EXHIBIT S
HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

OAR 345-021-0010(1)(s)

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FIGURE

S-1 Historic, Cultural, and Archaeological Resources Analysis Area

ATTACHMENTS

S-1 Technical Report: Cultural Resources Survey of the Proposed Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon [*Confidential and Not for Public Distribution. Provided Under Separate Cover.*]

S-2 Monitoring Plan for Cultural Resources, Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon

S-3 Cultural Resource Awareness Training Information

S-4 Inadvertent Discovery Plan for Cultural Resources, Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon

S.1 CULTURAL RESOURCES ANALYSIS AREA

The cultural resources analysis area for this Exhibit includes all areas within the Boardman Solar Energy Facility (Facility) site boundary. The Facility site boundary is defined as the perimeter of the area where the Facility will be constructed. The cultural resources survey conducted for the Facility encompassed the entire analysis area. A desktop review was completed to identify archaeological investigations and prehistoric and historical sites previously recorded within the analysis area, and within 1.0 mile of the analysis area. A pedestrian field survey led by a professional archaeologist encompassed the entire analysis area. Figure S-1 shows the cultural resources analysis area.

S.2 INFORMATION ABOUT HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

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 ORS 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:*

Response: This Exhibit provides information about historic, cultural, and archaeological surveys conducted within the Facility site boundary and general findings of those surveys. Additional information is provided in Attachment S-1, *Technical Report: Cultural Resources Survey of the Proposed Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon* (cultural resources survey report, CH2M, 2016). The cultural resources survey report is a confidential document that is exempt from public disclosure under Oregon Revised Statute (ORS) 192.501(11), and as such is provided separately. Boardman Solar Energy LLC (Applicant) provided copies of the confidential cultural resources survey report to the Oregon State Historic Preservation Office (SHPO) and area Tribes as identified by the Commission on Indian Services.

The sections that follow describe the cultural resources survey methodology, historic resources listed or eligible for listing on the National Register of Historic Places (NRHP), archaeological objects and sites on private land and public lands with regulatory definitions of "objects" and "sites," potential Facility impacts to historic, cultural, and archaeological resources, and proposed monitoring. The conclusion derived from the cultural and archaeological surveys is that construction, operation, and retirement of the proposed Facility are not likely to result in significant adverse impacts to historic, cultural, or archaeological resources that have been listed on, or would likely be listed on the NRHP. This Exhibit and the attached confidential cultural resources survey report provide evidence to support a finding by the Council as required by OAR 345-022-0090.

S.3 SURVEY METHODOLOGY

The survey methodology can be split into three main components. The first component involved a desktop file search of previous cultural investigations and archaeological site records as well as cartographic research to determine the likelihood of historic, cultural, and archaeological sites existing within the Facility site boundary. This background review and research was also used to determine the appropriate field methods for the identification of cultural resources.

The second component of the survey involved field investigation of all areas within the site boundary, which included a pedestrian survey spaced at 20 meter intervals and subsurface shovel test probing.

The third component of the survey involved consultation with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) which resulted in a viewshed assessment to identify potential visual impacts to nearby NRHP-eligible resources.

S.3.1 File Search

A professional archaeologist from CH2M HILL Engineers, Inc. (CH2M) conducted a file search through the SHPO online geographic information system database on September 17, 2016, for previously recorded cultural resources and previous cultural resource investigations conducted within 1.0 mile of the site boundary. A total of 11 previous cultural resource investigations were conducted within 1.0 mile of the site boundary, two of which cross the Facility site. A total of 16 cultural resources were previously recorded within 1.0 mile of the site boundary. However, the file search did not identify any previously recorded NRHP-eligible resources, archaeological sites, or objects (as defined by ORS 358.905(1)(a) and (c)) within the site boundary.

S.3.2 Cartographic Research

Historic-era General Land Office (GLO) plats of survey were reviewed to investigate the potential for undocumented historic-era cultural resources to be located within the site boundary. A review of the 1870 GLO maps for Gilliam County (Township 3 North, Range 22 East, Sections 1 and 12; and Township 4 North, Range 22E, Sections 25 and 26) and Morrow County (Township 4 North, Range 23 East, Sections 20, 21, 28, 29, 30, and 31) shows no cultural resources within the site boundary. The GLO maps describe the landscape as “land generally level, soil sandy and of second-rate grazing quality” (BLM, 2016).

Historic maps (BLM, 1869; Metsker Maps, 1935; USGS, 1906, 1953, 1975, 1984, 1993) show no cultural features aside from roads within the site boundary. One U.S. Geological Survey (USGS) map (USGS, 1953) shows a road in the western portion of the site boundary, while another USGS map (1975) shows an unimproved dirt road in the eastern portion of the Facility.

Portions of the site boundary were granted to the Northern Pacific Railroad in 1896, and the northwest quarter of Section 28 of Township 4 North, Range 23 East was homesteaded by Henry C. Willis in 1889 (BLM, 2016). In 1935, the western portion of the site boundary was still federally owned, while most of the eastern portion was privately owned, by Jesse F. Deos, Rosetta Sharrard, D.A. Wade, and L.M. Davis (Metsker Maps, 1935). Federally owned land was transferred to state ownership in the 1960s (BLM, 2016).

A review of USGS quad maps ranging from 1962 to 2011 indicates that some areas within the site boundary were excavated between 1970 and 1993 for aggregate.

S.3.3 Pedestrian Survey

A team of archaeologists from CH2M, led by professional archaeologist David Sheldon, M.S., conducted the pedestrian surface survey between September 20 and 22, 2016, by walking linear survey transects within the site boundary oriented generally north/south and spaced no more than 66 feet apart. Field workers recorded and mapped all archaeological or cultural materials estimated to be 48 years of age or greater. The survey was guided by the use of a Trimble Geo7X global positioning system unit with submeter accuracy preloaded with data files with the Facility site boundary. During the pedestrian survey, exposures of mineral soil were closely inspected

for the presence of artifacts or other indicators of archaeological resources, such as fire-modified rock or discolored sediment. Field documentation included notes on any cultural resources observed, ground visibility, vegetation, landforms, and areas of visible disturbance. Two discrete areas within the site boundary totaling 8.8 acres could not be surveyed. These discrete areas consisted of two small wetlands with dense vegetation (Figure S-1). The Applicant intends to avoid these areas during construction. No additional fieldwork is recommended in the two unsurveyed areas.

S.3.4 Subsurface Probing

Subsurface testing was conducted by the same team of CH2M archaeologists on September 23, 2016. The testing was conducted along the eastern edge of Threemile Canyon because of the proximity to water and the identification of petrified wood and cryptocrystalline silicate (CCS) material during the pedestrian survey. Petrified wood and CCS material, depending on quality, are both potential sources of raw toolstone material. Although no evidence of human modification was found on either the petrified wood or CCS materials, they are possible indicators of a nearby archaeological site. The subsurface testing utilized shovel test probes with a minimal diameter of 12 inches and a maximum depth of 39 inches barring obstruction. If artifacts were encountered, their depth was noted and the artifacts returned to the test. No further excavation took place within that unit. If a positive probe was encountered, two radial probes were placed in each cardinal direction, spaced at 66- and 33-foot intervals in order to establish a boundary comprising two sterile probes. Radial probes were excavated from the outside, inward toward the initial find so as to limit impacts during identification. Detailed notes were taken on the dimensions of each probe. Descriptions were documented of soil composition, stratigraphy, disturbance, and any artifacts or features encountered. Figure S-1 shows the shovel test probe locations.

S.3.5 CTUIR Consultation and Viewshed Assessment

CH2M archeologists consulted with CTUIR to determine whether there were any unrecorded resources in the analysis area. This consultation led to the development of a viewshed assessment to analyze indirect visual impacts to NRHP-eligible resources within the viewshed of the proposed Facility. The viewshed assessment used similar methods to those used in Exhibit R to establish a zone of visual influence for the proposed Facility. These methods include use of ArcGIS coupled with topographic data and known dimensions of the Facility to identify areas from which the Facility would be visible. Individual analyses were generated for the solar arrays and transmission lines. Information provided by the CTUIR was used to identify locations from which to analyze if the Facility would be visible. Photographs were taken from these specific locations and included in the assessment for reference. In deference to a request from the CTUIR, the viewshed assessment was prepared as a separate, stand-alone document for use during consultation with the CTUIR.

S.4 HISTORIC RESOURCES LISTED OR ELIGIBLE FOR LISTING ON NATIONAL REGISTER OF HISTORIC PLACES

(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.

Response: No previously recorded historic or cultural resources within the Facility site boundary are listed, or would likely be eligible for listing, on the NRHP. Consultation with CTUIR identified a single potentially NRHP-eligible resource within 1.0 mile of the site boundary; this resource is described in the confidential cultural resources survey report (Attachment S-1).

The pedestrian survey identified a single archaeological site, 35GM402, within the Facility site boundary consisting of a low-lying rock wall, or stacked rock feature, approximately 98 feet in length. No artifacts were found in association with 35GM402. Stacked rock features are considered significant in Plateau culture for their role in subsistence or for their association with spiritual practices such as vision quests. 35GM402 was documented on a draft online site form through SHPO's online site form database. The site form is included as Appendix C to the confidential cultural resources survey report (Attachment S-1). Site 35GM402 is recommended eligible for listing on the NRHP.

S.5 ARCHAEOLOGICAL OBJECTS AND ARCHAEOLOGICAL SITES ON PRIVATE LANDS

(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.

Response: A single archaeological site, 35GM402, was identified within the cultural resources analysis area, on private lands and meets the definition of an archaeological site as defined by ORS 358.905(1)(c).

S.5.1 Regulatory Definitions

For private lands, ORS 358.905(1)(a) defines archaeological objects as follows:

(a) Archaeological object means an object that:

> *(A) Is at least 75 years old;*
>
> *(B) Is part of the physical record of an indigenous or other culture found in the state or waters of the state; and*
>
> *(C) 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.*

For private lands, ORS 358.905(1)(c) defines archaeological sites as follows:

(c)(A) Archaeological site means a geographic locality in Oregon, including but not limited to submerged and submersible lands and the bed of the sea within the states jurisdiction, that contains archaeological objects and the contextual associations of the archaeological objects with:

> > *(i) Each other; or*
> >
> > *(ii) Biotic or geological remains or deposits.*
>
> *(B) Examples of archaeological sites described in subparagraph (A) of this paragraph include but are not limited to shipwrecks, lithic quarries, house pit villages, camps, burials, lithic scatters, homesteads and townsites.*

S.5.2 Archaeological Objects and Sites Found within the Analysis Area

The pedestrian survey identified a single archaeological site, 35GM402, within the Facility site boundary consisting of a low-lying rock wall approximately 98 feet in length. No artifacts were found in association with 35GM402. Stacked rock features are considered significant in Plateau culture for their role in subsistence or for their association with spiritual practices such as vision

quests. 35GM402 was documented on a draft online site form through SHPO's online site form database. The site form is included as Appendix C to the confidential cultural resources survey report (Attachment S-1). 35GM402 was evaluated and recommended eligible for listing on the NRHP under Criterion A. The NRHP evaluation is included as Appendix D to the confidential cultural resources survey report (Attachment S-1). The Applicant plans to avoid direct impacts to 35GM402.

The pedestrian survey did not identify any other archaeological objects or sites. The 15 shovel test probes did not identify any archaeological sites or objects.

S.6 ARCHAEOLOGICAL OBJECTS AND ARCHAEOLOGICAL SITES ON PUBLIC LANDS

(C) For public lands, archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area.

Response: No portion of the Facility site boundary is proposed on public lands. Thus, no archaeological sites, as defined in ORS 358.905(1)(c), were found on public lands.

S.7 POTENTIAL IMPACTS TO HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

(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:

(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).

S.7.1 Discovery Measures

The historic, cultural, and archaeological surveys described in Section S.4 and in the confidential cultural resources survey report (Attachment S-1) were conducted to identify archaeological sites in accordance with guidelines from SHPO and the U.S. Department of the Interior. No additional discovery measures are recommended or proposed. Should detailed design result in placement of Facility components outside of the previously surveyed area, additional field surveys would be required. The field surveys would be conducted in accordance with the same procedures followed for the original surveys. Any results would be communicated to the Oregon Department of Energy and to SHPO in a report to be provided for review before Facility construction begins.

(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.

Response: Two resources were identified through the discovery measures.

One archaeological site, 35GM402, was recommended eligible for listing on the NRHP and is located within the Facility site boundary. This site can and will be avoided during construction, operation, and retirement of the proposed Facility with the use of protective measures and therefore will not be directly impacted.

The setting of 35GM402 and the other NRHP-eligible resource identified during consultation with CTUIR may be affected by cumulative visual impacts but the Applicant's assessment is that these impacts will not be significant. Based on the viewshed assessment, the solar array and the transmission line may be visible from the resource identified during consultation with CTUIR but only the transmission line will be visible from 35GM402. In the event that the solar array is visible, the appearance will be similar to a dark line on the horizon. The Columbia River and associated shoreline, as well as existing infrastructure such as railroad tracks, transmission lines and I-84, will remain the dominant features. Although the transmission line may be visible in certain views from these cultural resource locations and therefore will have a visual impact, it was purposefully routed directly adjacent to the existing PGE aboveground transmission line in its entirety to lessen the visibility and appearance of new infrastructure and minimize any cumulative impact. In addition, the transmission line will not obstruct views toward the predominant landscape features of Willow Creek and the Columbia River. In summary, given the existing infrastructure that is already visible, the Facility will not result in significant adverse impacts to the visual setting experienced in views toward the Facility from these cultural resource locations.

S.7.2 Protective Measures

(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.

Response: The Applicant will site Facility components in such a way as to avoid direct impacts and minimize indirect impacts to NRHP-eligible resources during construction, operations, and retirement activities. No Facility components will be constructed, operated, or retired within recorded archaeological sites regardless of NRHP eligibility status.

The following protective measures will be implemented during Facility construction, operations, and retirement:

- During construction, an archaeological monitor will be present during ground-disturbing activities. The monitor will follow the guidance put forth in the *Monitoring Plan for Cultural Resources, Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon* provided in Attachment S-2.
- A cultural resources sensitivity training for personnel working on Facility construction will be conducted during preconstruction meetings by the monitor or cultural resources specialist. The purpose of this training will be to instruct Facility personnel on the sensitivity of cultural resources in the Facility area, the importance of respecting exclusion areas, and the consequences of violating those entry restrictions. Attachment S-3 contains cultural resource awareness information for distribution during the training and for reference when ground-disturbing work is performed during construction, operation, and retirement. This short document provides information on how to identify cultural resources that may be found, who to contact in case of a find, and the applicable ORS that protect cultural resources located on private land.
- During Facility construction, 35GM402 will be avoided. In advance of construction, the Applicant will identify the site on Facility construction maps as a no-entry area, and will flag a 100-foot (30-meter) buffer using temporary fencing surrounding the site and the area avoided during construction activities.

- During Facility construction, operations, and retirement, all work in the vicinity will stop immediately in the event of an inadvertent discovery of possible cultural materials, including human remains. A 100-foot (30-meter) buffer will be placed around the discovery and the area will be secured and protected from further disturbance. Construction, operations, and retirement activities will proceed outside of this buffered area unless additional cultural materials are encountered. The Project Manager/Land Manager will be notified. The Project/Land Manager will notify Oregon SHPO and the Oregon Department of Energy (ODOE). No work may resume in the buffered area until consultation with SHPO and ODOE has occurred and a professional archaeologist is able to assess the discovery.
- During Facility construction, operations, and retirement, if possible human remains are encountered, the Oregon State Police, Commission on Indian Services, SHPO, ODOE, and appropriate Tribes will also be notified, as described in the I*nadvertent Discovery Plan for Cultural Resources, Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon*, provided in Attachment S-4.
- During Facility construction, operations, and retirement, lighting will be minimized to avoid visual impacts. Motion detectors or timers and hoods that minimize skyward light will be installed on exterior lights on the O&M building, collector station, and substation. No lighting will be installed on the module blocks, service roads or transmission line. Construction will be directed to extinguish nighttime exterior lights at the O&M building, substation, and any temporary construction work site, equipment and laydown yard, if any, when not in use.

In addition, the Applicant's initial assessment was that the Facility will not result in significant adverse impacts to the visual setting experienced in views toward the Facility from the cultural resource locations. However, the Applicant recognizes the viewpoint of the CTUIR that the construction and operation of the Facility will result in significant impacts and will therefore mitigate these indirect impacts through off-site mitigation actions with the CTUIR. These actions will occur on or after Facility construction begins.

S.8 PROPOSED MONITORING PROGRAM

(E) The applicant's proposed monitoring program, if any, for impacts to historic, cultural and archaeological resources during construction and operation of the proposed facility.

Response: An archaeological monitor will be on site during Facility construction activities. The monitor will keep daily logs describing work activities, soil types, and findings, if any. This information will be compiled in a monitoring report to be distributed to the area Tribes, SHPO, and the Oregon Department of Energy at the completion of Facility activities. The monitor will follow the monitoring plan provided in Attachment S-2. In advance of construction, the monitor will provide a brief cultural resource awareness training to construction personnel to describe the types of resources that may be present below the ground surface and appropriate actions to take in case of a find. The training is provided in Attachment S-3. In case of a post-review discovery, the archaeological monitor will follow the Inadvertent Discovery Plan protocol described in Attachment S-4 to this Exhibit S.

S.9 SUMMARY

The evidence provided in this Exhibit and attachments demonstrates that construction, operation, and retirement of the proposed Facility are not likely to result in significant adverse impacts to historic, cultural, or archaeological resources that are eligible or potentially eligible for listing on the NRHP.

S.10 REFERENCES

Bureau of Land Management (BLM). 1869. Plat of Township 4 North, Range 23 East, Willamette Meridian. General Land Office (GLO) Records. Accessed October 2, 2016. http://www.glorecords.blm.gov/search/.

Bureau of Land Management (BLM). 2016. Township 4 North, Range 23 East, Willamette Meridian. General Land Office (GLO) Records. Accessed October 2, 2016. http://www.glorecords.blm.gov/search/.

Metsker Maps. 1935. *Township 4 North, Range 23 East, Willamette Meridian, Morrow County, Oregon*.

U.S. Geological Survey (USGS). 1906. *Blalock Island Quadrangle, Oregon-Washington*. 1:125,000, 30 Minutes Series, U.S. Department of the Interior.

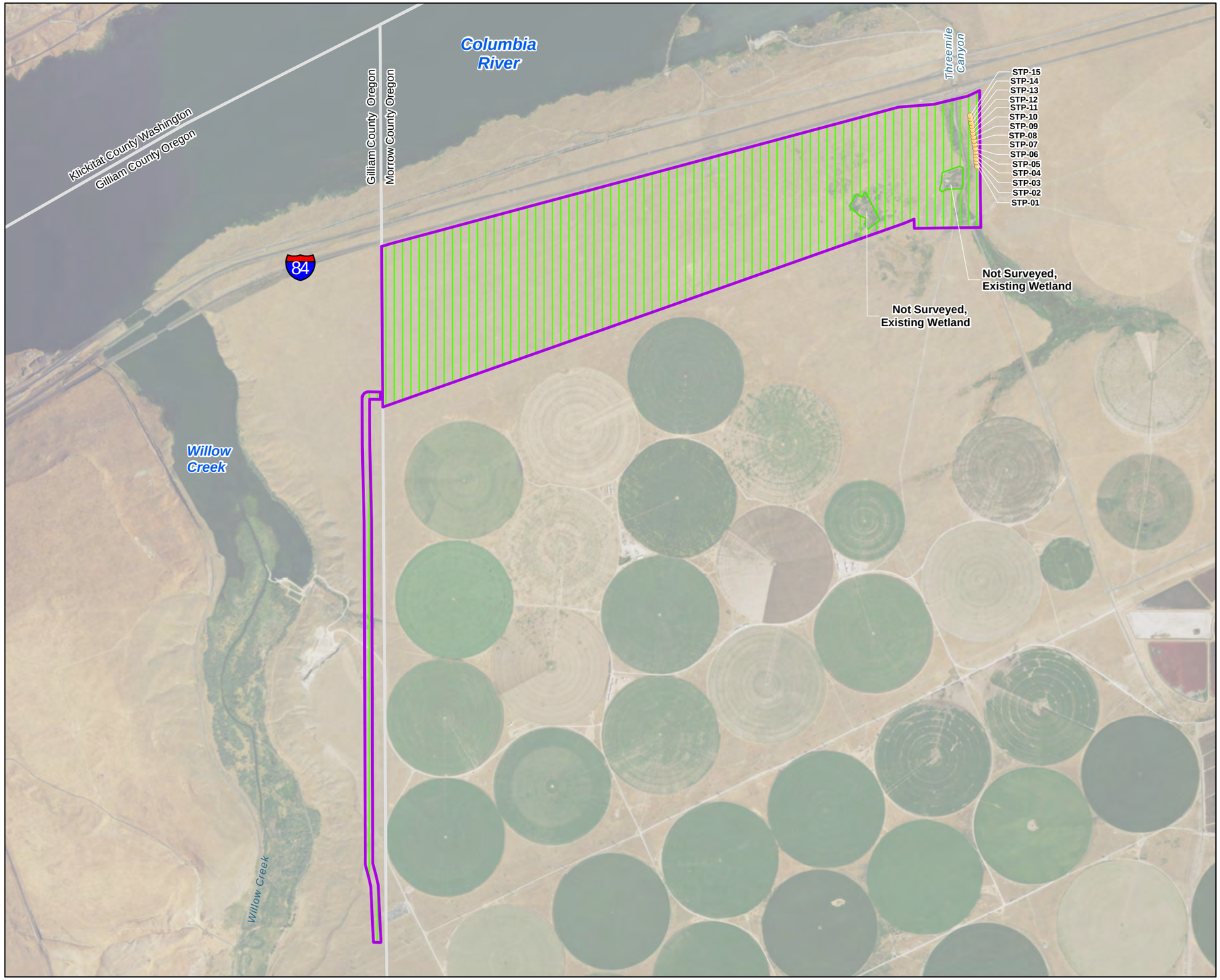
U.S. Geological Survey (USGS). 1953. *Pendleton Quadrangle, Oregon; Washington*. Revised 1973. 1:250,000, 30 Minute Series, U.S. Department of the Interior.

U.S. Geological Survey (USGS). 1975. *Pendleton Quadrangle, Oregon; Washington*. 1:250,000, 30 Minute Series, U.S. Department of the Interior.

U.S. Geological Survey (USGS). 1984. *Hermiston Quadrangle, Oregon; Washington*. 1:100,000, U.S. Department of the Interior.

U.S. Geological Survey (USGS). 1993. *Golgotha Butte Quadrangle, Washington*. 1:24,000, U.S. Department of the Interior.

Figure



VICINITY MAP

LEGEND

- Facility Site Boundary/Analysis Area
- Cultural Survey Transect
- Shovel Test Probe (STP)

N

0 2,000 4,000
Feet

FIGURE S-1
Historic, Cultural, and Archaeological Resources Analysis Area
Boardman Solar Energy Facility Application for Site Certificate
Morrow and Gilliam Counties, Oregon

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Confidential and Not for Public Distribution

Attachment S-1
Technical Report: Cultural Resources Survey of the Proposed Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon

Attachment S-2
Monitoring Plan for Cultural Resources, Boardman Solar Energy Facility, Gilliam and Morrow Counties, Oregon

Monitoring Plan for Cultural Resources, Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon

Consultation with the Oregon State Historic Preservation Office (SHPO) and Confederated Tribes of the Umatilla Indian Reservation (CTUIR), along with additional background research, has identified the possibility that buried archaeological resources or human remains may be present along a traditional travel corridor for the Umatilla and other peoples of the mid-Columbia River. As a result of consultation and the additional background research, the survey conducted for the proposed Boardman Solar Energy Facility (Facility) and documented in *Technical Report: Cultural Resources Survey of the Proposed Boardman Solar Energy Facility, Gilliam and Morrow Counties, Oregon* (CH2M, 2017) resulted in a recommendation for cultural resources monitoring during fieldwork activities. This monitoring plan was designed to identify and protect archaeological resources or burials that may be present within the Facility area and provides guidelines to be implemented during Facility construction and operation. Representatives of the CTUIR should be notified at least 1 week prior to the commencement of ground-disturbing Facility activities and offered a chance to participate in monitoring.

Cultural Resources Monitor

The Cultural Resources Monitor (Monitor) will have at a minimum an undergraduate degree in anthropology, archaeology, historic archaeology, or a related field and at least 1 year of professional archaeological experience or equivalent specialized training. The Monitor will work closely with the construction managers to provide status updates on a daily basis. The Monitor's actions and activities will be reviewed on a daily or as-needed basis by a cultural resource professional meeting the Secretary of Interior Standards of professional archaeology.

Monitoring Duties

The Monitor will provide a cultural resource awareness training (CH2M, 2017: Appendix F) to construction personnel on the role and responsibility of the Monitor and the procedures to be followed in the event of a cultural resource discovery.

The Monitor will be present during ground-disturbing activities to watch and inspect cleared ground and excavated areas for signs of previously undiscovered archaeological resources. Ground-disturbing activities include those activities that remove earth with excavating equipment but exclude those activities that involve post-driving equipment. The Monitor will observe activities involving native soil disturbance in areas where subsurface deposits may exist.

If the Monitor or other construction personnel discover archaeological materials during construction, the Monitor will have authority to halt construction and will notify the designated cultural resource contacts. If archaeological materials are discovered, all work will stop in the immediate area (100 feet [30 meters]) of discovery. The discovery perimeter will be flagged to prevent access and protect further disturbance to materials.

The Monitor will prepare a daily monitoring log (briefly describing the field conditions, type of construction equipment being used, construction progress and activities) and record any finds of archaeological material.

It is the Monitor's responsibility to ensure that the appropriate cultural resource protections (for example, flagging avoidance areas and installing no entry signs) are in place at the only recorded archaeological site, 35GM402, in the vicinity of the Facility before construction work begins on the transmission line and associated service road.

Construction-Related Discoveries

The Monitor will photograph the work area and any cultural resources in the immediate area before work begins to establish a record of baseline conditions in the proposed Facility area.

In the event that previously unidentified archaeological materials are encountered during monitoring, the Monitor will stop construction-related activities within the immediate vicinity (100 feet [30 meters]) of the discovery. The monitor will follow the guidelines outlined in the *Inadvertent Discovery Plan for Cultural Resources* (CH2M, 2017: Appendix G)

The Monitor will evaluate whether significant cultural resources are present and, if so, whether they will be adversely affected by continuing operations. The types of cultural resources that may be encountered include prehistoric artifacts such as grinding stones, fire-cracked rock, shell fragments, projectile points, lithic materials, bone, cobble tools, or other indicators. Historic artifacts may include glass bottles, ceramic objects, metal objects, building foundations, bricks, concrete, or other indicators. The Monitor will be responsible for directing Facility-related activities away from the newly identified cultural resources.

The area of the discovery will be delineated using flagging tape, rope, or some other means to ensure Facility activities do not continue in the area of the discovery. The Monitor will notify the field construction manager and contact the Facility's Cultural Resources Manager or designee. Ground-disturbing activities in the immediate vicinity of the discovery will remain stopped to avoid any additional impacts to the discovery until significance is determined and an appropriate treatment can be identified and implemented through consultation between the Applicant, Oregon Department of Energy, SHPO, and the CTUIR. During this period, construction activities outside the find area will continue.

If the newly identified cultural resources are determined to be either an isolate or a site, the Monitor or designated Cultural Resources Specialist will determine whether the new material is a stand-alone cultural resource or part of an adjoining site. The Monitor will document the discovery and prepare an isolate or site form and request a Smithsonian trinomial from SHPO. Isolate discoveries will be recorded and construction will continue. Isolate finds will be reported in a final Facility monitoring report.

Discovery of Human Remains

In the event that human skeletal remains are discovered during construction activities, the Monitor will follow the protocol outlined in the *Inadvertent Discovery Plan for Cultural Resources* (CH2M, 2017: Appendix G)

Monitoring Documentation

Cultural resource monitoring will be documented in daily monitoring logs (see Attachment 1) and photographs. Areas monitored during the day will be marked on a map (see Figure 1 in Attachment 2). Photographic documentation will be collected by the Monitor before Facility construction begins, during ground-disturbing activities, and after work is complete.

Monitoring Report

A monitoring report will be prepared by the Monitor following the completion of monitoring activities. The monitoring report will include descriptions and photographs of monitored activities within the Facility area. The monitoring report will be submitted to SHPO, the CTUIR and the Oregon Department of Energy after completion of the monitoring activities.

Reference

CH2M HILL Engineers, Inc. (CH2M). 2017. *Technical Report: Cultural Resources Survey of the Proposed Boardman Solar Energy Facility, Gilliam and Morrow Counties, Oregon*. Prepared for Boardman Solar Energy, LLC, by David Sheldon and Jamelon Brown. Report on file at the Oregon State Historic Preservation Office, Salem. Revised July.

Attachment 1
Daily Cultural Monitoring Log

Daily Cultural Monitoring Log
Boardman Solar Energy Facility

Monitor Name(s): _____ Date: _____

Participant Name(s): _____

Job Site Contact: _____ Phone Number: _____

Project Description:

Conditions:

Location and Dimensions (Length x Width x Height) of Excavation:

Excavation Technique (include types of equipment used):

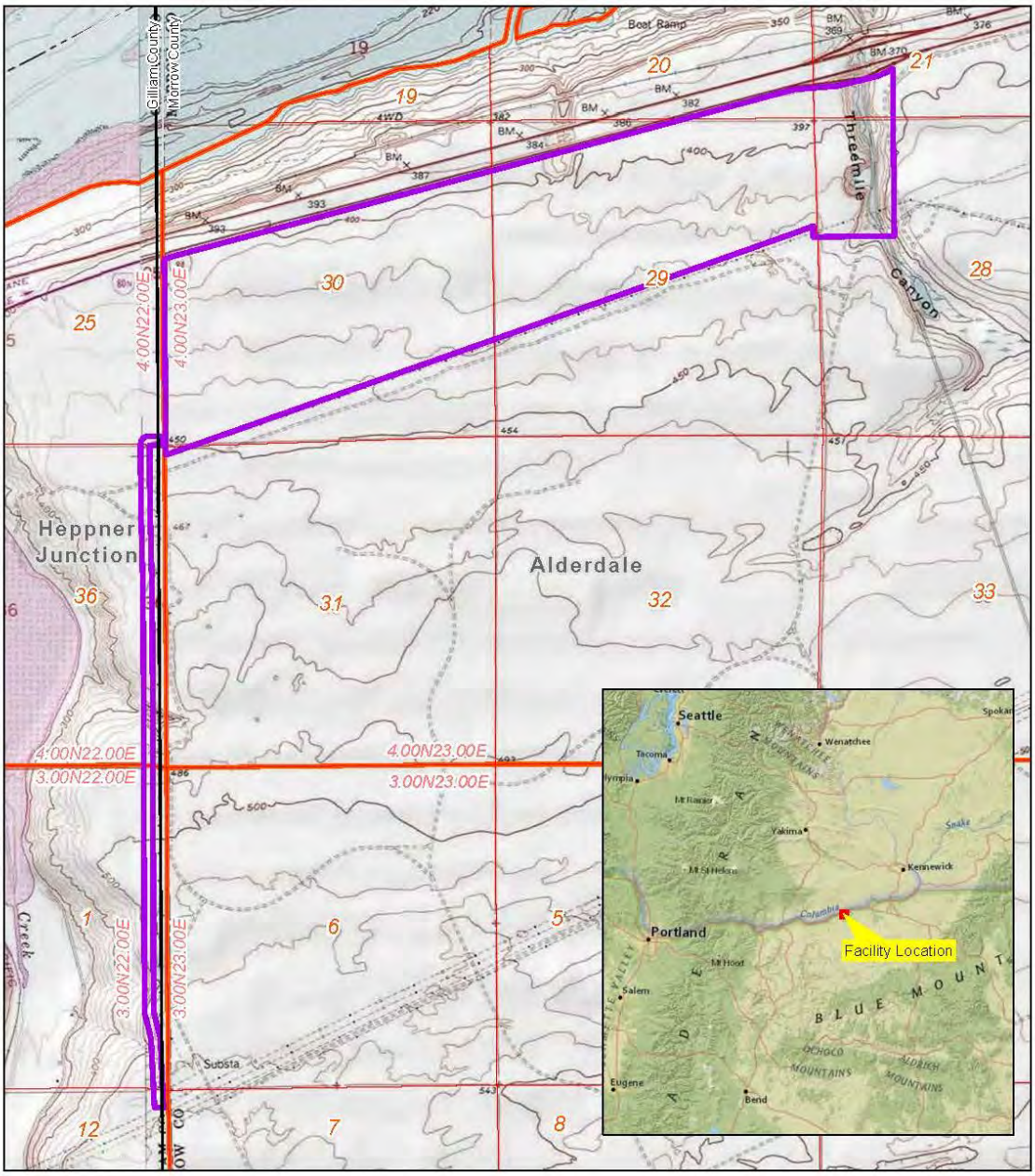
Sediment Description (if sediment is fill, explain why):

Cultural Materials Observed:

Additional Notes:

Sketch Maps of the Excavation and Sidewalls:

Attachment 2
Figure 1: Facility Site Boundary on Topographic Background



LEGEND

- Facility Site Boundary
- County
- USGS 7.5-minute Quadrangle
- Township and Range
- Section

N

0 2,250

Feet

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FIGURE 1
Facility Site Boundary on Topographic Background
Boardman Solar Energy Facility
Morrow and Gilliam Counties, Oregon

ch2m

BAOTSP01 C:\GIS\PROJ\INVENERGY\421624HEPPNER\BOARDMAN_SOLAR_PROJECT\GIS\MAPFILES\2016\CULTURAL\NOVEMBER\FIG1_FACILITY_SITE_BOUNDARY_ON_TOPO.MXD

Attachment S-3
Cultural Resources Awareness Training Information

Cultural Resource Awareness Training Information

Information in this training document outlines how Boardman Solar Energy Facility (Facility) cultural resource personnel can identify cultural resources that may be found at the Facility during construction, operation, and retirement, who to contact in case of a find, and the applicable Oregon Revised Statutes that protect cultural resources located on private land. This document was developed by the CH2M HILL Engineers, Inc., archaeologist on behalf of Boardman Solar Energy LLC (Applicant) in April 2017. The document conforms with guidelines located on the Oregon State Historic Preservation Office (SHPO) Web site[1] *regarding the identification and protection of cultural resources.*

Any trace of past human activity greater than 50 years old may be an important cultural resource. Places or sites where these traces occur are a part of a proud heritage that belongs to all of us. In Oregon, there are archaeological remains that represent over 11,000 years of Native American prehistory. Historical archaeological features and deposits, and may also be found in the area. Because these achievements define what we are and affect what we become, the past belongs to us all and we all have a responsibility to help preserve significant cultural resources.

Archaeological and historical sites are a nonrenewable resource. Though we are always creating new cultural resources for people of the future to interpret or preserve for posterity, historical and archaeological sites, once destroyed, cannot be recreated.

Archaeological remains are often so fragmentary that it is possible to scrape, dig, or bulldoze right through a buried site without realizing it. Look for the following:

- Discolored soil, particularly gray-black soil with a “greasy” feel to it, in an area of lighter colored soils.
- Any animal or human bone. The proper treatment of Native American graves is of great concern. Possession of human remains from a Native American grave or associated sacred objects is a crime (ORS 97.740)-97.760).
- A thin layer, or series of layers, particularly dark layers containing charcoal or ash, in an excavation side wall.
- Shell, freshwater or marine, or shell artifacts
- Any unusual concentration of rocks, particularly if they seem to form a pattern (such as a campfire or are stacked in a low wall).
- A concentration of small pieces of broken rock, particularly obsidian or chert with sharp edges.
- A concentration of historic-era trash, including bottles, broken glass, broken ceramic, bone, and metal pieces.
- A concentration of brick, concrete, or mortared stone that might indicate a structural foundation.

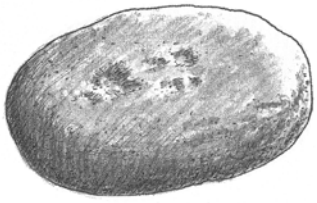
[1] https://www.oregon.gov/oprd/HCD/ARCH/pages/index.aspx

Examples of Cultural Resources

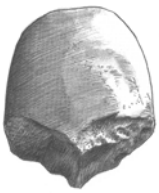
The kinds of cultural resources that may be discovered at the Facility site include prehistoric artifacts such as stacked rock walls, grinding stones, arrowheads, and stone flakes, and historic artifacts such as glass bottles, cans, and ceramics. Human skeletons may also be exposed.

The following are examples of cultural resources that could be uncovered in the Facility area, including stone tools shaped for specific functions.

The first example is a small **hammer stone**. Hammer stones were used for a wide range of tasks and may show wear at one or both ends.



Hammer Stone

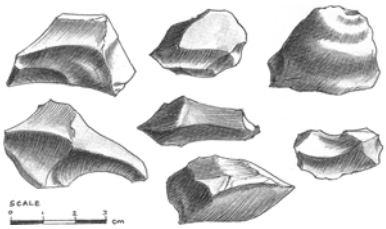


Flaked Cobble

Flaked cobbles were used for scraping, digging, or cutting. They can occur in a variety of shapes and sizes with a smooth end for holding.

Scrapers had a variety of uses including preparing animal skins, shaping wood, or preparing food. Depending on their function, scrapers come in many shapes and sizes.

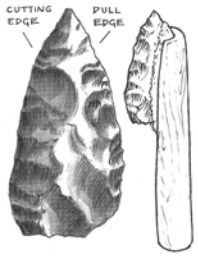
Scraper



Lithic Debitage

Lithic debitage is the waste material produced during the manufacture of flaked stone tools such as knives and projectile points. Debitage may be found in a variety of shapes and sizes, often as a concentration of small flakes of stone.

Flaked knives are very distinctive and easily identified by shape and flaking pattern. Flaked knives can be found in a large number of shapes and sizes.



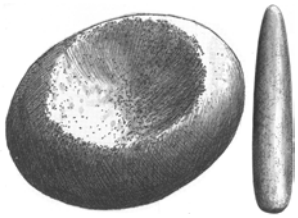
Flaked Knives

Projectile Points are also very distinctive, and are commonly referred to as arrowheads. Projectile points can range in size from one to six inches long and several inches wide.

Arrowheads

The **Mortar and Pestle** were used together as a grinding tool. They were used to prepare foods, pigments, medicines, and potions.

Historic artifacts that may be present include glass bottles, bone, ceramics, metal cans and other metal objects, including wire, nails, and building hardware, as well as the remains of former building foundations and underground utilities.



Mortar and Pestle

Your Responsibility

If a cultural resource is found, it is your responsibility to stop work and notify your supervisor. The Project/Land Manager will notify SHPO and the Oregon Department of Energy (ODOE). A buffer will be placed around the discovery and the area will be secured and protected from further disturbance. No work may resume within the buffered area until consultation with SHPO and ODOE has occurred and a professional archaeologist is able to assess the discovery. If possible human remains are encountered, the Oregon State Police, Commission on Indian Services, SHPO, ODOE, and appropriate Tribes will also be notified.

The following state regulations affect the management of cultural resources identified at the Facility:

- Oregon Revised Statutes (ORS 358.905 through 358.961) regarding the protection of significant archaeological sites and objects.
- ORS 97.740-760 regarding the protection of human remains, associated funerary items, or sacred objects.

Violations of these regulations are punishable by civil and criminal penalties and could result in the revocation of project certifications, and shutdown of the project at the direction of the appropriate state agency.

Only authorized personnel may handle cultural resources. Notify your supervisor if you think you may have found a cultural resource. Do not touch or move the object.

If you have any questions about these procedures, please ask your supervisor for more information.

Attachment S-4
Inadvertent Discovery Plan for Cultural Resources, Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon

Inadvertent Discovery Plan for Cultural Resources, Boardman Solar Energy Facility, Morrow and Gilliam Counties, Oregon

Boardman Solar Energy LLC (Applicant) proposes to construct a photovoltaic solar power generation facility on approximately 798 acres of private land in Morrow and Gilliam counties, Oregon. The project will consist of photovoltaic panels, inverters, mounting infrastructure, electrical collection system, substation, operations and maintenance building, private service roads, a 115-kilovolt transmission line, and fencing. **The Inadvertent Discovery Plan should be followed if cultural materials, including human remains, are encountered during construction.**

Protocol for Coordination in the Event of Inadvertent Discovery

☐ In the event of an inadvertent discovery of possible cultural materials, including human remains, all work will stop immediately in the vicinity of the find. A 100-foot (30-meter) buffer should be placed around the discovery with work being able to proceed outside of this buffered area unless additional cultural materials are encountered.

☐ The area will be secured and protected by flagging and roping off the area and covering (not reburying) the cultural materials/human remains.

☐ The Project Manager/Land Manager will be notified. The Project/Land Manager will notify the State Historic Preservation Office (SHPO) and the Oregon Department of Energy (ODOE). If possible human remains are encountered, the Oregon State Police, Commission on Indian Services (CIS), SHPO, ODOE, and appropriate Tribes will also be notified, in accordance with Oregon Revised Statute 97.745(4). The Applicant's representative will be responsible for contacting the Tribe(s) after confirming the appropriate Tribe(s) with CIS.

