    .000,   1.000,    .000
'PHB-1   ','A',   -3.50,   32.50, 1,   1.453,    .000,  23.000,-120.000,   1.000,    .000
'PHC-1   ','A',   -2.50,   25.00, 1,   1.453,    .000,  23.000, 120.000,   1.000,    .000
'PHA-2   ','A',    2.50,   25.00, 1,   1.453,    .000,  23.000,    .000,   1.000,    .000
'PHB-2   ','A',    3.50,   32.50, 1,   1.453,    .000,  23.000,-120.000,   1.000,    .000
'PHC-2   ','A',    2.50,   39.00, 1,   1.453,    .000,  23.000, 120.000,   1.000,    .000
'GND1    ','A',    1.00,   45.00, 1,    .360,    .000,    .000,    .000,    .000,    .000
 40 -200.0    5.0
 41     .0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
******************WHEATRIDGE WIND FARM *******************
FIGURE AA-4 34.5 kV (1) 1590 KCMIL 60 MW-1000A
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
PHA-1	-2.50	39.00	2.86	1.45	1	.00	23.00	.00	1.00	.000
PHB-1	-3.50	32.50	2.57	1.45	1	.00	23.00	-120.00	1.00	.000
PHC-1	-2.50	25.00	2.81	1.45	1	.00	23.00	120.00	1.00	.000
PHA-2	2.50	25.00	2.81	1.45	1	.00	23.00	.00	1.00	.000
PHB-2	3.50	32.50	2.57	1.45	1	.00	23.00	-120.00	1.00	.000
PHC-2	2.50	39.00	2.87	1.45	1	.00	23.00	120.00	1.00	.000
GND1	1.00	45.00	.69	.36	1	.00	.00	.00	.00	.000

```
AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=      .0 FT
RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT
```

LATERAL DIST FROM REFERENCE	AUDIBLE NOISE (RAIN) L50	AUDIBLE NOISE (FAIR) L50	RADIO INTERFERENCE (RAIN) L50	RADIO INTERFERENCE (FAIR) L50	TVI TOTAL RAIN	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL	ELECTRIC FIELD	MAGNETIC FIELD

(FEET)	DBA	DBA	DBUV/M	DBUV/M	DBUV/M	PPB	KV/M	GAUSS
-200.0	-43.6	-68.6	-45.7	-62.7	-77.3	.000000	.001	.00021
-195.0	-43.5	-68.5	-45.4	-62.4	-77.1	.000000	.001	.00022
-190.0	-43.3	-68.3	-45.1	-62.1	-76.9	.000000	.001	.00024
-185.0	-43.2	-68.2	-44.8	-61.8	-76.6	.000000	.001	.00025
-180.0	-43.1	-68.1	-44.5	-61.5	-76.4	.000000	.001	.00027
-175.0	-42.9	-67.9	-44.1	-61.1	-76.2	.000000	.002	.00029
-170.0	-42.8	-67.8	-43.8	-60.8	-75.9	.000000	.002	.00031
-165.0	-42.7	-67.7	-43.4	-60.4	-75.7	.000000	.002	.00033
-160.0	-42.5	-67.5	-43.0	-60.0	-75.4	.000000	.002	.00036
-155.0	-42.4	-67.4	-42.6	-59.6	-75.2	.000000	.002	.00038
-150.0	-42.2	-67.2	-42.2	-59.2	-74.9	.000000	.002	.00042
-145.0	-42.0	-67.0	-41.8	-58.8	-74.6	.000000	.002	.00045
-140.0	-41.9	-66.9	-41.3	-58.3	-74.3	.000000	.002	.00049
-135.0	-41.7	-66.7	-40.8	-57.8	-74.0	.000000	.002	.00053
-130.0	-41.5	-66.5	-40.3	-57.3	-73.7	.000000	.003	.00059
-125.0	-41.3	-66.3	-39.8	-56.8	-73.3	.000000	.003	.00064
-120.0	-41.1	-66.1	-39.3	-56.3	-73.0	.000000	.003	.00071
-115.0	-40.9	-65.9	-38.7	-55.7	-72.6	.000000	.003	.00079
-110.0	-40.7	-65.7	-38.1	-55.1	-72.3	.000000	.003	.00088
-105.0	-40.5	-65.5	-37.5	-54.5	-71.9	.000000	.004	.00098
-100.0	-40.3	-65.3	-36.8	-53.8	-71.5	.000000	.004	.00111
-95.0	-40.1	-65.1	-36.2	-53.2	-71.1	.000000	.004	.00125
-90.0	-39.8	-64.8	-35.4	-52.4	-70.6	.000000	.004	.00142
-85.0	-39.6	-64.6	-34.7	-51.7	-70.2	.000000	.004	.00163
-80.0	-39.3	-64.3	-33.8	-50.8	-69.7	.000000	.005	.00189
-75.0	-39.0	-64.0	-33.0	-50.0	-69.2	.000000	.005	.00220
-70.0	-38.7	-63.7	-32.1	-49.1	-68.7	.000000	.005	.00258
-65.0	-38.4	-63.4	-31.1	-48.1	-68.1	.000000	.005	.00306
-60.0	-38.1	-63.1	-30.1	-47.1	-67.5	.000000	.004	.00367
-55.0	-37.7	-62.7	-29.1	-46.1	-66.9	.000000	.004	.00444
-50.0	-37.3	-62.3	-27.9	-44.9	-66.1	.000000	.004	.00544
-45.0	-36.9	-61.9	-26.8	-43.8	-65.2	.000000	.008	.00674
-40.0	-36.5	-61.5	-25.6	-42.6	-64.3	.000000	.014	.00845
-35.0	-36.1	-61.1	-24.4	-41.4	-63.2	.000000	.025	.01072
-30.0	-35.6	-60.6	-23.2	-40.2	-62.1	.000000	.042	.01371
-25.0	-35.2	-60.2	-21.5	-38.5	-60.8	.000000	.068	.01759
-20.0	-34.7	-59.7	-19.4	-36.4	-59.4	.000000	.104	.02244
-15.0	-34.2	-59.2	-17.3	-34.3	-58.0	.000000	.148	.02802
-10.0	-33.8	-58.8	-15.6	-32.6	-56.7	.000000	.192	.03350
-5.0	-33.6	-58.6	-14.6	-31.6	-55.8	.000000	.222	.03732
.0	-33.5	-58.5	-14.6	-31.6	-55.8	.000000	.232	.03819
5.0	-33.6	-58.6	-14.7	-31.7	-55.8	.000000	.223	.03732
10.0	-33.8	-58.8	-15.7	-32.7	-56.7	.000002	.193	.03350
15.0	-34.2	-59.2	-17.4	-34.4	-58.0	.000008	.150	.02802
20.0	-34.7	-59.7	-19.4	-36.4	-59.5	.000014	.107	.02244
25.0	-35.2	-60.2	-21.6	-38.6	-60.8	.000019	.071	.01759
30.0	-35.6	-60.6	-22.9	-39.9	-62.1	.000022	.045	.01371
35.0	-36.1	-61.1	-24.1	-41.1	-63.3	.000024	.028	.01072
40.0	-36.5	-61.5	-25.3	-42.3	-64.3	.000024	.017	.00845
45.0	-36.9	-61.9	-26.5	-43.5	-65.3	.000024	.010	.00674
50.0	-37.3	-62.3	-27.7	-44.7	-66.0	.000024	.006	.00544
55.0	-37.7	-62.7	-28.8	-45.8	-66.6	.000024	.004	.00444
60.0	-38.1	-63.1	-29.8	-46.8	-67.2	.000023	.003	.00367
65.0	-38.4	-63.4	-30.8	-47.8	-67.8	.000022	.003	.00306
70.0	-38.7	-63.7	-31.8	-48.8	-68.4	.000021	.003	.00258
75.0	-39.0	-64.0	-32.7	-49.7	-68.9	.000021	.003	.00220
80.0	-39.3	-64.3	-33.6	-50.6	-69.4	.000020	.003	.00189