- Oregon State Police: Chris Allori (503-731-4717)
- CIS: Karen Quigley (503-986-1067)
- Appropriate Tribes: As confirmed with CIS
- SHPO: Dennis Griffin (503-986-0674), John Pouley (503-986-0675), or Matt Diederich (503-986-0577)
- ODOE: Katie Clifford (503-302-0267)

☐ No work may resume until consultation with SHPO and ODOE has occurred and a professional archaeologist is able to assess the discovery.

☐ If human remains are encountered, do not disturb them in any way. *Do not call 911*. Do not speak with the media. Secure the location. Do not take photos. The location should be secured and work will not resume in the area of discovery until all parties involved agree upon a course of action.

☐ A professional archaeologist may be needed to assess the discovery and they will consult with SHPO, ODOE, and appropriate Tribal governments to determine an appropriate course of action.

☐ Archaeological excavations may be required. This is handled on a case-by-case basis by the professional archaeologist and Project Manager, in consultation with SHPO, ODOE, and appropriate tribes.

When to Stop Work

Construction work may uncover previously unidentified Native American or Euroamerican artifacts. This may occur for a variety of reasons, but may be associated with deeply buried cultural material, access restrictions during project development, or if the area contains impervious surfaces throughout most of the project area that would have prevented standard archaeological site discovery methods.

Work must stop when the following types of artifacts or features are encountered:

Native American artifacts may include (but are not limited to):

☐ Flaked stone tools (for example, arrowheads, knives scrapers)

☐ Waste flakes that resulted from the construction of flaked stone tools

☐ Ground stone tools like mortars and pestles

☐ Layers (strata) of discolored earth resulting from fire hearths (may be black, red, or mottled brown and often contain discolored cracked rocks or dark soil with broken shell)

☐ Human remains

☐ Structural remains—wooden beams, post holes, fish weirs

Euroamerican artifacts may include (but are not limited to):

☐ Glass (from bottles, vessels, windows)

☐ Ceramic (from dinnerware, vessels)

☐ Metal (nails, drink/food cans, tobacco tins, industrial parts)

☐ Building materials (bricks, shingles)

☐ Building remains (foundations, architectural components)

☐ Old wooden posts, pilings, or planks (these may be encountered above or below water)

☐ Remains of ships or seagoing vessels, or marine hardware

☐ Old farm equipment (may indicate historic resources in the area)

Even what looks to be old garbage could very well be an important archaeological resource.

When in doubt, call it in!

Proceeding with Construction

☐ Construction can proceed only after the proper archaeological inspections have occurred and environmental clearances are obtained. This requires close coordination with SHPO, ODOE, and the tribes.

☐ After an inadvertent discovery, some areas may be specified for close monitoring or no-work zones. Any such areas will be identified by the professional archaeologist to the Project Manager and appropriate contractor personnel.

☐ In coordination with SHPO and ODOE, the Project Manager will verify these identified areas and be sure that the areas are clearly demarcated in the field, as needed.

Detailed Protocol for Treatment of Native American Human Remains

Any Native American human skeletal remains will be treated with the utmost dignity and respect. Attached is a Tribal position paper on the treatment of human remains titled *Treatment of Native American Human Remains Discovered Inadvertently or Through Criminal Investigations on Private and Public, State-Owned Lands in Oregon* (Government to Government Cultural Resources Cluster Group, September 2006; accessed from SHPO Web site on March 30, 2017). The attached paper further describes the appropriate protocol for the treatment of Native American human remains.

Attachment
Tribal Position Paper on the Treatment of Human Remains

Treatment of Native American Human Remains Discovered Inadvertently or Through Criminal Investigations on Private and Public, State-Owned Lands in Oregon

Native American burial sites are not simply artifacts of the tribe's cultural past, but are considered sacred and represent a continuing connection with their ancestors. Native American ancestral remains, funerary objects, sacred objects and objects of cultural patrimony associated with Oregon Tribes are protected under state law, including criminal penalties (ORS 97.740-.994 and 358.905-.961). The laws recognize and codify the Tribes' rights in the decision-making process regarding ancestral remains and associated objects. Therefore both the discovered ancestral remains and their associated objects should be treated in a sensitive and respectful manner by all parties involved.

Identification of Human Remains

- Oregon laws (ORS 146.090 & .095) outline the types of deaths that require investigation and the accompanying responsibilities for that investigation. The law enforcement official, district medical examiner, and the district attorney for the county where the death occurs are responsible for deaths requiring investigation. Deaths that require investigation include those *occurring under suspicious or unknown circumstances*.
- If human remains that are inadvertently discovered or discovered through criminal investigations **are not clearly modern**, then there is high probability that the remains are Native American and therefore ORS 97.745(4) applies, which requires immediate notification with State Police, State Historic Preservation Office, Commission on Indian Services, and all appropriate Native American Tribes. To determine who the "appropriate Native American Tribe" the responsible parties should contact the Legislative Commission on Indian Services (CIS). To determine whether the human remains are Native American the responsible parties should contact the appropriate Native American Tribes at the initial discovery. It should be noted that there may be more than one appropriate Native American Tribe to be contacted.
- If the human remains are possibly Native American then the area should be secured from further disturbance. The human remains and associated objects **should not be disturbed**, **manipulated, or transported from the original location until a plan is developed in consultation with the above named parties.** These actions will help ensure compliance with Oregon state law that prohibits any person willfully removing human remains and/or objects of cultural significance from its original location (ORS 97.745).
- All parties involved and the appropriate Native American Tribes shall implement a culturally sensitive plan for reburial.

Notification

- State law [ORS 97.745 (4)] requires that any discovered human remains suspected to be Native American shall be reported to-
    1. State Police (current contact Chris Allori, Department of State Police, office phone 503-731-4717)
    2. State Historic Preservation Office (SHPO)

*Note: This document was created by the Government to Government Cultural Resource Cluster Group in September, 2006.

- Primary contact= Dennis Griffin, State Archaeologist, office phone 503-986-0674, cell phone 503-881-5038
- Secondary contacts= Asst. State Archaeologists John Pouley, office phone 503-986-0675, or Matt Diederich, office phone 503-986-0577

3. Commission on Indian Services (CIS)
   - Current contact= Karen Quigley, Director, office phone 503-986-1067. Karen will confirm the list of appropriate Native American Tribes.
4. All appropriate Native American Tribes provided by CIS.

- Burns Paiute Tribe- Theresa Peck 541-573-1375 X6
- Confederated Tribes of Coos, Lower Umpqua and Siuslaw- Arrow Coyote 541-888-9577 X4574
- Confederated Tribes of Grand Ronde- Eirik Thorsgard 503-879-1630; cell 971-241-2696
- Confederated Tribes of Siletz- Robert Kentta 541-444-2532; cell 541-351-0148
- Confederated Tribes of the Umatilla Indian Reservation- Teara Farrow 541-276-3629, secondary contact; Catherine Dickson 541-966-2338
- Confederated Tribes of Warm Springs- Sally Bird 541-553-3555
- Coquille Indian Tribe- Nicole Norris 541-756-0904
- Cow Creek Band of Umpqua Indians- Jessie Plueard 541-677-5575 X5577
- Klamath Tribes- Perry Chocktoot 541-783-2219 X159

*Note: This document was created by the Government to Government Cultural Resource Cluster Group in September, 2006.

EXHIBIT T
RECREATIONAL FACILITIES AND OPPORTUNITIES

OAR 345-021-0010(1)(t)

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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:*

Response: To issue a site certificate for a proposed energy facility, OAR 345-022-0100(1) states that "the Council must find that the design, construction, and operation of a facility, taking into account mitigation, are not likely to result in significant adverse impact to important recreational opportunities in the analysis area as described in the project order." As defined in OAR 345-001-0010, the analysis area for impacts on recreational opportunities is 5 miles. Further, OAR 345-022-0100 provides factors that the Council will consider in judging the importance of a recreational opportunity. Specifically, OAR 345-022-0100 provides the following:

> *(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;*
>
> *(e) Irreplaceability or irretrievability of the opportunity[1].*

Boardman Solar Energy LLC (Applicant) provides the following information to demonstrate that the Boardman Solar Energy Facility (Facility), taking into account mitigation, will not result in significant adverse impacts on any important recreational opportunities in the 5-mile analysis area.

T.1 RECREATIONAL OPPORTUNITIES IN THE ANALYSIS AREA

OAR 345-021-0010(1)(t)(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.*

Response: The analysis area for impacts on recreational opportunities includes the area within the Facility site boundary and extends 5 miles beyond the Facility site boundary, as shown on Figure T-1. In general, recreational activities within the analysis area include wildlife viewing,

[1] While OAR 345-022-0100(1)(e) does not explain the terms "irreplaceability or irretrievability" for the purpose of this rule, within its context, the Applicant believes that the rule asks whether there are other recreational opportunities within the 5-mile analysis area that could provide the same types of recreational opportunities in the event that a specific recreation facility is closed or otherwise unable to provide services to the surrounding population.

camping, boating, hiking, photography, angling, and waterfowl hunting. There are no recreational opportunities within the Facility site boundary.

OAR 345-022-0100 prescribes criteria used to evaluate a recreational opportunity's relative importance: any special designation or management, degree of demand, outstanding or unusual qualities, availability or rareness, and irreplaceability or irretrievability of the opportunity.

The potential importance of recreational opportunities within the 5-mile analysis area, as shown on Figure T-1**,** was evaluated. Based on this evaluation, five important recreational opportunities have been identified in the analysis area and one identified recreational opportunity does not meet the criteria of important. Table T-1 provides a summary of this analysis in accordance with the criteria outlined in OAR 345-022-0100.

T.1.1 Identified Recreational Opportunities That Do Not Meet the Criteria of Important

One recreational opportunity located within the 5-mile analysis area (Horn Butte Wildlife Area) was determined to be "not important" because it does not meet the criteria prescribed in OAR 345-022-0100 (see Table T-1). While it does have special designation/management by the U.S. Department of the Interior Bureau of Land Management (BLM), it was found not to be unusual in terms of its recreation potential and could be replaced if affected.

Golgatha Butte, a land form of local interest located approximately 4 miles northeast of the Facility, is not publicly accessible and is developed with private vineyards. Because of the lack of public access and evidence of any recreational use, Golgatha Butte was not included in the importance evaluation.

No other privately owned recreational opportunities such as golf courses or RV parks were identified in the analysis area. Privately owned recreational resources are not considered important because they do not meet any of the OAR 345-022-0100 criteria.

The recreation area determined to be not important is described in Section T.1.1.1 and support for this conclusion is summarized in Table T-1. Figure T-1 shows the approximate locations of the five recreational opportunities.

Table T-1. Summary of Recreational Importance Evaluation

Recreational Opportunity	Distance from Facility Site Boundary to Nearest Point of Recreational Opportunity	Special Designation/ Management	Degree of Demand	Outstanding/ Unusual Quality	Availability/ Rareness	Irreplaceability /Irretrievability	Recreational Importance
Morrow County							
Quesnel Park	0.2	Columbia River – John Day Recreation Site/USACE cooperatively manages with ODFW	Moderate (seasonal)	Fishing and primitive camping with a boat launch in a natural setting and low population area between Arlington and Boardman.	Somewhat uncommon	Somewhat replaceable	Important
Lewis and Clark National Historic Trail	0.3	Received federal designation as a "historic trail" under the NTSA in 1978. The purpose of the historic trail designation is to protect the historic route and associated artifacts. Thus, the focus of the NTSA is on historic preservation, not management of recreation resources.		The locations of the LCNHT include an approximate water trail along the Columbia River, which is how the Lewis and Clark expedition moved from east to west in 1804, and a motor route along Washington SR 14, which is in the general vicinity of the expedition's return trip from the Pacific Ocean along the north shore of the Columbia River in 1806.	Uncommon	Irreplaceable	Important
Gilliam County							
Willow Creek Wildlife Area	0.2	Wildlife Management Area/ODFW	Moderate	Limited - year-round public access to bird watching/wildlife viewing, angling, and hunting (primarily of waterfowl) at Willow Lake.	Somewhat uncommon	Somewhat replaceable	Important
Horn Butte Wildlife Area	0.7	SMA – Horn Butte Curlew Area/BLM	Low	Limited Off-road vehicle use limited to existing roads and trails.	Somewhat uncommon	Replaceable	Not Important
Blue Mountain Scenic Byway	1.2	Umatilla National Forest and Wallowa-Whitman National Forest/USDA Forest Service	Moderate	The scenic byway stretches from Arlington, along Willow Creek Wildlife Area, and down through the Blue Mountains. Drivers can experience ranching country, remnants of the Oregon Trail, historic towns, and National forest as well as nature viewing.	Uncommon	Irreplaceable	Important

Table T-1. Summary of Recreational Importance Evaluation

Recreational Opportunity	Distance from Facility Site Boundary to Nearest Point of Recreational Opportunity	Special Designation/ Management	Degree of Demand	Outstanding/ Unusual Quality	Availability/ Rareness	Irreplaceability /Irretrievability	Recreational Importance
Klickitat County							
Lewis and Clark Trail Scenic Byway	1.3	Washington State Scenic Byway/WDOT[b]	Moderate	Provides a 572-mile scenic drive along the historic Lewis and Clark Trail between Clarkston on the Idaho border and Cape Disappointment on the Pacific Coast, of which a small portion of SR 14 is within the analysis area.	Uncommon	Irreplaceable	Important

[a] Approximate distances provided are measured from the Facility site boundary to the nearest point of the recreational opportunity.

[b] One of the two important recreational opportunities identified in this Exhibit is located partially or entirely within the State of Washington. Although the Applicant has studied potential impacts on all important recreational opportunities within the analysis area, the Applicant reserves the right to take the position that applicable Oregon law does not require analysis of recreational opportunities outside of Oregon.

Notes:
LCNHT = Lewis and Clark National Historic Trail
NTSA = National Trails System Act
ODFW = Oregon Department of Fish and Wildlife
SMA = Special Management Area
SR = State Route
USACE = U.S. Army Corps of Engineers
WDOT = Washington Department of Transportation

T.1.1.1 Horn Butte Wildlife Area

The Horn Butte Wildlife Area is located just south of the Facility site boundary and is managed by the BLM in accordance with the *Two Rivers Resource Management Plan and Record of Decision* (BLM, 1986). Based on this management plan, limited recreation occurs within the Horn Butte Wildlife Area. The primary recreational opportunity described by this plan is off road vehicle use. However, it describes the Horn Butte Wildlife Area as having a "Limited Designation" in regards to off-road vehicle use where vehicle travel is restricted to existing roads and trails, year-round. While the management plan also discusses rockhounding as a popular public use of BLM lands in this management area, the Horne Butte Wildlife Area is not identified in the management plan as having moderate or high value for rockhounding (BLM, 1986). There is limited information available on public use of this wildlife area, but owing to its remote nature and lack of trails, public use is assumed to be low.

While Horn Butte Wildlife Area has a special designation and management as described by OAR 345-022-0100(1)(a), the degree of public demand is assumed to be low. The outstanding or unusual quality associated with the wildlife area is the Horn Butte ACEC, which does not have public recreation value beyond wildlife viewing, specifically viewing the long-billed curlew. According to ODFW, the long-billed curlew is most abundant in the Columbia River basin and the Harney/Malheur Lake area (ODFW, 2014). While the Wildlife Area is somewhat uncommon in terms of rareness, there are other BLM wildlife areas throughout the John Day Basin Management Area such as the Ferry Canyon ACEC, Armstrong Canyon ACEC, and North Fork John Day ACEC. In addition, the long-billed curlew is found most abundantly in both the Columbia River basin and the Harney/Malheur Lake area, so this recreational opportunity is replaceable and does not meet the criteria of important.

T.1.2 Recreational Opportunities that Meet the Criteria of Important

The Applicant identified five recreational opportunities that meet the criteria of important. All five recreational opportunities occur outside the site boundary and within the 5-mile analysis area, as follows:

- **Quesnel Park –** A USACE-managed Columbia River recreation site with a boat ramp, primitive camping, and river access for activities such as fishing and windsurfing.
- **Willow Creek Wildlife Area** – One of four ODFW-managed Columbia Basin Wildlife Areas in the vicinity, Willow Creek encompasses Willow Lake just east of the Facility.
- **Blue Mountain Scenic Byway** — A 145-mile scenic byway that travels east and then south through the analysis area on the Oregon side of the Columbia River before extending eastward into Baker City.
- **Lewis and Clark Trail Scenic Byway** — A portion of this 572-mile scenic byway that follows the historic Lewis and Clark Trail occurs within the analysis area on the Washington side of the Columbia River along a stretch of SR 14.
- **Lewis and Clark National Historic Trail** — A portion of the historic trail meant to generally display the route the Lewis and Clark expedition traveled to and from the Pacific Ocean in 1804-06.

Sections T.1.2.1 through T.1.2.1.5 describe the above-listed recreational opportunities with information on the factors listed in OAR 345-022-0100(1). The analysis is summarized in Table T-1. Figure T-1 shows the approximate locations of the recreational opportunities described above.

T.1.2.1 Quesnel Park

The USACE-managed recreation site is a no-fee public use site with primitive camping and a gravel boat ramp (USACE, 2016). The site is most commonly used seasonally for fishing and windsurfing. According to personal communication with the Dalles Ranger Station (Tilton, 2016, pers. comm.), other than in summertime, use is generally low, with almost no use during the fall, winter, and early spring months.

Quesnel Park is one of 18 recreation sites along the Columbia River within the John Day grouping, and one of 42 USACE recreation sites along the Columbia River as a whole (USACE, 2016). However, the park provides year-round public access in the Columbia Basin, which is made up of only 5 percent public lands. Additionally, the boat ramp is the only publicly available launch site to the Columbia River between Arlington and Boardman. As such, it is a somewhat uncommon resource. While the specific recreational opportunities provided by this site (fishing, camping, river access) are not unique among other regional recreation sites, given the high summer season demand, the attractive natural setting, and the presence of some protective offshore islands or breakwaters, the recreational opportunities at this recreation area are considered only somewhat replaceable and thus qualify as “important”.

T.1.2.2 Willow Creek Wildlife Area

Willow Creek Wildlife Area is one of four Columbia Basin Wildlife Areas managed by ODFW in accordance with the Columbia Basin Wildlife Areas Management Plan (ODFW, 2008). Willow Creek Wildlife Area encompasses Willow Lake and is sited on land owned by the USACE (ODFW, 2016). Public access is open year-round for recreational purposes and the parking area can be reached off of Interstate 84 (I-84), exit 151, and Threemile Canyon Road, which is the point of access proposed for the Facility. Willow Creek Wildlife Area ranges in elevation from approximately 260 feet at water level (Willow Creek Bay) to 480 feet. In addition to Willow Lake, the wildlife area contains a variety of wetland habitats types that are the result of modern agriculture, irrigation, and/or the John Day Lock and Dam Project (ODFW, 2008).

The wildlife area is managed to protect and enhance fish and wildlife resources and their habitats, while providing public use of those resources (ODFW, 2008). Public use of the wildlife area includes hunting, trapping, and angling, wildlife viewing, and educational/interpretive uses (ODFW, 2008). While waterfowl hunting is the most common, hunting for upland birds, big game and other unprotected species also occurs. Trapping at the wildlife area is limited to a few individuals in pursuit of muskrat, beaver, and river otter. Angling occurs throughout Willow Lake but is concentrated at the mouth of the Umatilla River and in Willow Creek Bay. The 2008 management plan notes that wildlife viewing has increased with the popularity of bird watching among local residents (ODFW, 2008). Educational and interpretive use includes visits from school and other groups that may come independently or arrange guided tours.

As one of four wildlife basins managed by ODFW within the Columbia Plateau ecoregion, Willow Creek Wildlife Area is somewhat uncommon, but not totally unique. It does have the outstanding quality of encompassing Willow Lake. While there are other similar accessible natural landscapes where surface water bodies and streams meet the Columbia River, they do not provide public access to hunting. Hence, this resource is somewhat irreplaceable. As a somewhat uncommon and somewhat irreplaceable recreational opportunity, this recreational opportunity meets the criteria prescribed in OAR 345-022-0100 for importance.

T.1.2.3 Blue Mountain Scenic Byway

Oregon's Blue Mountain Scenic Byway is a designated Oregon State Scenic Byway and generally located within the analysis area 1.2 miles west of the Facility site boundary where measured from the byway's Heppner Junction off I-84. In this location, the byway is Oregon SR 74 along Willow Creek (ODOT, 2015). The byway stretches 145 miles out of Heppner Junction, heading southeast through ranching country on SR 74. Just before reaching the Umatilla national forest, it diverges from a highway and becomes forest road (FR-53). After heading through Ukiah, the byway continues south east ending at the North Fork John Day Campground.

Primary recreational uses include sightseeing and road touring. A number of points of interest occur along the byway (such as Willow Creek Wildlife Area, the historic towns of Cecil, Ione, Lexington, and Heppner, Potamus Point, Ukiah, and the Bridge Creek Wildlife Area); however, the towns and Bridge Creek Wildlife Area do not occur within the Facility's analysis area. The nearest point of interest along the byway is Willow Creek Wildlife Area located 1.2 miles from the proposed Facility.

Owing to its scenic views, designation as a state scenic byway, and the access that it provides to historic towns and other recreational opportunities, the byway satisfies the criteria of OAR 345-022-0100 and is classified as an important recreational opportunity.

T.1.2.4 Lewis and Clark Trail Scenic Byway

In Washington, the Lewis and Clark Trail Scenic Byway is located 1.4 miles north of the Facility. This is a state-designated scenic byway that stretches 572 miles, following the historic Lewis and Clark Trail (WDOT, 2016). In the analysis area, this scenic byway occurs on the Washington side of the Columbia River along a stretch of SR 14. This stretch of the byway follows the Columbia River, a portion of Lewis and Clark's travels described as among the most vivid, and compelling episodes of the entire journey (WDOT, 2016).

Primary recreational uses include sightseeing and road touring. A number of points of interest occur along the byway; however, none occur within the analysis area. The nearest point of interest along the byway is Crow Butte State Park, located outside the analysis area 5.1 miles northeast of the Facility.

As a result of its scenic views, designation as a state scenic byway, access it provides to other recreational opportunities, and historic connection to the Lewis and Clark expedition, the byway satisfies the criteria of OAR 345-022-0100 and is classified as an important recreational opportunity.

T.1.2.5 Lewis and Clark National Historic Trail

The 5-mile analysis area includes a portion of the LCNHT, which received federal designation as a "historic trail" under the NTSA in 1978. The purpose of the historic trail designation is to protect the historic route and associated artifacts. Thus, the focus of the NTSA is on historic preservation, not management of recreation resources.

As detailed in Exhibit R, the National Park Service prepared the *Lewis and Clark National Historic Trail, Comprehensive Plan for Management and Use* (CPMU) in accordance with Section 5(f) of the NTSA which, "guides development and use of the Trail and provides a basis for coordinated and consistent implementation…" (pg. 2). The locations of the LCNHT were determined from the CPMU mapping (sheet 40), including an approximate water trail along the Columbia River, which

is how the expedition moved from east to west in 1804, and a motor route along Washington SR 14, which is in the general vicinity of the expedition's return trip from the Pacific Ocean along the north shore of the Columbia River in 1806.

The CPMU also identifies specific parks along the trail route, which the plan indicates have the potential for inclusion as part of the LCNHT. None of the identified parks are within the Facility's analysis area.

The CPMU indicates that after appropriate protection measures have been established, sites and segments should be accessible and available for historic interpretation and public use and enjoyment. For those portions of the LCNHT within the analysis area, recreational opportunities to support public use and historic interpretation may include driving the approximate route along Washington SR 14 or I-84, boating the approximate route in the Columbia River, or visiting the parks identified along the approximate route. A more detailed description of the motor route along SR 14 is included above under the Lewis and Clark Trail Scenic Byway. Again, the recreational opportunities with boating the water route include visiting parks along the Columbia River, wildlife viewing, and historic interpretation of what the Lewis and Clark expedition experienced, although the general Columbia River environment is completely different that it was in the early 1800s.

Owing to its historic connection to the Lewis and Clark expedition and access it provides to other recreational opportunities, the LCNHT satisfies the criteria of OAR 345-022-0100 and is classified as an important recreational opportunity.

T.2 SIGNIFICANT POTENTIAL ADVERSE IMPACTS

OAR 345-021-0010(1)(t)(B)) *A description of any significant potential adverse impacts to the important opportunities identified in (A) including, but not limited to:*

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

Response: For the purpose of this Exhibit, a direct loss is assumed to occur when the Facility's construction or operation affects a recreational opportunity by destroying or directly altering the resource so that it no longer exists in its current state (for example, demolishing a park). An indirect loss is assumed to occur when the Facility's construction or operation limits access or otherwise alters a significant aspect of the recreational opportunity in a way that the opportunity may still exist, but that it cannot be enjoyed or used as it has been historically (for example, completely blocking a view from a scenic overlook or imposing such a nuisance impact as to render a recreational area unusable).

The Facility will not occur within the boundaries of any of the important recreational opportunities identified in Table T-1. As such, no recreational opportunity will be destroyed or directly altered as a result of Facility construction or operation. Therefore, no direct loss related to Facility construction or operation is anticipated.

Assessment of indirect loss is directly related to potential noise, traffic, and visual impacts. As demonstrated below in response to OARs 345-021-0010(1)(t)(B)(ii) through (iv), significant adverse impacts related to noise, traffic, and visibility of structures from Facility construction and operation are not anticipated at the important recreational opportunities identified in Section T.1.2. Consequently, the Applicant demonstrates that no indirect loss related to Facility construction or operation is anticipated.

(ii) Noise resulting from facility construction or operation.

Response: As detailed in Exhibit X, projected noise levels resulting from Facility construction and operation will meet requirements contained in Oregon Department of Environmental Quality rules. Construction noise will be temporary in nature, and operational noise extremely low, if any. Given the projected noise levels and the distance to the recreational opportunities, Facility construction and operational noise will not significantly affect any of the important recreational resources identified within the 5-mile analysis area.

The important recreational opportunities closest to the Facility are Quesnel Park and Willow Creek Wildlife Area, both 0.2 mile from the Facility site boundary at its closest point. Quesnel Park is located directly adjacent to both I-84 and a high-volume railroad track, sources of constant traffic noise. Public utilizing Quesnel Park will be anticipating existing ambient noise due to the park's proximity to the highway and railroad. While fishing is a somewhat noise-sensitive use, windsurfing is not. The recreational opportunities associated with the wildlife area are more sound sensitive (fishing, hunting, and wildlife viewing). However, at both nearby important recreational opportunities, construction noise will be temporary and long-term operational noise will be so low as to be undetectable.

I-84 and the railroad tracks also bisect the northern section of Willow Creek Wildlife Area and a second railroad track runs directly adjacent to the western bank of the wildlife area. Recreational fire arms from hunting produce loud noises that can reverberate, or bounce off steep slopes making the noise louder. Thus, Willow Creek Wildlife Area is also subject to sound from major transportation infrastructure and recreational uses and is not acoustically pristine. In addition, there is a water pumping facility located at the southern end of Willow Lake. The eastern section of the wildlife area closest to the Facility, has an exceedingly steep slope, and is therefore not conducive to frequent public use. The public may access this area by boat on Willow Creek Bay, but it is approximately 250 feet lower in elevation than the Facility due to the steep slope that provides topographical screening to the Facility.

As shown in Exhibit X, Table X-5, composite construction site noise levels are conservatively estimated to decrease 6 dBA for each doubling of distance. Based on Table X-5, the temporary construction noise levels will not exceed approximately 60 dBA at Willow Creek Wildlife Area (0.5 mile) or Quesnel Park. However, as noted, these levels are conservative and will be further reduced when additional attenuation factors discussed in Exhibit X are considered such as terrain and ground effects. In addition, although potentially audible, the noise level is not such that it will result in activity or resource interference with the relevant recreational uses.

There are very few sources of noise associated with solar facilities and they are generally minor compared to other energy facilities. The traffic on the adjacent I-84 represents a more substantial source of noise than the proposed Facility. There is no unusually loud construction (including from the batch plant) or operational noise sources associated with the Facility; therefore, a significant potential noise impact on Quesnel Park and Willow Creek Wildlife Area is not anticipated.

The LCNHT is another nearby important recreational opportunity, which is located approximately 0.3 mile from the Facility site boundary at its closest point. The primary recreational activities associated with this recreational opportunity are auto touring and boating. Auto touring is an activity which is not noise sensitive and itself generates noise. This is also the case with use of the Blue Mountain Scenic Byway, one of the other important recreational opportunities within the analysis area. In addition, both auto touring opportunities

are more than a mile away from the Facility so short-term construction noise will be faint, if present at all. Boating along the water route portion of the LCNHT is already prone to constant traffic noise from both I-84 and SR 14. Short-term construction noise will only be heard along the portions of the LCNHT immediately adjacent to the Facility, and long-term operational noise will be so low as to be undetectable.

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

Response: Traffic impacts are addressed in greater detail in Exhibit U, which provides information on anticipated traffic volumes and peak construction traffic times, and measures the construction contractor will implement to avoid significant traffic impacts. This section focuses on the impacts of increased traffic on important recreational opportunities.

I-84 and Threemile Canyon Road may be temporarily affected by traffic increases as a result of construction vehicles accessing the site. As the primary transportation route will be I-84, and the state highway system is constructed to design, safety, and load-bearing standards, minimal impacts are anticipated from potential construction and operational traffic on traffic safety or road maintenance. Impacts related to temporary construction traffic will be inconsequential, as construction vehicles will constitute just a fraction of the daily traffic typical on I-84. Thus, as further explained below, recreational opportunities within the analysis area that are accessed via I-84 will not be significantly impacted due to any increase in traffic on I-84 from construction or operation of the Facility.

Quesnel Park and Willow Creek Wildlife Area. From Exit 151 on I-84, access to the proposed Facility will occur via Threemile Canyon Road, a private road that runs north and south just east of the Facility. Access to Quesnel Park and Willow Creek Wildlife Area also occurs via Exit 151 and Threemile Canyon Road. Access to Quesnel Park is north of Exit 151 on a segment of the road that will not be used for the Facility. Thus, any increase in traffic affecting access to Quesnel Park will be limited to the I-84 on and off ramps and will be negligible.

As mentioned above, 600 feet of the private access road where it turns west from Threemile Canyon Road will be upgraded to accommodate Facility construction and operation. To provide access to Willow Creek Wildlife Area during construction, particularly while the 600-foot section of upgraded private road is under construction, the Applicant, in coordination with the existing landowner, Threemile Canyon Farms, will provide a temporary alternate public access to Willow Creek Wildlife Area. The alternate access, shown in Exhibit L Figure L-2, follows Threemile Canyon Road 1.1 miles south of the existing Willow Creek Wildlife Area turnoff and then turns west onto an existing privately owned dirt road, which continues west to Willow Creek Wildlife Area. Although this route will be approximately 0.6 mile longer than the existing access route to the wildlife area, most of it will be on Threemile Canyon Road, which is paved. Paved roads generally allow for faster travel speeds and increased fuel economy. The Applicant will coordinate with ODFW and the landowner to ensure there is safe and clear wayfinding to Willow Creek Wildlife Area for the alternate route, including but not limited to directional roadway signage along the alternate access route and a description of the route on ODFW's website. Therefore, although the construction traffic on Threemile Canyon Road and the slightly increased travel distance for the alternate access route may slightly delay access to Willow Creek Wildlife Area, the delays will only be during the construction period, and will not significantly impact access to the wildlife area.

Backups and delays of a temporary nature may occur on the 0.5-mile segment of Threemile Canyon Road from the increase in traffic during construction that may impact access to the Willow Creek Wildlife Area. These impacts are mitigated by the fact that the traffic will primarily

be from the delivery of large components as a result of truck size, weight, and maneuverability. Large delivery trucks will be concentrated over a smaller duration within the overall construction schedule (e.g., approximately 4 to 6 months), limiting the time period over which delays will occur. In addition, the arrival of large delivery trucks will likely be during the work week, thereby minimizing delays to weekend visitors. The Applicant will monitor road traffic on Threemile Canyon Road during delivery of heavy components, and will implement measures such as advance signage and flag personnel as described in Exhibit U Section U.4.7.

Traffic impacts to the Willow Creek Wildlife Area during Facility operation are not anticipated from the limited number of operational trips to be added. Long-term negative impacts from traffic will be negligible due to the limited number of permanent employees. In addition, after construction, access to Willow Creek Wildlife Area will be improved with the upgraded turnoff and 600-foot section from Threemile Canyon Road.

Blue Mountain Scenic Byway. The most westerly portion of the Blue Mountain Scenic Byway begins at Heppner Junction (the intersection of I-84 and SR 74) and is accessed via I-84, the identified primary transportation route for the Facility. Hence, motorists utilizing this recreational resource may experience limited traffic increases during Facility construction. This impact will be temporary in nature, occurring over the main access route to the byway's starting point, as opposed to the byway itself. Traffic demands on this portion of I-84 immediately adjacent to the byway are low, as is public use of the byway in all but the summer months. Therefore, potential effects are expected to be temporary and will not have negative impacts on the byway. Long-term negative impacts from traffic will be negligible because the Facility will employ a limited number of people.

Lewis and Clark Trail Scenic Byway. As SR 14 is not a primary transportation route for the Facility, no traffic-related impacts are anticipated to drivers on the Lewis and Clark Trail Scenic Byway or motor route segment of the LCNHT. Any potential impacts on the water route segment of the LCNHT related to traffic will be indirect as described above in the noise assessment. Boating along the water route portion of the LCNHT is already prone to constant traffic noise from both I-84 and SR 14. Any increase to traffic on I-84 attributable to the Facility will be minimal and in terms of additional traffic noise, will be undetectable.

(iv) Visual impacts of facility structures or plumes.

Response: A comprehensive analysis of Facility visibility is provided in Exhibit R.

Quesnel Park is not identified in Exhibit R as a significant or important scenic resource in any applicable land use plans. Additionally, Quesnel Park is located immediately adjacent to the Columbia River shore at a lower elevation than the Facility, which is situated on a river terrace approximately 100 feet higher than the park. Views of the Facility will be limited from the park, with the tallest structures, the transmission poles, located furthest away from the park over a mile and a half away. Hence, the Facility will not result in any significant visual impacts to recreational users at the park, including those windsurfing or fishing on the Columbia River.

While recognized in an applicable land use plan, Willow Creek Wildlife Area is not identified as a significant or important scenic resource in Exhibit R. Specifically, the *Columbia Basin Wildlife Areas Management Plan* (ODFW, 2008) does not identify important scenic resources or values within the scenic resources analysis area. Instead, the wildlife area is addressed in Exhibit L, Protected Areas. As the wildlife area is situated in a canyon at a lower elevation than the Facility, taking into account existing screening, Exhibit L finds that the Facility will not likely be

visible from the wildlife area and Facility structures will not constitute a significant adverse visual impact on this Protected Area.

Exhibit R analyzes visual impacts from the Facility on the Blue Mountain Scenic Byway, Lewis and Clark Trail Scenic Byway, and LCNHT, and concludes the design, construction, and operation of the Facility will not result in significant adverse impacts. Both the Blue Mountain Scenic Byway and Lewis and Clark Trail Scenic Byway are located more than 1 mile away from the Facility site boundary. Existing screening in the form of varying topography adjacent to the highways, vegetation, and structures, occurs along both byways and blocks many views except in certain locations. Views of the landscape are dominated by the Columbia River and steep bluffs along the Washington state border to the north; vacant grasslands crossed by a mixture of existing transmission line infrastructure to the east and the south; and existing wind power generation turbines associated with wind farms such as Shepherds Flat (North, Central, and South), Pebble Springs, Leaning Juniper, Willow Creek, and Threemile Canyon located west and southwest of the Facility site boundary. In addition, the transmission line poles will be by far the tallest features of the Facility at 70 to 135 feet in height; however, the transmission line has been routed directly adjacent to an existing transmission line. The new transmission line poles will be next to existing poles that are similar in scale and appearance, thus minimizing visual impacts that may be associated with the transmission line. Although certain portions of the Facility may be visible, the Facility will not result in significant impacts on views from the Blue Mountain Scenic Byway and Lewis and Clark Trail Scenic Byway.

The water route segment of the LCNHT, which is located adjacent to the Oregon shoreline of the Columbia River, is approximately 110 to 170 feet in elevation below the area within the Facility site boundary. In addition, the Applicant has purposefully sited the taller components of the Facility such as the transmission line, substation, and the operations and maintenance building on the south end of the Facility site, farthest away from the river. Again, the Facility's transmission line, which will be the tallest feature of the Facility, has been routed directly adjacent to an existing transmission line in order to minimize visual impacts. Thus, the Facility will not result in significant impacts on views from the LCNHT.

T.3 MITIGATION MEASURES

OAR 345-021-0010(1)(t)(C) *A description of any measures the applicant proposes to avoid, reduce or otherwise mitigate the significant adverse impacts identified in (B).*

Response: No significant adverse impacts on important recreational opportunities will result from Facility design, construction, and operation. Therefore, no measures are proposed to avoid, reduce, or otherwise mitigate Facility impacts.

T.4 MAP OF ANALYSIS AREA

OAR 345-021-0010(1)(t)(D) *A map of the analysis area showing the locations of important recreational opportunities identified in (A).*

Response: Figure T-1 shows the analysis area for recreational opportunities and the potentially important recreational opportunities identified pursuant to OAR 345-021-0010(1)(t)(A).

T.5 MONITORING PROGRAM

OAR 345-021-0010(1)(t)(E) *The applicant's proposed monitoring program, if any, for impacts to important recreational opportunities.*

Response: Because there will be no significant impacts on important recreational opportunities, no monitoring program is proposed.

T.6 SUMMARY

The Facility will have no significant adverse impacts on any important recreational opportunities within the analysis area. Quesnel Park, Willow Creek Wildlife Area, as well as segments of the Blue Mountain Scenic Byway, Lewis and Clark Trail Scenic Byway, and LCNHT that extend into the analysis area will not be significantly affected. Accordingly, the Facility can be designed, constructed, and operated to have no significant adverse impact on important recreational opportunities in the analysis area, in accordance with OAR 345-022-0100(1).

T.7 REFERENCES

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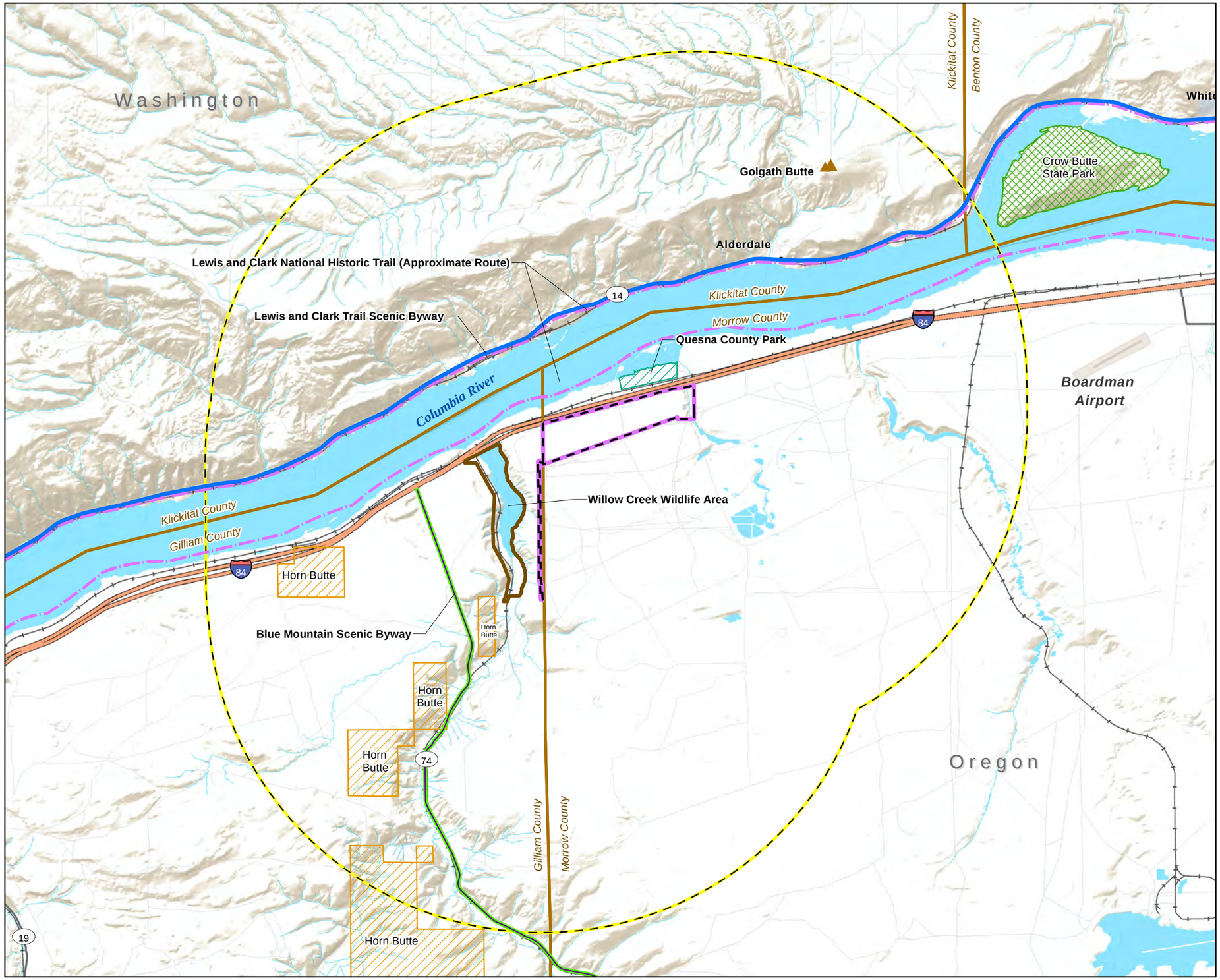
Figure



VICINITY MAP

LEGEND

- Facility Site Boundary
- 5-mile Analysis Area
- Lewis and Clark National Historic Trail (Approximate Route)
- Lewis and Clark Trail Scenic Byway
- Blue Mountain Scenic Byway
- Quesna County Park
- Horn Butte Wildlife Area
- Willow Creek Wildlife Area
- State Park
- State Boundary
- County Boundary
- Water
- Major Highway
- Highway
- Major Road
- Local Road

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FIGURE T-1
Recreational Opportunities within the 5-mile Analysis Area
Boardman Solar Energy Facility
Application for Site Certificate
Morrow and Gilliam Counties, Oregon

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EXHIBIT U
PUBLIC SERVICES/SOCIOECONOMIC IMPACTS

OAR 345-022-0010(1)(u)

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U-2 Primary and Alternative Transportation Routes

ATTACHMENTS

U-1 Ability of Morrow County to Provide Police Protection Services
U-2 Ability of Morrow County to Provide Fire Protection Services

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 OAR 345-022-0110. The applicant shall include:*

Response: In accordance with OAR 345-001-0010(57)(b), the analysis area for public services consists of the area within the Boardman Solar Energy Facility (Facility) site boundary and 10 miles from the Facility site boundary. Figure U-1 shows the analysis area, which includes portions of Morrow and Gilliam counties in Oregon, and Klickitat and Benton counties in Washington[1]. The Columbia River traverses the approximate middle of the analysis area. This Exhibit describes the potential adverse impacts of Facility construction and operation on employment, population, housing, and transportation in the analysis area.

OAR 345-022-0110 requires that the site certificate application for the proposed energy facility address important public services:

> "*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, stormwater drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools*."

OAR 345-022-0110, however, is not a directly applicable approval criterion for solar energy facilities and other selected special criteria facilities [see OAR 345-022-0110(2) and (3), 345-015-0310]. While not directly applicable, the Council may still apply the requirements of OAR 345-022-0110(1) as conditions on the Facility's site certificate. Therefore, this Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(u) and provides evidence to support a finding by the Council as required by OAR 345-022-0110.

U.1 ASSUMPTIONS USED TO EVALUATE POTENTIAL IMPACTS

OAR 345-021-0010(1)(u)(A) *The important assumptions the applicant used to evaluate potential impacts.*

Response: The assumptions used to evaluate the potential Facility impacts on public service providers, employment, population, housing, and transportation in the analysis area are described in the following subsections.

U.1.1 Employment

U.1.1.1 Construction

Boardman Solar Energy LLC (Applicant) proposes to begin construction by October 1, 2018, and complete construction by December 31, 2019. During construction, the Facility will employ an average of approximately 100 people. An estimated maximum of 250 people may be employed during peak construction in the summer months.

[1] The analysis area includes communities within Washington, and potential adverse effects to these communities were considered in this Exhibit. However, the Council likely does not have jurisdiction to include conditions in the site certificate for potential impacts outside the State of Oregon.

The majority of the construction workforce will be employees of construction contractors and equipment manufacturing companies, who will be directly contracted to the Applicant. These workers will include those hired for road and solar array foundation construction, substation and electrical transmission construction, solar module installation, and array connection and commissioning. For this analysis, the Applicant conservatively estimates that approximately 10 to 15 percent of the construction workers will be hired locally (for example, from Morrow and Gilliam counties) and the remainder will come from outside of the analysis area (greater than 10 miles from the Facility).

The percentage of locally hired workers will vary, depending on the availability of specialized laborers with the necessary experience to construct the Facility components. Additional workers might commute daily from communities outside of the 10-mile analysis area, such as The Dalles or Umatilla, which could lessen the impacts of an influx of new residents on local service providers. However, an increase in workers commuting from outside the analysis area could increase traffic on the roads within the analysis area. The Applicant will hire locally to the extent possible to minimize these impacts and support the local economy.

U.1.1.2 Operations

Approximately two permanent, fulltime employees will be employed at the Facility as operational personnel involved in day-to-day management of the Facility. To the extent possible, operations and maintenance (O&M) staff will be hired locally with the possible exception of positions that require previous experience at other solar power facilities. Specialized outside contractors might also be required occasionally for tasks that cannot be completed by onsite personnel. Facility operations are anticipated to begin at the beginning of 2020.

U.1.2 Population and Housing

U.1.2.1 Construction

The 10-mile analysis area includes portions of both Oregon and Washington. It is expected that population will change very little as a result of Facility construction. Assuming conservatively that only 10 to 15 percent of the construction workers will be local residents (from Morrow and Gilliam counties in Oregon, and Klickitat and Benton counties in Washington), an average of about 87 and a maximum of about 225 new workers will be temporary residents (in-migrants) at the Facility. Based on the assumption that the average household size will be 2.0 persons (since it is likely many workers will not be accompanied by families or others), an estimated maximum of about 450 temporary new residents may be associated with Facility construction during the peak construction period. However, it is likely the actual number of temporary residents will be lower due to more local hiring and fewer workers bringing families or others with them. In-migrants associated with construction will likely choose temporary housing options such as hotels, campgrounds, recreational vehicle (RV) parks, rental houses, or other temporary housing located within a commutable distance, approximately 70 miles, to the Facility. The commutable distance was selected based on an assumed travel distance of 1 hour.

U.1.2.2 Operations

Compared to construction, fewer new permanent residents are expected to result from Facility operations. It is assumed that two permanent, fulltime employees will be hired as part of the Facility operating staff and some will already be local residents. Assuming conservatively that 50 percent (one) of these employees are in-migrants with an average household size of 3.0 (larger than for temporary employees as a result of the expectation that more employees will be

living with families or others), as many as three new permanent residents could be added to the local population. It is assumed that these workers will live locally, with the exception of specialized personnel who may commute from outside the area. The actual number of permanent residents added by the Facility is insignificant in comparison to the populations of Morrow, Gilliam, Klickitat, and Benton counties.

U.1.3 Transportation

A number of transportation routes will be used to access the Facility during construction and operations. These routes will be used to bring Facility components, equipment and materials, water, and workers from outside of the analysis area to the Facility and will include state, county, and private roadways. Primary and alternative transportation routes are depicted on Figure U-2. The following sections describe the transportation routes, truck traffic, and points of origin.

U.1.3.1 Transportation Routes

The transportation routes to the site begin with Interstate 84 (I-84) from either the east or west (Figure U-2). The transportation routes are assumed to carry all construction-related vehicles, including equipment component delivery vehicles, water trucks, and workforce traffic. The primary route will likely begin in the Portland, Oregon, area on eastbound I-84 and continue toward Morrow County.

From I-84, the primary transportation route will exit southbound at Exit 151 on Threemile Canyon Road east of the Facility. The route will continue south on Threemile Canyon Road for approximately 0.5 mile to the turnoff for the Willow Creek Wildlife Area located on the west side of Threemile Canyon Road. Approximately 600 feet of existing 8-foot-wide dirt road from Threemile Canyon Road will be used for the access road, and it will be upgraded to accommodate construction and operation of the Facility. When the existing road ends, a new portion will be built that continues north another 900 feet to the main access gate. The entire 1,500 feet of the access road are considered impacted by the Facility. See Figure C-2D in Exhibit C for the site access plan.

The Facility's point of interconnection (POI) and the southern end of the Facility's transmission line will be accessed via 3 miles of existing private road owned by Threemile Canyon Farms, LLC, which extends west from Threemile Canyon Road (Figure U-2). Vehicles needing to access the POI and southern end of the transmission line during construction and operation will take I-84, Exit 151, Threemile Canyon Road, and then the existing private road.

An alternate transportation route may originate from east of the site, for example, from Boardman, Umatilla, or Hermiston. This route would extend westbound on I-84 to Exit 151. Vehicles on this route would travel southbound on Threemile Canyon Road, resuming the primary transportation route described above.

U.1.3.2 Truck Traffic

During construction, a number of trucks will be accessing the site on the transportation routes. Heavy-duty trucks will be carrying gravel and other materials required for site grading and to improve or construct the access road. Heavy-duty trucks will also provide concrete materials for Facility component foundations and materials for the module blocks themselves. Lighter-duty trucks will be utilized to deliver water to the site for dust control during construction and for the temporary concrete batch plant. Light-duty trucks carrying electrical equipment and materials

required for solar panel construction and power transmission also will be necessary. Personal vehicles will also access the Facility and will park in the main temporary staging area.

U.1.3.3 Points of Origin

Facility construction is anticipated to take approximately 15 months. During construction, an estimated average workforce of 100 people will be employed, with a maximum of 250 people during the peak months of construction. Local workers will most likely originate in Arlington or Boardman, or other cities within 30 miles of the Facility site boundary. Workers could also originate from farther away, including from the City of Kennewick, Washington (approximately 65 miles from the Facility), or from the City of The Dalles, Oregon (approximately 70 miles from the Facility). It is assumed that some workers from outside the local area may temporarily relocate to communities closer to the Facility. Workers needed for specialized construction (e.g., solar panel installation and power transmission) may originate from areas outside Morrow or Gilliam counties.

U.1.4 Sewers and Sewage Treatment

During construction, sewage treatment and handling will be provided by licensed haulers and disposal facilities. No publicly owned treatment works hookups are within the Facility footprint. As such, the sewage services required by the Facility during construction will be related to the handling of sewage from contract portable toilets.

During operations, the O&M building to be constructed at the Facility site will be the only facility that discharges sewage waste. The Facility will have a bathroom, kitchen, and utility sink which will drain into an onsite septic system. This private septic system will provide the only sewage treatment for the Facility.

U.1.5 Water

It is estimated that approximately 9.7 million gallons of water will be required for the Facility during construction under worst-case conditions. This includes 9 million gallons for dust suppression and 700,000 gallons for the temporary batch plant if needed.

U.1.6 Stormwater Drainage

No public stormwater systems will be utilized by the Facility. During construction, erosion and sediment control measures developed pursuant to the Facility's 1200-C Construction Stormwater National Pollutant Discharge Elimination System (NPDES) Permit will be applied. Facility components will be designed to maintain existing stormwater drainage patterns.

U.1.7 Solid Waste Management

Solid waste generated during construction will include general construction debris, waste concrete, and excavated soil. Excavated soil will be used onsite as fill or transported offsite for disposal. Construction material and office recycling programs will be implemented to the extent practical to reduce the volume of material that will be disposed of as solid waste.

U.1.8 Police and Fire Protection

The key assumptions for assessing police and fire protection adequacy in the analysis area are the estimates of additional construction and operational personnel and their families who may migrate to the area as a result of the Facility. These assumptions are included in Sections U.1.1 and U.1.2.

U.1.9 Health Care

The key assumptions for assessing impacts to health care in the analysis area are the estimates of additional construction and operational personnel and their families who may migrate to the area as a result of the Facility. These assumptions are included in Sections U.1.1 and U.1.2.

U.1.10 Schools

The key assumptions for assessing impacts to schools in the analysis area are the estimates of additional construction and operational personnel and their families who may migrate to the area as a result of the Facility. These assumptions are included in Sections U.1.1 and U.1.2. Furthermore, it is assumed that construction work for the Facility will be short-term and temporary with peak construction occurring during the summer months.

U.2 PUBLIC AND PRIVATE PROVIDERS IN THE ANALYSIS AREA

OAR 345-021-0010(1)(u)(B) *Identification of the public and private providers in the analysis area that would likely be affected.*

Response: The public and private providers of services for employment, population, housing, and transportation in the analysis area are identified in the following subsections.

U.2.1 Counties, Cities, and Communities

The majority of the Facility is located in Morrow County, while the transmission line from the Facility substation to the point of interconnect (POI) is located in Gilliam County. The analysis area includes portions of Morrow, Gilliam, Klickitat, and Benton counties within a 10-mile radius of the Facility site boundary (Figure U-1). The City of Arlington, Oregon, in Gilliam County is the only Oregon city in the analysis area. Other Oregon cities nearby, but outside of the analysis area, include Boardman, Irrigon, and Ione in Morrow County. Table U-1 presents historical population estimates for each of the counties within the Facility analysis area, the City of Arlington, and other cities nearest but outside the Facility analysis area. In 2010, 0.3 percent of the entire State of Oregon population resided in the communities located in Morrow and Gilliam, and 2.9 percent of the entire State of Washington population resided in communities in Klickitat and Benton counties.

Table U-1. Historical Population of Counties, Cities, and Communities within the Analysis Area

	Population				Average Annual Growth Rate	
	1990	2000	2010	2015	1990-00	2000-10
Morrow	7,625	10,995	11,173	11,190	3.6%	0.2%
Boardman	1,387	2,855	3,220	3,354	6.9%	1.2%
Irrigon	741	1,729	1,826	1,800	8.0%	0.5%
Ione	255	321	329	330	2.3%	0.2%
Gilliam	1,717	1,915	1,871	1,871	1.1%	-0.2%
Arlington	425	524	586	583	2.1%	1.1%
Klickitat	16,616	19,161	20,318	21,026	1.4%	0.6%
Benton	112,560	142,473	175,177	190,309	2.3%	2.1%

Source: U.S. Census Bureau, 2016.

Between 1990 and 2000, communities in the analysis area added population at varying rates. Annual growth decreased from 2000 to 2010, with a decrease in population in Gilliam County, Oregon. Alternatively, Morrow County has gained over 3,500 residents since 1990. Benton County has also experienced growth, and, unlike the other counties in the analysis area, has experienced average annual growth at a near constant rate from 1990 to 2010. The remaining counties in the analysis area grew at a slower rate from 2000 to 2010, compared to 1999 to 2000.

The Dalles, located to the west of the Facility outside the analysis area in Wasco County, is the largest community within commutable distance to the Facility (approximately 70 miles from the Facility). The Dalles had a 2010 population of approximately 14,583 people.

U.2.2 Service Providers

Public service providers for the communities in the analysis area that provide the essential governmental services listed in OAR 345-022-0110(1) are described in the subsections below.

U.2.2.1 Sewers and Sewage Treatment

The Facility site is not in the service area of any current providers of sewers or sewage treatment. The City of Arlington has a sewer system and treatment facility, but no other rural areas in the analysis area have sewer systems or treatment facilities. Rural residences in the area generally use onsite private septic systems for sewage disposal. The O&M building to be constructed at the Facility site will have a bathroom, kitchen, and utility sink which will drain into an onsite septic system.

U.2.2.2 Water

The City of Arlington has a public water system that serves their incorporated area, but this system will not be used or affected by the Facility. During construction, water will most likely be obtained from the City of Boardman. The City of Boardman has sufficient water sources to meet the Facility requirements. During operations, office use water will be from a well that will produce fewer than 5,000 gallons per day to be located near the O&M building (see Exhibit O).

U.2.2.3 Stormwater Drainage

No service providers in the analysis area currently provide stormwater drainage service to the Facility site. During construction, numerous best management practices (BMPs), outlined in the Facility erosion and sediment control plan (ESCP) (Attachment I-1 to Exhibit I), will be implemented to minimize erosion and sedimentation that could alter the surrounding stormwater drainages.

U.2.2.4 Solid Waste Management

No community in the analysis area currently provides solid waste management services to the Facility site. Solid waste disposal for the Facility during construction and operations will be provided by private contract with a local commercial hauler or haulers. The Facility is located between two public landfills: the Arlington Landfill owned by Waste Management Services of Oregon, Inc., located approximately 27 miles from the Facility, and Finley Buttes Landfill located approximately 30 miles from the Facility south of Boardman.

U.2.2.5 Housing

An average of about 87 and a maximum of about 225 new workers will be temporary residents (in-migrants) as a result of construction of the Facility. Therefore, a comparable number of temporary housing units will be needed for the estimated temporary workforce. Motels, hotels, and trailer or RV parking will be the most available housing option for temporary residents. An Internet search identified more than 500 hotel and motel rooms in communities within a commutable distance, or approximately 70 miles, to the Facility (Hotelguides.com, 2016). Some rooms are available in Arlington and Boardman. Most rooms were found in Kennewick, Washington, and Hermiston, Oregon, which are both located outside the analysis area, but within commuting distance. Additional temporary housing will be available in overnight facilities located at Oregon state parks and private RV campgrounds. Boardman Marina & RV Park and the Driftwood RV Resort, both located in Boardman, for example, have over 150 sites combined that can accommodate RVs (Boardmanmarinapark.com, 2016; Driftwood-rv.com, 2016). Hotel occupancy was measured in the first half of 2013 to be approximately 47 percent for Eastern Oregon (City of Hermiston, 2013).

Adequate opportunities will be available to purchase housing or to construct new housing in the analysis area, or within a commutable distance from the Facility outside of the analysis area, for the one to two new permanent households anticipated because of Facility operations. An adequate supply of housing is available within a commutable distance from the Facility, including the housing stock in the analysis area, with what is available in nearby communities, and larger cities such as The Dalles and Kennewick.

Table U-2 presents housing supply and availability data for counties and communities within or near the analysis area.

Table U-2. Housing Supply in Counties, Cities, and Communities within the Analysis Area

	Housing Units		Average Annual Growth Rate	Vacancy Rate
	2010	**2014**	**2010-2014**	**2014**
Morrow	4,435	4,442	0.04%	16.4%
Boardman	1,072	1,039	-0.8%	7.5%
Ione	128	152	4.3%	23.7%
Irrigon	639	661	0.8%	10.3%
Gilliam	1,099	1,135	0.8%	22.6%
Arlington	255	274	1.8%	21.9%
Klickitat	9,612	9,857	0.6%	19.3%
Benton	73,060	70,606	-0.9%	5.6%

Source: U.S. Census Bureau, 2016.

Housing vacancy rates for 2014 estimates, based on the 2010 census, ranged from 7.5 percent in Boardman to 23.7 percent in Ione. The four-county average vacancy rate of approximately 16.0 percent is higher than the state of Oregon's average of 9.7 percent and Washington's average of 9.4 percent.

U.2.2.6 Transportation

The providers of transportation services in Morrow County are the Morrow County Public Works Department and the Oregon Department of Transportation (ODOT) Region 5. Transportation providers in Gilliam County include the Gilliam County Road Department and the Oregon Department of Transportation (ODOT) Region 4. Within the analysis area, two public airports provide access to general aviation: Boardman Airport operated by the Port of Morrow in Morrow County and Arlington Municipal Airport operated by the City of Arlington in Gilliam County.

Roadways surrounding the Facility, specifically those along the transportation routes, may be temporarily affected by traffic increases as a result of construction vehicles accessing the site. The primary transportation route to the Facility utilizes the state highway, I-84. Since the state highway system is constructed to design, safety, and load-bearing standards, minimal impacts are anticipated from potential construction and operational traffic on traffic safety or road maintenance. I-84 is capable of accommodating vehicles at the legal load limit, thereby reducing the potential for significant traffic safety and maintenance impacts. Impacts will be inconsequential, as construction vehicles will constitute just a fraction of the daily traffic typical on I-84. There are currently no permanent restrictions on I-84 truck traffic.

Traffic Volumes and Roadways

Average daily traffic volumes (ADT) on the primary transportation route (I-84) were collected from the most recent 5 years of published ODOT traffic data (ODOT, 2012, 2013, 2014, 2015a, and 2016a).

I-84 begins at the junction with I-5 in Portland and to the east it extends to Boise, Idaho, and Salt Lake City, Utah. The ODOT name and classification system identifies I-84 from I-5 to the junction with US 730 as Columbia River Highway No. 2. Through the Facility analysis area, I-84 is divided with four lanes (two lanes in each direction) with varying paved shoulder widths. I-84 is classified as a state highway by ODOT, and has a posted speed limit of 70 miles per hour (mph), and 65 mph for trucks. Traffic volumes on I-84 have increased by approximately 11 to 13 percent near the Facility site since 2011. Table U-3 presents the ADT volumes for the most recent 5 years of data available at various milepost locations along the transportation routes.

Table U-3. Oregon State Highway Traffic Volumes and Lane Numbers

Highway	Location	Milepost	Number of Lanes	2011 ADT	2012 ADT	2013 ADT	2014 ADT	2015 ADT
I-84	Troutdale	17.71	4, divided	28,100	28,500	29,000	29,000	33,700
I-84	The Dalles	87.31	4, divided	15,000	15,100	15,500	15,900	16,500
I-84	Arlington	137.02	4, divided	10,500	10,500	10,700	10,800	11,900
I-84	Boardman	163.86	4, divided	13,100	12,900	13,200	13,600	14,600

Source: ODOT, 2012, 2013, 2014, 2015a, 2016a, and 2016b.

Pavement Conditions

Table U-4 summarizes the pavement condition of state highways proposed for use as transportation routes. Most segments of highway proposed as transportation routes are in varying states. Pavement conditions are reported by ODOT Pavement Services, and are

published in various district and regional pavement condition maps. The most recent pavement map covering the Facility vicinity was published in 2015.

Table U-4. Pavement Conditions

Highway	Pavement Condition
I-84 (Troutdale to Multnomah Falls)	Fair
I-84 (Cascade Locks to Hood River)	Fair
I-84 (The Dalles)	Poor
I-84 (Arlington to Boardman)	Very Good

Source: ODOT, 2015b.

U.2.2.7 Police Protection

Local police service in the Facility analysis area is provided by the Gilliam County Sheriff's Office in Condon, Oregon, and the Morrow County Sheriff's Office in Heppner, Oregon. The Applicant will receive assistance from the Morrow County Sheriff's Office in Heppner, Oregon, for police service (see Attachment U-1). Backup law enforcement service is available from the Oregon State Police Eastern Region, with offices in Arlington, Heppner, and Hermiston. The City of Boardman, Oregon, also has a local police department that may be able to assist in the event of an emergency at the Facility.

U.2.2.8 Fire Protection

Fire protection in the Facility analysis area is provided by the Boardman Rural Fire Protection District and the North Gilliam County Rural Fire Protection District (see Attachment U-2). The Applicant will notify both Fire Protection Districts of construction plans and phasing, identify the location of and access to Facility structures, and provide mutual assistance in the case of fire within or around the Facility site boundary. The site will be equipped with fire protection equipment in accordance with the Oregon Fire Code.

U.2.2.9 Health Care

Owing to the limited population in the analysis area, hospitals and health care services tend to be regional in nature. There are no hospitals within the analysis area. The hospitals nearest to the Facility are the Arlington Medical Center in Arlington (about 15 miles away by car) and the Good Shepherd Health Care System in Hermiston, Oregon (about 35 miles away by car). The Pioneer Memorial Hospital in Heppner and the Mid-Columbia Medical Center located in The Dalles are additional options with a distance of 57 and 70 miles by car, respectively. The Arlington Medical Center is serviced by the North Gilliam Medic ambulance service. Providers offer basic, intermediate, and advanced life support emergency medical care and transportation.

Although the Facility will employ an average of approximately 100 people during construction, no significant impacts on health care services are anticipated from this temporary population increase. As evidenced by the fact that a number of wind facilities have been developed in the area in the last 10 years and the temporary increase in population did not overburden the health care services, significant impacts to health care services are not anticipated as a result of Facility construction.

U.2.2.10 Schools

Communities in and near the analysis area are served by the Morrow County School District and the Arlington Community Charter Schools. Schools in Boardman, part of the Morrow County School District, include Sam Boardman Elementary School, Windy River Elementary School, and Riverside Junior/Senior High School. The Arlington Community Charter School consists of an elementary school, middle school, and high school.

U.3 IMPACTS ON PROVIDERS

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.*

Response: The following subsections describe any likely adverse impacts on the ability of the providers identified.

U.3.1 Economic and Demographic Impacts

U.3.1.1 Population

The Facility will result in limited in-migration for construction-related employment and permanent O&M employment. The influx of temporary construction-related jobs filled from outside of the analysis area is anticipated to last no more than 12 months. During that time, a positive impact on the local economy is expected as workers likely will stay at area motels, eat at local restaurants, and purchase amenities such as gas and groceries in the local area.

Of the estimated staff of two permanently employed at the Facility for O&M, qualified local applicants and/or qualified applicants from outside the area will be hired. It is assumed that these workers will live locally. In-migrant operational staff and their families will not have a significant impact on the local population. Assuming conservatively that 50 percent (one) of the O&M positions are filled from outside the analysis area and the average household size is 3.0 (higher than for temporary employees), approximately three new residents could be added to the local population, if all relocate within Morrow and Gilliam counties. That number is small in comparison to the populations of Morrow and surrounding counties.

U.3.1.2 Economic Activity

Revenue generated for the local economy will benefit public services, including schools and others services Morrow and Gilliam counties provide for their citizens. While Klickitat and Benton counties in Washington are included in the analysis area, they will not gain revenue from the site operation through tax payments. However, residents from communities within Klickitat and Benton counties may be employed during construction and operation of the Facility. Income earned by in-migrant workers will contribute to the local economy indirectly through local purchases. In addition, the Facility itself will purchase goods and services from local and regional businesses: from Facility maintenance services, to office equipment, to business services. All of this activity will result in a net inflow of dollars into the local economy that will have a beneficial effect beyond that of the new employment.

U.3.1.3 Tax Revenues

Development of the Facility will result in an increase in annual property tax revenue to Morrow and Gilliam counties. In addition, Facility development will raise the value of other properties

because of the increase in wages and overall economic activity in the analysis area. The additional tax revenue generated by the existence of the Facility will increase the county's ability to provide roadways, police and fire protection, and other services to its citizens.

U.3.2 Sewers and Sewage Treatment

No adverse impacts are anticipated from Facility construction as sewage service demands will be minimal and temporary. The only sewage services required by the Facility during construction will be related to the handling of sewage from contract portable toilets.

The O&M building to be constructed at the Facility site will have a bathroom, kitchen, and utility sink which will drain into an onsite private septic system. No other sewage treatment will be needed for Facility operations.

U.3.3 Water

It is estimated that approximately 9.7 million gallons of water will be required for the Facility during construction and 0.5 million gallons per year may be required for module washing during operations. Water for construction and module washing will be purchased from the City of Boardman under an existing municipal water right. As demonstrated in Exhibit O, the City of Boardman has adequate water to supply the Facility without impairing supply to existing users.

Kitchen and bathroom facilities will be installed in the O&M building. Nominal amounts of water will be needed for domestic purposes (handwashing, drinking, toilets). During operations, water will be withdrawn from a new well that produces fewer than 5,000 gallons per day. Given that the operational needs of the Facility represent an insignificant fraction of the total municipal water use in the analysis area, existing water rights will not be detrimentally affected, and sufficient water is available for the intended uses. Accordingly, no adverse impacts on water use are anticipated.

U.3.4 Stormwater Drainage

During construction, application of the erosion and sediment control measures developed pursuant to the Facility's 1200-C Construction Stormwater NPDES Permit, as described in Section U.4.4, will prevent adverse impacts related to construction of these facilities. Facility components will be designed to maintain existing stormwater drainage patterns. Exhibit E discusses the 1200-C permit in greater detail. A copy of the permit application is located in Attachment I-1 to Exhibit I.

Through proper site design and the other procedures described in Section U.4.4, no adverse impacts on stormwater drainage are anticipated during operations.

U.3.5 Solid Waste Management

Solid waste generated during construction will include general construction debris, waste concrete, and excavated soil. Excavated soil will be used onsite as fill or transported offsite for disposal. Construction material and office recycling programs will be implemented to the extent practical to reduce the volume of material that will be disposed of as solid waste. General construction debris will be collected by a local contractor and transported to a municipal waste landfill in Morrow County or Gilliam County. As described in Exhibit G, minimal construction waste will require offsite disposal. In addition, only minimal amounts of solid waste will be generated by the Facility during operations. The selected landfills for waste disposal have sufficient capacity to handle the needs of the Facility. The Arlington Landfill has a facility acreage

of 12,000 acres with a projected remaining life of approximately 140 years (Waste Management, 2017). Finley Buttes Landfill, the second largest landfill in Oregon, was expanded in 2004 to 1,800 acres and is not projected to reach capacity for 100 to 150 years (Northwest CHP TAP, 2015, and Hess, 2016)

Since solid waste disposal for the Facility during construction and operations will be provided through a private contract with a local commercial hauler or haulers (Exhibit V), service to the Facility is not anticipated to disrupt services already being provided in the surrounding communities.

U.3.6 Housing

While it is not known where the new temporary residents associated with construction of the Facility will settle and what type of housing they will select, motels, hotels, and trailer or RV parking will be the most available housing option for temporary residents. More than 500 hotel and motel rooms in communities within a commutable distance, and additional temporary housing in overnight facilities located at Oregon state parks and private RV campgrounds were identified within a commutable distance to the Facility. Lodging vacancy rates in Eastern Oregon were estimated at approximately 53 percent (City of Hermiston, 2013). Considering similar occupancy rates during the construction phase of the Facility, adequate supplies are available in relation to the number of temporary workers.

Permanent housing for up to two new households may be required when operations begin. Given the limited number of new housing required and the general availability of housing opportunities, ranging from 7.5 percent housing vacancy in Boardman to 23.7 percent in Ione, no significant adverse impacts on the ability of communities to provide housing are anticipated from Facility operations.

U.3.7 Transportation

It is anticipated that roadways within the analysis area will safely accommodate Facility construction traffic. Public airports within the analysis area are equipped to handle additional air traffic should it be needed to support construction or operation of the Facility. The Port of Morrow operates the Boardman Airport Industrial Park with a general aviation landing strip regularly used by local industry. The Port advertises support for local industry and available hanger space (Port of Morrow, 2017).

U.3.7.1 Construction Traffic Volumes

Facility construction will temporarily increase the traffic volume on roads within the analysis area, specifically the transportation routes. Construction is not expected to cause an increase in the potential of traffic safety impacts on surrounding roadways, because construction traffic will be managed to minimize impacts. Given the low traffic volumes on the roads used to access the Facility, it is unlikely that safety of these roads will be impacted. In addition, the pavement conditions of the primary transportation route are fair to good (with the exception of a segment of I-84 in The Dalles in poor condition), which will minimize the potential for traffic safety impacts. Vehicle size and weight may be of concern where roadways are designed for less than the legal load limit of 80,000 pounds. To mitigate concerns about oversized loads, any oversized components will be transported by oversized transportation trucks, legal loads, and trucks. Additional oversized vehicles will transport large construction operating equipment (e.g., cranes, bulldozers).

To calculate the impacts on traffic volumes on the primary transportation routes, the Applicant assumed 4 to 6 months of peak construction activity, with 22 days of construction per month. During peak construction, an estimated 45 daily trucks will be put in use each day, for an estimated total of 90 truck trips per day (45 trucks making one inbound trip and one outbound trip). Truck trips will include construction equipment and material deliveries. Approximately 250 workforce personnel will be required during the peak of construction. Assuming these workers carpool in two- and three-person carpools, roughly 100 workforce vehicles will arrive and depart the site each day. Combining truck trips and workforce trips, up to 145 construction vehicles (or 290 one-way trips) per day will be added to the background traffic patterns along the primary transportation route. This estimate is conservative, as truck trips and workers may not all be on the road at one given time, and the construction workforce will be distributed throughout a commutable distance from the Facility.

Based on data presented in Table U-3, average daily traffic volumes on I-84 just west of the Facility are approximately 11,900 vehicles per day. If construction vehicles originate west of the Facility, average daily traffic could increase by 290 trips per day (or approximately 2.4 percent) with construction trips. If construction vehicles originate east of the Facility, average daily traffic volumes on I-84 will increase by approximately 2.0 percent. Construction traffic will likely originate from a combination of sites, and therefore traffic increases on I-84 will be lower than those stated in Table U-3.

Because traffic on Threemile Canyon Road is significantly lower than I-84, it will likely see a higher relative increase in daily traffic volumes. However, this is a private road and, with the exception of vehicles accessing the Willow Creek Wildlife Areas, will only add to vehicles accessing Threemile Canyon Farms. Backups and delays of a temporary nature may occur during the delivery of large components as a result of truck size, weight, and maneuverability. Large delivery trucks will be concentrated over a smaller duration within the overall construction schedule (e.g., approximately 4 to 6 months during peak construction), limiting the time period over which delays would occur. In addition, the arrival of large delivery trucks will likely be spread out over the course of the day, thereby minimizing delays resulting from each truck's transit over surrounding roads. Table U-5 shows the anticipated increase in traffic volume during construction. Morrow and Gilliam counties do not maintain traffic volume data for public or private roads. However, based on the rural nature of the area, existing volumes are assumed to be small.

Construction traffic volumes generated by the Facility represent a minimal increase in traffic over State Highway average daily volumes. The increase on Threemile Canyon Road could be significant but temporary in duration, and will be mitigated by the measures described here.

Table U-5. Anticipated Increase in Traffic Volume from Construction on Transportation Routes

Highway	Location	Milepost	Number of Lanes	2015 Average Daily Traffic	Estimated Average Daily Traffic Including Construction[b]	Percentage Increase
Primary Transportation Route[a]						
I-84	Troutdale	17.71	4, divided	33,700	33,990	0.9%
I-84	The Dalles	87.31	4, divided	16,500	16,790	1.8%
I-84	Arlington	137.02	4, divided	11,900	12,190	2.4%
I-84	Boardman	163.86	4, divided	14,600	14,890	2.0%

[a] Oregon Department of Transportation, 2012-2016a Traffic Volume Tables.

[b] Average daily traffic assuming all construction vehicles originate west of the Facility (Troutdale, The Dalles, Arlington) or all originate east of the Facility (Boardman).

Aircraft operations at the Boardman Airport average 29 flights per week and approximately 18 flights per week at the Arlington Airport (AirNav.com, 2017a and 2017b). Potential flights associated with the construction of the Facility are not assumed to represent an increase for either airport. The majority of construction and operations personnel will use vehicular transportation to access the Facility and will not utilize air traffic. Should specialized workforce members need to fly to the site, these personnel would most likely fly into either commercial airports such as Pendleton, Portland, or the Tri-Cities. Components will be delivered by truck and not by air.

U.3.7.2 Construction Traffic and Design Standards

I-84, the primary transportation route, is designed and constructed to accommodate legal loads of 80,000 pounds without requiring a permit. Some trucks carrying large loads may exceed the legal load limit of 80,000 pounds gross vehicle weight. In cases where transportation vehicles exceed the legal load limit, the transportation contractor will seek authorization from ODOT. ODOT does not list any bridge restrictions along the primary transportation route. Nevertheless, the Applicant will consult with ODOT before construction to identify roadway segments or bridges that should be restricted for construction traffic, and to obtain any heavy haul permits required to allow transport of oversized loads.

Threemile Canyon Road is the only other existing road proposed for use as part of the transportation routes within the analysis area. Improvements to the access road made during construction will ensure that vehicles approaching Threemile Canyon Road (which has a 45 MPH posted speed limit sign) from the improved road to Willow Creek Wildlife Area (with no posted speed limit sign), as well as for vehicles approaching the road to Willow Creek Wildlife Area from the access road, will have intersectional sight distances in accordance with the Morrow County Zoning Ordinance (Article 4 Supplementary Provisions Section 4.020).

The access road will be 20 feet wide for one-way traffic flow and emergency vehicle access and will not require maneuvering within a street right-of-way.

Parking for construction vehicles in the main temporary staging area will be designed in accordance with the Morrow County Zoning Ordinance Article 4 Supplementary Provisions Section 4.050 Off-Street Parking and Loading.

U.3.7.3 Operational Impacts

Traffic impacts during Facility operation are not anticipated. Operational trips include employees traveling to work in their personal vehicles, and specialized personnel who may travel in light-duty trucks. Delivery trucks may also access the site on occasion, but are not anticipated to occur daily. Once completed, the Facility will require far fewer trips and personnel than during construction. Assuming a maximum of two workers during operations, each with one round trip into and out of the Facility per day, a typical increase in daily traffic from the Facility would include an additional four trips (two inbound and two outbound) to background traffic volumes. A worst-case increase in traffic may include three additional trips by specialized personnel and delivery trucks, totaling ten trips to and from the Facility. Table U-6 presents the anticipated worst-case increase in traffic trips as a result of Facility operation, assuming all workforce traffic originates either east or west of the Facility. Workforce personnel will likely originate from a combination of areas, and therefore traffic increases on I-84 will be lower than those stated in Table U-6. The additional volumes of traffic on I-84 and Threemile Canyon Road are not expected to affect traffic patterns during operations because of the low existing traffic volumes and sufficient capacity for additional vehicles. Therefore, adverse impacts on the transportation network are not anticipated during Facility operation.

Table U-6. Anticipated Increase in Traffic Volume from Operation on Transportation Routes

Primary Transportation Route[a]	Location	Milepost	Number of Lanes	2015 Average Daily Traffic	Estimated Average Daily Traffic Including Construction[b]	Percentage Increase
I-84	Arlington	137.02	4, divided	11,900	11,910	0.0008%
I-84	Boardman	163.86	4, divided	14,600	14,610	0.0007%

[a] Oregon Department of Transportation, 2012-2016a Traffic Volume Tables.

[b] Average daily traffic assuming all operations vehicles originate west of the Facility (Arlington) or all operations vehicles originate east of the Facility (Boardman).

Parking for operations vehicles will be designed in accordance with the Morrow County Zoning Ordinance Article 4 Supplementary Provisions Section 4.040 Off-Street Vehicle Parking Requirements and Section 4.060 Design and Improvement Standards – Parking Lots. For example, there will be one space per employee on the largest shift, or in this case, five spaces to account for worst-case conditions of two employees and three specialized personnel and delivery trucks. Spaces will be designed in accordance with Table 4-060-1 of the ordinance.

No air traffic is expected during the normal operation of the Facility. Operational workers will most likely access the Facility by vehicle. Should specialized workforce members need to fly to the site, these personnel would most likely fly into either Pendleton, Portland, or the Tri-Cities. These specialized workers would use public flights (not private jets) based on availability (i.e., tickets).

U.3.8 Police Protection

The additional temporary and permanent workforce is not anticipated to create any significant concerns. Correspondence from the Morrow County Sheriff's Office confirms that they will provide services for the Facility (see Attachment U-1). If needed, backup law enforcement will be available from the Oregon State Police Eastern Region. The relatively small number of new temporary and permanent residents is not anticipated to place significant new demands on the providers of police protection in the analysis area. Therefore, the Facility will not have a

significant adverse impact on the ability of local communities to provide police protection or law enforcement services.

U.3.9 Fire Protection and Emergency Response

During Facility construction, there could be some risk of accidental grass fires on the site. Therefore, measures taken to prevent fires during construction will include construction vehicles using established roads to keep vehicles away from dry grassland areas, using diesel vehicles whenever possible (to prevent potential ignition by catalytic converters), avoiding idling vehicles in grassy areas, and keeping cutting torches and similar equipment away from grass. Potential fire hazards from operation of the Facility include the possibility of electrical fire, in which case the fire will be monitored to ensure it does not spread, but it will not be extinguished. The primary service fire protection and emergency response personnel will likely provide is be first responders to injured or sick workers and transport to local hospitals. Correspondence from the Boardman Rural Fire Protection District confirms that they will provide services for the Facility (see Attachment U-2). Therefore, the Facility will not have a significant impact on the ability of local fire departments to provide fire protection services.

The relatively small number of new temporary and permanent residents is not anticipated to place significant new demands on the fire protection forces that serve the area. For the reasons provided above, the Facility will not have an impact on the ability of surrounding communities to provide fire protection during construction or operations.

U.3.10 Health Care

The small number of new temporary and permanent residents is not expected to place significant new demands on routine health care services. Furthermore, impacts on local health care services will be minimized by careful management of site health and safety risks. To reduce the potential for health and safety risks, the Applicant will require that onsite construction contractors prepare site health and safety plans before they begin construction activities. Each plan will inform employees and others what to do in case of emergencies. Plans will include locations of fire extinguishers, important telephone numbers, and first aid techniques. Nearby hospital names, addresses, and contact information will be listed. The plans will be maintained during construction and operations.

Additional preventive measures could be included, such as briefings with local hospitals and emergency service providers, identification of an emergency helicopter or aircraft landing area, and coordination with local fire officials. Furthermore, the small number of new temporary and permanent residents is not expected to place significant new demands on the health care facilities that serve the area.

U.3.11 Schools

Construction work for the Facility will be short-term and temporary with peak construction occurring during the summer months. Therefore, no new students are anticipated in association with Facility construction. As a result, during operations, up to two new permanent households may result from the Facility, an estimated maximum of four new schoolchildren (assuming two children per household) could move to the analysis area. Actual impacts on schools will depend on the housing choices of new residents with children, which is unknown. Given that new residents may settle in a dispersed area, the relatively small number of anticipated new schoolchildren, and the number of schools available, it is unlikely that any one school will receive more new students than could be accommodated.

U.4 EVIDENCE THAT ADVERSE IMPACTS IDENTIFIED IN SECTION (C) ARE NOT SIGNIFICANT

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.