85.0	-39.6	-64.6	-34.4	-51.4	-69.9	.000019	.003	.00163
90.0	-39.8	-64.8	-35.1	-52.1	-70.4	.000019	.003	.00142
95.0	-40.1	-65.1	-35.9	-52.9	-70.8	.000018	.003	.00125
100.0	-40.3	-65.3	-36.6	-53.6	-71.2	.000017	.003	.00111
105.0	-40.5	-65.5	-37.2	-54.2	-71.6	.000017	.003	.00098
110.0	-40.7	-65.7	-37.9	-54.9	-72.0	.000016	.002	.00088
115.0	-40.9	-65.9	-38.4	-55.4	-72.4	.000016	.002	.00079
120.0	-41.1	-66.1	-39.0	-56.0	-72.7	.000015	.002	.00071
125.0	-41.3	-66.3	-39.6	-56.6	-73.1	.000015	.002	.00064
130.0	-41.5	-66.5	-40.1	-57.1	-73.4	.000015	.002	.00059
135.0	-41.7	-66.7	-40.6	-57.6	-73.7	.000014	.002	.00053
140.0	-41.9	-66.9	-41.0	-58.0	-74.0	.000014	.002	.00049
145.0	-42.0	-67.0	-41.5	-58.5	-74.3	.000013	.002	.00045
150.0	-42.2	-67.2	-41.9	-58.9	-74.6	.000013	.002	.00042
155.0	-42.4	-67.4	-42.3	-59.3	-74.9	.000013	.002	.00038
160.0	-42.5	-67.5	-42.7	-59.7	-75.2	.000012	.001	.00036
165.0	-42.7	-67.7	-43.1	-60.1	-75.4	.000012	.001	.00033
170.0	-42.8	-67.8	-43.5	-60.5	-75.7	.000012	.001	.00031
175.0	-42.9	-67.9	-43.9	-60.9	-75.9	.000012	.001	.00029
180.0	-43.1	-68.1	-44.2	-61.2	-76.2	.000011	.001	.00027
185.0	-43.2	-68.2	-44.5	-61.5	-76.4	.000011	.001	.00025
190.0	-43.3	-68.3	-44.9	-61.9	-76.6	.000011	.001	.00024
195.0	-43.5	-68.5	-45.2	-62.2	-76.9	.000011	.001	.00022
200.0	-43.6	-68.6	-45.5	-62.5	-77.1	.000010	.001	.00021

1

Exhibit BB

Other Requested Information

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Oregon Administrative Rule (OAR) 345-021-0010(1)(bb) requires proponents to provide "any other information that the Department requests in the project order or in a notification regarding expedited review."