U.4.1 Economic and Demographic Impacts

Jobs created by the Facility, both new temporary construction jobs and new operations jobs created, will represent less than one percent of total employment in the four counties included in the analysis area (a total of 98,069 jobs [U.S. Bureau of Labor Statistics, 2015]). Similarly, new temporary and permanent populations will represent a small fraction of total population of the two counties. Because the Facility will be located in an unincorporated part of the county, the Facility and related jobs will not directly affect the employment base of a specific city or town. The jobs created by the Facility will result in short-term and long-term benefits to overall employment in the analysis area.

U.4.2 Sewers and Sewage Treatment

As discussed in Section U.3.2, the Facility will have no significant adverse impact on the ability of any community in the area to provide sewers or sewage treatment and no mitigation measures are proposed.

U.4.3 Water

As discussed in Section U.3.3, the City of Boardman, or use of the well, will supply adequate water for the Facility without impairing supply to existing users. Therefore, no significant adverse impacts were identified and no mitigation measures are proposed.

U.4.4 Stormwater Drainage

New roads constructed as part of the Facility will be designed to maintain existing drainage patterns. Construction of roads, Facility foundations, and other related or supporting facilities will be regulated by an ESCP and 1200-C Construction Stormwater NPDES Permit that will require BMPs to minimize erosion and control sedimentation (see Exhibit I).

Erosion and sediment control BMPs will be implemented during all aspects of construction. BMPs will be selected to minimize and eliminate erosion, rather than controlling sedimentation after erosion has already occurred. Exhibit I contains the ESCP that will be implemented during construction of the Facility. Key BMPs presented in the ESCP are as follows:

- Preserve natural vegetation to the extent feasible.
- Establish vegetative buffer strips between the areas affected by construction activities and any receiving waters. Use vegetative buffers in conjunction with silt fence installation.
- Install sediment fence or straw wattles downgradient from land-disturbing activities.
- Stabilize disturbed areas mulching.
- Install check dams and sediment traps in drainages and roadside conveyances to capture sediment and minimize stormwater velocity.
- Using surface roughening techniques in conjunction with mulching disturbed areas.
- Reseed disturbed areas as final stabilization.

- Implement good housekeeping practices, such as using dedicated construction/ equipment staging areas, and proper stockpile management, such as covering stockpiles with much or plastic sheeting.
- Perform concrete washout in dedicated areas.

Proper implementation and updating of the ESCP with upgraded BMPs, as needed, will minimize erosion and the potential for sediment transport. The Facility will not alter existing drainage patterns, in the surrounding areas directly adjacent to where the Facility is located.

During operations, the majority of the BMPs outlined above are not applicable because an industrial stormwater permit is not required for operations at this Facility and because construction activities requiring erosion and sediment control will be complete. However, adherence to site design and implementation of several good housekeeping BMPs during site operation will minimize erosion and mobilization of sediment. These practices include restoring the site in accordance with the Revegetation Plan (see Attachment P-6 to Exhibit P) required as part of the site certificate. No adverse impacts on the ability of any community to provide stormwater drainage are anticipated from Facility operations.

U.4.5 Solid Waste Management

As discussed in Section U.3.5, the Facility will generate minimal waste and use private contractors to haul waste. Services already being provided in the surrounding communities will not be disrupted by the Facility. Therefore, no significant adverse impacts were identified and no mitigation measures are proposed.

U.4.6 Housing

As discussed in Section U.3.6, no significant adverse impacts on the ability of communities to provide housing are anticipated. Therefore, no significant adverse impacts were identified and no mitigation measures are proposed.

U.4.7 Transportation

Traffic volumes will increase on roadways surrounding the Facility during construction. However, taking into account the mitigation measures described here, significant adverse impacts on traffic safety and transportation are not anticipated. Numerous practices will be implemented to ensure that roadway safety will not be negatively affected. As a result of low traffic volumes on roads near the Facility in Morrow and Gilliam counties, the travel times will not increase after completion of Facility construction and because of operations staff. Although there may be short delays experienced during construction (as a result of slow-moving delivery trucks or trucks entering and exiting the Facility), the delays are likely to be temporary and limited to Threemile Canyon Road and will be mitigated with the following practices:

- Install and maintain temporary road signage and warnings such as “Equipment on Road,” “Truck Access,” or “Road Crossings” at locations where trucks are expected to slow down or enter/exit a public roadway, in accordance with Chapter 3, Page 93 of the ODOT *Traffic Control Plans Design Manual* (ODOT, 2016c)).
- Implement advance signage, where possible, in accordance with Chapter 3, Page 62 and Chapter 3, Page 84 of the ODOT *Traffic Control Plans Design Manual* (ODOT, 2016c).
- Use pilot cars for slow or oversize loads per Oregon Administrative Rule 734-082-0035.

- Encourage and promote carpooling of the construction workforce, and provide high-occupancy vans or buses to transport workers to the site.
- Use flag personnel to minimize the potential for accidents during large deliveries, in accordance with Chapter 3, Page 102-107 of the ODOT *Traffic Control Plans Design Manual* (ODOT, 2016c).
- At all times during construction, maintain at least one travel lane at entrance and exit points onto public roads.
- To provide access to Willow Creek Wildlife Area during construction and while the private road access is under construction, the Applicant, in coordination with the owner of the private farm, will provide a temporary alternate access to Willow Creek Wildlife Area (see Section L.3.1 for more information).

Traffic impacts during Facility operation are not anticipated. Operational trips including employees traveling to work in their personal vehicles, and specialized personnel who may travel in light-duty trucks, will be largely limited to I-84 and Threemile Canyon Road. Delivery trucks may also access the site on occasion, but are not anticipated to occur daily. In addition, no increase in air traffic is anticipated as a result of Facility construction or operation. Therefore, the Applicant anticipates no significant adverse impacts on the transportation network during Facility operation.

U.4.8 Police Protection

As described in Section U.3.8, the small number of new temporary and permanent residents is not anticipated to place significant new demands on law enforcement agencies in the area or result in any adverse impacts. Therefore, no mitigation measures are proposed.

U.4.9 Fire Protection and Emergency Response

As described in Exhibit B and Section U.3.9 of this Exhibit, Facility fire protection measures will minimize the risk of potential grass fires and the Facility will not have an adverse impact on the ability of local communities to provide fire protection and emergency response services.

U.4.10 Health Care

As described in Section U.3.10, no significant impacts on health care services are anticipated. Therefore, no mitigation measures are proposed.

U.4.11 Schools

As described in Section U.3.11, no significant adverse impacts on the ability of communities to provide school services are anticipated as a result of Facility construction or operation.

U.5 PROPOSED MONITORING PROGRAMS

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.*

Response: The Applicant is not proposing a monitoring program related to any of its impacts because the impacts will not be significant.

U.6 SUMMARY

The evidence provided in this Exhibit demonstrates that the Facility will not result in a significant adverse impact on the ability of the communities in the analysis area to provide the following services: sewers and sewage treatment, water, stormwater drainage, solid waste management, housing, transportation and traffic safety, police protection, fire protection and emergency response, health care, and schools.

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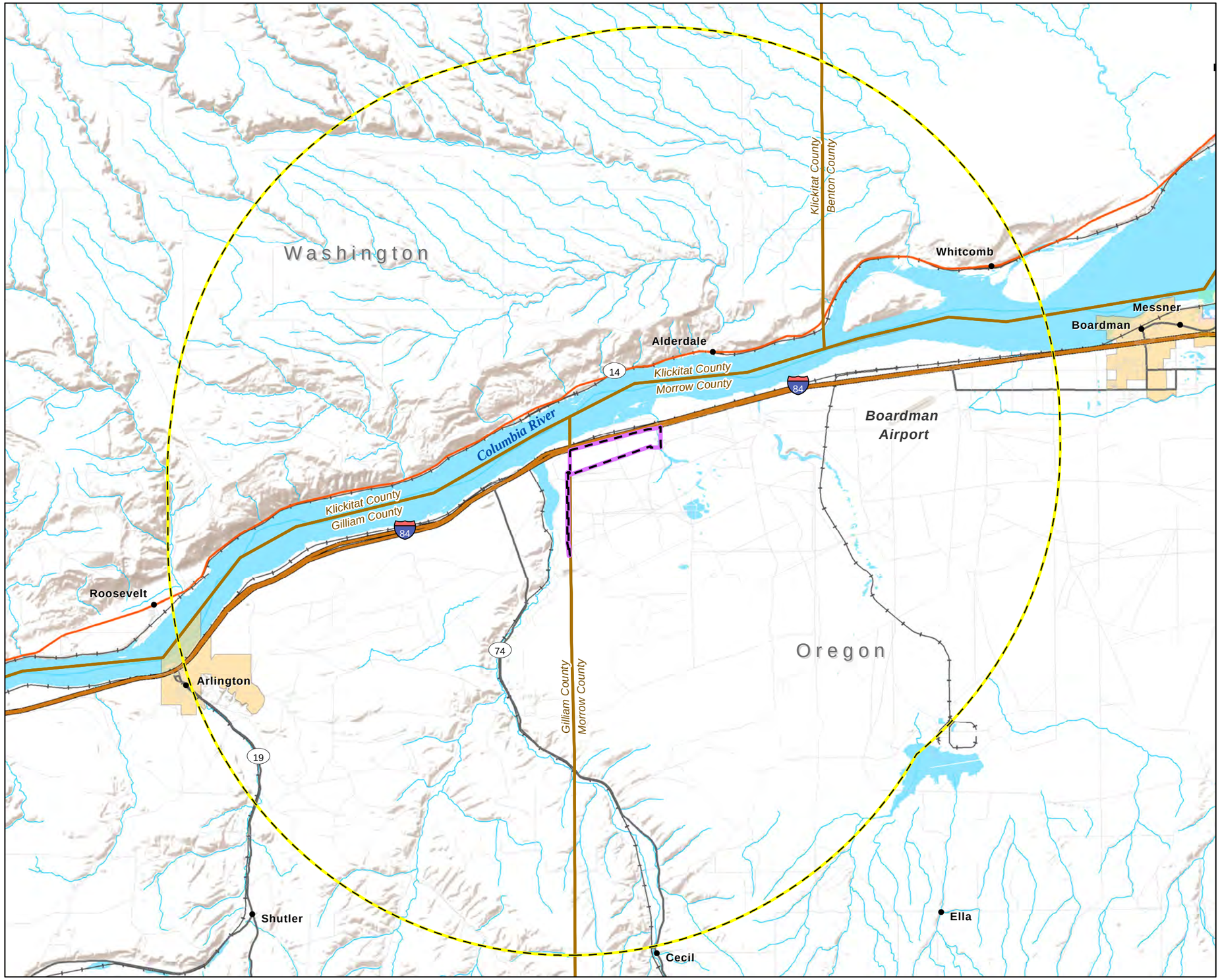
Figures



VICINITY MAP

LEGEND

- Facility Site Boundary
- Public Services and Socioeconomic Impact Analysis Area (10 miles)
- Water
- River / Stream
- State Boundary
- County Boundary
- Major Highway
- Highway
- Major Road
- Local Road

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FIGURE U-1
Analysis Area for Public Services and Socioeconomic Impacts
Boardman Solar Energy Facility Application for Site Certificate
Morrow and Gilliam Counties, Oregon

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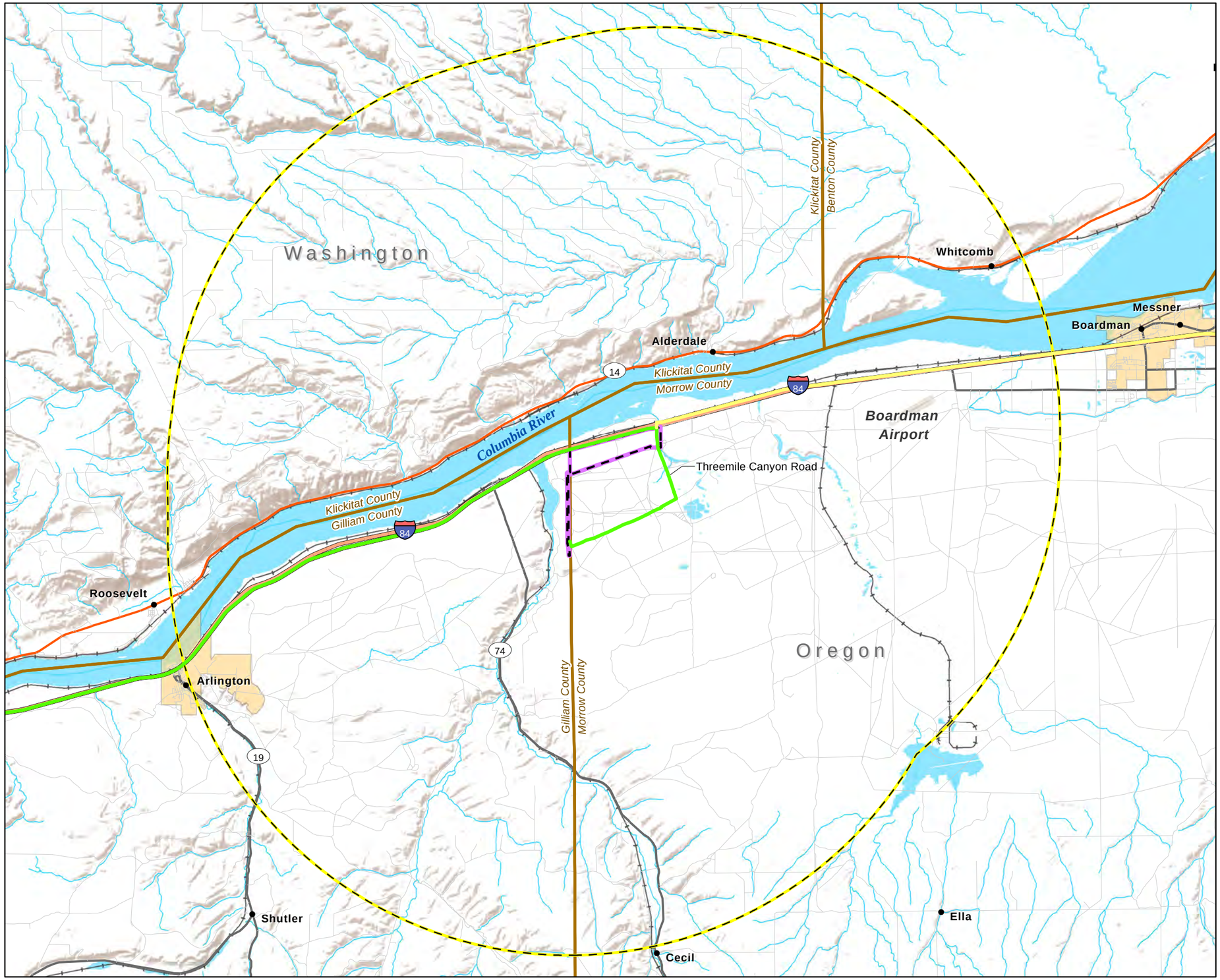

VICINITY MAP

LEGEND

- Facility Site Boundary
- Public Services and Socioeconomic Impact Analysis Area (10 miles)
- Water
- River / Stream
- State Boundary
- County Boundary
- Major Highway
- Highway
- Major Road
- Local Road
- Primary Transportation Route
- Alternative Transportation Route

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FIGURE U-2
Primary and Alternative Transportation Routes
Boardman Solar Energy Facility Application for Site Certificate
Morrow and Gilliam Counties, Oregon

Invenergy
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Attachment U-1
Ability of Morrow County to Provide Police Protection Services

MORROW COUNTY SHERIFF

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

Kenneth W. Matlack, Sheriff
John A. Bowles, Undersheriff

TO WHOM IT MAY CONCERN

DATE: July 3, 2017

TO: Nathan Williams, PE
Project Manager
CH2M
2020 SW 4th Avenue Suite 300
Portland, OR 97201

FROM: Sheriff Kenneth W. Matlack
Sheriff Morrow County
PO Box 159 Heppner, OR 97836

RE: PROPOSED SOLAR POWER FACILITY IN MORROW COUNTY

The Morrow County Sheriff's Office is the primary agency that provides law enforcement services in the vicinity of the proposed solar power facility. You may forward a copy of this letter to the Oregon Department of Energy to verify that the Morrow County Sheriff's Office does in fact provide primary law enforcement services in the area of Highway 184 near mile point 152 which is near the Intersection of 3 Mile Canyon Road. The area south of I84 on 3 Mile Canyon Road is all within the boundary of Morrow County.

As your project goes forward, the Sheriff's Office would very much be interested in determining the size, location, personnel and other possible service needs you might expect from the Sheriff's Office should your proposal be accepted and the facility built.

Respectfully yours,

Kenneth W. Matlack

Cc: file

Attachment U-2
Ability of Boardman Rural Fire Protection District to Provide Fire Protection Services

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

June 15, 2017

To: Laura Miner
Invenergy LLC

Re: Fire Protection for Proposed Solar Energy Site

The Boardman Rural Fire Protection District is responsible for Fire protection in the proposed Location extending to the Morrow / Gilliam county lines.
While this facility is not anticipated to cause any substantial increase the impacts upon the fire district, it is located in an area that is subject to high indices of large and rapid spreading wildfires. After review of the facility's management plans,

Exhibit B Section B.1.5 Fire Prevention which reads –
The equipment will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards and will not pose a significant fire risk. Facility roads will be sufficiently sized for emergency vehicle access in accordance with 2014 Oregon Fire Code Section 503 and Appendix D (Fire Apparatus Access Roads). Specifically, roads will be all-weather gravel compacted and 20 feet wide with an internal turning radius of 28 feet and less than 10 percent grade. A perimeter road with additional space will provide a 50-foot, noncombustible, defensible space clearance, although only a 10-foot clearance is required under 2014 Oregon Fire Code Section 605.12.1. The rest of the ground in the Facility will be managed in accordance with Oregon Fire Code requirements. Under the 2014 Oregon Fire Code Section 605.12.2, the area under and around the installation will have a gravel base or other noncombustible base that is approved by the fire code official and does not create a dust hazard. This requirement is noted on the Facility Layout Details (Exhibit C Figure C-2B), and the base will be kept free of vegetation in accordance with the Revegetation and Noxious Weed Control Plan (Exhibit P Attachment P-6). In the rare event of an electrical fire in the module blocks or substation, it is likely that Facility staff will monitor and contain the fire, but not try to extinguish it. The control house and operations and maintenance (O&M) building will have smoke detectors, fire extinguishers, and eyewash stations to protect the buildings and workers.-

The Fire District feels that the concerns are addressed.

Marc Rogelstad, Chief
Boardman Rural Fire Protection District.

EXHIBIT V
WASTE MINIMIZATION
OAR 345-021-0010(1)(v)

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V-1 Inventory of Waste Materials Associated with Facility Retirement V-2

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:*

Response: This Exhibit demonstrates how Boardman Solar Energy LLC (Applicant) will minimize solid waste and wastewater generated during construction and operation of the Boardman Solar Energy Facility (Facility). The Applicant will recycle and reuse solid waste, as outlined in the Applicant's solid waste and wastewater plans that are described in this Exhibit. In addition, the Applicant will manage solid waste in a manner that will result in minimal impacts on surrounding and adjacent areas. The Applicant will also manage solid waste consistent with the Morrow County Solid Waste Ordinance as demonstrated in this Exhibit.

OAR 345-021-0010(1)(v) requires that the site certificate application for the Facility address waste minimization in accordance with OAR 345-022-0120, which states the following:

> *(1) Except for facilities described in section (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; [and]*
>
> *(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.*

The information presented in this Exhibit is generally organized in accordance with OAR 345-021-0010(1)(v) and provides evidence needed to support a finding by the Council (as required by OAR 345-022-0120).

V.1 MAJOR TYPES OF WASTE PRODUCED WITH QUANTITY ESTIMATES

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.*

Response: The major types of solid waste and wastewater likely to be generated by the Facility are nonhazardous construction or demolition debris, construction and operation-related wastewater, and office waste. The following sections provide additional details of the major types of waste generated and volume estimates.

V.1.1 Construction

As presented in Exhibit G, nonhazardous construction waste will be generated. Primary sources of waste include general construction debris such as scrap steel, waste concrete, and excavated soil. Other materials such as packaging from the installed solar photovoltaic modules and associated electrical equipment and erosion control material (e.g., silt fencing and straw wattles) may also be generated during construction. The nonhazardous waste produced during construction will be accommodated by a local solid waste hauler. Estimated volume of

construction waste will be one 40-cubic-yard roll-off per week during active construction, which is estimated span 4 to 6 months.

Wastewater generated during construction will result from portable toilets. Portable toilets will be managed by a local contractor and wastewater will be disposed of in accordance with state law. An average of 15 portable toilets will be onsite during construction, including 40 portable toilets during peak construction.

V.1.2 Operations

During operations, the primary waste generated will be office waste in the operations and maintenance building. Office waste will be solid waste primarily composed of paper, packaging, and food scraps. Disposal of materials for routine maintenance and housekeeping, such as lubrication oils and cleaning supplies, will be managed according to the pertinent regulations and the guidelines outlined in Exhibit G. An estimated 2 yards of solid waste will be generated per month.

Other than the washwater periodically generated from washing panels, which will be covered under an Oregon General Water Pollution Control Facilities 1700-B Permit, industrial wastewater will not be generated through Facility operation. Solar panel washwater consisting of no added cleaning solvents will be generated and will be discharged by evaporation and seepage into the ground, as detailed in Exhibit O. Equipment in the maintenance garage may also be periodically washed down; an estimated 75 gallons of equipment washwater will be generated and disposed of each day. Sanitary wastewater that is generated onsite will be disposed of and treated using an onsite septic system and drain field. An estimated 90 gallons of sanitary wastewater will be generated and disposed of each day.

Waste such as universal waste (for example, lightbulbs) and batteries will be recycled according to applicable regulations.

V.1.3 Retirement

When the Facility is retired, aboveground equipment will be removed and sold for scrap, reused, or disposed of at a local landfill. Aboveground and underground electrical cables will be rendered inert and underground electrical cables will be left in place. To allow for agricultural activities, concrete foundations will be removed, recycled, and replaced by suitable clean fill. Table V-1 describes the major types of waste materials associated with retirement of the Facility. The table provides an inventory of estimated waste stream quantities and proposed disposal methods.

Table V-1. Inventory of Waste Materials Associated with Facility Retirement

Material/Chemical	Description	Estimated Quantity Used During Operation	Disposal Method
Buildings	O&M and Control House	Two buildings	Recycle materials, if feasible, then dispose of in landfill
34.5-kilovolt electrical cable	Solar photovoltaic underground collection cables	3.3 miles	Render underground cables inert and leave in place
Solar photovoltaic modules, steel	30 module blocks for solar power generation. Each module consists of 72 cells and 355 watts of polycrystalline on a steel	73,125 steel mounting posts	Recycle

Table V-1. Inventory of Waste Materials Associated with Facility Retirement

Material/Chemical	Description	Estimated Quantity Used During Operation	Disposal Method
mounting racks, and steel trackers	mounting rack and single-axis steel tracker.		
115-kilovolt electrical cable	One 2.1-mile-long overhead transmission line	One 2.1-mile-long overhead transmission line	Recycle
Transmission poles and associated structures	Connection of the Facility substation to the point of interconnection	2.1 miles of transmission line with 400-foot spacing (27 poles)	Reuse materials, if feasible, or dispose of in landfill
Concrete	Foundations for O&M building and control house building (240 cubic yards) Foundations for solar module trackers (20,000 cubic yards maximum)	20,240 cubic yards (maximum)	Recycle materials above 3 eet below ground; leave other material in place
Rock/gravel aggregate	Road construction material	40,287 tons (maximum)	Recycle

V.2 STRUCTURES, SYSTEMS, AND EQUIPMENT TO MANAGE AND DISPOSE OF WASTE

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.*

Response: Construction waste minimization practices will be implemented to minimize the amount of solid waste generated. The practices will include implementing a detailed material usage estimating and procurement system to minimize the amount of excess materials ordered. In addition, a general procedure will be implemented to separate recyclable material from solid waste. Solid waste and recyclables generated during construction will be handled by local commercial haulers. The Facility is located between two public landfills: Arlington Landfill (also called Columbia Ridge Recycling and Landfill), owned by Waste Management Services of Oregon, Inc., and located approximately 27 miles from the Facility, and Finley Buttes Landfill, located approximately 30 miles from the Facility south of Boardman (see Exhibit U).

Recyclable materials consisting of scrap steel, cardboard, general packaging materials, and wood will be segregated from solid waste and transported to a recycling facility. Waste concrete and hardened concrete from concrete washout areas will be incorporated into the foundation excavations, or transported offsite and disposed of at Arlington Landfill. Solid waste that is not recyclable will be collected, sorted, and transported offsite for disposal at Arlington Landfill.

Solar panels that are nonfunctional or are retired will be recycled to the maximum extent feasible through the Solar Energy Industries Association (SEIA) National PV Recycling Program (SEIA, 2017). The purpose of this program is to combine services offered by recycling partners in order to provide cost-effective and environmentally responsible. SEIA is sponsoring this program and research and development that could make the entire industry landfill free. Ultimately, it is the Applicant's goal to achieve a zero waste to landfill standard.

V.2.1 Construction

During construction, several structural and nonstructural best management practices (BMPs) will be implemented to prevent erosion and control sedimentation. As described in Section I.4 of Exhibit I, construction of access roads, foundations, and other facilities will be regulated by an

erosion and sediment control plan and a 1200-C Construction Stormwater NPDES Permit (see Attachment I-1 to Exhibit I) that will require BMPs to minimize possible impacts from erosion or other impacts to soils. A summary of the BMPs provided in Attachment I-1 and Section I.4 to be implemented during Facility construction include the following:

- **Runoff Control**: Runoff controls will be installed to minimize stormwater velocity. Runoff controls will primarily consist of silt fencing and fiber rolls. Silt fencing will be installed on contours downgradient of land-disturbing activities.
- **Erosion Prevention:** During construction, the focus will be on preventing erosion, rather than on implementing sediment control after erosion has already occurred. The types of BMPs that will be implemented during land-disturbing activities include mulching, deploying erosion control matting, and applying soil binders and tackifiers.
- **Wind Erosion and Dust Control:** As a result of the arid weather conditions at the Facility site, the primary mechanism for soil and sediment transport will be wind. Dust suppression techniques will be used to minimize this transportation pathway. Water will be primarily applied to the graveled or rocked access roads for the duration of the dry months of construction. Additional BMPs, including the use of additives, will be implemented if water alone does not sufficiently address wind erosion or visible dust.
- **Vegetative Erosion Control:** As feasible, existing vegetation will be preserved, and buffered to minimize erosion. The use of natural vegetative barriers will be implemented in conjunction with sediment controls (for example, silt fencing). Vegetative buffers minimize stormwater velocity and can effectively capture suspended particulate that mobilized through stormwater runoff.
- **Sediment Tracking Control:** To prevent sediment discharge onto public roads, a stabilized construction entrance/exit will be installed and maintained at locations where newly constructed Facility access roads intersect existing paved roads, and at the construction staging areas. As part of the inspection protocol, these intersections will be routinely inspected. Additional BMPs may be implemented, including street sweeping and tire wheel wash, if sediment tracking is observed.
- **Stockpile Management:** Stockpiled material will use silt fencing or fiber rolls as perimeter control, and the material will be covered either with a thick layer of mulch or plastic sheeting.
- **Pollutant Management:** Potential pollutants will be stored within the contractor staging area with secondary containment. Construction vehicles will be fueled and maintained only in staging areas, with containment BMPs in place. Handling, storage, and disposal of materials will be consistent with federal, state, and local ordinances.

V.2.2 Operations

During operations, a small amount of office waste will be produced. Solid waste generated during Facility operations will be disposed of though local haulers, and will ultimately be disposed of at Arlington Landfill. Solid waste during operations will likely consist of paper, packaging, and food scraps. To the extent feasible, recyclable material will be separated for disposal at a recycling facility.

V.2.3 Retirement

Waste minimization during Facility retirement will consist largely of the same measures employed during Facility construction. To the extent practicable, Facility components will be

sold for reuse or scrap, which will minimize the amount of waste requiring disposal at a solid waste facility. Similar BMPs will be implemented to protect stormwater quality.

V.3 WATER USE REDUCTION

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.*

Response: Water use reduction actions will be implemented during construction and operation of the Facility. The following sections provide additional details.

V.3.1 Construction

Water will be used on an as-needed basis to construct concrete foundations, suppress dust on the roads (and other areas disturbed as a result of grading). To reduce the water used for dust suppression during construction, stabilization materials such as mulch, soil tackifiers, and soil binders may be placed on exposed soils to minimize dust generation without the use of daily water.

V.3.2 Operations

During Facility operation, water will be trucked to the Facility and held in a water tank or obtained via an onsite well. Water minimization practices and devices will be implemented in order to conserve water, such as installation of low-flow toilets and faucets.

V.4 PLANS FOR RECYCLING AND REUSE

OAR 345-021-0010(1)(v)(D) *The applicant's plans to minimize, recycle or reuse the solid waste and wastewater described in (A).*

Response: Waste generated during construction will be minimized by implementing efficient construction practices and detailed estimates of material needed. Waste generated through construction, operation, and retirement of the Facility will be recycled as appropriate and feasible. Waste that can be recycled includes metals, glass, paper, and yard debris. Recyclable waste will be sorted, stored in dumpsters or other suitable containers, and then transported to a local transfer station or other recycling facility for recycling.

Wastewater generated during construction within the portable toilets will be regularly pumped and sent to a treatment facility. Wastewater generated during operation will be disposed of and treated using an onsite septic system and drain field.

V.5 ADVERSE IMPACTS OF WASTE DISPOSAL

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.*

Response: Adverse impacts on surrounding and adjacent areas are not anticipated during Facility construction and operation. A minimal amount of solid waste, wastewater, and stormwater is anticipated to be accumulated, disposed of, and transported during construction and operation. Additionally, a hazardous material spill prevention program will be implemented, as described in Exhibit G. Solid waste disposed of at landfills will be minimized through recycling and waste minimization practices employed during construction. The Facility will generate approximately one 40-cubic-yard roll-off per week during construction and one 8-cubic-yard

dumpster per month during operation. Therefore, the solid waste generated will not adversely affect the capacity at local landfills.

Wastewater will be captured and treated using an onsite septic tank and drain field during operation of the Facility. Therefore, no aboveground accumulation or transportation of this waste will be needed. During construction, portable toilets will be serviced a minimum of once per week. Wastewater generated during construction will be transported via trucks by a local contractor to a treatment facility. Water used for dust suppression will percolate into the ground.

Stormwater generated onsite during construction and operation is expected to be minimal. Stormwater controls will be implemented onsite as needed. During operation, the stormwater will infiltrate into the ground.

V.6 EVIDENCE THAT ADVERSE IMPACTS WILL BE MINIMAL

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.*

Response: The Applicant's proposed measures to avoid, reduce, or otherwise mitigate any possible impacts on the site or surrounding and adjacent areas (as discussed in this Exhibit and in Exhibit G) will result in minimal impacts caused by the construction, operation, and retirement of the Facility. Examples of such measures include a hazardous materials spill prevention program and recycling measures that will be implemented to minimize the amount of waste that is disposed of as landfill waste. Furthermore, waste will be disposed of at a properly licensed facility by a licensed contractor.

Solid waste that is generated during construction, operation, and retirement of the Facility will be sorted for recycling and then transported offsite for disposal. Wastewater generated during construction will be pumped from portable toilets and removed regularly. Wastewater generated during operation will be disposed of and treated using an onsite septic tank and drain field.

V.7 PROPOSED MONITORING PROGRAM

OAR 345-021-0010(1)(v)(G) *The applicant's proposed monitoring program, if any, for minimization of solid waste and wastewater impacts*

Response: Given the minimal generation of solid waste and wastewater, and proposed recycling measures and waste minimization practices, the Facility is not expected to incur significant effects onsite or on surrounding and adjacent areas. Therefore, no monitoring program is proposed. Waste management practices will comply with applicable regulations and will be inspected periodically by the Applicant.

V.8 MORROW COUNTY SOLID WASTE ORDINANCE

The Morrow County Solid Waste Ordinance was adopted in 2006 and select provisions of the ordinance are addressed in this section with respect to construction, operation, and retirement of the Facility.

SECTION 3.000. PURPOSE AND POLICY

To protect the health, safety and welfare of the people of Morrow County, hereafter referred to as the County, and to meet the goals of the Solid Waste Management Plan, it is declared to be the policy of the County to regulate solid waste management by:

Response: The provisions in this section (3.000) are directives on how the County intends to regulate solid waste management through planning and operational practices. The provisions in Section 3.000 are not directly applicable to the Facility, although the Applicant addresses them below.

1. Following the priorities on managing solid waste provided in Oregon Revised Statute (ORS) 459.015(2);

Response: ORS 459.015(2) is a statute for how the State of Oregon intends to manage solid waste and is not directly applicable to the Facility. However, a description of how Facility construction and operation will be consistent with the priorities of (ORS) 459.015(2)(a)(A-F) is included below. In addition, Table V-1 describes the major types of waste materials associated with retirement of the Facility and proposed recycle, reuse, and disposal methods.

ORS 459.015(2)(a)(A): First, to reduce the amount of solid waste generated;

Response: Construction waste minimization practices will be implemented to minimize the amount of solid waste generated. The practices will include implementing a detailed material usage estimating and procurement system to minimize the amount of excess materials ordered. A general procedure will be implemented to separate recyclable material from solid waste. Recyclable materials consisting of scrap steel, cardboard, general packaging materials, and wood will be segregated from solid waste and transported to a recycling facility. Waste concrete and hardened concrete from concrete washout areas will be incorporated into the foundation excavations where possible.

During operations, a small amount of office waste will be produced. Office waste reduction measures such as minimizing printing and reusing boxes for packaging will be implemented to reduce solid waste generation during operations. To the extent feasible, recyclable material will be separated for disposal at a recycling facility.

Waste minimization during Facility retirement will consist largely of the same measures employed during Facility construction. To the extent practicable, Facility components will be sold for reuse or scrap, which will minimize the amount of waste requiring disposal at a solid waste facility.

ORS 459.015(2)(a)(B): Second, to reuse material for the purpose for which it was originally intended;

Response: To the extent practicable, materials will be reused during construction, operation, and retirement. For example, during construction, waste concrete and hardened concrete from concrete washout areas will be incorporated into the foundation excavations where possible, and excavated soil will be reused onsite as fill whenever feasible. During retirement, Facility components will be sold for reuse or scrap.

ORS 459.015(2)(a)(C): Third, to recycle material that cannot be reused;

Response: For material that cannot be reused, construction and office recycling programs will be implemented to the extent practical to reduce the volume of material that will be disposed of as solid waste. With Facility retirement, most components of the Facility will be reused or recycled as outlined in Table V-1.

During construction, waste that can be recycled includes metals, glass, paper, and yard debris. Recyclable waste will be sorted, stored in dumpsters or other suitable containers, and then transported to a local transfer station or other recycling facility for recycling.

Solar panels that are nonfunctional or are retired will be recycled to the maximum extent feasible through the SEIA National PV Recycling Program (SEIA, 2017). The purpose of this program is to combine services offered by recycling partners in order to provide cost-effective and environmentally responsible. SEIA is sponsoring this program and research and development that could make the entire industry landfill free. Ultimately, it is the Applicant's goal to achieve a zero waste to landfill standard.

ORS 459.015(2)(a)(D): Fourth, to compost material that cannot be reused or recycled;

Response: The Facility will generate only a very small amount of compostable material during construction, operation, and retirement. Therefore, this provision is not applicable.

ORS 459.015(2)(a)(E) Fifth, to recover energy from solid waste that cannot be reused, recycled or composted so long as the energy recovery facility preserves the quality of air, water and land resources; and

Response: Although the Facility may generate a small of solid waste that cannot be reused or recycled, all solid waste generated from Facility construction and operation is waste that was used to support solar energy – a sustainable and renewable energy source. Arlington Landfill does not provide a landfill gas to energy program and shipping the waste farther would require additional energy.

ORS 459.015(2)(a)(F) Sixth, to dispose of solid waste that cannot be reused, recycled, composted or from which energy cannot be recovered by landfilling or other method approved by the Department of Environmental Quality.

Response: The public landfill nearest to the Facility site is Arlington Landfill owned by Waste Management, Inc. (see Exhibit U). Solid waste that is not reusable or recyclable will be collected, sorted, and transported offsite for disposal at Arlington Landfill.

2. Providing for the safe and sanitary accumulation, storage, collection, transportation and disposal of solid waste;

Response: Solid waste that is generated during construction, operation, and retirement of the Facility will be stored in covered containers or some other appropriate covering as applicable. Solid waste will be transported within appropriate containers or enclosed vehicles as necessary during transport on public roads or otherwise secured such that none could escape during transport. Furthermore, waste will be disposed of at a properly licensed facility by a licensed waste hauler. Recyclable waste will be sorted, stored in dumpsters or other suitable containers, and then transported to a local transfer station or other recycling facility for recycling.

3. Providing the opportunity to recycle as part of the overall solid waste plan;

Response: As noted above in response to ORS 459.015(2)(a)(C) and (A), recycling will occur at the Facility during construction, operation, and retirement.

4. Providing for public input in solid waste management and recycling through the Solid Waste Advisory Committee; and

Response: This is a directive for the County and its operation and is not applicable to the Facility.

5. Prohibiting accumulation of waste or solid waste on private property in such manner as to create a public nuisance, a hazard to health or a condition of unsightliness, and to provide for the abatement of such conditions where found.

Response: During construction and operation, solid waste will not accumulate or be stored within the Facility site boundary except on a short-term basis prior to delivery to an appropriate disposal facility. General construction debris will be collected by a local contractor and transported to either Arlington Landfill or Finley Buttes Landfill. Waste collection containers will be secured within the construction staging areas, reducing the risk of access by unauthorized persons. Nonhazardous solid waste generated during operation will be recycled or disposed of as municipal waste. Disposal practices for hazardous waste materials will follow applicable regulations and will depend on the type of waste. Paint, oil, and solvents will be disposed of during the Morrow County annual household hazardous waste event, or will be transported to Arlington Landfill.

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.

Response: Solid waste that is generated during construction, operation, and retirement of the Facility will be transported within appropriate containers or enclosed vehicles as necessary during transport on public roads or otherwise secured such that none could escape during transport. Furthermore, waste will be disposed of at a properly licensed facility by a licensed waste hauler.

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: During Facility construction, operation, and retirement, solid waste will not accumulate or be stored within the Facility site boundary except on a short-term basis before delivery to an appropriate disposal facility. General construction debris will be collected by a local contractor and transported to either Arlington Landfill or Finley Buttes Landfill. Waste collection containers will be secured within the construction staging areas, reducing the risk of access by unauthorized persons. Nonhazardous solid waste generated during operation will be recycled or disposed of as municipal waste. Disposal practices for hazardous waste materials will follow applicable regulations and will depend on the type of waste. Paint, oil, and solvents will be disposed of during the Morrow County annual household hazardous waste event, or will be transported to Arlington Landfill.

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: During Facility construction, operation, and retirement, it is expected that a minimal amount of hazardous materials will be generated. Hazardous materials are expected to consist of paint, spent lubrication oils, and solvents, as listed in Tables G-1 and G-2 in Exhibit G. Disposal practices for hazardous waste materials will follow applicable regulations and will depend on the type of waste. Paint, oil, and solvents will be disposed of during the Morrow County annual household hazardous waste event, or will be transported to Arlington Landfill. No hazardous solid waste associated with the Facility will be deposited, buried, or dumped onsite.

5.032. Responsibility for Proper Disposal of Solid Waste

It is the responsibility of the occupant or owner of real property in Morrow County to use satisfactory and legal disposal methods to dispose of their household generated solid wastes as defined in the Solid Waste Management Plan.

Response: This provision is associated with household solid waste and disposal. The Facility is not a household. However, solid waste from the Facility will be managed to reduce and reuse to the greatest extent practical, and any solid waste generated will be transported by a licensed hauler to a licensed facility.

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: No burning will be required with construction, operation, or retirement of the Facility. Therefore, this provision does not apply.

V.9 SUMMARY

The evidence provided in this Exhibit demonstrates that the Council's waste minimization standard (OAR 345-022-0120) is met because waste will be minimized, reused, or recycled where feasible and because minimal adverse impacts on the surrounding or adjacent areas will result from the management of waste related to the Facility. This Exhibit also demonstrates compliance with the Morrow County Solid Waste Ordinance.

V.10 REFERENCE

Solar Energy Industries Association (SEIA). 2017. *SEIA National PV Recycling Program*. http://www.seia.org/seia-national-pv-recycling-program. Accessed April 2017.

EXHIBIT W
RETIREMENT AND RESTORATION

OAR 345-021-0010(1)(w)

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ATTACHMENT

W-1 Boardman Solar Energy Facility Estimated Retirement and Restoration Cost

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:*

W.1 USEFUL LIFE

OAR 345-021-0010(1)(w)(A) *The estimated useful life of the proposed facility.*

Response: The estimated useful life of the proposed Boardman Solar Energy Facility (Facility) is 30 years. However, the Facility will operate for as long as there is a market for the production of electrical energy. Facility upgrades may be implemented to prolong operation well beyond 30 years.