In its Project Order of May 22, 2013, the Oregon Department of Energy (ODOE) did not specifically identify any additional information to be provided in Exhibit BB. All information required by OAR 345 Division 21 and/or identified in the Project Order has been provided in the relevant exhibits.

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Exhibit CC

Potentially Applicable Statutes, Rules and Ordinances

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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Table of Contents

List of Tables

Acronyms and Abbreviations

OAR	Oregon Administrative Rule
ORS	Oregon Revised Statutes
Project	Wheatridge Wind Energy Facility

1.0 Introduction

Exhibit CC was prepared to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(1)(cc), which states:

> ***345-021-0010(1)(cc) Identification***
>
> *By legal citation, of all state statutes and administrative rules and local government ordinances containing standards or criteria that the proposed facility must meet for the Council to issue a site certificate, other than statutes, rules and ordinances identified in Exhibit E, and identification of the agencies administering those statutes, administrative rules and ordinances. The applicant shall identify all statutes, administrative rules and ordinances that the applicant knows to be applicable to the proposed facility, whether or not identified in the project order. To the extent not addressed by other materials in the application, the applicant shall include a discussion of how the proposed facility meets the requirements of the applicable statutes, administrative rules and ordinances.*

2.0 State Statutes and Administrative Rules - OAR 345-021-0010(cc)

This section describes state statutes and administrative rules not discussed in Exhibit E. These statutes and rules are discussed in other sections of the Application for Site Certificate; the applicable section is indicated below.

Responsible Agency: Oregon Department of Agriculture (ODA)
Authority: Oregon Revised Statues (ORS) 564; OAR Chapter 603, Division 73
Location of Discussion: Exhibit Q
Agency Address: Department of Botany and Plant Pathology Cordley Hall, Oregon State University Corvallis, OR 97331 Administrative address: 635 Capitol St. NE Salem, OR 97301

Responsible Agency: Oregon Department of Fish and Wildlife (ODFW)
Authority: ORS 496.171-192, OAR 635-100-0080-0170, OAR Chapter 635, Divisions 44, 100
Location of Discussion: Exhibit Q
Agency Address: Oregon Department of Fish & Wildlife 2042 SE Paulina Road Prineville, Oregon 97754

Responsible Agency: Oregon Department of Fish and Wildlife (ODFW)
Authority: OAR Chapter 635 Division 415
Location of Discussion: Exhibit P
Agency Address: Oregon Department of Fish & Wildlife 2042 SE Paulina Road Prineville, Oregon 97754

Responsible Agency: Oregon Department of Fish and Wildlife (ODFW)
Authority: ORS 496 and 506; OAR Chapter 635, Divisions 100 and 415
Location of Discussion: Exhibit K
Agency Address: Oregon Department of Fish & Wildlife 2042 SE Paulina Road Prineville, Oregon 97754

Responsible Agency: Oregon Department of Geology and Mineral Industries (DOGAMI)
Authority: OAR Chapter 632
Location of Discussion: Exhibits H and I
Agency Address: Oregon Department of Geology and Mineral Industries 800 NE Oregon St. Suite 965 Portland, OR 97232

Responsible Agency: Oregon Department of Parks and Recreation - Archaeological
Authority: ORS 97.740-97.760, ORS 358.90-358.955, OAR 736-051-0090
Location of Discussion: Exhibit S
Agency Address: State Historic Preservation Office 725 Summer St, NE. Suite C Salem, OR 97301

Responsible Agency: Oregon Office of State Fire Marshall (EPCRA)
Authority: ORS 453; OAR Chapter 837, Divisions 85 and 95
Location of Discussion: Exhibits B, C, and U
Agency Address: Oregon Office of State Fire Marshall 4760 Portland Rd NE Salem, OR 97305

Responsible Agency: Oregon Department of Environmental Quality (ODEQ)
Authority: ORS 467; OAR Chapter 340, Division 35
Location of Discussion: Exhibit X
Contact Information: No contacts. The ODEQ Noise Control Program was terminated in 1991.

Responsible Agency: Oregon Department of Environmental Quality (ODEQ)
Authority: ORS 468 and 468B; OAR Chapter 340, Divisions 14, 40,41, 45, 52 and 55
Location of Discussion: Exhibit V
Agency Address: Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701

Responsible Agency: Oregon Department of Environmental Quality (ODEQ)
Authority: ORS 459; OAR Chapter 340, Division 93
Location of Discussion: Exhibits G and V
Agency Address: Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701

Responsible Agency: Oregon Department of Environmental Quality (ODEQ)
Authority: ORS 465 and 466, OAR Chapter 340, Divisions 100 through 122
Location of Discussion: Exhibit V
Agency Address: Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701

Responsible Agency: Morrow County Planning Department – Land Use
Authority: Morrow County Zoning Ordinance Articles 1 – 10
Location of Discussion: Exhibit K
Agency Address: Morrow County 205 NE 3rd St Irrigon, OR 97844

Responsible Agency: Umatilla County Planning Department – Land Use
Authority: Umatilla County Development Code Chapter 152
Location of Discussion: Exhibit K
Agency Address: Umatilla County Department of Land Use Planning 216 SE 4th St. Pendleton, OR 97801

Responsible Agency: Oregon Biodiversity Information Center
Authority: ORS 564.105; OAR 603-73-070 and 345-022-0070
Location of Discussion: Exhibits P and Q
Agency Address: Oregon Biodiversity Center Oregon State University Institute for Natural Resources University Center Building Suite 335 527 SW Hall St Portland, OR 97201

Responsible Agency: Oregon Water Resources Department – Water Rights Division
Authority: ORS Chapters 537, 540; OAR Chapter 690
Location of Discussion: Exhibit O
Agency Address: Department of Water Resources Commerce Building 158 12th Ave NE Salem, OR 97301

Responsible Agency: Oregon Department of State Lands
Authority: OAR Chapter 131
Location of Discussion: Exhibit J
Agency Address: Oregon Department of State Lands 775 Summer St. NE. Suite 100 Salem, OR 97301

Responsible Agency: Oregon Department of Land Conservation and Development
Authority: ORS Chapter 197; OAR Chapter 660
Location of Discussion: Exhibit K
Agency Address: Department of Land Conservation and Development 635 Capitol St. NE Suite 150 Salem, OR 97301

Exhibit K identifies state statutes, administrative rules and local government ordinances containing land use standards or criteria that the applicant believes may be applicable to the Wheatridge Wind Energy Project (Project). Rather than repeat those statutes, rules and local ordinances here, Wheatridge requests the Energy Facility Siting Council refer to Exhibit K.

3.0 Spill Response Statutes

In regards to reporting and responding to spills or the release of hazardous materials, the following rules and statutes contain state and federal release reporting requirements:

- ORS 466.635;
- OAR Chapter 340, Divisions 45, 47, 108, 122, 150, 160;
- 33 CFR part 153; and
- 40 CFR parts 110, 122, 262, 265, 280, 302, 355, 761.

Oregon Agencies that may be required to be notified in the event of spill or the release of hazardous materials includes:

- Oregon Emergency Management Division;
- Oregon Department of Environmental Quality; and
- Oregon Department of State Police.

4.0 Submittal Requirements and Approval Standards

4.1 Submittal Requirements

Table CC-1 Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(cc) Identification, by legal citation, of all state statutes and administrative rules and local government ordinances containing standards or criteria that the proposed facility must meet for the Council to issue a site certificate, other than statutes, rules and ordinances identified in Exhibit E, and identification of the agencies administering those statutes, administrative rules and ordinances. The applicant shall identify all statutes, administrative rules and ordinances that the applicant knows to be applicable to the proposed facility, whether or not identified in the project order. To the extent not addressed by other materials in the application, the applicant shall include a discussion of how the proposed facility meets the requirements of the applicable statutes, administrative rules and ordinances.	Section 2.0
Project Order Comments	**Location**
None	N/A

4.2 Approval Standard

OAR 345 Division 22 does not provide an approval standard specific to Exhibit CC.

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Exhibit DD

Public Safety and Cumulative Effects

Prepared for

Wheatridge Wind Energy, LLC

Wheatridge Wind Energy Facility

July 2015

Prepared by

Tetra Tech, Inc.

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List of Tables

Terms and Definitions

Collector Line	An underground or overhead electrical 34.5 kV line transmitting power from the turbines to a Substation
Construction Yard	The temporary area for construction activities and Project component storage prior to installation
GE 1.7-103 Layout	Project turbine layout comprised of 292 GE 1.7MW turbines with 80m hub heights and 103m rotor diameters
GE 2.5-120 Layout	Project turbine layout comprised of 200 GE 2.5MW turbines with 85m hub heights and 120m rotor diameters
Gen-tie Line(s)	One or two 230 kV transmission line(s) conveying power from the Project to an interconnection point with the grid, which will be permitted and built by UEC or UEC/CB
Intraconnection Corridor	The intraconnection transmission line corridor connecting Wheatridge East with Wheatridge West
Intraconnection Line(s)	One or two overhead electrical 230 kV lines connecting the Project Substations in Wheatridge East and Wheatridge West.
Met Tower	Permanent meteorological tower
O&M Buildings	Permanent operations and maintenance buildings, including parking
Project	Wheatridge Wind Energy Facility
Site Access Road	Private road to be constructed or improved for the purpose of accessing turbines and associated Project facilities
Site Boundary	The boundary within which all Project facilities will be constructed, also known as the micrositing corridor
Substation	A facility in which electric power from the turbines is aggregated, stepped up in voltage, and connected to the Intraconnection Line(s) or the Gen-tie Line(s)
Turbine	A collective term for the foundation, tower, nacelle, blades and rotor that comprise a wind turbine generator in the Project
Turbine Pad	A cleared, graveled area around the base of each turbine encompassing primarily the turbine's foundation
Wheatridge	Wheatridge Wind Energy, LLC
Wheatridge East	The eastern group of turbines
Wheatridge West	The western group of turbines

Acronyms and Abbreviations

APLIC	Avian Power Line Interaction Committee
CB	Columbia Basin Electric Cooperative
FAA	Federal Aviation Administration
kV	kilovolts
MBTH	maximum blade tip height
MW	megawatts
NESC	National Electric Safety Code
OAR	Oregon Administrative Rule
UEC	Umatilla Electric Cooperative