Boardman Solar Energy LLC (Applicant) plans to secure a Power Purchase Agreement to sell the energy and environmental attributes from the Facility to a reputable entity. The Applicant will use the Power Purchase Agreement to secure financing for Facility construction.

W.2 RETIREMENT AND RESTORATION ACTIONS

OAR 345-021-0010(1)(w)(B) *Specific actions and tasks to restore the site to a useful, non-hazardous condition.*

Response: The Facility will be constructed with materials consisting of steel, aluminum, concrete, solar modules, cable, transformer insulating oil, and plastics. When the Facility reaches the end of its operational life, the components will be disassembled and component materials will be recycled, sold for scrap, or taken to a landfill. Retirement and restoration will be accomplished using conventional construction equipment with the objective of maximizing the recycling of materials and minimizing the amount of waste to be disposed. Demolition debris will be placed in temporary onsite, secured, storage areas pending final transportation and disposal or recycling according to the following steps:

1. The first step in the retirement and restoration process is the assessment of existing site conditions and preparation of the Facility site. Internal service roads and access road, fencing, and electrical power will remain in place for use by the retirement and restoration workers until no longer needed. The necessary permits, such as for land use or road access, will be obtained before conducting any retirement and restoration work.
2. The retirement and restoration of the Facility will then proceed in reverse order of its construction and commissioning. The Facility will be disconnected from the transmission system. Solar modules will be disconnected, collected, packed, and sent to the original manufacturer or a local recycler. Site equipment will be disconnected from aboveground and underground cables. The underground cables below three feet of the surface will be rendered inert and left in place; all other cables will be removed and transported offsite to an approved recycling facility or landfill. The solar module steel racking system will be removed and transported offsite to a recycling facility. Electrical and electronic devices, including medium voltage step-up transformers and solar inverters, will be removed and transported offsite to a recycling facility. Disconnect switches will be removed and sold for reuse, recycled, or sent to a landfill. Concrete foundations will be removed to a minimum depth of 3 feet and then transported offsite and recycled, recycled by portable recycling equipment brought onsite, or taken to a landfill.
3. The last step, treatment of internal service roads and access road, fences, gates, and the transmission line, will depend on whether there is a planned next use of the land. If there is a need for these improvements, they will be left in place and maintained. If there is not, they will be removed and the land will be restored. Because the area will be minimally graded for construction, it will only be necessary to restore the original grading in certain

locations. The land will be revegetated with plants or plant seed mix consistent with the landowner's needs and the weed control plan approved by Morrow and Gilliam counties.

W.3 RETIREMENT AND RESTORATION COST ESTIMATE

OAR 345-021-0010(1)(w)(C) *An estimate, in current dollars, of the total and unit costs of restoring the site to a useful, non-hazardous condition*.

Response: Attachment W-1 provides a detailed cost estimate for Facility retirement and restoration. The estimated cost, in fourth quarter 2016 dollars, is approximately $4.5 million. The estimate assumes removal of all improvements to restore the Facility to preconstruction condition. It was prepared using Oregon Department of Energy (ODOE) 2011 guidelines. ODOE does not have a guidance document for estimating retirement and restoration costs for solar energy facilities, but the key components of Facility retirement and restoration will be similar to those of a wind energy facility. For example, the unit cost for grading, seeding, electrical transmission line removal, transport, and disposal will be the same for solar and wind energy facilities. As such, the cost estimate presented in Attachment W-1 relies on the unit costs developed by ODOE in the wind energy facility guidance document titled *Site Restoration Cost Estimating Guide* (ODOE, 2011), and on specific unit costs developed for components that apply to a solar energy facility. The solar unit costs were developed based on standard industrial practice.

OAR 345-021-0010(1)(w)(D) *A discussion and justification of the methods and assumptions used to estimate site restoration costs.*

Response: The Applicant made the following assumptions to estimate site restoration costs:

- Demolition debris will be removed to a licensed landfill that will accept construction materials.
- Steel, concrete, and other components will be recycled, to the extent possible.
- Underground material below 3 feet will be left in place. This will include concrete foundations for the solar module posts, and a portion of the posts themselves.
- Before removing the main transformer, oil will be removed and disposed of appropriately. Inverters and transformers will be removed with oils in place.
- Bare ground portions will be seeded in accordance with the *Revegetation and Noxious Weed Control Plan* (Exhibit P, Attachment P-6) once retirement and restoration are complete. Owing to the nature of the retirement and restoration activities, site grading will not be required prior to seeding. During Facility operations, noxious weeds will be controlled to promote establishment of native vegetation. During Facility retirement and restoration, care will be taken to minimize the disturbance to existing vegetation. To be conservative, this estimate assumes that the entire area occupied by the solar modules (approximately 453 acres) will be reseeded (or likely over-seeded).
- The operations and maintenance (O&M) facility will be removed, and the surrounding graveled area will be removed, regraded, and reseeded.
- The site perimeter fence, O&M fence, and substation fence will be removed and recycled.
- Internal services roads and access road will be removed, regraded, and reseeded as part of retirement and restoration activities. During retirement and restoration of the module blocks, the internal service roads and access road will be used to minimize the disturbance to the surrounding areas.

- Salvage value of Facility materials is not included, but should be considered if Energy Facility Siting Council policy or rules change to allow credit for these values.
- The estimate includes a 10 percent administration and project management allowance and a 10 percent future developments contingency allowance.

W.4 MONITORING PLAN

OAR 345-021-0010(1)(w)(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.*

Response: The Facility is not expected to cause site contamination by hazardous materials, and therefore no monitoring plan is proposed or required. Hazardous materials associated with the Facility will be limited to transformer oils that will either be pumped out to a specialized vehicle for recycling before removing the transformers, or removed with the equipment. The Facility will not have any fuel storage tanks, and any small quantities of lubricants or fuel from passing vehicles are highly unlikely to result in soil contamination.

Attachment W-1
Boardman Solar Energy Facility
Estimated Retirement and Restoration Cost

Boardman Solar Energy Facility

COST ESTIMATE FOR FACILITY SITE RETIREMENT AND RESTORATION

(Unit Costs in 2nd Quarter 2010 Dollars)

Adjustment Factor: 1.10495 **Current Quarter:** **4Q 2016**

GDP Index 2nd Quarter 2010: **101**

GDP Index Current Quarter: **111.6**

http://www.oregon.gov/DAS/OEA/Pages/Index.aspx

Cost Estimate Component	Quantity	Unit Cost	Extension
Module Blocks			
Disconnect electrical and ready for disassembly	1	$18,280	$18,280
Remove solar facilities (per block)	30	$6,113	$183,388
Remove steel posts (per ton)	2,133	$82	$174,891
Remove post foundation (per CY)	0	$0	$0
Remove pad transformer and foundation (per block)	30	$2,616	$78,491
Restore module site (per block)	30	$51,306	$1,539,192
O&M Facilities			
Remove O&M facility and fences/gates	1	$310,912	$310,912
Substations			
Remove substation or substations	2	$16,385	$32,770
Transmission Lines			
Remove 34.5-kV collector, single-circuit (per mile)	0	$0	$0
Remove 34.5-kV collector, double-circuit (per mile)	0	$0	$0
Remove aboveground high-voltage transmission line (per mile)	10.5	$5,907	$62,020
Remove collector system junction boxes (each)	14	$51	$719
Road Restoration			
Internal service roads (Mi)	11.6	$30,316	$352,905
Access road (Mi)	0.3	$30,316	$8,504
Restore Additional Areas Disturbed by Facility Removal			
Grading and seeding			
Temporary Disturbance - Access roads, O&M facility and staging areas	59	$3,398	$200,435
General Costs			
- Permits, mobilization, engineering, overhead			$342,375
Subtotal			**$3,304,881**
Subtotal Adjusted to Current Dollars **4Q 2016**			**$3,651,730**
Performance Bond @ 1%			$36,517
Gross Cost (Adjusted)			**$3,688,248**
Administration and Project Management @ 10%			$368,825
Future Developments Contingency @ 10%			$368,825
Total Site Restoration Cost (current dollars)			**$4,425,897**
Total Site Restoration Cost (rounded to nearest $1,000)			**$4,426,000**

EXHIBIT X
NOISE

OAR 345-02100010(1)(x)

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FIGURE

X-1 Noise-Sensitive Properties

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 340-035-0035.*

Response: This Exhibit provides a noise assessment consistent with the requirements of OAR 345-021-0010(1)(x). The evidence provided in this Exhibit demonstrates that Boardman Solar Energy LLC (Applicant) has a reasonable likelihood of designing and operating the Boardman Solar Energy Facility (Facility) in compliance with the Oregon Department of Environmental Quality's (DEQ's) noise control standards in OAR 340-035-0035, Noise Control Regulations for Industry and Commerce.

X.1 BACKGROUND INFORMATION ABOUT NOISE

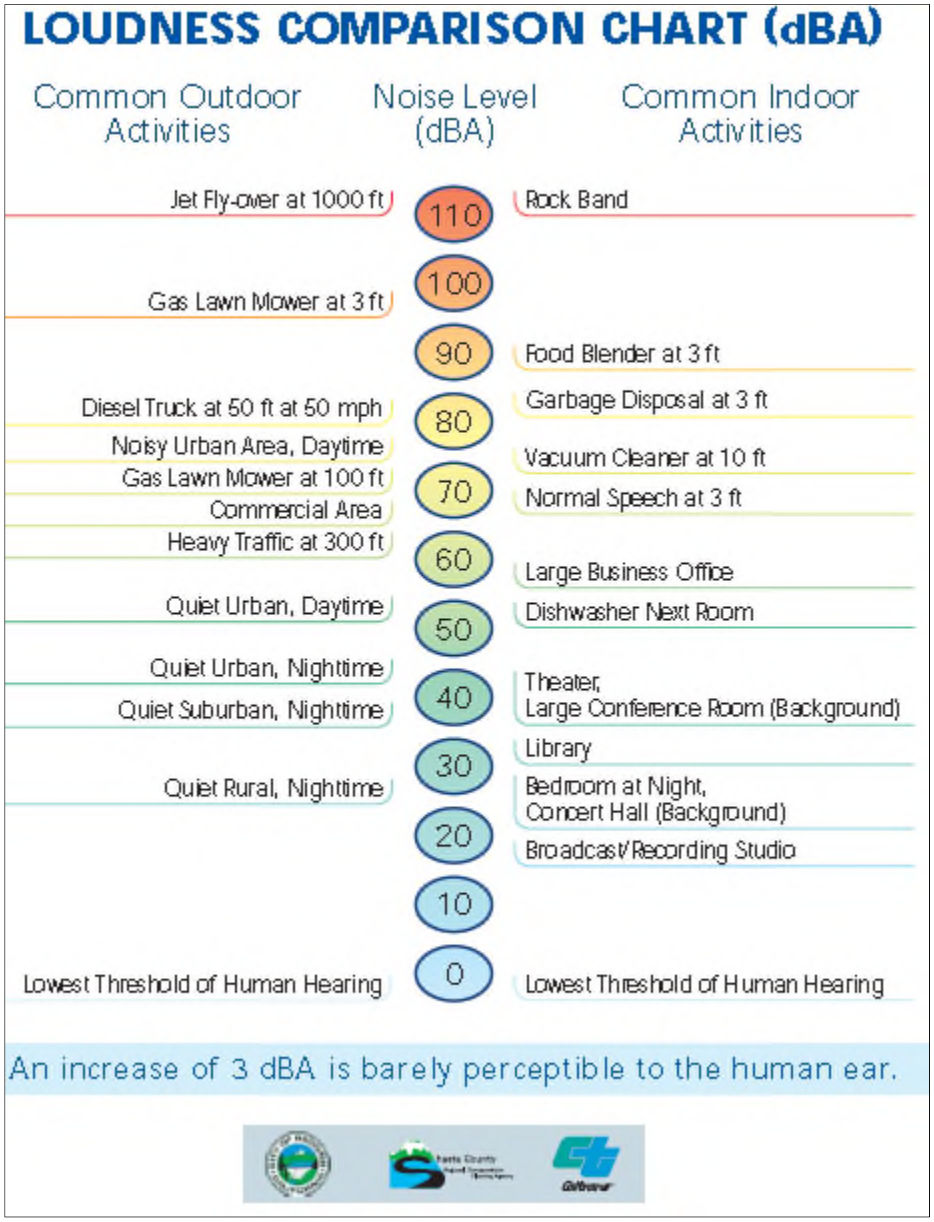
An understanding of how noise is defined and measured provides useful background for this Exhibit. Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several different ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Table X-1 summarizes the technical noise terms used in this Exhibit.

Table X-1. Definitions of Acoustical Terms

Term	Definition
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals.
A-weighted sound pressure level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Statistical noise level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L_{50} is the level exceeded 50 percent of the time).

Table X-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

Table X-2. Typical Sound Levels Measured in the Environment and Industry



Source: Caltrans, 2017.

An understanding of the difference between a sound *pressure* level (or noise level) and a sound *power* level also can be useful. A sound power level (commonly abbreviated as PWL or Lw) is analogous to the wattage of a light bulb; it is a measure of the acoustical energy emitted by the source and is, therefore, independent of distance. A sound pressure level is analogous to the brightness or intensity of light experienced at a specific distance from a source and is measured directly with a sound-level meter. Sound pressure levels always should be specified with a location or distance from the noise source.

Sound power level data are used in acoustic models to predict sound pressure levels. This is because sound power levels take into account the size of the acoustical source and account for the total acoustical energy emitted by the source.

It is also important to note that decibels cannot be directly added arithmetically, that is, 50 dBA + 50 dBA does not equal 100 dBA. When two sources of equal level are added together the result will always be 3 dB greater; that is 50 dBA + 50 dBA = 53 dBA and 70 dBA + 70 dBA = 73 dBA. If the difference between the two sources is 10 dBA, the level (when rounded to the nearest whole decibel) will not increase; that is 40 dBA + 50 dBA=50 dBA and 60 dBA + 70 dBA=70 dBA.

The decrease in sound level caused by distance from any single sound source normally follows the inverse square law; that is, the sound pressure level changes in inverse proportion to the square of the distance from the sound source. In a large open area with no obstructive or reflective surfaces, it is a general rule that at distances greater than approximately the largest dimension of the noise-emitting surface, the sound pressure level from a single source of sound drops off at a rate of 6 dB with each doubling of the distance from the source. Sound energy is absorbed in the air as a function of temperature, humidity, and the frequency of the sound. This attenuation can be up to 2 dB over 1,000 feet. The drop-off rate will also vary based on terrain conditions and the presence of obstructions in the sound's propagation path. These factors are considered in the development of the acoustical model.

X.2 SITE BOUNDARY AND ANALYSIS AREA

The approximately 798-acre Facility site boundary encompasses exclusively private land that is located south of Interstate 84 and historically has been used for winter and spring cattle grazing. The Applicant has negotiated a long-term lease for land within the site boundary. The analysis area consists of any area within the vicinity of the Facility site boundary that could be affected by noise from Facility construction or operation.

X.3 REGULATORY REQUIREMENTS

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, L_{10} or L_{50}, 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.*

Response: Noise standards promulgated by DEQ are contained in OAR 340-035-0035, Noise Control Regulations for Industry and Commerce (DEQ Noise Rules). The DEQ Noise Rules provide two types of noise limits for new industrial or commercial noise sources on a previously unused site.[1] Specifically, OAR 340-035-0035(1)(b)(B)(i) limits the increase over existing ambient levels to 10 dBA while ensuring that a given project does not exceed the levels identified in Table 8 of the OAR.

Table X-3 contains the "Table 8" statistical noise limits referenced in the DEQ Noise Rules. The L_{50} is the median sound level (50 percent of the measurement interval is above this level and 50 percent is below).

[1] A "previously unused industrial or commercial site" 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.

Table X-3. New Industrial and Commercial Noise Source Standards

Statistical Descriptor	Daytime (7 a.m. – 10 p.m.) (dBA)	Nighttime (10 p.m. – 7 a.m.) (dBA)
L_{50}	55	50
L_{10}	60	55
L_1	75	60

Source: OAR 340-35-0035, Table 8.
http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_035.html

In addition, OAR 340-035-0035(1)(f) establishes standards that regulate octave band sound pressure levels and audible discrete tones. Such standards can be applied by DEQ when it believes the limits discussed above do not adequately protect the health, safety, or welfare of the public[2].

OAR 340-035-0035(5) provides exemptions for emergency equipment, warning devices not operating continuously for more than 5 minutes, sounds that originate on construction sites, and sounds created in construction or maintenance of capital equipment.

The noise limits apply at "appropriate measurement points" on "noise-sensitive property." The "appropriate measurement point" is defined in the DEQ Noise Rules under OAR 340-35-0035(3)(b) as whichever of the following is farther from the noise source:

- 25 feet (7.6 meters) toward the noise source from that point on the noise-sensitive building nearest the noise source
- That point on the noise-sensitive property line nearest the noise source

"Noise-sensitive property" is defined in OAR 340-35-0015(38) 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 foregoing criteria in more than an incidental manner."

Noise-sensitive properties in the Facility area are shown on Figure X-1. The closest residential receptor to the solar array or substation is more than 2 miles away. The closest residential receptor to the transmission line is more than 1 mile away.

X.4 NOISE ANALYSIS METHODOLOGY

This Exhibit analyzes potential noise impacts from construction and operation of the proposed solar array and associated inverters as well as related or supporting facilities consisting of a substation transformer and 115-kilovolt (kV) transmission line.

There are very few sources of noise associated with solar facilities and they are generally minor compared to other energy facilities. The primary noise sources are inverters and transformers. The current produced by solar modules is in the form of direct current (DC). In order to be sent to the electrical grid, the DC current must be converted into alternating current (AC) power, and inverters serve this function. Transformers increase the voltage to ensure the power is efficiently transmitted to the grid.

[2] Impulse noise is also regulated in OAR 340-35-0035(1)(d), but solar facilities do not generate impulsive sounds such as those associated with blasting, gunfire, pile-driving, riveting, hammering, or stamping.

X.5 IMPACTS OF THE PROPOSED FACILITY

The applicant shall include: **OAR 345-021-0010(1)(x)(A)** *Predicted noise levels resulting from construction and operation of the proposed facility.*

OAR 345-021-0010(1)(x)(B) *An analysis of the proposed facility's compliance with the applicable noise regulations in OAR 340-035-0035, including a discussion and justification of the methods and assumptions used in the analysis.*

Response:

X.5.1 Construction

OAR 340-035-0035(5)(g) specifically exempts construction activity. Therefore, by regulatory definition, there will be no construction noise impacts. Regardless, the following presents potential construction noise levels at the residential receptors nearest to the Facility, the closest of which is more than 1 mile away, as stated in Section X.3.

Table X-4 documents the results of a U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control analysis of noise from construction equipment, power plant construction sites, and other types of facilities (EPA, 1971). Data from the EPA study have been used as a basis for Facility analysis in the absence of specific information about types, quantities, and operating schedules of construction equipment. The EPA data are conservative because the evolution of construction equipment has generally been toward quieter design. Use of these data is reasonable for estimating noise levels, given that they are still widely used by acoustical professionals.

Table X-4. Average Noise Levels from Common Construction at a Reference Distance of 50 feet

Construction Equipment	Typical Average Noise Level at 50 feet (dBA)
Air compressor	81
Backhoe	85
Concrete mixer	85
Concrete pump	82
Crane, mobile	83
Dozer	80
Generator	78
Grader	85
Loader	79
Paver	89
Pile driver	101
Pneumatic tool	85
Pump	76
Rock drill	98
Saw	78
Scraper	88
Shovel	82

Table X-4. Average Noise Levels from Common Construction at a Reference Distance of 50 feet

Construction Equipment	Typical Average Noise Level at 50 feet (dBA)
Truck	91

Source: EPA, 1971.

Table X-5 shows the total composite noise level at a reference distance of 50 feet as well as additional distances, based on typical equipment operating during each phase of construction and the typical usage factor for each piece of equipment. The predicted construction noise levels at 1 and 2 miles are also shown. The calculated levels are likely conservative, because the only attenuating mechanism considered was geometric spreading, which results in an attenuation rate of 6 dBA per doubling of distance; attenuation related to the presence of structures, trees or vegetation, ground effects, and terrain is not considered.

Table X-5. Composite Construction Site Noise Levels

Construction Phase	50 feet (dBA)	100 feet (dBA)	200 feet (dBA)	400 feet (dBA)	1 mile (dBA)	2 miles (dBA)
Clearing	88	82	76	70	48	42
Excavation	90	84	78	72	50	44
Foundation	89	83	77	71	49	43
Erection	84	78	72	66	44	38
Finishing	89	83	77	71	49	43

X.5.2 Operations

A noise model of the proposed Facility was developed using source input levels derived from data supplied by manufacturers, or information found in the technical literature. The noise levels presented represent the anticipated steady-state level from the Facility with essentially all equipment operating.

Standard acoustical engineering methods were used in the noise analysis. The noise model, CADNA/A by DataKustik GmbH of Munich, Germany, is a sophisticated device that enables one to fully model complex industrial plants. The sound propagation factors used in the model have been adopted from ISO 9613-2 *Acoustics—Sound Attenuation During Propagation Outdoors*. Atmospheric absorption was estimated for conditions of 10 degrees Celsius (°C) and 70 percent relative humidity (conditions that favor propagation) and computed in accordance with ISO 9613-1. The model divides the proposed Facility into a list of individual noise sources representing each piece of equipment that produces a significant amount of noise. The sound power levels representing the standard performance of each of these components are assigned based on data supplied by manufacturers or information found in the technical literature. Using these sound power levels as a basis, the model calculates the sound pressure level that would occur at each receptor from each source after losses from distance, air absorption and other factors are considered. The sum of all these individual levels is the total plant level at the modeling point.

The sound power levels used in the model are summarized in Table X-6. As noted above, sound power level data are used in acoustic models to predict sound pressure levels. This is because sound power levels take into account the size of the acoustical source and account for the total acoustical energy emitted by the source. The approximate sound pressure level at 50 and 400

feet, the sound level one would measure or hear, is identified in Table X-6. When compared to sounds from other nearby sources, such as a diesel truck traveling at 50 miles per hour on Interstate 84 (approximately 80 dBA at 50 feet per Table X-2), the equipment proposed at this Facility is substantially quieter.

As is typical at this stage of a project, these data are preliminary and detailed vendor specifications will ultimately be developed to ensure the Facility complies with the conditions of certification.

Table X-6. Sound Power Levels Used to Model the Facility

Plant Component	Sound Pressure Level at 50 feet (dBA)	Sound Pressure Level at 400 feet (dBA)	*Sound Power Level (dBA)*
Inverter	58	39	*92*
Transformer	64	45	*97*

Given the low level of sound emitted from Facility components and the vast distance to the closest residence (over 2 miles), the predicted sound levels attributable to Facility operations with all equipment operating simultaneously is less than 20 dBA. This is an extraordinarily low sound level that is not expected to be discernible at the residences, particularly given that traffic on the adjacent Interstate 84 represents a more substantial source of noise than the proposed Facility. Noise generated during the testing and commissioning phase of the Facility is not expected to be substantially different from that produced during normal full-load operation.

A sound level of 20 dBA is extremely low, similar to that of a recording studio. If the ambient degradation standard (OAR 340-035-0035(1)(b)(B)(i)) is considered applicable to such levels, in order for a sound level of 20 dBA to exceed the 10 dBA incremental threshold, the existing level at the "appropriate measurement points" on "noise-sensitive property" would have to be less than 10 dBA. An ambient level of 10 dBA is even quieter than a recording studio and special instrumentation is required to reliably measure levels of this low magnitude. Areas where the sound levels are consistently less than 20 dBA are rare and tend to be concentrated in National Parks or similarly remote landscapes. As the Facility is not in an acoustically pristine area and is in fact adjacent to an Interstate Highway, it can be very reasonably concluded that the ambient level exceeds 10 dBA and the Facility will comply with OAR 340-035-0035.

X.5.3 Transmission Line

Corona is the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware because of very high electric field strength. Corona may result in audible noise produced by the transmission lines. The amount of corona produced by an overhead transmission line is a function of the voltage of the line, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors and hardware, and the local weather conditions. Power flow does not affect the amount of corona produced by a transmission line. Corona is generally a design concern with transmission lines of 345 kV and higher. The Applicant is proposing a 115-kV transmission line, which is not a substantial source of corona noise to start. As discussed in Exhibit AA, the proposed 115-kV line would parallel an existing 230-kV transmission line owned by Portland General Electric and both lines are more than 1 mile from the closest residences. The proposed addition of the 115-kV line is not predicted to result in a discernible increase in corona-related noise.

To reach this conclusion, the Applicant modeled the existing 230-kV line, the proposed 115-kV line, and the combined 230- and 115-kV line. Model results are summarized in Table X-7 and show that the addition of the proposed line does not result an increase exceeding either "Table 8" or the ambient degradation standard ((OAR 340-035-0035(1)(b)(B)(i))) at the right-of-way (ROW). Given there is no exceedance at the ROW, there will be no exceedance at the closest "appropriate measurement points" on "noise-sensitive property," which is over 1-mile away. Thus, it can be very reasonably concluded that the transmission line complies with OAR 340-035-0035.

Table X-7. Calculated Corona Audible Noise Values for 115-kV Overhead Transmission Line

	Left/West ROW Edge (50 ft) (dBA)	Maximum (dBA)	Right/East ROW Edge (50 ft) (dBA)
Case 1 – Existing 230-kV Transmission Line without Proposed 115-kV Line			
Fair Weather	10	19	15
Wet Weather	38	48	43
Case 2 – Proposed 115-kV Transmission Line without Existing, Adjacent 230-kV Line			
Fair Weather	0.0	0.0	0
Wet Weather	15	19	15
Case 3 – Proposed Transmission Line with Existing, Adjacent 230-kV Line			
Fair Weather	10	19	15
Wet Weather	38	48	43

X.6 PROPOSED MITIGATION MEASURES

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.*

Response: The Applicant proposes to employ the equipment selection and specification criteria necessary to ensure compliance with the Oregon noise standards (OAR 340-035-0035). While the Facility is anticipated to operate in compliance with the Oregon noise standards without unusual noise mitigation measures, the Applicant has many measures available to ensure compliance is achieved during detailed design. Such measures include specifying quieter equipment (when available) and installing improved acoustical enclosures or barriers. Therefore, no significant noise impacts from the operations are anticipated and no additional mitigation is planned.

X.7 PROPOSED MONITORING MEASURES

OAR 345-021-0010(1)(x)(D*) *Any measures the applicant proposes to monitor noise generated by operation of the facility.*

Response: Given the greater-than-2-mile distance to the closest noise-sensitive areas from the Facility's primary noise sources, the proximity of Interstate 84, and the low level of noise associated with solar equipment and the 115-kV line, the Applicant intends to monitor noise only in response to a legitimate noise complaint.

X.8 NOISE-SENSITIVE PROPERTIES

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.*

Response: No noise-sensitive properties, as defined in OAR 340-035-0015, are located within 1 mile of the proposed site boundary. The Applicant's consultants reviewed aerial photography and conducted a field visit on November 16 and 17, 2016.

X.9 SUMMARY

The noise analysis presented in this Exhibit provides sufficient evidence to support a Council finding that Facility construction and operation can comply with applicable DEQ noise control standards in OAR 340-035-0035.

Specifically, the Applicant has provided information about the predicted noise levels during the Facility's construction and operations in accordance with OAR 345-021-0010(1)(x)(A), and included an analysis of the Facility's compliance with applicable DEQ noise regulations per OAR 345-021-0010(1)(x)(B). The Applicant has employed reasonable assumptions into its noise modeling analysis to demonstrate that the final Facility is capable of complying with the DEQ noise standard.

Accordingly, the Applicant has provided sufficient evidence to support an Energy Facility Siting Council finding that the Facility complies with applicable DEQ noise control standards in OAR 340-035-0035. The Applicant is committed to designing and operating the Facility in full compliance with the applicable requirements.

X.10 REFERENCES

CADNA/A Version 2017. DataKustik, GmbH, Munich, Germany. http://www.datakustik.de/frameset.php?lang=en.

California Department of Transportation (Caltrans). 2017. Loudness Comparison Chart (dBA). Accessed April 2017. http://www.dot.ca.gov/dist2/projects/sixer/loud.pdf.

U.S. Environmental Protection Agency (EPA). 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.

Figure

VICINITY MAP

LEGEND

- Noise-Sensitive Properties
- Facility Site Boundary
- Facilty Module Blocks
- Substation
- Facility Transmission Line
- Facility Perimeter Fence
- Facility Service Roads
- County

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Feet

FIGURE X-1
Noise-Sensitive Properties
Boardman Solar Energy Facility
Application for Site Certificate
Morrow and Gilliam Counties, Oregon

Invenergy
ch2m

EXHIBIT Y
CARBON DIOXIDE EMISSIONS

OAR 345-021-0010(1)(y)

Exhibit Y requires information about a base load gas plant, a non-base load power plant, or a nongenerating energy facility that emits carbon dioxide. Exhibit Y is not required for this application because Boardman Solar Energy LLC (Applicant) is not proposing to construct any facilities that emit carbon dioxide.

EXHIBIT Z
EVAPORATIVE COOLING TOWERS

OAR 345-021-0010(1)(z)

Exhibit Z requires information about evaporative cooling towers and cooling tower plumes. Exhibit Z is not required for this application because Boardman Solar Energy LLC (Applicant) is not proposing to construct an evaporative cooling tower.

EXHIBIT AA
ELECTRIC TRANSMISSION LINE

OAR 345-021-0010(1)(aa)
OAR 345-024-0090(1),(2)

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AA-4 Audible Noise Profile for 115-kV Single-Circuit, Monopole Support Structure with Existing Neighboring 230-kV Line

ATTACHMENTS

AA-1 Results of the EPRI Electric and Magnetic Fields Workstation: ENVIRO Program

OAR 345-021-0010(1)(aa) *If the proposed energy facility is a transmission line or has, as a related or supporting facility, a transmission line of any size:*

Response: The proposed Boardman Solar Energy Facility (Facility) will consist of approximately 75 megawatts (MW) of nominal and average electric generating capacity with an associated 2.1-mile-long, single-circuit, 115-kilovolt (kV) overhead transmission line that parallels an existing 230-kV transmission line. The Facility's projected maximum load of 75 MW is used in this Exhibit to calculate electric and magnetic fields (EMFs). The 115-kV transmission line will be installed from a new, proposed Facility substation to the point of interconnection with the existing electrical grid.

Collection cables will be located completely within the Facility. The cables will be underground and will not be accessible to the public. As such, these lines are not subject to the 9-kilovolt per meter (kV/m) standard found within OAR 345-024-0090 and modeling of the lines is not required to demonstrate compliance with the standard.

AA.1 ELECTRIC AND MAGNETIC FIELDS

OAR 345-021-0010(1)(aa)(A) *Information about the expected electric and magnetic fields (EMFs), including:*

AA.1.1 Distance from Transmission Line Centerline to Edge of Right-of-Way

(i) The distance in feet from the proposed center line of each proposed transmission line to the edge of the right-of-way.

Response: The right-of-way (ROW) will be 50 feet wide in each direction from the centerline of the proposed transmission line for a total of 100 feet in width.

AA.1.2 Types of Occupied Structures within 200 Feet of Proposed Transmission Line Centerline

(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.

(iii) The approximate distance in feet from the proposed center line to each structure identified in (A).

Response: There are no occupied structures within 200 feet on each side of the centerline of the proposed transmission line based on a desktop evaluation of the proposed route.

AA.1.3 Graphs of Electric and Magnetic Field Levels

(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.

Response:

AA.1.3.1 Overview of EMFs Produced by Transmission Lines

All electric utility wires and devices generate alternating EMFs. The earth itself generates steady state EMFs. The EMF produced by the alternating current (AC) electrical power system in the United States has a frequency of 60 hertz (Hz), meaning that the fields change from positive to negative and back to positive, 60 times per second.

In AC power systems, voltage swings positive to negative and back to positive, a 360-degree cycle, 60 times every second. Current follows the voltage, flowing forward, reversing direction, and returning to the forward direction, again a 360-degree cycle, 60 times every second. 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 the phase difference. However, when a person stands under a transmission line or over a buried circuit of underground lines, one conductor is always significantly closer and will most likely contribute a net uncancelled field at the person's location, assuming the three-phase currents are equal.

Electric Fields

Electric fields around transmission lines are produced by electrical charges, 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 electric field is inversely proportional to the distance a sensor is from the conductors, so that the electric field strength decreases as the distance from the conductor increases. For the proposed Facility's transmission line, the voltage and electric field alternate at a frequency of 60 Hz. The strength of the electric field is measured in units of kV/m. The voltage, and therefore the electric field, around a transmission line remains practically steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

Magnetic Fields

Magnetic fields around transmission lines are produced by the electrical load, or the amount of current flow through the conductors measured in terms of amperage. Like the electric field, the magnetic field alternates at a frequency of 60 Hz. The magnetic field strength is directly proportional to the amperage; that is, increased power flow results in increased amperage, which produces a stronger magnetic field. The magnetic field is inversely proportional to the sensor's distance from the conductors. Also, like the electric field, the magnetic field strength decreases as the distance from the conductor increases. Magnetic fields are expressed in units of milligauss (mG). However, unlike voltage, the amperage and therefore the magnetic field around a transmission line fluctuate hourly and daily as the amount of current flow varies. 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.

AA.1.3.2 EMF Calculations for 115-kV Overhead Transmission Line

The route that is being examined by Boardman Solar Energy LLC (Applicant) for connecting the 115-kV transmission line to an existing interconnection substation uses a typical monopole overhead structural configuration. The 100-foot ROW overall width is the same for the entire 2.1-mile length, and a single route is proposed by the Applicant that was modeled alone and

with the existing, adjacent 230-kV transmission line owned by Portland General Electric (PGE), whose centerline is 112.5 feet from the centerline of the proposed 115-kV transmission line.

Line Loads for EMF Calculation

Of importance to note is that any discussion of EMFs includes the assumptions used to calculate these fields. Of additional importance is that the EMF in the vicinity of the transmission lines varies with regard to line design, line loading, distance from the line, and other factors. The electric field depends on line voltage, which remains nearly constant for a transmission line in normal operation. The magnetic field is proportional to line loading (amperage), which varies as power generation is changed by the intensity of the Facility. Maximum magnetic fields are produced at the maximum (peak) conductor currents.

The 115-kV transmission line proposed in this study is rated for a nominal voltage of 115 kV measured phase to phase. The peak line loading value assumed for the single overhead circuit is 369.4 amperes per phase conductor based on the maximum line loading. Each phase conductor was modeled as an assumed single conductor of 795 thousand circular-mil aluminum-conductor-steel-reinforced "drake" with a diameter of 1.108 inches. The ground wire was modeled as an assumed single conductor of extra high strength "7/16EHS" with a diameter of 0.4356 inches.

Owing to the lack of available information concerning the existing, adjacent 230-kV transmission line, the existing 230-kV transmission line was modeled as a wooden H-frame design with single-phase conductors of 1,192 thousand circular-mil aluminum-conductor-steel-reinforced "bunting" with a diameter of 1.302 inches. The ground wires were assumed to be single conductors constructed of extra high strength "7/16EHS" with diameters of 0.4356 inches centered on top of the structure's poles. An amperage of 1,000 amperes per phase conductor was assumed for the existing line.

Calculation Methods

The calculation methods used for the analysis are provided in Chapter 7 of the *Transmission Line Reference Book, 200-kV and Above* (EPRI, 2005).

The software program used to model the transmission line, called "EMFWorkstation: ENVIRO (Version 3.52)," is a Windows-based model developed by the Electric Power Research Institute (EPRI). The EMF and corona results were calculated in the ENVIRO program, which uses the methodology developed by Bonneville Power Administration (BPA). Measurements of corona effects from many operating transmission lines were used to develop empirical equations that were programmed by BPA into a computer model called Corona. The Corona model was in turn programmed into the ENVIRO model to predict EMF and corona effects from transmission lines. The inputs and outputs (results) of the ENVIRO program are provided in Attachment AA-1.

To estimate the maximum fields, the calculations in the model are performed at mid-span where the conductors have sagged to their lowest point between structures (the estimated maximum sag point, or minimum ground clearance). These estimates are computed for a height of 3.3 feet (1 meter) above the ground on the proposed transmission line route. The actual magnetic field values vary, as load varies hourly, daily, seasonally, and as conductor sag changes with ambient temperature and where the receptor is located between the transmission structures (the magnetic fields will be less at the structures because the conductors will be higher off the ground). The levels shown represent the highest magnetic fields expected for the

proposed Facility. Average fields along the ground between poles, and over a year's time, will be considerably less than the peak values shown.

Results of 115-kV Overhead EMF Calculations

As stated in Section AA.1.3.2, a single route is proposed by the Applicant and was modeled alone and with the existing, adjacent 230-kV transmission line, whose centerline is 112.5 feet from the centerline of the proposed transmission line. Table AA-1 presents the calculated values of the EMF at the ROW edges for each case and the maximum calculated value.

Table AA-1. Electric and Magnetic Field Modeling Results for Proposed Overhead 115-kV Transmission Line

	Left/West ROW Edge (50 ft)	Maximum Calculated Field	Right/East ROW Edge (50 ft)
Case 1 – Existing 230-kV Transmission Line without Proposed 115-kV Line			
Electric Field (kV/m)	0.06	3.08	0.83
Magnetic Field (mG)	9.10	258.15	55.35
Case 2 – Proposed Transmission Line without Existing Adjacent 230-kV Line			
Electric Field (kV/m)	0.26	1.38	0.22
Magnetic Field (mG)	11.27	59.56	13.45
Case 3 – Proposed Transmission Line with Existing Adjacent 230-kV Line			
Electric Field (kV/m)	0.25	3.11	0.93
Magnetic Field (mG)	10.48	257.11	65.87

The maximum calculated magnetic field shown in Table AA-1 occurs at approximately 5 feet to the right (east) of the centerline of the proposed 115-kV overhead transmission line when modeled alone and 115 feet to the right (east) of the centerline when modeled with the existing, adjacent 230-kV transmission line. The maximum calculated electric field shown in Table AA-1 occurs approximately 10 feet to the right (east) when modeled alone and 135 feet to the right (east) of the centerline when modeled with the existing, adjacent 230-kV transmission line because of the structural configuration of the proposed 115-kV overhead transmission line.

The results are plotted on the graphs shown in Figures AA-1 and AA-2.

AA.1.3.3 Overview of Corona Audible Noise Produced by Transmission Lines

Corona is the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware because of very high electric field strength. Corona may result in audible noise being produced by the transmission lines.

The amount of corona produced by an overhead transmission line is a function of the voltage of the line, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors and hardware, and the local weather conditions. Power flow does not affect the amount of corona produced by a transmission line.

Corona also increases at higher elevations, where the atmosphere is less dense than at sea level. The 115-kV transmission line does not traverse high elevations. Accordingly, the effects of elevation are minimal and the line was modeled with an elevation of 300 feet (100 meters).

Raindrops, snow, fog, hoarfrost, and condensation accumulated on the conductor surface are also sources of surface irregularities that can increase corona. During fair weather, the number of these condensed water droplets or ice crystals is usually small and the corona effect is also small. However, during wet weather, the number of these sources increases (such as when raindrops stand on the conductor) and corona effects are therefore greater. During wet or foul weather conditions, the conductor will produce the greatest amount of corona noise. However, during heavy rain, the noise generated by the falling raindrops hitting the ground typically will be greater than the noise generated by corona and thus will mask the audible noise from the transmission line.

AA.1.3.4 Corona Audible Noise Calculations for 115-kV Overhead Transmission Line

The data needed to model audible noise include elevation and the same information needed to model EMF (voltage, number of circuits, and geometry of the conductors and the transmission structure itself). Audible noise does not vary with the amount of current flow. A single route is proposed by the Applicant and was modeled alone and with the existing, adjacent 230-kV transmission line whose centerline is 112.5 feet from the centerline of the proposed transmission line.

Calculation Methods

The audible noise from the proposed transmission line was predicted using EMF Workstation: ENVIRO (Version 3.52), the same program used for the EMF analyses. The results of the ENVIRO Program are provided in Attachment AA-1.

To estimate the maximum noise, the calculations in the model are performed at mid-span where the conductors have sagged to their lowest point between structures (the estimated maximum sag point, or minimum ground clearance). These estimates are computed for a height of 3.3 feet (1 meter) above the ground on the proposed transmission line route. Because the equations that predict audible noise were created from empirical measurements, the accuracy of the model is as good as these measurements that produced the original equations.

Results of 115-kV Overhead Corona Noise Calculations

As stated in Section AA.1.3.2, a single route is proposed by the Applicant that was modeled alone and with the existing, adjacent 230-kV transmission line, whose centerline is 112.5 feet from the centerline of the proposed transmission line. Table AA-2 presents the calculated levels of corona noise at the ROW edges for each case and the maximum calculated levels.

Table AA-2 also presents the anticipated levels of corona noise from the proposed 115-kV transmission line. Analysis results show that under the more typical fair-weather conditions, the maximum level of corona noise from the 115-kV transmission line is predicted to be less than 19 decibels on an A-weighted scale (dBA) when modeled with the existing, adjacent 230-kV transmission line. These levels are below the allowable statistical noise levels for new industrial and commercial noise sources found in Table 8 to OAR 340-035-0035. The results are plotted on the graph shown in Figures AA-3 and AA-4.