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1.0 Introduction

Wheatridge Wind Energy, LLC (Wheatridge), proposes to construct the Wheatridge Wind Energy Facility (Project), a wind generation facility with a maximum nominal generating capacity of 500 megawatts (MW) in Morrow and Umatilla counties, Oregon (see Figures C-1 and C-2). The Project is comprised of up to 292 turbines divided into two groups: a western group of turbines (Wheatridge West) and an eastern group of turbines (Wheatridge East). Wheatridge West and Wheatridge East are electrically connected by an 'Intraconnection Corridor' containing up to two parallel overhead 230-kilovolt (kV) transmission lines (Intraconnection Lines), each no longer than 35 miles in length. Other Project components include access roads (Site Access Roads), an electrical collection and control system, the Project's substations (Substations), operations and maintenance buildings (O&M Buildings), and temporary construction yards (Construction Yards). These facilities are all described in greater detail in Exhibit B.

Wheatridge West is located entirely within Morrow County, approximately 5 miles northeast of Lexington, and approximately 7 miles northwest of Heppner. Wheatridge West is bisected by Oregon Highway 207 (OR-207). Wheatridge East is located approximately 16 miles northeast of Heppner and encompasses land in both Morrow and Umatilla counties. The Intraconnection Corridor is located primarily within Morrow County and adjoins to the southeastern portion of Wheatridge West and the southern portion of Wheatridge East.

Exhibit DD provides information for the Project as required to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(1)(dd) paragraphs (A) and (C). Paragraph (B) does not apply because the Project does not include a surface facility related to underground gas storage reservoirs. This Exhibit demonstrates compliance with the approval standards in OAR 345-024-0010, OAR 345-024-0015, and OAR 345-024-0090:

345-024-0010 Public Health and Safety Standards for Wind Energy Facilities

To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:

(1) Can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment.

(2) Can design, construct and operate the facility to preclude structural failure of the tower or blades that could endanger the public safety and to have adequate safety devices and testing procedures designed to warn of impending failure and to minimize the consequences of such failure.

345-024-0015 Cumulative Effects Standard for Wind Energy Facilities

To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant can design and construct the facility to reduce cumulative adverse environmental effects in the vicinity by practicable measures including, but not limited to, the following:

(1) Using existing roads to provide access to the facility site, or if new roads are needed, minimizing the amount of land used for new roads and locating them to reduce adverse environmental impacts.

(2) Using underground transmission lines and combining transmission routes.

(3) Connecting the facility to existing substations, or if new substations are needed, minimizing the number of new substations.

(4) Designing the facility to reduce the risk of injury to raptors or other vulnerable wildlife in areas near turbines or electrical equipment.

(5) Designing the components of the facility to minimize adverse visual features.

(6) Using the minimum lighting necessary for safety and security purposes and using techniques to prevent casting glare from the site, except as otherwise required by the Federal Aviation Administration or the Oregon Department of Aviation.

OAR 345-024-0090 Siting Standards for Transmission Lines

To issue a site certificate for a facility that includes any transmission line under Council jurisdiction, the Council must find that the applicant:

(1) Can design, construct and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;

(2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.

2.0 Analysis Area

In accordance with Section VI of the Project Order, the analysis area for public health and safety standards is the Site Boundary. The Site Boundary is defined in detail in Exhibits B and C.

3.0 Public Health and Safety

3.1 Public Access Restrictions

Public access to Project facilities would be minimal to none. All Project facilities would be located on private lands; therefore public access is already limited. Access roads developed or improved for the purposes of Project construction and operation would be gated and locked when not actively in use. Should the Project site be accessed without permission, design features of the Project components would limit the accessibility of the Project facilities to the public and are designed to prevent tampering with Project equipment. The wind turbines can be accessed only through a steel door that would be kept locked except during maintenance. The wind turbine models under consideration are designed to have a minimum ground-to-blade clearance of over 80 feet. The pad transformers would be enclosed within vented steel boxes, and the remainder of the electrical collection system would be largely, if not entirely, underground. The O&M Buildings would be in a fenced area; both the building and the fence would be locked when not occupied. The Project Substations would be within fenced enclosures with locked gates. The Intraconnection Line(s) between Wheatridge East and Wheatridge West would utilize overhead poles that inhibit climbing.

The Project has also been designed around substantial setbacks that further limit public access to the turbines and associated electrical components. The Project uses a minimum setback of 110% of the maximum blade tip height (MBTH) from public roads; this both limits public access and prevents harm to members of the public in the highly unlikely event of a catastrophic failure (e.g., falldown) of a turbine. Similarly, the Project observes a falldown distance (100% MBTH) setback to non-participating landowner properties.

With these restrictions, design features and setbacks, the only persons who would come in close proximity to the turbines or electrical equipment would be employees of the Project, or the landowners on whose property the Project is located. Landowners would not be in close proximity to the turbine blades, given the 80 feet or greater of ground-to-blade clearance of the considered turbine models.

3.2 Structural and Equipment Safety

Structural and equipment safety is primarily a matter of observing appropriate engineering standards during design and construction, particularly for turbine foundations.

Two types of catastrophic failures that have been documented are tower collapse and blade throw. While possible and potentially dangerous, tower collapse and blade throw are very rare occurrences and often are linked to improper assembly or exceedance of design limits (AWEA 2008). Such incidents have been largely eliminated due to technological improvements and mandatory safety standards during turbine design, manufacturing, and installation. All turbines are designed with several levels of built-in safety and comply with the codes set forth by the Occupational Safety and Health Administration and American National Standards Institute. The wind turbines would also be equipped with Supervisory control and data acquisition systems that allow for remote control and monitoring of individual turbines and the wind farm as a whole from both the central host computer or from a remote computer. This system would enable the emergency halting of the rotors at any time. That same system provides for automated responses designed to prevent damage to the turbines under extreme environmental conditions or if a problem is detected. For example, at wind speeds greater than about 55 miles per hour, the turbine shuts down; the blades are feathered so they do not catch the wind, brakes are applied to slow and stop the rotor, and once stopped the rotor is locked to prevent damage to the turbine. The rotor would similarly be stopped if an imbalance is detected, such as may occur with ice buildup on the blades, or if a mechanical failure in the blade attachment system occurs.

While a few cases of tower collapse or foundation failure have been documented, these have generally occurred as a result of inadequate foundation engineering or soils characterization. The use of robust engineering design for the foundations that is appropriate to the specific site and soils characteristics at each turbine location is expected to prevent this type of catastrophic failure.

Tower collapse has occurred in a few cases under extreme winds, as a result of a blade hitting the tower; this would normally be prevented by stopping and locking the rotor under such conditions.

As noted above, the Project is designed to maintain substantial setbacks such that, in the highly unlikely event of a catastrophic failure, the collapsed turbine or thrown blades could not impact public roads or nonparticipating property owners.

4.0 Cumulative Effects

OAR 345-024-0015 requires that Wheatridge take all practical measures to reduce the cumulative effects of the Project, including but not limited to: minimizing the creation of new roads; placing electrical Collector Lines underground; interconnecting via existing facilities; designing the project to reduce risks to raptors and other sensitive species; and designing the facility to reduce visual impacts including lighting effects. This section describes the measures that Wheatridge has taken to minimize the cumulative effects of the Project.

4.1 Access Roads

Wheatridge would utilize existing farm access roads to the greatest extent practicable for providing access to the wind turbines and other Project facilities. Development of the Project would require approximately 65 to 73 miles of access roads, of which about 16% to 19% would be improvements upon existing farm roads. There are no additional existing farm roads that can feasibly be utilized for the Project due to their location and route, geometry (slope, in particular), or ownership. Where new access roads are needed, they are sited to limit the overall impacts of the Project to soils, habitat, and agricultural practices. For example, new access roads are generally sited along the edges of farm fields to limit disruptions to plowing patterns. Roads are placed within the fields when the alternative would be an impact to sensitive habitat. Through an iterative design process, some access roads have been re-routed or eliminated entirely to avoid impacts to wetlands, streams, Category 1 habitat, and archaeological and culturally significant features.

Whether new or improvements to existing, access roads would be constructed to limit their overall environmental impact. Access roads would be constructed with the minimum width necessary to move construction equipment, then would be narrowed to a width that would accommodate the smaller vehicles used for routine maintenance. The extra disturbed area would be restored following construction to a condition appropriate for the location. Appropriate stormwater Best Management Practices would be employed at all times to reduce or avoid impacts to streams in the area, see Exhibit I Attachment I-2.

4.2 Electrical Lines

The Project would require up to 88 miles of Collector Lines, nearly all of which would be located underground as well as up to 35 miles of Intraconnection Line(s). These options are discussed below in sections 4.2.1, 4.2.2, and 4.2.3. All Collector and Intraconnection lines will be constructed according to National Electrical Safety Code (NESC) standards.

4.2.1 Underground Collector Lines

The Project would require approximately 80 to 88 miles of Collector Lines, nearly all of which would be located underground. Installation of the underground electrical Collector Lines would have temporary minimal impacts to soils, habitat, wildlife, and agricultural practices. The Collector Lines would be placed within narrow trenches, typically 3 feet below ground. Most of the Collector Lines would be placed within or adjacent to access roads to minimize additional disturbance. In cases in which underground Collector Lines cross agricultural fields, the Collector Lines may be placed deeper to prevent damage to the lines by agricultural activities including deep tillage; however, the lines would not be deep enough to affect groundwater resources. In situations in which soils and underlying geology would make burying the Collector Lines to a depth of 3 feet impractical, the Collector Lines may be buried at a depth of less than 3 feet but still be in accordance with NESC standards.

Topsoil and subsoils would be segregated during trench excavation for placement back into the trenches in the proper order. Areas outside of the turbine pads and access roads that are disturbed by construction of the underground electrical lines would be re-topsoiled and revegetated as soon as practicable following completion of construction, and monitored to ensure successful revegetation with no weed infestations.

4.2.2 Overhead Collector Lines

It is possible that the Collector Lines may need to be run overhead in situations in which a buried cable would be infeasible or would create unnecessary impacts, such as at stream or canyon crossings. In such instances, overhead Collector Lines will be supported by a wooden or steel pole structure. Each support structure pole would be buried approximately 6 feet in the ground and would extend to a height of approximately 60 feet above ground, spaced 100 to 200 feet apart.