Table AA-2. Calculated Corona Audible Noise Values for 115-kV Overhead Transmission Line

	Distance from Centerline to 50 dBA (Left/West Side of Centerline) (ft)	Left/West ROW Edge (50 ft) (dBA)	Maximum (dBA)	Right/East ROW Edge (50 ft) (dBA)	Distance from Centerline to 50 dBA (Right/East Side of Centerline) (ft)
Case 1 – Existing 230-kV Transmission Line without Proposed 115-kV Line					
Fair Weather	N/A	10	19	15	N/A
Wet Weather	N/A	38	48	43	N/A
Case 2 – Proposed Transmission Line without Existing, Adjacent 230-kV Line					
Fair Weather	N/A	0.0	0.0	0	N/A
Wet Weather	N/A	15	19	15	N/A
Case 3 – Proposed Transmission Line with Existing, Adjacent 230-kV Line					
Fair Weather	N/A	10	19	15	N/A
Wet Weather	N/A	38	48	43	N/A

N/A = not applicable

AA.1.3.5 Measures Proposed to Reduce EMF Levels

(v) Any measures the applicant proposes to reduce electric or magnetic field levels.

Response: EMF levels will be reduced by the use of a delta configuration of the phase conductors. This arrangement brings the conductors close together and results in the most cancellation of magnetic fields.

AA.1.3.6 Assumptions and Methods Used in EMF Analyses

(vi) The assumptions and methods used in the electric and magnetic field analysis, including the current in amperes on each proposed transmission line.

Response: See Section AA.1.3.2. Attachment AA-1 shows the data inputs and assumptions used in the EMF, and the audible noise analysis conducted using the EPRI EMF Workstation: ENVIRO (Version 3.52) program.

AA.1.3.7 Monitoring Program

(vii) The applicant's proposed monitoring program, if any, for actual electric and magnetic field levels.

Response: The Applicant is not proposing to conduct a post-construction monitoring program for EMFs.

AA.2 ALTERNATING CURRENT ELECTRIC FIELDS

OAR 345-024-0090 *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;

Response: The electric fields calculated for the proposed 115-kV single-circuit transmission line do not exceed 9 kV per meter when modeled alone or with the existing, adjacent 230-kV transmission line. Figure AA-1 demonstrates that the maximum electric field modeled is less than 3.3 kV per meter, which is approximately one third of the 9-kV–per-meter standard set forth in OAR 345-024-0090(1).

AA.3 INDUCED VOLTAGE AND CURRENT

OAR 345-024-0090 *To issue a site certificate for a facility that includes any transmission line under Council jurisdiction, the Council must find that the applicant:*

(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.

Response: The Applicant has designed the transmission line so that induced currents will be as low as reasonably achievable. Below is an analysis of the risk of induced currents from the proposed overhead line.

AA.3.1 Induced Voltage

Voltage is the electrical pressure that pushes current through a conducting wire or object. An object such as a bird, person, vehicle, pipeline, or barbed-wire fence that is insulated from ground and in an electric field will possess an induced voltage. A bird flying through the field is safe because the induced voltage cannot make current flow through the bird, unless there is a conducting path for the current. Induced voltages can only be a hazard when the object is shorted to ground, allowing a path for current to flow. The conductivity of the air around the overhead conductor will determine the upper limit of the current that can flow when the object is shorted to ground.

A common induced voltage hazard occurs on wire fences that parallel overhead transmission lines. If the fence is ungrounded, it possesses the voltage of the net electric field of the overhead conductors at the location of the fence. A person touching such a fence becomes a conducting path for the current to flow to ground and will feel a momentary shock. The AC static voltage on the fence bleeds off quickly but can be annoying. This hazard is easily removed by bonding the fence wires along the length of the fence to grounding rods that are driven into the soil.

AA.3.2 Induced Current

Induced currents for 115-kV transmission lines are not a hazard to people because almost no voltage is involved. A current carrying conductor will induce a current to flow in another conductor that is parallel to it. Induced currents result from the net AC magnetic field. In the common case cited under Induced Voltage above, grounded fences create electrical loops in which induced currents can flow. The value of the induced current will depend on the magnetic field strength, the size, shape, and location of the conducting object, and the object-to-ground resistance.

Where possible, sufficient distance will be maintained between such facilities and the proposed transmission line to avoid induced current. Any metal fences that parallel and are close to a transmission line will be grounded to prevent electrical loops and circulating current from occurring.

AA.4 RADIO AND TV INTERFERENCE

OAR 345-021-0010(1)(aa)(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.*

Response: This OAR is not applicable. Radio and TV interference typically is not an issue for transmission lines 230 kV and lower, particularly when the line is at a low elevation such as this one. Overhead transmission lines of higher voltage or elevation can generate random corona radiation during wet weather as a result of raindrops on the wire or to a lesser amount in dry weather as a result of dust, insects, or sharp points on the conductors or suspension hardware that would result in radio and TV interference.

AA.5 SUMMARY

Based on the above information, the Applicant has satisfied the requirement of OAR 345-021-0010(1)(aa), and the Council may find that the standards contained in OAR 345-024-0090 have been satisfied.

AA.6 REFERENCE

Electric Power Research Institute (EPRI). 2005. *Transmission Line Reference Book, 200-kV and Above*. Third Edition.

Figures

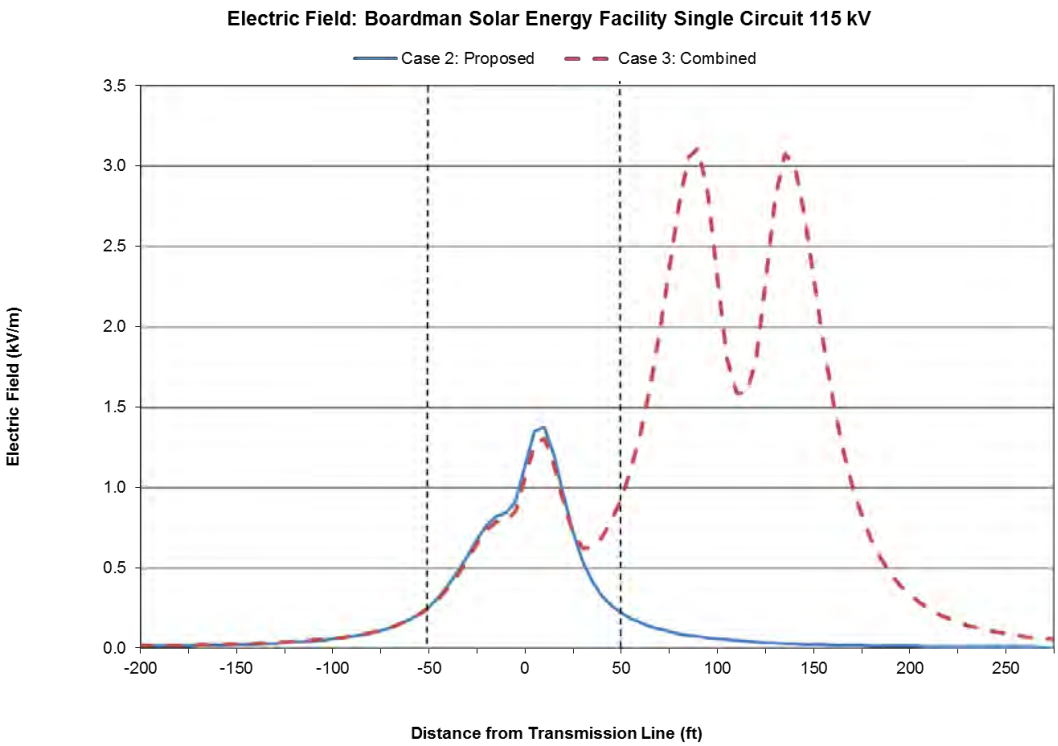

Figure AA-1. Electric Field Profile for 115-kV Single-Circuit, Monopole Support Structure

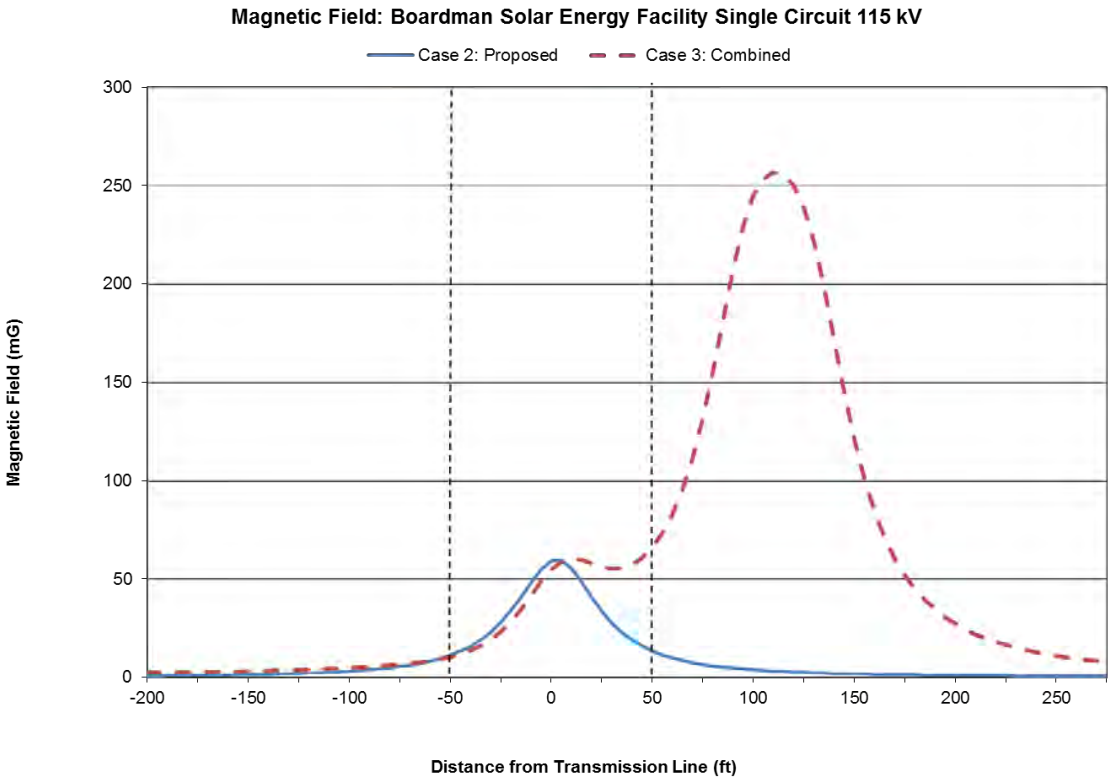

Figure AA-2. Magnetic Field Profile for 115-kV Single-Circuit, Monopole Support Structure

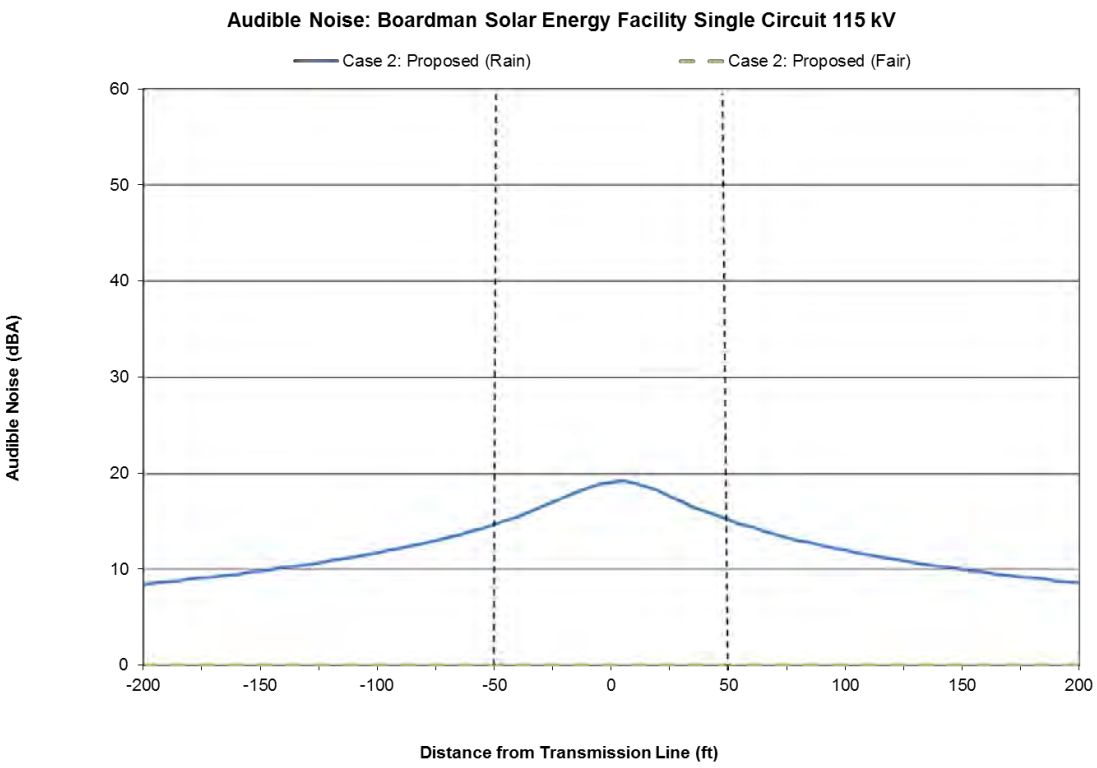

Figure AA-3. Audible Noise Profile for 115-kV Single-Circuit, Monopole Support Structure

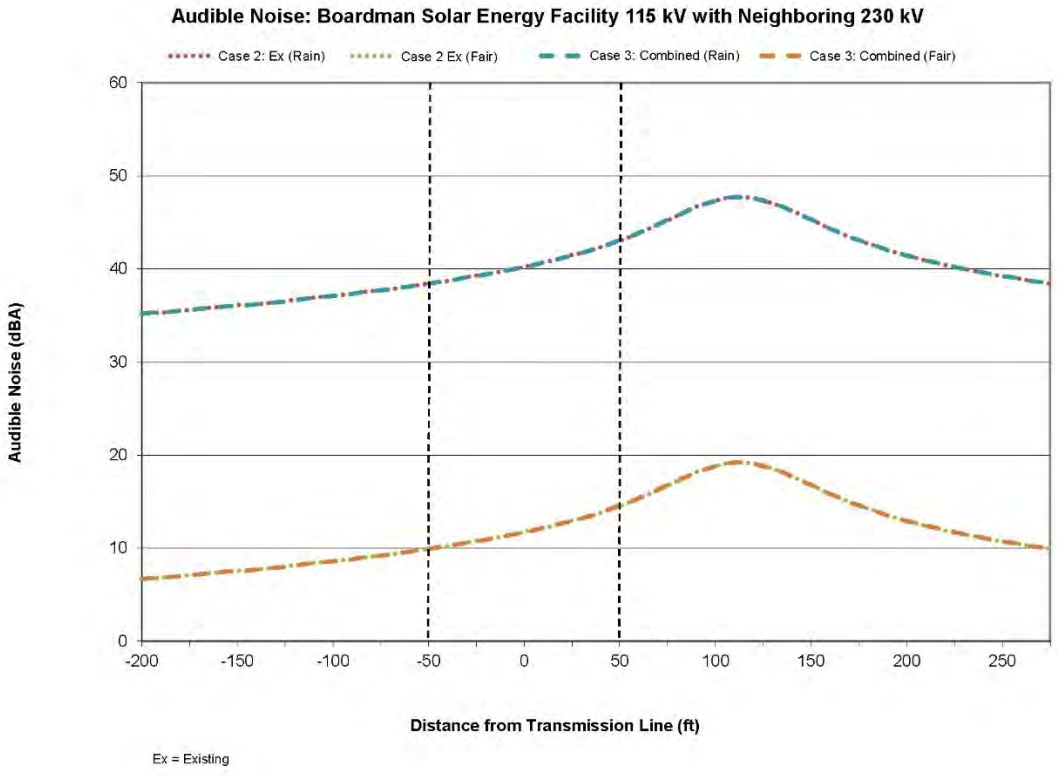

Figure AA-4. Audible Noise Profile for 115-kV Single-Circuit, Monopole Support Structure with Existing Neighboring 230-kV Line

Attachment AA-1
Results of the EPRI Electric and Magnetic Fields Workstation: ENVIRO Program

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\USERS\JKOSTA1\DESKTOP\EMF\INVENE~1\ITSAA004\ITSAA004.I01
DATE: ######## TIME: 9:36

Rev4 Ave ITS

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* BUNDLE INFORMAT *

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BNDL	CIR #	VOLTAGE	ANGLE	VOLTAGE #	CURRENT LOAD	# (kV)	ANGLE (DEG)	COORDINA OF	(AMPS)	X (DEG)	Y COND	(FT)	PHASE (FT)	
	1		1	0	0		0	0	0	1	102.8	32	GND	
	2		1	0	0		0	0	0	1	122.3	32	GND	
	3		1	230	0		1000	0	0	1	93	27	A	
	4		1	230	240		1000	120	0	1	112.5	27	B	
	5		1	230	120		1000	240	0	1	132	27	C	

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* MINIMUM GROUND CLEARANC = 27 FT. *

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* SUBCONDI INFORMAT - REGULAR BUNDLES *

****

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI	AC RESIST. (OHMS/MI	AC REACT.
3	1.302	0	0.0777	0.0805	0.382
4	1.302	0	0.0777	0.0805	0.382
5	1.302	0	0.0777	0.0805	0.382
1	0.435	0	4.61	4.74	1.28
2	0.435	0	4.61	4.74	1.28

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* MAXIMUN SURFACE GRADIENT (kV/cm) *

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BNDL	#	Type	ACrms	PEAK(+)	PEAK(-)
3	AC		13.28	18.78	-18.78
4	AC		14.22	20.11	-20.11
5	AC		13.28	18.78	-18.78
1	Ground	Wire	4.73	6.69	-6.69
2	Ground	Wire	4.73	6.69	-6.69

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* AC ELECTRIC FIELD PROFILE *

* at 3.28 feet above ground *

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LATERAL DISTANCE (feet)	MAXIMUM FIELD (meters)	MINOR/MA ELLIPSE (kV/m)	SPACE AXES (ratio)	VERTICAL (kV/m)	HORIZONT (kV/m)	POTENTIAL (kV)
-500	-152.4	0.002	0.002	0.002	0	0.002
-495	-150.88	0.002	0.002	0.002	0	0.002
-490	-149.35	0.002	0.002	0.002	0	0.002
-485	-147.83	0.002	0.002	0.002	0	0.002
-480	-146.3	0.002	0.003	0.002	0	0.002
-475	-144.78	0.002	0.003	0.002	0	0.002
-470	-143.26	0.002	0.003	0.002	0	0.002
-465	-141.73	0.002	0.003	0.002	0	0.002
-460	-140.21	0.002	0.003	0.002	0	0.002
-455	-138.68	0.002	0.003	0.002	0	0.002
-450	-137.16	0.002	0.003	0.002	0	0.002
-445	-135.64	0.002	0.003	0.002	0	0.002
-440	-134.11	0.002	0.003	0.002	0	0.002
-435	-132.59	0.002	0.003	0.002	0	0.002
-430	-131.06	0.002	0.003	0.002	0	0.002
-425	-129.54	0.002	0.003	0.002	0	0.002
-420	-128.02	0.002	0.003	0.002	0	0.002
-415	-126.49	0.003	0.003	0.003	0	0.003
-410	-124.97	0.003	0.003	0.003	0	0.003
-405	-123.44	0.003	0.003	0.003	0	0.003
-400	-121.92	0.003	0.003	0.003	0	0.003
-395	-120.4	0.003	0.003	0.003	0	0.003
-390	-118.87	0.003	0.003	0.003	0	0.003
-385	-117.35	0.003	0.003	0.003	0	0.003
-380	-115.82	0.003	0.003	0.003	0	0.003
-375	-114.3	0.003	0.003	0.003	0	0.003
-370	-112.78	0.003	0.003	0.003	0	0.003
-365	-111.25	0.003	0.003	0.003	0	0.003
-360	-109.73	0.003	0.003	0.003	0	0.003
-355	-108.2	0.003	0.003	0.003	0	0.003
-350	-106.68	0.003	0.003	0.003	0	0.003
-345	-105.16	0.004	0.003	0.004	0	0.004
-340	-103.63	0.004	0.003	0.004	0	0.004
-335	-102.11	0.004	0.003	0.004	0	0.004
-330	-100.58	0.004	0.003	0.004	0	0.004
-325	-99.06	0.004	0.003	0.004	0	0.004
-320	-97.54	0.004	0.003	0.004	0	0.004
-315	-96.01	0.004	0.003	0.004	0	0.004
-310	-94.49	0.004	0.004	0.004	0	0.004
-305	-92.96	0.005	0.004	0.005	0	0.005
-300	-91.44	0.005	0.004	0.005	0	0.005
-295	-89.92	0.005	0.004	0.005	0	0.005
-290	-88.39	0.005	0.004	0.005	0	0.005
-285	-86.87	0.005	0.004	0.005	0	0.005
-280	-85.34	0.005	0.004	0.005	0	0.005
-275	-83.82	0.005	0.004	0.005	0	0.005
-270	-82.3	0.006	0.004	0.006	0	0.006
-265	-80.77	0.006	0.004	0.006	0	0.006
-260	-79.25	0.006	0.004	0.006	0	0.006
-255	-77.72	0.006	0.004	0.006	0	0.006
-250	-76.2	0.007	0.004	0.006	0	0.006
-245	-74.68	0.007	0.004	0.007	0	0.007
-240	-73.15	0.007	0.004	0.007	0	0.007
-235	-71.63	0.007	0.004	0.007	0	0.007

-230	-70.1	0.008	0.004	0.008	0	0.008
-225	-68.58	0.008	0.004	0.008	0	0.008
-220	-67.06	0.008	0.004	0.008	0	0.008
-215	-65.53	0.008	0.004	0.008	0	0.008
-210	-64.01	0.009	0.004	0.009	0	0.009
-205	-62.48	0.009	0.004	0.009	0	0.009
-200	-60.96	0.01	0.004	0.01	0	0.01
-195	-59.44	0.01	0.004	0.01	0	0.01
-190	-57.91	0.011	0.004	0.011	0	0.011
-185	-56.39	0.011	0.004	0.011	0	0.011
-180	-54.86	0.012	0.004	0.012	0	0.012
-175	-53.34	0.012	0.004	0.012	0	0.012
-170	-51.82	0.013	0.004	0.013	0	0.013
-165	-50.29	0.013	0.004	0.013	0	0.013
-160	-48.77	0.014	0.004	0.014	0	0.014
-155	-47.24	0.015	0.004	0.015	0	0.015
-150	-45.72	0.015	0.004	0.015	0.001	0.015
-145	-44.2	0.016	0.004	0.016	0.001	0.016
-140	-42.67	0.017	0.005	0.017	0.001	0.017
-135	-41.15	0.018	0.005	0.018	0.001	0.018
-130	-39.62	0.019	0.005	0.019	0.001	0.019
-125	-38.1	0.02	0.005	0.02	0.001	0.02
-120	-36.58	0.022	0.005	0.022	0.001	0.022
-115	-35.05	0.023	0.005	0.023	0.001	0.023
-110	-33.53	0.024	0.005	0.024	0.001	0.024
-105	-32	0.026	0.005	0.026	0.001	0.026
-100	-30.48	0.028	0.005	0.028	0.001	0.028
-95	-28.96	0.03	0.005	0.03	0.001	0.03
-90	-27.43	0.032	0.004	0.032	0.001	0.032
-85	-25.91	0.034	0.004	0.034	0.002	0.034
-80	-24.38	0.037	0.004	0.037	0.002	0.037
-75	-22.86	0.04	0.004	0.039	0.002	0.039
-70	-21.34	0.043	0.004	0.043	0.002	0.043
-65	-19.81	0.046	0.004	0.046	0.002	0.046
-60	-18.29	0.05	0.004	0.05	0.003	0.05
-55	-16.76	0.054	0.004	0.054	0.003	0.054
-50	-15.24	0.059	0.004	0.059	0.003	0.059
-45	-13.72	0.065	0.004	0.065	0.004	0.065
-40	-12.19	0.071	0.004	0.071	0.004	0.071
-35	-10.67	0.078	0.004	0.078	0.005	0.078
-30	-9.14	0.086	0.004	0.086	0.006	0.086
-25	-7.62	0.095	0.004	0.095	0.007	0.095
-20	-6.1	0.106	0.004	0.106	0.008	0.106
-15	-4.57	0.118	0.003	0.118	0.009	0.118
-10	-3.05	0.133	0.003	0.132	0.01	0.133
-5	-1.52	0.149	0.003	0.149	0.012	0.149
0	0	0.169	0.003	0.169	0.014	0.169
5	1.52	0.192	0.003	0.192	0.017	0.192
10	3.05	0.22	0.002	0.219	0.02	0.22
15	4.57	0.253	0.002	0.252	0.024	0.253
20	6.1	0.293	0.002	0.292	0.029	0.293
25	7.62	0.342	0.002	0.34	0.035	0.342
30	9.14	0.402	0.001	0.4	0.044	0.402
35	10.67	0.476	0.001	0.473	0.054	0.476
40	12.19	0.569	0.001	0.565	0.068	0.568
45	13.72	0.685	0	0.68	0.085	0.684
50	15.24	0.832	0	0.825	0.108	0.83
55	16.76	1.018	0.001	1.009	0.136	1.015
60	18.29	1.253	0.001	1.241	0.172	1.249
65	19.81	1.547	0.002	1.532	0.211	1.541

70	21.34	1.903	0.005	1.886	0.249	1.893
75	22.86	2.308	0.009	2.292	0.269	2.291
80	24.38	2.713	0.018	2.702	0.244	2.687
85	25.91	3.017	0.034	3.015	0.162	2.978
90	27.43	3.082	0.063	3.081	0.209	3.027
95	28.96	2.814	0.12	2.799	0.444	2.748
100	30.48	2.294	0.223	2.263	0.634	2.228
105	32	1.799	0.356	1.782	0.685	1.747
110	33.53	1.598	0.4	1.598	0.641	1.537
115	35.05	1.598	0.4	1.598	0.641	1.537
120	36.58	1.799	0.356	1.782	0.685	1.747
125	38.1	2.294	0.223	2.263	0.634	2.228
130	39.62	2.814	0.12	2.799	0.444	2.748
135	41.15	3.082	0.063	3.081	0.209	3.027
140	42.67	3.017	0.034	3.015	0.162	2.978
145	44.2	2.713	0.018	2.702	0.244	2.687
150	45.72	2.308	0.009	2.292	0.269	2.291
155	47.24	1.903	0.005	1.886	0.249	1.893
160	48.77	1.547	0.002	1.532	0.211	1.541
165	50.29	1.253	0.001	1.241	0.172	1.249
170	51.82	1.018	0.001	1.009	0.136	1.015
175	53.34	0.832	0	0.825	0.108	0.83
180	54.86	0.685	0	0.68	0.085	0.684
185	56.39	0.569	0.001	0.565	0.068	0.568
190	57.91	0.476	0.001	0.473	0.054	0.476
195	59.44	0.402	0.001	0.4	0.044	0.402
200	60.96	0.342	0.002	0.34	0.035	0.342
205	62.48	0.293	0.002	0.292	0.029	0.293
210	64.01	0.253	0.002	0.252	0.024	0.253
215	65.53	0.22	0.002	0.219	0.02	0.22
220	67.06	0.192	0.003	0.192	0.017	0.192
225	68.58	0.169	0.003	0.169	0.014	0.169
230	70.1	0.149	0.003	0.149	0.012	0.149
235	71.63	0.133	0.003	0.132	0.01	0.133
240	73.15	0.118	0.003	0.118	0.009	0.118
245	74.68	0.106	0.004	0.106	0.008	0.106
250	76.2	0.095	0.004	0.095	0.007	0.095
255	77.72	0.086	0.004	0.086	0.006	0.086
260	79.25	0.078	0.004	0.078	0.005	0.078
265	80.77	0.071	0.004	0.071	0.004	0.071
270	82.3	0.065	0.004	0.065	0.004	0.065
275	83.82	0.059	0.004	0.059	0.003	0.059
280	85.34	0.054	0.004	0.054	0.003	0.054
285	86.87	0.05	0.004	0.05	0.003	0.05
290	88.39	0.046	0.004	0.046	0.002	0.046
295	89.92	0.043	0.004	0.043	0.002	0.043
300	91.44	0.04	0.004	0.039	0.002	0.039
305	92.96	0.037	0.004	0.037	0.002	0.037
310	94.49	0.034	0.004	0.034	0.002	0.034
315	96.01	0.032	0.004	0.032	0.001	0.032
320	97.54	0.03	0.005	0.03	0.001	0.03
325	99.06	0.028	0.005	0.028	0.001	0.028
330	100.58	0.026	0.005	0.026	0.001	0.026
335	102.11	0.024	0.005	0.024	0.001	0.024
340	103.63	0.023	0.005	0.023	0.001	0.023
345	105.16	0.022	0.005	0.022	0.001	0.022
350	106.68	0.02	0.005	0.02	0.001	0.02
355	108.2	0.019	0.005	0.019	0.001	0.019
360	109.73	0.018	0.005	0.018	0.001	0.018
365	111.25	0.017	0.004	0.017	0.001	0.017

370	112.78	0.016	0.004	0.016	0.001	0.016
375	114.3	0.015	0.004	0.015	0.001	0.015
380	115.82	0.015	0.004	0.015	0	0.015
385	117.35	0.014	0.004	0.014	0	0.014
390	118.87	0.013	0.004	0.013	0	0.013
395	120.4	0.013	0.004	0.013	0	0.013
400	121.92	0.012	0.004	0.012	0	0.012
405	123.44	0.012	0.004	0.012	0	0.012
410	124.97	0.011	0.004	0.011	0	0.011
415	126.49	0.011	0.004	0.011	0	0.011
420	128.02	0.01	0.004	0.01	0	0.01
425	129.54	0.01	0.004	0.01	0	0.01
430	131.06	0.009	0.004	0.009	0	0.009
435	132.59	0.009	0.004	0.009	0	0.009
440	134.11	0.008	0.004	0.008	0	0.008
445	135.64	0.008	0.004	0.008	0	0.008
450	137.16	0.008	0.004	0.008	0	0.008
455	138.68	0.008	0.004	0.008	0	0.008
460	140.21	0.007	0.004	0.007	0	0.007
465	141.73	0.007	0.004	0.007	0	0.007
470	143.26	0.007	0.004	0.007	0	0.007
475	144.78	0.007	0.004	0.006	0	0.006
480	146.3	0.006	0.004	0.006	0	0.006
485	147.83	0.006	0.004	0.006	0	0.006
490	149.35	0.006	0.004	0.006	0	0.006
495	150.88	0.006	0.004	0.006	0	0.006
500	152.4	0.005	0.004	0.005	0	0.005

AC CURRENTS IN EACH BUNDLE:

BNDL #	AC CURRENTS (Amperes) REAL	IMAGINAR	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
3	1000	0	1000	93	27
4	-500	866.03	1000	112.5	27
5	-500	-866.03	1000	132	27
1	14.57	-20.5	25.15	102.75	32
2	6.67	20.48	21.54	122.25	32

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* MAGNETIC FIELD PROFILE *

* at 3.28 feet above ground *

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<---------- LATERAL DISTANCE (feet)	AC MAGNETIC FIELD ----------> MAJOR AXIS (meters)	MINOR/ MAJOR (mG)	VERTICAL COMP (RATIO)	HORIZONT COMP (mG)	RMS RESULTANT (mG)	(mG)
-500	-152.4	0.79	0.026	0.78	0.13	0.79
-495	-150.88	0.8	0.026	0.79	0.13	0.8
-490	-149.35	0.81	0.025	0.8	0.13	0.81

-485	-147.83	0.83	0.025	0.81	0.13	0.83
-480	-146.3	0.84	0.024	0.83	0.13	0.84
-475	-144.78	0.85	0.024	0.84	0.13	0.85
-470	-143.26	0.86	0.024	0.85	0.13	0.86
-465	-141.73	0.88	0.023	0.87	0.14	0.88
-460	-140.21	0.89	0.023	0.88	0.14	0.89
-455	-138.68	0.9	0.022	0.89	0.14	0.9
-450	-137.16	0.92	0.022	0.91	0.14	0.92
-445	-135.64	0.93	0.022	0.92	0.14	0.93
-440	-134.11	0.95	0.021	0.94	0.14	0.95
-435	-132.59	0.96	0.021	0.95	0.15	0.96
-430	-131.06	0.98	0.021	0.97	0.15	0.98
-425	-129.54	1	0.02	0.98	0.15	1
-420	-128.02	1.01	0.02	1	0.15	1.01
-415	-126.49	1.03	0.02	1.02	0.15	1.03
-410	-124.97	1.05	0.019	1.04	0.16	1.05
-405	-123.44	1.06	0.019	1.05	0.16	1.06
-400	-121.92	1.08	0.019	1.07	0.16	1.08
-395	-120.4	1.1	0.018	1.09	0.16	1.1
-390	-118.87	1.12	0.018	1.11	0.17	1.12
-385	-117.35	1.14	0.018	1.13	0.17	1.14
-380	-115.82	1.16	0.017	1.15	0.17	1.16
-375	-114.3	1.18	0.017	1.17	0.17	1.18
-370	-112.78	1.21	0.017	1.19	0.18	1.21
-365	-111.25	1.23	0.016	1.22	0.18	1.23
-360	-109.73	1.25	0.016	1.24	0.18	1.25
-355	-108.2	1.28	0.016	1.26	0.19	1.28
-350	-106.68	1.3	0.015	1.29	0.19	1.3
-345	-105.16	1.33	0.015	1.31	0.19	1.33
-340	-103.63	1.35	0.015	1.34	0.2	1.35
-335	-102.11	1.38	0.014	1.37	0.2	1.38
-330	-100.58	1.41	0.014	1.4	0.21	1.41
-325	-99.06	1.44	0.014	1.42	0.21	1.44
-320	-97.54	1.47	0.014	1.45	0.22	1.47
-315	-96.01	1.5	0.013	1.48	0.22	1.5
-310	-94.49	1.53	0.013	1.52	0.23	1.53
-305	-92.96	1.57	0.013	1.55	0.23	1.57
-300	-91.44	1.6	0.012	1.58	0.24	1.6
-295	-89.92	1.64	0.012	1.62	0.24	1.64
-290	-88.39	1.67	0.012	1.66	0.25	1.67
-285	-86.87	1.71	0.012	1.69	0.26	1.71
-280	-85.34	1.75	0.011	1.73	0.26	1.75
-275	-83.82	1.79	0.011	1.77	0.27	1.79
-270	-82.3	1.84	0.011	1.82	0.28	1.84
-265	-80.77	1.88	0.011	1.86	0.29	1.88
-260	-79.25	1.93	0.01	1.91	0.29	1.93
-255	-77.72	1.98	0.01	1.95	0.3	1.98
-250	-76.2	2.03	0.01	2	0.31	2.03
-245	-74.68	2.08	0.01	2.05	0.32	2.08
-240	-73.15	2.13	0.009	2.11	0.33	2.13
-235	-71.63	2.19	0.009	2.16	0.34	2.19
-230	-70.1	2.25	0.009	2.22	0.36	2.25
-225	-68.58	2.31	0.009	2.28	0.37	2.31
-220	-67.06	2.37	0.008	2.34	0.38	2.38
-215	-65.53	2.44	0.008	2.41	0.4	2.44
-210	-64.01	2.51	0.008	2.48	0.41	2.51
-205	-62.48	2.59	0.007	2.55	0.43	2.59
-200	-60.96	2.66	0.007	2.63	0.44	2.66
-195	-59.44	2.74	0.007	2.7	0.46	2.74
-190	-57.91	2.83	0.007	2.79	0.48	2.83

-185	-56.39	2.92	0.006	2.87	0.5	2.92
-180	-54.86	3.01	0.006	2.96	0.52	3.01
-175	-53.34	3.11	0.006	3.06	0.55	3.11
-170	-51.82	3.21	0.006	3.16	0.57	3.21
-165	-50.29	3.32	0.005	3.27	0.6	3.32
-160	-48.77	3.43	0.005	3.38	0.63	3.43
-155	-47.24	3.55	0.005	3.49	0.66	3.55
-150	-45.72	3.68	0.004	3.62	0.69	3.68
-145	-44.2	3.82	0.004	3.75	0.73	3.82
-140	-42.67	3.96	0.004	3.88	0.77	3.96
-135	-41.15	4.11	0.004	4.03	0.81	4.11
-130	-39.62	4.27	0.003	4.18	0.85	4.27
-125	-38.1	4.44	0.003	4.35	0.9	4.44
-120	-36.58	4.62	0.003	4.52	0.96	4.62
-115	-35.05	4.81	0.002	4.71	1.02	4.81
-110	-33.53	5.02	0.002	4.9	1.08	5.02
-105	-32	5.24	0.002	5.11	1.15	5.24
-100	-30.48	5.47	0.001	5.34	1.23	5.47
-95	-28.96	5.73	0.001	5.57	1.31	5.73
-90	-27.43	6	0	5.83	1.4	6
-85	-25.91	6.29	0	6.1	1.5	6.29
-80	-24.38	6.6	0.001	6.4	1.62	6.6
-75	-22.86	6.94	0.001	6.71	1.74	6.94
-70	-21.34	7.3	0.002	7.05	1.88	7.3
-65	-19.81	7.7	0.002	7.42	2.03	7.7
-60	-18.29	8.13	0.003	7.82	2.21	8.13
-55	-16.76	8.59	0.003	8.25	2.4	8.59
-50	-15.24	9.1	0.004	8.72	2.61	9.1
-45	-13.72	9.66	0.005	9.23	2.86	9.66
-40	-12.19	10.27	0.005	9.78	3.14	10.27
-35	-10.67	10.95	0.006	10.39	3.45	10.95
-30	-9.14	11.69	0.007	11.05	3.81	11.69
-25	-7.62	12.52	0.008	11.78	4.22	12.52
-20	-6.1	13.43	0.009	12.59	4.7	13.44
-15	-4.57	14.46	0.01	13.47	5.25	14.46
-10	-3.05	15.61	0.012	14.45	5.89	15.61
-5	-1.52	16.9	0.013	15.54	6.64	16.9
0	0	18.36	0.015	16.75	7.53	18.37
5	1.52	20.03	0.017	18.1	8.58	20.03
10	3.05	21.93	0.019	19.6	9.84	21.94
15	4.57	24.12	0.021	21.28	11.36	24.13
20	6.1	26.66	0.024	23.17	13.21	26.67
25	7.62	29.62	0.027	25.27	15.47	29.63
30	9.14	33.09	0.031	27.61	18.27	33.11
35	10.67	37.21	0.035	30.21	21.77	37.24
40	12.19	42.13	0.04	33.04	26.2	42.17
45	13.72	48.06	0.046	36.07	31.84	48.11
50	15.24	55.27	0.053	39.16	39.12	55.35
55	16.76	64.12	0.062	42.05	48.57	64.24
60	18.29	75.03	0.072	44.19	60.89	75.23
65	19.81	88.56	0.086	44.59	76.89	88.89
70	21.34	105.26	0.102	41.6	97.29	105.81
75	22.86	125.54	0.123	33.24	122.04	126.49
80	24.38	149.23	0.15	23.56	149.06	150.91
85	25.91	174.94	0.184	44.12	172.34	177.9
90	27.43	199.55	0.228	93.55	182.05	204.68
95	28.96	218.99	0.283	150.65	170.6	227.6
100	30.48	230.55	0.348	197.77	143.07	244.09
105	32	234.62	0.414	224.45	118.76	253.93
110	33.53	234.49	0.46	233.37	110.38	258.15

115	35.05	233.92	0.461	233.29	109.16	257.57
120	36.58	232.95	0.415	224.51	114.91	252.21
125	38.1	227.88	0.349	198.44	137.33	241.32
130	39.62	215.45	0.284	152.12	164.35	223.94
135	41.15	195.36	0.228	95.58	176.12	200.38
140	42.67	170.38	0.184	45.86	167.06	173.24
145	44.2	144.55	0.149	21.83	144.5	146.14
150	45.72	120.91	0.122	29.53	118.17	121.8
155	47.24	100.8	0.1	37.77	94	101.31
160	48.77	84.32	0.084	40.85	74.1	84.61
165	50.29	71.03	0.07	40.6	58.5	71.2
170	51.82	60.35	0.059	38.62	46.5	60.45
175	53.34	51.72	0.05	35.9	37.32	51.79
180	54.86	44.72	0.043	32.97	30.27	44.76
185	56.39	38.98	0.037	30.1	24.8	39
190	57.91	34.23	0.032	27.41	20.53	34.25
195	59.44	30.27	0.027	24.95	17.15	30.28
200	60.96	26.93	0.024	22.73	14.46	26.94
205	62.48	24.11	0.02	20.74	12.29	24.11
210	64.01	21.69	0.018	18.97	10.52	21.69
215	65.53	19.61	0.015	17.39	9.07	19.61
220	67.06	17.81	0.013	15.97	7.87	17.81
225	68.58	16.23	0.011	14.71	6.87	16.24
230	70.1	14.86	0.009	13.58	6.03	14.86
235	71.63	13.64	0.008	12.57	5.31	13.64
240	73.15	12.57	0.006	11.65	4.71	12.57
245	74.68	11.61	0.005	10.83	4.19	11.61
250	76.2	10.76	0.004	10.09	3.74	10.76
255	77.72	10	0.003	9.42	3.35	10
260	79.25	9.31	0.002	8.8	3.02	9.31
265	80.77	8.69	0.001	8.25	2.72	8.69
270	82.3	8.12	0	7.74	2.46	8.12
275	83.82	7.61	0.001	7.27	2.24	7.61
280	85.34	7.14	0.002	6.85	2.03	7.14
285	86.87	6.72	0.002	6.46	1.86	6.72
290	88.39	6.33	0.003	6.1	1.7	6.33
295	89.92	5.97	0.004	5.76	1.55	5.97
300	91.44	5.64	0.004	5.46	1.43	5.64
305	92.96	5.34	0.005	5.17	1.31	5.34
310	94.49	5.06	0.006	4.91	1.21	5.06
315	96.01	4.8	0.006	4.66	1.12	4.8
320	97.54	4.56	0.007	4.44	1.03	4.56
325	99.06	4.33	0.007	4.22	0.96	4.33
330	100.58	4.12	0.008	4.03	0.89	4.12
335	102.11	3.93	0.009	3.84	0.82	3.93
340	103.63	3.75	0.009	3.67	0.77	3.75
345	105.16	3.58	0.01	3.51	0.71	3.58
350	106.68	3.42	0.01	3.35	0.66	3.42
355	108.2	3.27	0.011	3.21	0.62	3.27
360	109.73	3.13	0.011	3.08	0.58	3.13
365	111.25	3	0.012	2.95	0.54	3
370	112.78	2.88	0.012	2.83	0.51	2.88
375	114.3	2.76	0.013	2.72	0.47	2.76
380	115.82	2.65	0.013	2.61	0.45	2.65
385	117.35	2.55	0.014	2.51	0.42	2.55
390	118.87	2.45	0.014	2.42	0.39	2.45
395	120.4	2.35	0.015	2.33	0.37	2.36
400	121.92	2.27	0.015	2.24	0.35	2.27
405	123.44	2.18	0.016	2.16	0.33	2.18
410	124.97	2.11	0.016	2.08	0.31	2.11

415	126.49	2.03	0.017	2.01	0.29	2.03
420	128.02	1.96	0.017	1.94	0.27	1.96
425	129.54	1.89	0.018	1.87	0.26	1.89
430	131.06	1.83	0.018	1.81	0.24	1.83
435	132.59	1.77	0.019	1.75	0.23	1.77
440	134.11	1.71	0.019	1.69	0.21	1.71
445	135.64	1.65	0.02	1.64	0.2	1.65
450	137.16	1.6	0.02	1.59	0.19	1.6
455	138.68	1.55	0.021	1.54	0.18	1.55
460	140.21	1.5	0.021	1.49	0.17	1.5
465	141.73	1.45	0.022	1.44	0.16	1.45
470	143.26	1.41	0.022	1.4	0.15	1.41
475	144.78	1.37	0.023	1.36	0.14	1.37
480	146.3	1.33	0.023	1.32	0.14	1.33
485	147.83	1.29	0.024	1.28	0.13	1.29
490	149.35	1.25	0.025	1.24	0.12	1.25
495	150.88	1.21	0.025	1.21	0.11	1.21
500	152.4	1.18	0.026	1.17	0.11	1.18

****
* *
* AUDIBLE NOISE *
* GENERATE ACOUSTIC POWER *
* (dB above 1uW/m) *
* *
****

L5 BNDL	L50 #	Type	Summer	Fair	RAIN	RAIN
3	AC		-80.91	-58.83	-70.21	
4	AC		-75.6	-55.52	-65.61	
5	AC		-80.91	-58.83	-70.21	
1	Ground	Wire	******	******	******	
2	Ground	Wire	******	******	******	

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* *
* AUDIBLE NOISE *
* *
* Microphor is 5 feet above ground *
* Altitude 0 ft *
* *
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<------ LATERAL DISTANCE (feet)	BPA FAIR WEATHER (meters)	METHOD L5 RAIN dB(A)	-------> L50 RAIN dB(A)	<- AVERAGE Ldn dB(A)	CRIEPI L5 FAIR dB(A)	--> L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ RAIN dB(A)	dB(A)
-500	-152.4	3.4	31.9	28.4	0	0	0	33	33.9	0
-495	-150.88	3.4	31.9	28.4	0	0	0	33	33.9	0
-490	-149.35	3.4	31.9	28.4	0	0	0	33	34	0
-485	-147.83	3.5	32	28.5	0	0	0	33.1	34	0
-480	-146.3	3.5	32	28.5	0	0	0	33.1	34.1	0
-475	-144.78	3.6	32.1	28.6	0	0	0	33.1	34.1	0
-470	-143.26	3.6	32.1	28.6	0	0	0	33.2	34.1	0
-465	-141.73	3.6	32.1	28.6	0	0	0	33.2	34.2	0
-460	-140.21	3.7	32.2	28.7	0	0	0	33.3	34.2	0

-455	-138.68	3.7	32.2	28.7	0	0	0	33.3	34.2	0
-450	-137.16	3.8	32.3	28.8	0	0	0	33.3	34.3	0
-445	-135.64	3.8	32.3	28.8	0	0	0	33.4	34.3	0
-440	-134.11	3.9	32.4	28.9	0	0	0	33.4	34.4	0
-435	-132.59	3.9	32.4	28.9	0	0	0	33.4	34.4	0
-430	-131.06	4	32.5	29	0	0	0	33.5	34.4	0
-425	-129.54	4	32.5	29	0	0	0	33.5	34.5	0
-420	-128.02	4.1	32.5	29.1	0	0	0	33.6	34.5	0
-415	-126.49	4.1	32.6	29.1	0	0	0	33.6	34.6	0
-410	-124.97	4.1	32.6	29.1	0	0	0	33.6	34.6	0
-405	-123.44	4.2	32.7	29.2	0	0	0	33.7	34.6	0
-400	-121.92	4.2	32.7	29.2	0	0	0	33.7	34.7	0
-395	-120.4	4.3	32.8	29.3	0	0	0	33.8	34.7	0
-390	-118.87	4.3	32.8	29.3	0	0	0	33.8	34.8	0
-385	-117.35	4.4	32.9	29.4	0	0	0	33.9	34.8	0
-380	-115.82	4.4	32.9	29.4	0	0	0	33.9	34.9	0
-375	-114.3	4.5	33	29.5	0	0	0	33.9	34.9	0
-370	-112.78	4.5	33	29.5	0	0	0	34	34.9	0
-365	-111.25	4.6	33.1	29.6	0	0	0	34	35	0
-360	-109.73	4.6	33.1	29.6	0	0	0	34.1	35	0
-355	-108.2	4.7	33.2	29.7	0	0	0	34.1	35.1	0
-350	-106.68	4.7	33.2	29.7	0	0	0	34.2	35.1	0
-345	-105.16	4.8	33.3	29.8	0	0	0	34.2	35.2	0
-340	-103.63	4.9	33.4	29.9	0	0	0	34.3	35.2	0
-335	-102.11	4.9	33.4	29.9	0	0	0	34.3	35.3	0
-330	-100.58	5	33.5	30	0	0	0	34.4	35.3	0
-325	-99.06	5	33.5	30	0	0	0	34.4	35.4	0
-320	-97.54	5.1	33.6	30.1	0	0	0	34.5	35.4	0
-315	-96.01	5.1	33.6	30.1	0	0	0	34.5	35.5	0
-310	-94.49	5.2	33.7	30.2	0	0	0	34.6	35.5	0
-305	-92.96	5.3	33.8	30.3	0	0	0	34.6	35.6	0
-300	-91.44	5.3	33.8	30.3	0	0	0	34.7	35.6	0
-295	-89.92	5.4	33.9	30.4	0	0	0	34.7	35.7	0
-290	-88.39	5.4	33.9	30.4	0	0	0	34.8	35.7	0
-285	-86.87	5.5	34	30.5	0	0	0	34.8	35.8	0
-280	-85.34	5.6	34.1	30.6	0	0	0	34.9	35.8	0
-275	-83.82	5.6	34.1	30.6	0	0	0	34.9	35.9	0
-270	-82.3	5.7	34.2	30.7	0	0	0	35	36	0
-265	-80.77	5.8	34.3	30.8	0	0	0	35.1	36	0
-260	-79.25	5.8	34.3	30.8	0	0	0	35.1	36.1	0
-255	-77.72	5.9	34.4	30.9	0	0	0	35.2	36.1	0
-250	-76.2	6	34.5	31	0	0	0	35.2	36.2	0
-245	-74.68	6	34.5	31	0	0	0	35.3	36.2	0
-240	-73.15	6.1	34.6	31.1	0	0	0	35.4	36.3	0
-235	-71.63	6.2	34.7	31.2	0	0	0	35.4	36.4	0
-230	-70.1	6.2	34.7	31.2	0	0	0	35.5	36.4	0
-225	-68.58	6.3	34.8	31.3	0	0	0	35.5	36.5	0
-220	-67.06	6.4	34.9	31.4	0	0	0	35.6	36.6	0
-215	-65.53	6.5	35	31.5	0	0	0	35.7	36.6	0
-210	-64.01	6.5	35	31.5	0	0	0	35.7	36.7	0
-205	-62.48	6.6	35.1	31.6	0	0	0	35.8	36.8	0
-200	-60.96	6.7	35.2	31.7	0	0	0	35.9	36.8	0
-195	-59.44	6.8	35.3	31.8	0	0	0	35.9	36.9	0
-190	-57.91	6.8	35.3	31.8	0	0	0	36	37	0
-185	-56.39	6.9	35.4	31.9	0	0	0	36.1	37	0
-180	-54.86	7	35.5	32	0	0	0	36.2	37.1	0
-175	-53.34	7.1	35.6	32.1	0	0	0	36.2	37.2	0
-170	-51.82	7.2	35.7	32.2	0	0	0	36.3	37.3	0
-165	-50.29	7.3	35.8	32.3	0	0	0	36.4	37.3	0
-160	-48.77	7.4	35.9	32.4	0	0	0	36.5	37.4	0

-155	-47.24	7.5	36	32.5	0	0	0	36.6	37.5	0
-150	-45.72	7.5	36	32.5	0	0	0	36.6	37.6	0
-145	-44.2	7.6	36.1	32.6	0	0	0	36.7	37.7	0
-140	-42.67	7.7	36.2	32.7	0	0	0	36.8	37.8	0
-135	-41.15	7.8	36.3	32.8	0	0	0	36.9	37.8	0
-130	-39.62	7.9	36.4	32.9	0	0	0	37	37.9	0
-125	-38.1	8	36.5	33	0	0	0	37.1	38	0
-120	-36.58	8.1	36.6	33.1	0	0	0	37.2	38.1	0
-115	-35.05	8.3	36.8	33.3	0	0	0	37.3	38.2	0
-110	-33.53	8.4	36.9	33.4	0	0	0	37.4	38.3	0
-105	-32	8.5	37	33.5	0	0	0	37.5	38.4	0
-100	-30.48	8.6	37.1	33.6	0	0	0	37.6	38.5	0
-95	-28.96	8.7	37.2	33.7	0	0	0	37.7	38.6	0
-90	-27.43	8.8	37.3	33.8	0	0	0	37.8	38.7	0
-85	-25.91	9	37.5	34	0	0	0	37.9	38.8	0
-80	-24.38	9.1	37.6	34.1	0	0	0	38	38.9	0
-75	-22.86	9.2	37.7	34.2	0	0	0	38.1	39	0
-70	-21.34	9.3	37.8	34.3	0	0	0	38.2	39.2	0
-65	-19.81	9.5	38	34.5	0	0	0	38.3	39.3	0
-60	-18.29	9.6	38.1	34.6	0	0	0	38.5	39.4	0
-55	-16.76	9.8	38.3	34.8	0	0	0	38.6	39.5	0
-50	-15.24	9.9	38.4	34.9	0	0	0	38.7	39.7	0
-45	-13.72	10.1	38.6	35.1	0	0	0	38.8	39.8	0
-40	-12.19	10.2	38.7	35.2	0	0	0	39	39.9	0
-35	-10.67	10.4	38.9	35.4	0	0	0	39.1	40.1	0
-30	-9.14	10.6	39.1	35.6	0	0	0	39.3	40.2	0
-25	-7.62	10.7	39.2	35.7	0	0	0	39.4	40.4	0
-20	-6.1	10.9	39.4	35.9	0	0	0	39.6	40.5	0
-15	-4.57	11.1	39.6	36.1	0	0	0	39.8	40.7	0
-10	-3.05	11.3	39.8	36.3	0	0	0	39.9	40.9	0
-5	-1.52	11.5	40	36.5	0	0	0	40.1	41.1	0
0	0	11.7	40.2	36.7	0	0	0	40.3	41.3	0
5	1.52	11.9	40.4	36.9	0	0	0	40.5	41.4	0
10	3.05	12.2	40.7	37.2	0	0	0	40.7	41.7	0
15	4.57	12.4	40.9	37.4	0	0	0	40.9	41.9	0
20	6.1	12.7	41.2	37.7	0	0	0	41.1	42.1	0
25	7.62	12.9	41.4	37.9	0	0	0	41.4	42.3	0
30	9.14	13.2	41.7	38.2	0	0	0	41.6	42.6	0
35	10.67	13.5	42	38.5	0	0	0	41.9	42.8	0
40	12.19	13.9	42.4	38.9	0	0	0	42.2	43.1	0
45	13.72	14.2	42.7	39.2	0	0	0	42.5	43.4	0
50	15.24	14.6	43.1	39.6	0	0	0	42.8	43.7	0
55	16.76	14.9	43.4	39.9	0	0	0	43.1	44.1	0
60	18.29	15.4	43.9	40.4	0	0	0	43.5	44.4	0
65	19.81	15.8	44.3	40.8	0	0	0	43.9	44.8	0
70	21.34	16.3	44.8	41.3	0	0	0	44.3	45.2	0
75	22.86	16.8	45.3	41.8	0	0	0	44.7	45.7	0
80	24.38	17.2	45.7	42.2	0	0	0	45.2	46.1	0
85	25.91	17.7	46.2	42.7	0	0	0	45.6	46.5	0
90	27.43	18.2	46.7	43.2	0	0	0	45.9	46.9	0
95	28.96	18.5	47	43.5	0	0	0	46.3	47.2	0
100	30.48	18.8	47.3	43.8	0	0	0	46.5	47.5	0
105	32	19.1	47.6	44.1	0	0	0	46.7	47.6	0
110	33.53	19.2	47.7	44.2	0	0	0	46.8	47.7	0
115	35.05	19.2	47.7	44.2	0	0	0	46.8	47.7	0
120	36.58	19.1	47.6	44.1	0	0	0	46.7	47.6	0
125	38.1	18.8	47.3	43.8	0	0	0	46.5	47.5	0
130	39.62	18.5	47	43.5	0	0	0	46.3	47.2	0
135	41.15	18.2	46.7	43.2	0	0	0	45.9	46.9	0
140	42.67	17.7	46.2	42.7	0	0	0	45.6	46.5	0

145	44.2	17.2	45.7	42.2	0	0	0	45.2	46.1	0
150	45.72	16.8	45.3	41.8	0	0	0	44.7	45.7	0
155	47.24	16.3	44.8	41.3	0	0	0	44.3	45.2	0
160	48.77	15.8	44.3	40.8	0	0	0	43.9	44.8	0
165	50.29	15.4	43.9	40.4	0	0	0	43.5	44.4	0
170	51.82	14.9	43.4	39.9	0	0	0	43.1	44.1	0
175	53.34	14.6	43.1	39.6	0	0	0	42.8	43.7	0
180	54.86	14.2	42.7	39.2	0	0	0	42.5	43.4	0
185	56.39	13.9	42.4	38.9	0	0	0	42.2	43.1	0
190	57.91	13.5	42	38.5	0	0	0	41.9	42.8	0
195	59.44	13.2	41.7	38.2	0	0	0	41.6	42.6	0
200	60.96	12.9	41.4	37.9	0	0	0	41.4	42.3	0
205	62.48	12.7	41.2	37.7	0	0	0	41.1	42.1	0
210	64.01	12.4	40.9	37.4	0	0	0	40.9	41.9	0
215	65.53	12.2	40.7	37.2	0	0	0	40.7	41.7	0
220	67.06	11.9	40.4	36.9	0	0	0	40.5	41.4	0
225	68.58	11.7	40.2	36.7	0	0	0	40.3	41.3	0
230	70.1	11.5	40	36.5	0	0	0	40.1	41.1	0
235	71.63	11.3	39.8	36.3	0	0	0	39.9	40.9	0
240	73.15	11.1	39.6	36.1	0	0	0	39.8	40.7	0
245	74.68	10.9	39.4	35.9	0	0	0	39.6	40.5	0
250	76.2	10.7	39.2	35.7	0	0	0	39.4	40.4	0
255	77.72	10.6	39.1	35.6	0	0	0	39.3	40.2	0
260	79.25	10.4	38.9	35.4	0	0	0	39.1	40.1	0
265	80.77	10.2	38.7	35.2	0	0	0	39	39.9	0
270	82.3	10.1	38.6	35.1	0	0	0	38.8	39.8	0
275	83.82	9.9	38.4	34.9	0	0	0	38.7	39.7	0
280	85.34	9.8	38.3	34.8	0	0	0	38.6	39.5	0
285	86.87	9.6	38.1	34.6	0	0	0	38.5	39.4	0
290	88.39	9.5	38	34.5	0	0	0	38.3	39.3	0
295	89.92	9.3	37.8	34.3	0	0	0	38.2	39.2	0
300	91.44	9.2	37.7	34.2	0	0	0	38.1	39	0
305	92.96	9.1	37.6	34.1	0	0	0	38	38.9	0
310	94.49	9	37.5	34	0	0	0	37.9	38.8	0
315	96.01	8.8	37.3	33.8	0	0	0	37.8	38.7	0
320	97.54	8.7	37.2	33.7	0	0	0	37.7	38.6	0
325	99.06	8.6	37.1	33.6	0	0	0	37.6	38.5	0
330	100.58	8.5	37	33.5	0	0	0	37.5	38.4	0
335	102.11	8.4	36.9	33.4	0	0	0	37.4	38.3	0
340	103.63	8.3	36.8	33.3	0	0	0	37.3	38.2	0
345	105.16	8.1	36.6	33.1	0	0	0	37.2	38.1	0
350	106.68	8	36.5	33	0	0	0	37.1	38	0
355	108.2	7.9	36.4	32.9	0	0	0	37	37.9	0
360	109.73	7.8	36.3	32.8	0	0	0	36.9	37.8	0
365	111.25	7.7	36.2	32.7	0	0	0	36.8	37.8	0
370	112.78	7.6	36.1	32.6	0	0	0	36.7	37.7	0
375	114.3	7.5	36	32.5	0	0	0	36.6	37.6	0
380	115.82	7.5	36	32.5	0	0	0	36.6	37.5	0
385	117.35	7.4	35.9	32.4	0	0	0	36.5	37.4	0
390	118.87	7.3	35.8	32.3	0	0	0	36.4	37.3	0
395	120.4	7.2	35.7	32.2	0	0	0	36.3	37.3	0
400	121.92	7.1	35.6	32.1	0	0	0	36.2	37.2	0
405	123.44	7	35.5	32	0	0	0	36.2	37.1	0
410	124.97	6.9	35.4	31.9	0	0	0	36.1	37	0
415	126.49	6.8	35.3	31.8	0	0	0	36	37	0
420	128.02	6.8	35.3	31.8	0	0	0	35.9	36.9	0
425	129.54	6.7	35.2	31.7	0	0	0	35.9	36.8	0
430	131.06	6.6	35.1	31.6	0	0	0	35.8	36.8	0
435	132.59	6.5	35	31.5	0	0	0	35.7	36.7	0
440	134.11	6.5	35	31.5	0	0	0	35.7	36.6	0

445	135.64	6.4	34.9	31.4	0	0	0	35.6	36.6	0
450	137.16	6.3	34.8	31.3	0	0	0	35.5	36.5	0
455	138.68	6.2	34.7	31.2	0	0	0	35.5	36.4	0
460	140.21	6.2	34.7	31.2	0	0	0	35.4	36.4	0
465	141.73	6.1	34.6	31.1	0	0	0	35.4	36.3	0
470	143.26	6	34.5	31	0	0	0	35.3	36.2	0
475	144.78	6	34.5	31	0	0	0	35.2	36.2	0
480	146.3	5.9	34.4	30.9	0	0	0	35.2	36.1	0
485	147.83	5.8	34.3	30.8	0	0	0	35.1	36.1	0
490	149.35	5.8	34.3	30.8	0	0	0	35.1	36	0
495	150.88	5.7	34.2	30.7	0	0	0	35	36	0
500	152.4	5.6	34.1	30.6	0	0	0	34.9	35.9	0

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions If a prediction method does not apply, the appropriat output data column will be zeros.

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\USERS\JKOSTA1\DESKTOP\EMF\INVENE~1\ITSAA003\ITSAA003.I01
DATE: ######## TIME: 9:27

Rev3 Ave ITS

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* BUNDLE INFORMAT *

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BNDL	CIR #	VOLTAGE	ANGLE	VOLTAGE #	CURRENT # LOAD	ANGLE	COORDINA OF	X	Y	COND	PHASE		
				(kV)	(AMPS)	(DEG)		(FT)	(FT)				
1		1	0	0	0	0	1	0	41		GND		
2		1	115	0	369.4	0	1	6	35		A		
3		1	115	240	369.4	120	1	-6	29		B		
4		1	115	120	369.4	240	1	6	23		C		

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* MINIMUM GROUND CLEARANC = 23 FT. *

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* SUBCONDI INFORMAT - REGULAR BUNDLES *

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BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI	AC RESIST. (OHMS/MI	AC REACT.
2	1.108	0	0.1152	0.117	0.399	
3	1.108	0	0.1152	0.117	0.399	
4	1.108	0	0.1152	0.117	0.399	
1	0.435	0	4.61	4.74	1.28	

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* MAXIMUN SURFACE GRADIENT (kV/cm) *

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BNDL	#	Type	ACrms	PEAK(+)	PEAK(-)
2	AC		8.52	12.04	-12.04
3	AC		8.32	11.77	-11.77
4	AC		8.54	12.07	-12.07
1	Ground	Wire	2.19	3.1	-3.1

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* AC ELECTRIC FIELD PROFILE *

* at 3.28 feet above ground *

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LATERAL MAXIMUN MINOR/MA SPACE

DISTANCE (feet)	FIELD (meters)	ELLIPSE (kV/m)	AXES (ratio)	VERTICAL (kV/m)	HORIZONT (kV/m)	POTENTIAL (kV)
-500	-152.4	0.002	0.001	0.002	0	0.002
-495	-150.88	0.002	0.002	0.002	0	0.002
-490	-149.35	0.002	0.002	0.002	0	0.002
-485	-147.83	0.002	0.002	0.002	0	0.002
-480	-146.3	0.002	0.002	0.002	0	0.002
-475	-144.78	0.002	0.002	0.002	0	0.002
-470	-143.26	0.002	0.002	0.002	0	0.002
-465	-141.73	0.002	0.002	0.002	0	0.002
-460	-140.21	0.002	0.002	0.002	0	0.002
-455	-138.68	0.002	0.002	0.002	0	0.002
-450	-137.16	0.002	0.002	0.002	0	0.002
-445	-135.64	0.002	0.002	0.002	0	0.002
-440	-134.11	0.003	0.002	0.003	0	0.003
-435	-132.59	0.003	0.002	0.003	0	0.003
-430	-131.06	0.003	0.002	0.003	0	0.003
-425	-129.54	0.003	0.002	0.003	0	0.003
-420	-128.02	0.003	0.002	0.003	0	0.003
-415	-126.49	0.003	0.002	0.003	0	0.003
-410	-124.97	0.003	0.002	0.003	0	0.003
-405	-123.44	0.003	0.002	0.003	0	0.003
-400	-121.92	0.003	0.002	0.003	0	0.003
-395	-120.4	0.003	0.002	0.003	0	0.003
-390	-118.87	0.003	0.002	0.003	0	0.003
-385	-117.35	0.003	0.002	0.003	0	0.003
-380	-115.82	0.003	0.003	0.003	0	0.003
-375	-114.3	0.003	0.003	0.003	0	0.003
-370	-112.78	0.004	0.003	0.004	0	0.004
-365	-111.25	0.004	0.003	0.004	0	0.004
-360	-109.73	0.004	0.003	0.004	0	0.004
-355	-108.2	0.004	0.003	0.004	0	0.004
-350	-106.68	0.004	0.003	0.004	0	0.004
-345	-105.16	0.004	0.003	0.004	0	0.004
-340	-103.63	0.004	0.003	0.004	0	0.004
-335	-102.11	0.004	0.003	0.004	0	0.004
-330	-100.58	0.004	0.003	0.004	0	0.004
-325	-99.06	0.005	0.003	0.005	0	0.005
-320	-97.54	0.005	0.004	0.005	0	0.005
-315	-96.01	0.005	0.004	0.005	0	0.005
-310	-94.49	0.005	0.004	0.005	0	0.005
-305	-92.96	0.005	0.004	0.005	0	0.005
-300	-91.44	0.005	0.004	0.005	0	0.005
-295	-89.92	0.006	0.004	0.006	0	0.006
-290	-88.39	0.006	0.004	0.006	0	0.006
-285	-86.87	0.006	0.004	0.006	0	0.006
-280	-85.34	0.006	0.005	0.006	0	0.006
-275	-83.82	0.007	0.005	0.007	0	0.007
-270	-82.3	0.007	0.005	0.007	0	0.007
-265	-80.77	0.007	0.005	0.007	0	0.007
-260	-79.25	0.007	0.005	0.007	0	0.007
-255	-77.72	0.008	0.005	0.008	0	0.008
-250	-76.2	0.008	0.006	0.008	0	0.008
-245	-74.68	0.008	0.006	0.008	0	0.008
-240	-73.15	0.009	0.006	0.009	0	0.009
-235	-71.63	0.009	0.006	0.009	0	0.009
-230	-70.1	0.009	0.007	0.009	0	0.009
-225	-68.58	0.01	0.007	0.01	0	0.01
-220	-67.06	0.01	0.007	0.01	0	0.01

-215	-65.53	0.011	0.007	0.011	0	0.011
-210	-64.01	0.011	0.008	0.011	0	0.011
-205	-62.48	0.012	0.008	0.012	0	0.012
-200	-60.96	0.013	0.008	0.013	0	0.013
-195	-59.44	0.013	0.009	0.013	0	0.013
-190	-57.91	0.014	0.009	0.014	0.001	0.014
-185	-56.39	0.015	0.01	0.015	0.001	0.015
-180	-54.86	0.016	0.01	0.016	0.001	0.016
-175	-53.34	0.017	0.01	0.017	0.001	0.017
-170	-51.82	0.018	0.011	0.018	0.001	0.018
-165	-50.29	0.019	0.011	0.019	0.001	0.019
-160	-48.77	0.02	0.012	0.02	0.001	0.02
-155	-47.24	0.022	0.012	0.022	0.001	0.022
-150	-45.72	0.023	0.013	0.023	0.001	0.023
-145	-44.2	0.025	0.014	0.025	0.001	0.025
-140	-42.67	0.027	0.014	0.027	0.001	0.027
-135	-41.15	0.029	0.015	0.029	0.002	0.029
-130	-39.62	0.032	0.016	0.032	0.002	0.032
-125	-38.1	0.035	0.017	0.035	0.002	0.035
-120	-36.58	0.038	0.017	0.038	0.002	0.038
-115	-35.05	0.042	0.018	0.042	0.003	0.042
-110	-33.53	0.047	0.019	0.047	0.003	0.047
-105	-32	0.052	0.02	0.052	0.004	0.052
-100	-30.48	0.058	0.021	0.058	0.005	0.058
-95	-28.96	0.065	0.022	0.065	0.005	0.065
-90	-27.43	0.074	0.023	0.074	0.006	0.074
-85	-25.91	0.084	0.024	0.084	0.008	0.084
-80	-24.38	0.096	0.025	0.096	0.009	0.096
-75	-22.86	0.112	0.026	0.111	0.011	0.111
-70	-21.34	0.13	0.027	0.129	0.014	0.13
-65	-19.81	0.153	0.028	0.152	0.017	0.153
-60	-18.29	0.182	0.029	0.18	0.022	0.181
-55	-16.76	0.217	0.03	0.216	0.027	0.217
-50	-15.24	0.262	0.031	0.26	0.034	0.262
-45	-13.72	0.319	0.033	0.316	0.042	0.318
-40	-12.19	0.389	0.036	0.385	0.052	0.387
-35	-10.67	0.473	0.041	0.469	0.063	0.471
-30	-9.14	0.571	0.049	0.567	0.072	0.567
-25	-7.62	0.674	0.064	0.671	0.077	0.668
-20	-6.1	0.765	0.094	0.763	0.086	0.755
-15	-4.57	0.82	0.154	0.82	0.127	0.807
-10	-3.05	0.839	0.251	0.839	0.211	0.828
-5	-1.52	0.913	0.305	0.908	0.293	0.901
0	0	1.134	0.221	1.122	0.298	1.104
5	1.52	1.349	0.136	1.346	0.206	1.31
10	3.05	1.376	0.099	1.375	0.144	1.342
15	4.57	1.206	0.092	1.198	0.183	1.182
20	6.1	0.955	0.1	0.941	0.187	0.94
25	7.62	0.72	0.11	0.708	0.155	0.712
30	9.14	0.541	0.115	0.532	0.115	0.537
35	10.67	0.414	0.112	0.409	0.082	0.412
40	12.19	0.327	0.103	0.323	0.058	0.326
45	13.72	0.265	0.09	0.263	0.042	0.264
50	15.24	0.219	0.077	0.218	0.031	0.219
55	16.76	0.185	0.065	0.184	0.023	0.185
60	18.29	0.158	0.055	0.157	0.018	0.158
65	19.81	0.136	0.047	0.136	0.014	0.136
70	21.34	0.118	0.041	0.118	0.012	0.118
75	22.86	0.104	0.036	0.103	0.009	0.104
80	24.38	0.092	0.032	0.091	0.008	0.092

85	25.91	0.081	0.028	0.081	0.007	0.081
90	27.43	0.073	0.026	0.072	0.006	0.072
95	28.96	0.065	0.023	0.065	0.005	0.065
100	30.48	0.059	0.021	0.058	0.004	0.059
105	32	0.053	0.019	0.053	0.004	0.053
110	33.53	0.048	0.018	0.048	0.003	0.048
115	35.05	0.044	0.017	0.044	0.003	0.044
120	36.58	0.04	0.015	0.04	0.002	0.04
125	38.1	0.037	0.014	0.037	0.002	0.037
130	39.62	0.034	0.014	0.034	0.002	0.034
135	41.15	0.031	0.013	0.031	0.002	0.031
140	42.67	0.029	0.012	0.029	0.001	0.029
145	44.2	0.027	0.011	0.027	0.001	0.027
150	45.72	0.025	0.011	0.025	0.001	0.025
155	47.24	0.023	0.01	0.023	0.001	0.023
160	48.77	0.022	0.01	0.022	0.001	0.022
165	50.29	0.021	0.009	0.021	0.001	0.021
170	51.82	0.019	0.009	0.019	0.001	0.019
175	53.34	0.018	0.008	0.018	0.001	0.018
180	54.86	0.017	0.008	0.017	0.001	0.017
185	56.39	0.016	0.008	0.016	0.001	0.016
190	57.91	0.015	0.007	0.015	0.001	0.015
195	59.44	0.014	0.007	0.014	0.001	0.014
200	60.96	0.014	0.007	0.014	0	0.014
205	62.48	0.013	0.006	0.013	0	0.013
210	64.01	0.012	0.006	0.012	0	0.012
215	65.53	0.012	0.006	0.012	0	0.012
220	67.06	0.011	0.006	0.011	0	0.011
225	68.58	0.011	0.005	0.011	0	0.011
230	70.1	0.01	0.005	0.01	0	0.01
235	71.63	0.01	0.005	0.01	0	0.01
240	73.15	0.009	0.005	0.009	0	0.009
245	74.68	0.009	0.005	0.009	0	0.009
250	76.2	0.009	0.005	0.009	0	0.009
255	77.72	0.008	0.004	0.008	0	0.008
260	79.25	0.008	0.004	0.008	0	0.008
265	80.77	0.008	0.004	0.008	0	0.008
270	82.3	0.007	0.004	0.007	0	0.007
275	83.82	0.007	0.004	0.007	0	0.007
280	85.34	0.007	0.004	0.007	0	0.007
285	86.87	0.007	0.004	0.007	0	0.007
290	88.39	0.006	0.003	0.006	0	0.006
295	89.92	0.006	0.003	0.006	0	0.006
300	91.44	0.006	0.003	0.006	0	0.006
305	92.96	0.006	0.003	0.006	0	0.006
310	94.49	0.005	0.003	0.005	0	0.005
315	96.01	0.005	0.003	0.005	0	0.005
320	97.54	0.005	0.003	0.005	0	0.005
325	99.06	0.005	0.003	0.005	0	0.005
330	100.58	0.005	0.003	0.005	0	0.005
335	102.11	0.005	0.003	0.005	0	0.005
340	103.63	0.005	0.003	0.005	0	0.005
345	105.16	0.004	0.003	0.004	0	0.004
350	106.68	0.004	0.002	0.004	0	0.004
355	108.2	0.004	0.002	0.004	0	0.004
360	109.73	0.004	0.002	0.004	0	0.004
365	111.25	0.004	0.002	0.004	0	0.004
370	112.78	0.004	0.002	0.004	0	0.004
375	114.3	0.004	0.002	0.004	0	0.004
380	115.82	0.004	0.002	0.004	0	0.004

385	117.35	0.004	0.002	0.004	0	0.004
390	118.87	0.003	0.002	0.003	0	0.003
395	120.4	0.003	0.002	0.003	0	0.003
400	121.92	0.003	0.002	0.003	0	0.003
405	123.44	0.003	0.002	0.003	0	0.003
410	124.97	0.003	0.002	0.003	0	0.003
415	126.49	0.003	0.002	0.003	0	0.003
420	128.02	0.003	0.002	0.003	0	0.003
425	129.54	0.003	0.002	0.003	0	0.003
430	131.06	0.003	0.002	0.003	0	0.003
435	132.59	0.003	0.002	0.003	0	0.003
440	134.11	0.003	0.002	0.003	0	0.003
445	135.64	0.003	0.002	0.003	0	0.003
450	137.16	0.003	0.002	0.003	0	0.003
455	138.68	0.002	0.002	0.002	0	0.002
460	140.21	0.002	0.002	0.002	0	0.002
465	141.73	0.002	0.001	0.002	0	0.002
470	143.26	0.002	0.001	0.002	0	0.002
475	144.78	0.002	0.001	0.002	0	0.002
480	146.3	0.002	0.001	0.002	0	0.002
485	147.83	0.002	0.001	0.002	0	0.002
490	149.35	0.002	0.001	0.002	0	0.002
495	150.88	0.002	0.001	0.002	0	0.002
500	152.4	0.002	0.001	0.002	0	0.002

AC CURRENTS IN EACH BUNDLE:

-----	AC CURRENTS (Amperes) -----			BUNDLE	POSITION
BNDL #	REAL	IMAGINAR	TOTAL	X-COORD	Y-COORD
2	369.35	0	369.35	6	35
3	-184.68	319.87	369.35	-6	29
4	-184.67	-319.87	369.35	6	23
1	0.08	-5.9	5.9	0	41

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* MAGNETIC FIELD PROFILE *

* at 3.28 feet above ground *

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<---------- AC	MAGNETIC FIELD		---------->		
LATERAL MAJOR	MINOR/	VERTICAL	HORIZONT	RMS	
DISTANCE AXIS	MAJOR	COMP	COMP	RESULTANT	
(feet) (meters)	(mG)	(RATIO)	(mG)	(mG)	(mG)
-500 -152.4	0.11	0.36	0.07	0.09	0.12
-495 -150.88	0.11	0.367	0.08	0.09	0.12
-490 -149.35	0.11	0.375	0.08	0.09	0.12
-485 -147.83	0.12	0.383	0.08	0.1	0.12
-480 -146.3	0.12	0.39	0.08	0.1	0.13
-475 -144.78	0.12	0.398	0.08	0.1	0.13
-470 -143.26	0.12	0.406	0.08	0.1	0.13

-465	-141.73	0.13	0.414	0.09	0.11	0.14
-460	-140.21	0.13	0.421	0.09	0.11	0.14
-455	-138.68	0.13	0.429	0.09	0.11	0.14
-450	-137.16	0.13	0.437	0.09	0.11	0.15
-445	-135.64	0.14	0.445	0.1	0.11	0.15
-440	-134.11	0.14	0.453	0.1	0.12	0.15
-435	-132.59	0.14	0.461	0.1	0.12	0.16
-430	-131.06	0.15	0.468	0.1	0.12	0.16
-425	-129.54	0.15	0.476	0.11	0.13	0.16
-420	-128.02	0.15	0.484	0.11	0.13	0.17
-415	-126.49	0.16	0.492	0.11	0.13	0.17
-410	-124.97	0.16	0.5	0.11	0.14	0.18
-405	-123.44	0.16	0.508	0.12	0.14	0.18
-400	-121.92	0.17	0.516	0.12	0.14	0.19
-395	-120.4	0.17	0.524	0.13	0.15	0.19
-390	-118.87	0.17	0.532	0.13	0.15	0.2
-385	-117.35	0.18	0.54	0.13	0.15	0.2
-380	-115.82	0.18	0.548	0.14	0.16	0.21
-375	-114.3	0.19	0.556	0.14	0.16	0.21
-370	-112.78	0.19	0.564	0.15	0.17	0.22
-365	-111.25	0.2	0.572	0.15	0.17	0.23
-360	-109.73	0.2	0.581	0.16	0.18	0.23
-355	-108.2	0.21	0.589	0.16	0.18	0.24
-350	-106.68	0.21	0.597	0.17	0.19	0.25
-345	-105.16	0.22	0.605	0.17	0.19	0.26
-340	-103.63	0.23	0.613	0.18	0.2	0.27
-335	-102.11	0.23	0.621	0.18	0.2	0.27
-330	-100.58	0.24	0.629	0.19	0.21	0.28
-325	-99.06	0.25	0.638	0.2	0.22	0.29
-320	-97.54	0.25	0.646	0.2	0.22	0.3
-315	-96.01	0.26	0.654	0.21	0.23	0.31
-310	-94.49	0.27	0.662	0.22	0.24	0.32
-305	-92.96	0.28	0.671	0.23	0.24	0.33
-300	-91.44	0.29	0.679	0.24	0.25	0.35
-295	-89.92	0.3	0.687	0.25	0.26	0.36
-290	-88.39	0.31	0.695	0.26	0.27	0.37
-285	-86.87	0.32	0.704	0.27	0.28	0.39
-280	-85.34	0.33	0.712	0.28	0.29	0.4
-275	-83.82	0.34	0.72	0.29	0.3	0.42
-270	-82.3	0.35	0.729	0.3	0.31	0.43
-265	-80.77	0.36	0.737	0.32	0.32	0.45
-260	-79.25	0.38	0.745	0.33	0.34	0.47
-255	-77.72	0.39	0.754	0.34	0.35	0.49
-250	-76.2	0.41	0.762	0.36	0.36	0.51
-245	-74.68	0.42	0.77	0.38	0.38	0.53
-240	-73.15	0.44	0.779	0.39	0.39	0.56
-235	-71.63	0.46	0.787	0.41	0.41	0.58
-230	-70.1	0.48	0.795	0.43	0.43	0.61
-225	-68.58	0.5	0.803	0.46	0.45	0.64
-220	-67.06	0.52	0.811	0.48	0.47	0.67
-215	-65.53	0.54	0.819	0.5	0.49	0.7
-210	-64.01	0.57	0.827	0.53	0.51	0.74
-205	-62.48	0.59	0.835	0.56	0.54	0.77
-200	-60.96	0.62	0.843	0.59	0.56	0.81
-195	-59.44	0.65	0.85	0.62	0.59	0.86
-190	-57.91	0.69	0.858	0.66	0.62	0.91
-185	-56.39	0.72	0.865	0.7	0.65	0.96
-180	-54.86	0.76	0.871	0.74	0.69	1.01
-175	-53.34	0.81	0.878	0.79	0.73	1.07
-170	-51.82	0.85	0.883	0.84	0.77	1.14