4.2.3 Overhead Intraconnection Lines

The Project also includes up to two parallel 230 kilovolts (kV) overhead Intraconnection Lines, each up to 35 miles in length. An overhead design was chosen because the environmental costs of installing underground transmission lines are significantly higher than for overhead lines. In addition, temporary impacts associated with underground transmission lines would be substantial; a trench would need to be dug the entire way between Wheatridge East and Wheatridge West, while crossing a number of streams and riparian areas as well as public and private roads. Underground construction would require large access vaults to be placed periodically along the line, resulting in a similar or larger overall permanent footprint as an overhead line. An overhead line, on the other hand, requires minimal ground disturbance at the pole locations, and construction during the summer months means that the ground would be hard enough to eliminate the need to construct access roads.

The design and routes of the Intraconnection Line(s) have been chosen to minimize other types of impacts. The Intraconnection Line(s) would be constructed to Avian Power Line Interaction

Committee (APLIC) standards, reducing the potential for impacts to raptors and other avian species. They have been routed to avoid high ground and public roads to minimize visual impacts. The wooden or non-reflective steel monopole construction would further reduce the lines' visibility compared to steel lattice construction. The lines are routed far from existing residences to avoid noise and electromagnetic impacts.

4.3 Substations

The Project does not include the construction of a substation at the grid interconnection point or a generator tie transmission line (Gen-Tie Line) to convey electricity from the Project to the grid interconnection; those facilities will be permitted, constructed, and owned by either the Umatilla Electric Cooperative (UEC) or a partnership of UEC and the Columbia Basin Electric Cooperative (CB). The outgoing connection point from the Project would be at one of the internal collector Substations; the various Substations and Intraconnection Line options are designed to accommodate a number of potential gen-tie line route options. Two likely candidates for the point of the interconnection Substation have been identified, but neither has been constructed; see Exhibit B Section 2.3 for more detail on the grid interconnection.

4.4 Avian and Wildlife Impact Minimization

The Project has been sited and designed to minimize impacts to wildlife and important wildlife habitat, as described in Exhibits P and Q of this application. On a broad scale, the Project has been sited in an area dominated by agricultural use and with little native habitat for sensitive or protected species. As design of the Project progressed, Project facilities have been sited to avoid all impacts to wetlands and to critical or Category 1 habitat, and to minimize impacts to other important habitat types. This has primarily been accomplished by siting Project facilities in existing agricultural fields and utilizing existing access roads to the greatest extent practicable. The Project layout has been planned to minimize permanent impacts associated with all Project facilities, particularly on-site access roads. Other design aspects of the Project that will minimize impacts to wildlife habitat include the use of a largely underground electrical collection system; the application of APLIC design standards for the Intraconnection Line(s); and the use of freestanding, non-guyed turbines and permanent met towers.

Additional measures to avoid and minimize impacts to wildlife will be implemented during Project construction. These include raptor nest monitoring and seasonal construction timing restrictions; having on-site environmental monitors during construction; implementing dust abatement measures; observing low speed limits; implementing measures to control the spread of invasive weed species; and restoring disturbed areas as soon as practicable following completion of construction, as outlined in the Revegetation Plan (Attachment P-2). Additional measures are described in Exhibits P and Q.

Finally, Wheatridge will provide mitigation for unavoidable impacts to wildlife habitat as outlined in the Habitat Mitigation Plan and the Wildlife Monitoring and Mitigation Plan (Attachments P-3 and P-4, respectively). The avoidance and minimization measures and the proposed mitigation measures together limit the impacts to wildlife to a minimum necessary, and compensate for those unavoidable impacts as mandated by the state's fish and wildlife habitat goals and standards.

4.5 Visual Impacts Minimization

Due to the size of modern wind turbines, opportunities and measures to effectively reduce visual impacts of the Project are limited. However, Wheatridge has or will utilize a number of design, engineering, and other measures to reduce visual impacts to the extent practicable. First and foremost, Wheatridge has sited the Project in a remote area of Morrow and Umatilla counties, and designed the turbine array such that it would not be visible from the nearest towns of Heppner, Lexington, and Ione. The location of the Project is such that, where it may be visible from other cities or developed areas in the vicinity, it would be at a background viewing distance of over 7 miles so would not dominate the viewshed. In addition, there are no important scenic resources identified in the area. The routes and design for the Intraconnection Line(s) have also been chosen in part to minimize the lines' visibility.

Additional measures that Wheatridge would employ to minimize visual impacts of the Project, include:

- The wind turbines would be painted in a uniform matte-finish neutral white or off-white color;
- The support poles for the Intraconnection Line(s) will be wood or non-reflective steel (e.g., self-weathering steel) to blend with the surroundings;
- The O&M Buildings will be designed and constructed to be generally consistent with the character of agricultural buildings used by farmers or ranchers in the area, and the buildings finished in a neutral color to blend with the surrounding landscape;
- Substation structures would be finished in neutral colors to blend with the surrounding landscape;
- Lighting will be kept to a minimum necessary, and designed to prevent offsite glare;
- No advertising or commercial signage is to be displayed on any part of the facility;
- Vegetation clearing and ground disturbance will be limited to the minimum area necessary to safely and efficiently install the Project equipment;
- Access roads and other areas of ground disturbance will be watered during construction, as needed, to avoid the generation of airborne dust; and
- Temporary impact areas will be restored and revegetated as soon as practicable following completion of construction.

4.6 Lighting

The effects of Project lighting would be minimal. Lighting for the Project would consist of the minimum necessary for safety purposes. Lights at the O&M Buildings and Substations would be downward-shielded and aimed inward to the site to avoid casting glare offsite. These lights would not typically be on at night; instead they would utilize motion-sensor switches to provide lighting only when needed.

Lighting of the turbines would consist of the minimum required by Federal Aviation Administration (FAA) regulations. Based on FAA guidance, lighting of the turbines will most likely consist of an array of red flashing lights, synchronized to flash simultaneously. Lights are not required on all turbines; in general, lights would be installed on turbines nearest the Project perimeter to define the outer boundaries of the obstruction area, and on select turbines within the Project such that lights are no more than 0.5 miles apart. Daytime lighting is not required; the white color of the turbines is the most effective daytime warning device. Wheatridge will submit a Notice of Proposed Construction to the FAA as required pursuant to 14 CFR 77 Subpart B, Section 77.5-7 and will base final lighting design on FAA recommendations.

5.0 Siting Standards for Transmission Lines

Exhibit AA of this application demonstrates compliance with the Siting Standard of OAR 345-024-0090. Specifically, Exhibit AA demonstrates that the proposed Intraconnection Line(s) would generate alternating current electric fields that would not exceed 4 kV per meter at one meter above ground surface, which is substantially lower than the 9 kV per meter required by the standard (see Exhibit AA Section 2.4).

Exhibit AA also provides information related to induced currents, and describes actions that Wheatridge will undertake at the time of final project engineering design to reduce or eliminate the potential for induced current and nuisance shocks. Specifically, during final engineering and construction of the Project, Wheatridge will identify wire fences, pipelines, irrigation lines, metal roofs, and other objects near the Intraconnection Line(s) and Collector Lines where a current could be induced. Such objects will be properly grounded within or as close as practicable to the right-of-way, in order to prevent induced current and nuisance shocks. Additionally, the Intraconnection Line(s) will be designed and constructed according to NESC standards, which require that sufficient conductor clearance to the ground be maintained to limit the short-circuit current induced in the largest anticipated vehicle under the line to 5 milliamperes or less (NESC 2007). A minimum 30 foot conductor-to-ground clearance required by NESC standards would generally meet this standard. However, if found to be necessary during final engineering, induced current potential at locations where large vehicles are anticipated can be further reduced by increasing the Intraconnection Lines' height, shielding the electric field, or by limiting access.

6.0 Submittal Requirements and Approval Standards

6.1 Submittal Requirements

Table DD-1. Submittal Requirements Matrix	
Requirement	**Location**
OAR 345-021-0010(1)(dd) If the proposed facility is a facility for which the Council has adopted specific standards, information about the facility providing evidence to support findings by the Council as required by the following rules:	
(A) For wind energy facilities, OAR 345-024-0010 and -0015.	See Table D-2
(B) For surface facilities related to underground gas storage reservoirs, OAR 345-024-0030, including information required by 345-021-0020.	N/A
(C) For any transmission line under Council jurisdiction, OAR 345-024-0090	See Table D-2
Project Order Comments	**Location**
None	N/A

6.2 Approval Standard

Table DD-2. Approval Standard	
Requirement	**Location**
345-024-0010 Public Health and Safety Standards for Wind Energy Facilities	
To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:	
(1) Can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment.	Section 3.1
(2) Can design, construct and operate the facility to preclude structural failure of the tower or blades that could endanger the public safety and to have adequate safety devices and testing procedures designed to warn of impending failure and to minimize the consequences of such failure.	Section 3.2
345-024-0015 Cumulative Effects Standard for Wind Energy Facilities	
To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant can design and construct the facility to reduce cumulative adverse environmental effects in the vicinity by practicable measures including, but not limited to, the following:	
(1) Using existing roads to provide access to the facility site, or if new roads are needed, minimizing the amount of land used for new roads and locating them to reduce adverse environmental impacts.	Section 4.1
(2) Using underground transmission lines and combining transmission routes.	Section 4.2
(3) Connecting the facility to existing substations, or if new substations are needed, minimizing the number of new substations.	Section 4.3
(4) Designing the facility to reduce the risk of injury to raptors or other vulnerable wildlife in areas near turbines or electrical equipment.	Section 4.4
(5) Designing the components of the facility to minimize adverse visual features.	Section 4.5

Table DD-2. Approval Standard	
(6) Using the minimum lighting necessary for safety and security purposes and using techniques to prevent casting glare from the site, except as otherwise required by the Federal Aviation Administration or the Oregon Department of Aviation.	Section 4.6
OAR 345-024-0090, Siting Standards for Transmission Lines	
To issue a site certificate for a facility that includes any transmission line under Council jurisdiction, the Council must find that the applicant:	
(1) Can design, construct, and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public; and	Section 5.0
(2) Can design, construct, and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.	Section 5.0

7.0 References

AWEA (American Wind Energy Association). 2008. Wind Energy Siting Handbook. Prepared by Tetra Tech EC, Inc. and Nixon Peabody LLP for AWEA. February 2008. Available online at: http://www.awea.org/Issues/Content.aspx?ItemNumber=5726

NESC (National Electric Safety Code). 2007. National Electrical Safety Code. 2007 ed. Institute of Electrical and Electronics Engineers, Inc., New York, NY. 287 pages.