-165	-50.29	0.91	0.888	0.89	0.82	1.21
-160	-48.77	0.96	0.893	0.95	0.87	1.29
-155	-47.24	1.02	0.896	1.02	0.93	1.38
-150	-45.72	1.09	0.898	1.09	0.99	1.47
-145	-44.2	1.17	0.9	1.17	1.06	1.57
-140	-42.67	1.26	0.9	1.26	1.13	1.69
-135	-41.15	1.35	0.898	1.35	1.21	1.82
-130	-39.62	1.46	0.896	1.46	1.31	1.96
-125	-38.1	1.58	0.892	1.58	1.41	2.12
-120	-36.58	1.72	0.887	1.71	1.53	2.3
-115	-35.05	1.87	0.881	1.86	1.67	2.5
-110	-33.53	2.05	0.874	2.03	1.82	2.72
-105	-32	2.25	0.866	2.22	1.99	2.98
-100	-30.48	2.49	0.857	2.43	2.2	3.28
-95	-28.96	2.76	0.847	2.67	2.43	3.61
-90	-27.43	3.07	0.837	2.95	2.71	4
-85	-25.91	3.44	0.826	3.26	3.04	4.46
-80	-24.38	3.87	0.814	3.62	3.43	4.99
-75	-22.86	4.38	0.801	4.04	3.9	5.62
-70	-21.34	5	0.787	4.51	4.48	6.36
-65	-19.81	5.74	0.773	5.06	5.2	7.25
-60	-18.29	6.64	0.757	5.69	6.09	8.33
-55	-16.76	7.75	0.741	6.4	7.22	9.65
-50	-15.24	9.13	0.723	7.22	8.66	11.27
-45	-13.72	10.87	0.704	8.14	10.5	13.29
-40	-12.19	13.06	0.683	9.21	12.85	15.81
-35	-10.67	15.84	0.66	10.53	15.8	18.99
-30	-9.14	19.39	0.637	12.39	19.36	22.98
-25	-7.62	23.86	0.611	15.53	23.26	27.97
-20	-6.1	29.35	0.586	21.09	26.69	34.02
-15	-4.57	35.75	0.561	29.82	28.14	41
-10	-3.05	42.53	0.541	40.46	26.47	48.36
-5	-1.52	48.61	0.528	48.59	25.7	54.97
0	0	52.39	0.527	48.25	34.36	59.23
5	1.52	52.38	0.541	38.4	45.53	59.56
10	3.05	48.3	0.568	28.31	47.79	55.54
15	4.57	41.58	0.604	26.23	40.9	48.58
20	6.1	34.29	0.644	26.25	31.22	40.79
25	7.62	27.74	0.685	24.29	23.23	33.62
30	9.14	22.36	0.723	21.07	17.82	27.59
35	10.67	18.13	0.757	17.7	14.28	22.74
40	12.19	14.85	0.787	14.73	11.85	18.9
45	13.72	12.31	0.813	12.28	10.04	15.86
50	15.24	10.33	0.834	10.32	8.62	13.45
55	16.76	8.77	0.851	8.77	7.46	11.51
60	18.29	7.53	0.864	7.53	6.5	9.95
65	19.81	6.53	0.872	6.53	5.7	8.67
70	21.34	5.72	0.877	5.72	5.02	7.61
75	22.86	5.06	0.878	5.06	4.45	6.74
80	24.38	4.51	0.877	4.51	3.96	6
85	25.91	4.05	0.874	4.04	3.54	5.38
90	27.43	3.66	0.869	3.65	3.18	4.84
95	28.96	3.32	0.864	3.31	2.87	4.39
100	30.48	3.03	0.857	3.02	2.61	3.99
105	32	2.78	0.851	2.77	2.37	3.65
110	33.53	2.56	0.844	2.55	2.17	3.35
115	35.05	2.36	0.837	2.36	1.98	3.08
120	36.58	2.19	0.83	2.18	1.82	2.85
125	38.1	2.04	0.823	2.03	1.68	2.64
130	39.62	1.9	0.816	1.89	1.56	2.45

135	41.15	1.78	0.809	1.77	1.44	2.28
140	42.67	1.66	0.803	1.66	1.34	2.13
145	44.2	1.56	0.796	1.56	1.25	2
150	45.72	1.47	0.79	1.47	1.17	1.88
155	47.24	1.39	0.784	1.39	1.09	1.76
160	48.77	1.31	0.777	1.31	1.02	1.66
165	50.29	1.24	0.771	1.24	0.96	1.57
170	51.82	1.18	0.766	1.18	0.91	1.48
175	53.34	1.12	0.76	1.12	0.85	1.41
180	54.86	1.06	0.754	1.06	0.81	1.33
185	56.39	1.01	0.749	1.01	0.76	1.27
190	57.91	0.97	0.744	0.97	0.72	1.21
195	59.44	0.92	0.738	0.92	0.68	1.15
200	60.96	0.88	0.733	0.88	0.65	1.1
205	62.48	0.85	0.728	0.85	0.62	1.05
210	64.01	0.81	0.723	0.81	0.59	1
215	65.53	0.78	0.718	0.78	0.56	0.96
220	67.06	0.75	0.714	0.75	0.53	0.92
225	68.58	0.72	0.709	0.72	0.51	0.88
230	70.1	0.69	0.704	0.69	0.49	0.85
235	71.63	0.67	0.7	0.67	0.47	0.81
240	73.15	0.64	0.695	0.64	0.45	0.78
245	74.68	0.62	0.691	0.62	0.43	0.75
250	76.2	0.6	0.687	0.6	0.41	0.73
255	77.72	0.58	0.683	0.58	0.39	0.7
260	79.25	0.56	0.678	0.56	0.38	0.67
265	80.77	0.54	0.674	0.54	0.36	0.65
270	82.3	0.52	0.67	0.52	0.35	0.63
275	83.82	0.51	0.666	0.51	0.34	0.61
280	85.34	0.49	0.662	0.49	0.33	0.59
285	86.87	0.48	0.658	0.48	0.31	0.57
290	88.39	0.46	0.655	0.46	0.3	0.55
295	89.92	0.45	0.651	0.45	0.29	0.54
300	91.44	0.44	0.647	0.44	0.28	0.52
305	92.96	0.42	0.644	0.42	0.27	0.5
310	94.49	0.41	0.64	0.41	0.26	0.49
315	96.01	0.4	0.636	0.4	0.26	0.48
320	97.54	0.39	0.633	0.39	0.25	0.46
325	99.06	0.38	0.629	0.38	0.24	0.45
330	100.58	0.37	0.626	0.37	0.23	0.44
335	102.11	0.36	0.623	0.36	0.23	0.43
340	103.63	0.35	0.619	0.35	0.22	0.41
345	105.16	0.34	0.616	0.34	0.21	0.4
350	106.68	0.34	0.613	0.34	0.21	0.39
355	108.2	0.33	0.61	0.33	0.2	0.38
360	109.73	0.32	0.606	0.32	0.19	0.37
365	111.25	0.31	0.603	0.31	0.19	0.36
370	112.78	0.31	0.6	0.3	0.18	0.36
375	114.3	0.3	0.597	0.3	0.18	0.35
380	115.82	0.29	0.594	0.29	0.17	0.34
385	117.35	0.29	0.591	0.29	0.17	0.33
390	118.87	0.28	0.588	0.28	0.16	0.32
395	120.4	0.27	0.585	0.27	0.16	0.32
400	121.92	0.27	0.582	0.27	0.16	0.31
405	123.44	0.26	0.579	0.26	0.15	0.3
410	124.97	0.26	0.577	0.26	0.15	0.3
415	126.49	0.25	0.574	0.25	0.14	0.29
420	128.02	0.25	0.571	0.25	0.14	0.28
425	129.54	0.24	0.568	0.24	0.14	0.28
430	131.06	0.24	0.566	0.24	0.13	0.27

435	132.59	0.23	0.563	0.23	0.13	0.27
440	134.11	0.23	0.56	0.23	0.13	0.26
445	135.64	0.22	0.558	0.22	0.13	0.26
450	137.16	0.22	0.555	0.22	0.12	0.25
455	138.68	0.22	0.553	0.22	0.12	0.25
460	140.21	0.21	0.55	0.21	0.12	0.24
465	141.73	0.21	0.548	0.21	0.11	0.24
470	143.26	0.2	0.545	0.2	0.11	0.23
475	144.78	0.2	0.543	0.2	0.11	0.23
480	146.3	0.2	0.54	0.2	0.11	0.22
485	147.83	0.19	0.538	0.19	0.1	0.22
490	149.35	0.19	0.536	0.19	0.1	0.22
495	150.88	0.19	0.533	0.19	0.1	0.21
500	152.4	0.18	0.531	0.18	0.1	0.21

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* *
* AUDIBLE NOISE *
* GENERATE ACOUSTIC POWER *
* (dB above 1uW/m) *
* *
****

L5 BNDL	L50 #	Type	Summer	Fair	RAIN	RAIN
2	AC	******	-89.92	******		
3	AC	******	-91.76	******		
4	AC	******	-89.72	******		
1	Ground	Wire	******	******	******	

****
* *
* AUDIBLE NOISE *
* *
* Microphor is 5 feet above ground *
* Altitude 0 ft *
* *
****

<------ LATERAL DISTANCE (feet)	BPA FAIR WEATHER (meters)	METHOD RAIN dB(A)	-------> L50 RAIN dB(A)	<- AVERAGE Ldn dB(A)	CRIEPI L5 FAIR dB(A)	--> L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ L5 RAIN dB(A)	dB(A)
-500	-152.4	0	4	0.5	0	0	0	15.2	14	0
-495	-150.88	0	4	0.5	0	0	0	15.2	14	0
-490	-149.35	0	4.1	0.6	0	0	0	15.2	14.1	0
-485	-147.83	0	4.1	0.6	0	0	0	15.3	14.1	0
-480	-146.3	0	4.2	0.7	0	0	0	15.3	14.1	0
-475	-144.78	0	4.2	0.7	0	0	0	15.4	14.2	0
-470	-143.26	0	4.3	0.8	0	0	0	15.4	14.2	0
-465	-141.73	0	4.3	0.8	0	0	0	15.5	14.3	0
-460	-140.21	0	4.4	0.9	0	0	0	15.5	14.3	0
-455	-138.68	0	4.4	0.9	0	0	0	15.6	14.4	0
-450	-137.16	0	4.5	1	0	0	0	15.6	14.4	0
-445	-135.64	0	4.5	1	0	0	0	15.7	14.5	0
-440	-134.11	0	4.6	1.1	0	0	0	15.7	14.5	0
-435	-132.59	0	4.7	1.2	0	0	0	15.8	14.6	0
-430	-131.06	0	4.7	1.2	0	0	0	15.8	14.6	0

-425	-129.54	0	4.8	1.3	0	0	0	15.9	14.7	0
-420	-128.02	0	4.8	1.3	0	0	0	15.9	14.7	0
-415	-126.49	0	4.9	1.4	0	0	0	16	14.8	0
-410	-124.97	0	5	1.5	0	0	0	16	14.8	0
-405	-123.44	0	5	1.5	0	0	0	16.1	14.9	0
-400	-121.92	0	5.1	1.6	0	0	0	16.1	14.9	0
-395	-120.4	0	5.1	1.6	0	0	0	16.2	15	0
-390	-118.87	0	5.2	1.7	0	0	0	16.2	15	0
-385	-117.35	0	5.3	1.8	0	0	0	16.3	15.1	0
-380	-115.82	0	5.3	1.8	0	0	0	16.3	15.2	0
-375	-114.3	0	5.4	1.9	0	0	0	16.4	15.2	0
-370	-112.78	0	5.5	2	0	0	0	16.5	15.3	0
-365	-111.25	0	5.5	2	0	0	0	16.5	15.3	0
-360	-109.73	0	5.6	2.1	0	0	0	16.6	15.4	0
-355	-108.2	0	5.7	2.2	0	0	0	16.6	15.4	0
-350	-106.68	0	5.7	2.2	0	0	0	16.7	15.5	0
-345	-105.16	0	5.8	2.3	0	0	0	16.8	15.6	0
-340	-103.63	0	5.9	2.4	0	0	0	16.8	15.6	0
-335	-102.11	0	5.9	2.4	0	0	0	16.9	15.7	0
-330	-100.58	0	6	2.5	0	0	0	16.9	15.8	0
-325	-99.06	0	6.1	2.6	0	0	0	17	15.8	0
-320	-97.54	0	6.2	2.7	0	0	0	17.1	15.9	0
-315	-96.01	0	6.2	2.7	0	0	0	17.1	16	0
-310	-94.49	0	6.3	2.8	0	0	0	17.2	16	0
-305	-92.96	0	6.4	2.9	0	0	0	17.3	16.1	0
-300	-91.44	0	6.5	3	0	0	0	17.4	16.2	0
-295	-89.92	0	6.6	3.1	0	0	0	17.4	16.2	0
-290	-88.39	0	6.6	3.1	0	0	0	17.5	16.3	0
-285	-86.87	0	6.7	3.2	0	0	0	17.6	16.4	0
-280	-85.34	0	6.8	3.3	0	0	0	17.6	16.5	0
-275	-83.82	0	6.9	3.4	0	0	0	17.7	16.5	0
-270	-82.3	0	7	3.5	0	0	0	17.8	16.6	0
-265	-80.77	0	7.1	3.6	0	0	0	17.9	16.7	0
-260	-79.25	0	7.2	3.7	0	0	0	18	16.8	0
-255	-77.72	0	7.3	3.8	0	0	0	18	16.9	0
-250	-76.2	0	7.4	3.9	0	0	0	18.1	16.9	0
-245	-74.68	0	7.5	4	0	0	0	18.2	17	0
-240	-73.15	0	7.6	4.1	0	0	0	18.3	17.1	0
-235	-71.63	0	7.7	4.2	0	0	0	18.4	17.2	0
-230	-70.1	0	7.8	4.3	0	0	0	18.5	17.3	0
-225	-68.58	0	7.9	4.4	0	0	0	18.6	17.4	0
-220	-67.06	0	8	4.5	0	0	0	18.7	17.5	0
-215	-65.53	0	8.1	4.6	0	0	0	18.8	17.6	0
-210	-64.01	0	8.2	4.7	0	0	0	18.9	17.7	0
-205	-62.48	0	8.3	4.8	0	0	0	19	17.8	0
-200	-60.96	0	8.4	4.9	0	0	0	19.1	17.9	0
-195	-59.44	0	8.6	5.1	0	0	0	19.2	18	0
-190	-57.91	0	8.7	5.2	0	0	0	19.3	18.1	0
-185	-56.39	0	8.8	5.3	0	0	0	19.4	18.2	0
-180	-54.86	0	9	5.5	0	0	0	19.5	18.3	0
-175	-53.34	0	9.1	5.6	0	0	0	19.6	18.5	0
-170	-51.82	0	9.2	5.7	0	0	0	19.8	18.6	0
-165	-50.29	0	9.4	5.9	0	0	0	19.9	18.7	0
-160	-48.77	0	9.5	6	0	0	0	20	18.8	0
-155	-47.24	0	9.7	6.2	0	0	0	20.2	19	0
-150	-45.72	0	9.8	6.3	0	0	0	20.3	19.1	0
-145	-44.2	0	10	6.5	0	0	0	20.4	19.2	0
-140	-42.67	0	10.2	6.7	0	0	0	20.6	19.4	0
-135	-41.15	0	10.3	6.8	0	0	0	20.7	19.5	0
-130	-39.62	0	10.5	7	0	0	0	20.9	19.7	0

-125	-38.1	0	10.7	7.2	0	0	0	21	19.9	0
-120	-36.58	0	10.9	7.4	0	0	0	21.2	20	0
-115	-35.05	0	11.1	7.6	0	0	0	21.4	20.2	0
-110	-33.53	0	11.3	7.8	0	0	0	21.6	20.4	0
-105	-32	0	11.5	8	0	0	0	21.8	20.6	0
-100	-30.48	0	11.7	8.2	0	0	0	22	20.8	0
-95	-28.96	0	12	8.5	0	0	0	22.2	21	0
-90	-27.43	0	12.2	8.7	0	0	0	22.4	21.2	0
-85	-25.91	0	12.5	9	0	0	0	22.6	21.4	0
-80	-24.38	0	12.7	9.2	0	0	0	22.8	21.7	0
-75	-22.86	0	13	9.5	0	0	0	23.1	21.9	0
-70	-21.34	0	13.3	9.8	0	0	0	23.4	22.2	0
-65	-19.81	0	13.6	10.1	0	0	0	23.6	22.5	0
-60	-18.29	0	14	10.5	0	0	0	23.9	22.7	0
-55	-16.76	0	14.3	10.8	0	0	0	24.2	23.1	0
-50	-15.24	0	14.7	11.2	0	0	0	24.6	23.4	0
-45	-13.72	0	15.1	11.6	0	0	0	24.9	23.8	0
-40	-12.19	0	15.5	12	0	0	0	25.3	24.1	0
-35	-10.67	0	16	12.5	0	0	0	25.7	24.5	0
-30	-9.14	0	16.5	13	0	0	0	26.1	25	0
-25	-7.62	0	17	13.5	0	0	0	26.6	25.4	0
-20	-6.1	0	17.5	14	0	0	0	27	25.8	0
-15	-4.57	0	18	14.5	0	0	0	27.5	26.3	0
-10	-3.05	0	18.5	15	0	0	0	27.9	26.7	0
-5	-1.52	0	18.9	15.4	0	0	0	28.2	27	0
0	0	0	19.1	15.6	0	0	0	28.4	27.2	0
5	1.52	0	19.2	15.7	0	0	0	28.5	27.3	0
10	3.05	0	19	15.5	0	0	0	28.3	27.1	0
15	4.57	0	18.6	15.1	0	0	0	28	26.8	0
20	6.1	0	18.2	14.7	0	0	0	27.5	26.4	0
25	7.62	0	17.6	14.1	0	0	0	27.1	25.9	0
30	9.14	0	17.1	13.6	0	0	0	26.6	25.4	0
35	10.67	0	16.5	13	0	0	0	26.2	25	0
40	12.19	0	16.1	12.6	0	0	0	25.7	24.5	0
45	13.72	0	15.6	12.1	0	0	0	25.3	24.1	0
50	15.24	0	15.2	11.7	0	0	0	24.9	23.8	0
55	16.76	0	14.7	11.2	0	0	0	24.6	23.4	0
60	18.29	0	14.4	10.9	0	0	0	24.2	23.1	0
65	19.81	0	14	10.5	0	0	0	23.9	22.7	0
70	21.34	0	13.7	10.2	0	0	0	23.6	22.5	0
75	22.86	0	13.3	9.8	0	0	0	23.4	22.2	0
80	24.38	0	13	9.5	0	0	0	23.1	21.9	0
85	25.91	0	12.8	9.3	0	0	0	22.8	21.7	0
90	27.43	0	12.5	9	0	0	0	22.6	21.4	0
95	28.96	0	12.2	8.7	0	0	0	22.4	21.2	0
100	30.48	0	12	8.5	0	0	0	22.2	21	0
105	32	0	11.7	8.2	0	0	0	22	20.8	0
110	33.53	0	11.5	8	0	0	0	21.8	20.6	0
115	35.05	0	11.3	7.8	0	0	0	21.6	20.4	0
120	36.58	0	11.1	7.6	0	0	0	21.4	20.2	0
125	38.1	0	10.9	7.4	0	0	0	21.2	20	0
130	39.62	0	10.7	7.2	0	0	0	21	19.9	0
135	41.15	0	10.5	7	0	0	0	20.9	19.7	0
140	42.67	0	10.3	6.8	0	0	0	20.7	19.5	0
145	44.2	0	10.2	6.7	0	0	0	20.6	19.4	0
150	45.72	0	10	6.5	0	0	0	20.4	19.2	0
155	47.24	0	9.8	6.3	0	0	0	20.3	19.1	0
160	48.77	0	9.7	6.2	0	0	0	20.2	19	0
165	50.29	0	9.5	6	0	0	0	20	18.8	0
170	51.82	0	9.4	5.9	0	0	0	19.9	18.7	0

175	53.34	0	9.2	5.7	0	0	0	19.8	18.6	0
180	54.86	0	9.1	5.6	0	0	0	19.6	18.5	0
185	56.39	0	9	5.5	0	0	0	19.5	18.3	0
190	57.91	0	8.8	5.3	0	0	0	19.4	18.2	0
195	59.44	0	8.7	5.2	0	0	0	19.3	18.1	0
200	60.96	0	8.6	5.1	0	0	0	19.2	18	0
205	62.48	0	8.5	5	0	0	0	19.1	17.9	0
210	64.01	0	8.3	4.8	0	0	0	19	17.8	0
215	65.53	0	8.2	4.7	0	0	0	18.9	17.7	0
220	67.06	0	8.1	4.6	0	0	0	18.8	17.6	0
225	68.58	0	8	4.5	0	0	0	18.7	17.5	0
230	70.1	0	7.9	4.4	0	0	0	18.6	17.4	0
235	71.63	0	7.8	4.3	0	0	0	18.5	17.3	0
240	73.15	0	7.7	4.2	0	0	0	18.4	17.2	0
245	74.68	0	7.6	4.1	0	0	0	18.3	17.1	0
250	76.2	0	7.5	4	0	0	0	18.2	17	0
255	77.72	0	7.4	3.9	0	0	0	18.1	16.9	0
260	79.25	0	7.3	3.8	0	0	0	18	16.9	0
265	80.77	0	7.2	3.7	0	0	0	18	16.8	0
270	82.3	0	7.1	3.6	0	0	0	17.9	16.7	0
275	83.82	0	7	3.5	0	0	0	17.8	16.6	0
280	85.34	0	6.9	3.4	0	0	0	17.7	16.5	0
285	86.87	0	6.8	3.3	0	0	0	17.6	16.5	0
290	88.39	0	6.7	3.2	0	0	0	17.6	16.4	0
295	89.92	0	6.7	3.2	0	0	0	17.5	16.3	0
300	91.44	0	6.6	3.1	0	0	0	17.4	16.2	0
305	92.96	0	6.5	3	0	0	0	17.4	16.2	0
310	94.49	0	6.4	2.9	0	0	0	17.3	16.1	0
315	96.01	0	6.3	2.8	0	0	0	17.2	16	0
320	97.54	0	6.2	2.7	0	0	0	17.1	16	0
325	99.06	0	6.2	2.7	0	0	0	17.1	15.9	0
330	100.58	0	6.1	2.6	0	0	0	17	15.8	0
335	102.11	0	6	2.5	0	0	0	16.9	15.8	0
340	103.63	0	5.9	2.4	0	0	0	16.9	15.7	0
345	105.16	0	5.9	2.4	0	0	0	16.8	15.6	0
350	106.68	0	5.8	2.3	0	0	0	16.8	15.6	0
355	108.2	0	5.7	2.2	0	0	0	16.7	15.5	0
360	109.73	0	5.7	2.2	0	0	0	16.6	15.4	0
365	111.25	0	5.6	2.1	0	0	0	16.6	15.4	0
370	112.78	0	5.5	2	0	0	0	16.5	15.3	0
375	114.3	0	5.5	2	0	0	0	16.5	15.3	0
380	115.82	0	5.4	1.9	0	0	0	16.4	15.2	0
385	117.35	0	5.3	1.8	0	0	0	16.3	15.2	0
390	118.87	0	5.3	1.8	0	0	0	16.3	15.1	0
395	120.4	0	5.2	1.7	0	0	0	16.2	15	0
400	121.92	0	5.1	1.6	0	0	0	16.2	15	0
405	123.44	0	5.1	1.6	0	0	0	16.1	14.9	0
410	124.97	0	5	1.5	0	0	0	16.1	14.9	0
415	126.49	0	5	1.5	0	0	0	16	14.8	0
420	128.02	0	4.9	1.4	0	0	0	16	14.8	0
425	129.54	0	4.8	1.3	0	0	0	15.9	14.7	0
430	131.06	0	4.8	1.3	0	0	0	15.9	14.7	0
435	132.59	0	4.7	1.2	0	0	0	15.8	14.6	0
440	134.11	0	4.7	1.2	0	0	0	15.8	14.6	0
445	135.64	0	4.6	1.1	0	0	0	15.7	14.5	0
450	137.16	0	4.6	1.1	0	0	0	15.7	14.5	0
455	138.68	0	4.5	1	0	0	0	15.6	14.4	0
460	140.21	0	4.4	0.9	0	0	0	15.6	14.4	0
465	141.73	0	4.4	0.9	0	0	0	15.5	14.3	0
470	143.26	0	4.3	0.8	0	0	0	15.5	14.3	0

475	144.78	0	4.3	0.8	0	0	0	15.4	14.2	0
480	146.3	0	4.2	0.7	0	0	0	15.4	14.2	0
485	147.83	0	4.2	0.7	0	0	0	15.3	14.1	0
490	149.35	0	4.1	0.6	0	0	0	15.3	14.1	0
495	150.88	0	4.1	0.6	0	0	0	15.2	14.1	0
500	152.4	0	4	0.5	0	0	0	15.2	14	0

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions If a prediction method does not apply, the appropriat output data column will be zeros.

RESULTS OF ENVIRO PROGRAM

STUDY FILE NAME: C:\USERS\JKOSTA1\DESKTOP\EMF\INVENE~1\ITSAA002.I01
DATE: ######## TIME: 8:28

Rev2 Ave ITS

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* BUNDLE INFORMAT *

****

BNDL	CIR #	VOLTAGE ANGLE #	VOLTAGE LOAD (kV)	CURRENT # ANGLE (DEG)	COORDINA OF (AMPS)	X (DEG)	Y COND	PHASE (FT)	(FT)	
1	1	0	0	0	0	1	0	41	GND	
2	1	115	0	369.4	0	1	6	35	A	
3	1	115	240	369.4	120	1	-6	29	B	
4	1	115	120	369.4	240	1	6	23	C	
5	1	0	0	0	0	1	102.8	32	GND	
6	1	0	0	0	0	1	122.3	32	GND	
7	1	230	0	1000	0	1	93	27	A	
8	1	230	240	1000	120	1	112.5	27	B	
9	1	230	120	1000	240	1	132	27	C	

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* MINIMUM GROUND CLEARANC = 23 FT. *

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* SUBCONDI INFORMAT - REGULAR BUNDLES *

****

BNDL #	DIAMETER (IN)	SPACING (IN)	DC RESIST. (OHMS/MI	AC RESIST. (OHMS/MI	AC REACT.
2	1.108	0	0.1152	0.117	0.399
3	1.108	0	0.1152	0.117	0.399
4	1.108	0	0.1152	0.117	0.399
7	1.302	0	0.0777	0.0805	0.382
8	1.302	0	0.0777	0.0805	0.382
9	1.302	0	0.0777	0.0805	0.382
1	0.435	0	4.61	4.74	1.28
5	0.435	0	4.61	4.74	1.28
6	0.435	0	4.61	4.74	1.28

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* MAXIMUN SURFACE GRADIENT (kV/cm) *

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BNDL #	Type	ACrms	PEAK(+)	PEAK(-)
2	AC	8.4	11.88	-11.88
3	AC	8.34	11.8	-11.8
4	AC	8.59	12.14	-12.14

7	AC		13.25	18.74	-18.74
8	AC		14.23	20.12	-20.12
9	AC		13.28	18.78	-18.78
1	Ground	Wire	2.4	3.4	-3.4
5	Ground	Wire	4.75	6.72	-6.72
6	Ground	Wire	4.7	6.64	-6.64

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* *
* AC ELECTRIC FIELD PROFILE *
* at 3.28 feet above ground *
* *
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LATERAL DISTANCE (feet)	MAXIMUM FIELD (meters)	MINOR/MA ELLIPSE (kV/m)	SPACE AXES (ratio)	VERTICAL (kV/m)	HORIZONT (kV/m)	POTENTIAL (kV)
-500	-152.4	0.003	0.002	0.003	0	0.003
-495	-150.88	0.003	0.002	0.003	0	0.003
-490	-149.35	0.003	0.002	0.003	0	0.003
-485	-147.83	0.003	0.003	0.003	0	0.003
-480	-146.3	0.003	0.003	0.003	0	0.003
-475	-144.78	0.003	0.003	0.003	0	0.003
-470	-143.26	0.003	0.003	0.003	0	0.003
-465	-141.73	0.003	0.003	0.003	0	0.003
-460	-140.21	0.003	0.003	0.003	0	0.003
-455	-138.68	0.003	0.003	0.003	0	0.003
-450	-137.16	0.003	0.003	0.003	0	0.003
-445	-135.64	0.003	0.003	0.003	0	0.003
-440	-134.11	0.003	0.003	0.003	0	0.003
-435	-132.59	0.003	0.003	0.003	0	0.003
-430	-131.06	0.003	0.003	0.003	0	0.003
-425	-129.54	0.004	0.003	0.004	0	0.004
-420	-128.02	0.004	0.003	0.004	0	0.004
-415	-126.49	0.004	0.003	0.004	0	0.004
-410	-124.97	0.004	0.003	0.004	0	0.004
-405	-123.44	0.004	0.003	0.004	0	0.004
-400	-121.92	0.004	0.003	0.004	0	0.004
-395	-120.4	0.004	0.003	0.004	0	0.004
-390	-118.87	0.004	0.003	0.004	0	0.004
-385	-117.35	0.004	0.004	0.004	0	0.004
-380	-115.82	0.004	0.004	0.004	0	0.004
-375	-114.3	0.005	0.004	0.005	0	0.005
-370	-112.78	0.005	0.004	0.005	0	0.005
-365	-111.25	0.005	0.004	0.005	0	0.005
-360	-109.73	0.005	0.004	0.005	0	0.005
-355	-108.2	0.005	0.004	0.005	0	0.005
-350	-106.68	0.005	0.004	0.005	0	0.005
-345	-105.16	0.005	0.004	0.005	0	0.005
-340	-103.63	0.006	0.004	0.006	0	0.006
-335	-102.11	0.006	0.004	0.006	0	0.006
-330	-100.58	0.006	0.004	0.006	0	0.006
-325	-99.06	0.006	0.005	0.006	0	0.006
-320	-97.54	0.006	0.005	0.006	0	0.006
-315	-96.01	0.007	0.005	0.007	0	0.007
-310	-94.49	0.007	0.005	0.007	0	0.007
-305	-92.96	0.007	0.005	0.007	0	0.007
-300	-91.44	0.007	0.005	0.007	0	0.007
-295	-89.92	0.007	0.005	0.007	0	0.007

-290	-88.39	0.008	0.005	0.008	0	0.008
-285	-86.87	0.008	0.006	0.008	0	0.008
-280	-85.34	0.008	0.006	0.008	0	0.008
-275	-83.82	0.009	0.006	0.009	0	0.009
-270	-82.3	0.009	0.006	0.009	0	0.009
-265	-80.77	0.009	0.006	0.009	0	0.009
-260	-79.25	0.01	0.007	0.01	0	0.01
-255	-77.72	0.01	0.007	0.01	0	0.01
-250	-76.2	0.01	0.007	0.01	0	0.01
-245	-74.68	0.011	0.007	0.011	0	0.011
-240	-73.15	0.011	0.007	0.011	0	0.011
-235	-71.63	0.012	0.008	0.012	0	0.012
-230	-70.1	0.012	0.008	0.012	0	0.012
-225	-68.58	0.013	0.008	0.013	0	0.013
-220	-67.06	0.013	0.009	0.013	0	0.013
-215	-65.53	0.014	0.009	0.014	0	0.014
-210	-64.01	0.014	0.009	0.014	0	0.014
-205	-62.48	0.015	0.01	0.015	0	0.015
-200	-60.96	0.016	0.01	0.016	0.001	0.016
-195	-59.44	0.017	0.011	0.017	0.001	0.017
-190	-57.91	0.017	0.011	0.017	0.001	0.017
-185	-56.39	0.018	0.012	0.018	0.001	0.018
-180	-54.86	0.019	0.012	0.019	0.001	0.019
-175	-53.34	0.02	0.013	0.02	0.001	0.02
-170	-51.82	0.022	0.014	0.021	0.001	0.022
-165	-50.29	0.023	0.014	0.023	0.001	0.023
-160	-48.77	0.024	0.015	0.024	0.001	0.024
-155	-47.24	0.026	0.016	0.026	0.001	0.026
-150	-45.72	0.027	0.017	0.027	0.001	0.027
-145	-44.2	0.029	0.018	0.029	0.001	0.029
-140	-42.67	0.031	0.019	0.031	0.002	0.031
-135	-41.15	0.033	0.02	0.033	0.002	0.033
-130	-39.62	0.036	0.021	0.036	0.002	0.036
-125	-38.1	0.039	0.023	0.039	0.002	0.039
-120	-36.58	0.042	0.024	0.042	0.002	0.042
-115	-35.05	0.046	0.026	0.046	0.003	0.046
-110	-33.53	0.05	0.027	0.05	0.003	0.05
-105	-32	0.055	0.029	0.055	0.004	0.055
-100	-30.48	0.061	0.031	0.06	0.004	0.061
-95	-28.96	0.067	0.032	0.067	0.005	0.067
-90	-27.43	0.075	0.034	0.075	0.006	0.075
-85	-25.91	0.085	0.036	0.085	0.008	0.085
-80	-24.38	0.096	0.037	0.096	0.009	0.096
-75	-22.86	0.111	0.039	0.11	0.011	0.11
-70	-21.34	0.128	0.04	0.127	0.014	0.128
-65	-19.81	0.15	0.041	0.149	0.017	0.149
-60	-18.29	0.177	0.042	0.176	0.021	0.176
-55	-16.76	0.211	0.043	0.209	0.027	0.21
-50	-15.24	0.254	0.044	0.252	0.033	0.253
-45	-13.72	0.308	0.045	0.306	0.042	0.307
-40	-12.19	0.376	0.046	0.373	0.052	0.374
-35	-10.67	0.458	0.049	0.454	0.062	0.456
-30	-9.14	0.553	0.056	0.549	0.071	0.549
-25	-7.62	0.652	0.07	0.65	0.076	0.646
-20	-6.1	0.739	0.098	0.737	0.085	0.729
-15	-4.57	0.787	0.158	0.787	0.125	0.773
-10	-3.05	0.795	0.263	0.795	0.209	0.782
-5	-1.52	0.855	0.325	0.851	0.29	0.843
0	0	1.071	0.234	1.059	0.297	1.039
5	1.52	1.281	0.149	1.278	0.21	1.241

10	3.05	1.303	0.122	1.302	0.167	1.267
15	4.57	1.133	0.137	1.124	0.211	1.107
20	6.1	0.896	0.182	0.885	0.217	0.882
25	7.62	0.708	0.233	0.702	0.186	0.704
30	9.14	0.621	0.238	0.62	0.149	0.621
35	10.67	0.626	0.188	0.626	0.121	0.626
40	12.19	0.69	0.129	0.688	0.105	0.689
45	13.72	0.792	0.085	0.788	0.104	0.791
50	15.24	0.93	0.056	0.924	0.115	0.928
55	16.76	1.107	0.037	1.099	0.137	1.105
60	18.29	1.334	0.025	1.323	0.169	1.331
65	19.81	1.618	0.017	1.605	0.208	1.614
70	21.34	1.965	0.014	1.95	0.245	1.957
75	22.86	2.361	0.015	2.347	0.265	2.346
80	24.38	2.758	0.022	2.748	0.241	2.732
85	25.91	3.054	0.036	3.051	0.162	3.014
90	27.43	3.11	0.064	3.109	0.215	3.055
95	28.96	2.834	0.12	2.819	0.449	2.767
100	30.48	2.305	0.221	2.273	0.638	2.238
105	32	1.801	0.355	1.783	0.688	1.748
110	33.53	1.591	0.402	1.59	0.643	1.53
115	35.05	1.587	0.403	1.587	0.642	1.526
120	36.58	1.789	0.357	1.772	0.685	1.736
125	38.1	2.285	0.223	2.254	0.634	2.219
130	39.62	2.807	0.12	2.792	0.444	2.74
135	41.15	3.075	0.063	3.074	0.209	3.02
140	42.67	3.011	0.034	3.008	0.162	2.971
145	44.2	2.706	0.018	2.696	0.244	2.68
150	45.72	2.301	0.01	2.285	0.27	2.284
155	47.24	1.896	0.005	1.879	0.249	1.886
160	48.77	1.54	0.003	1.525	0.211	1.534
165	50.29	1.246	0.002	1.234	0.172	1.242
170	51.82	1.011	0.001	1.001	0.136	1.008
175	53.34	0.825	0.001	0.818	0.108	0.823
180	54.86	0.678	0.001	0.672	0.085	0.677
185	56.39	0.562	0.002	0.558	0.068	0.561
190	57.91	0.469	0.002	0.466	0.054	0.469
195	59.44	0.395	0.002	0.393	0.043	0.395
200	60.96	0.336	0.003	0.334	0.035	0.335
205	62.48	0.287	0.003	0.286	0.029	0.287
210	64.01	0.247	0.003	0.246	0.024	0.247
215	65.53	0.214	0.004	0.213	0.02	0.214
220	67.06	0.187	0.004	0.186	0.016	0.187
225	68.58	0.164	0.004	0.163	0.014	0.164
230	70.1	0.144	0.005	0.144	0.012	0.144
235	71.63	0.128	0.005	0.127	0.01	0.128
240	73.15	0.114	0.005	0.113	0.009	0.113
245	74.68	0.101	0.005	0.101	0.007	0.101
250	76.2	0.091	0.005	0.091	0.006	0.091
255	77.72	0.082	0.006	0.082	0.006	0.082
260	79.25	0.074	0.006	0.074	0.005	0.074
265	80.77	0.067	0.006	0.067	0.004	0.067
270	82.3	0.061	0.006	0.061	0.004	0.061
275	83.82	0.055	0.006	0.055	0.003	0.055
280	85.34	0.051	0.006	0.051	0.003	0.051
285	86.87	0.046	0.006	0.046	0.003	0.046
290	88.39	0.043	0.006	0.043	0.002	0.043
295	89.92	0.039	0.007	0.039	0.002	0.039
300	91.44	0.036	0.007	0.036	0.002	0.036
305	92.96	0.034	0.007	0.034	0.002	0.034

310	94.49	0.031	0.007	0.031	0.002	0.031
315	96.01	0.029	0.007	0.029	0.001	0.029
320	97.54	0.027	0.007	0.027	0.001	0.027
325	99.06	0.025	0.007	0.025	0.001	0.025
330	100.58	0.023	0.007	0.023	0.001	0.023
335	102.11	0.022	0.007	0.022	0.001	0.022
340	103.63	0.02	0.007	0.02	0.001	0.02
345	105.16	0.019	0.007	0.019	0.001	0.019
350	106.68	0.018	0.007	0.018	0.001	0.018
355	108.2	0.017	0.007	0.017	0.001	0.017
360	109.73	0.016	0.007	0.016	0.001	0.016
365	111.25	0.015	0.007	0.015	0.001	0.015
370	112.78	0.014	0.007	0.014	0.001	0.014
375	114.3	0.013	0.007	0.013	0	0.013
380	115.82	0.013	0.007	0.013	0	0.013
385	117.35	0.012	0.007	0.012	0	0.012
390	118.87	0.011	0.007	0.011	0	0.011
395	120.4	0.011	0.007	0.011	0	0.011
400	121.92	0.01	0.007	0.01	0	0.01
405	123.44	0.01	0.007	0.01	0	0.01
410	124.97	0.009	0.007	0.009	0	0.009
415	126.49	0.009	0.007	0.009	0	0.009
420	128.02	0.009	0.007	0.009	0	0.009
425	129.54	0.008	0.007	0.008	0	0.008
430	131.06	0.008	0.007	0.008	0	0.008
435	132.59	0.007	0.007	0.007	0	0.007
440	134.11	0.007	0.007	0.007	0	0.007
445	135.64	0.007	0.007	0.007	0	0.007
450	137.16	0.007	0.007	0.007	0	0.007
455	138.68	0.006	0.007	0.006	0	0.006
460	140.21	0.006	0.007	0.006	0	0.006
465	141.73	0.006	0.007	0.006	0	0.006
470	143.26	0.006	0.007	0.006	0	0.006
475	144.78	0.005	0.007	0.005	0	0.005
480	146.3	0.005	0.007	0.005	0	0.005
485	147.83	0.005	0.007	0.005	0	0.005
490	149.35	0.005	0.007	0.005	0	0.005
495	150.88	0.005	0.007	0.005	0	0.005
500	152.4	0.005	0.007	0.004	0	0.004

AC CURRENTS IN EACH BUNDLE:

BNDL #	AC CURRENTS (Amperes) REAL	IMAGINAR	TOTAL	BUNDLE POSITION X-COORD	Y-COORD
2	369.35	0	369.35	6	35
3	-184.68	319.87	369.35	-6	29
4	-184.67	-319.87	369.35	6	23
7	1000	0	1000	93	27
8	-500	866.03	1000	112.5	27
9	-500	-866.03	1000	132	27
1	-0.52	-13.83	13.84	0	41
5	12.97	-19.86	23.72	102.75	32
6	5.28	21.15	21.79	122.25	32

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* *
* MAGNETIC FIELD PROFILE *
* at 3.28 feet above ground *
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<---------- LATERAL DISTANCE (feet)	AC MAJOR AXIS (meters)	MAGNETIC FIELD MINOR/ MAJOR (mG)	VERTICAL COMP (RATIO)	----------> HORIZONT COMP (mG)	RMS RESULTANT (mG)	(mG)
-500	-152.4	0.68	0.013	0.65	0.21	0.68
-495	-150.88	0.69	0.012	0.66	0.21	0.69
-490	-149.35	0.7	0.012	0.67	0.22	0.7
-485	-147.83	0.71	0.012	0.68	0.22	0.71
-480	-146.3	0.72	0.012	0.69	0.22	0.72
-475	-144.78	0.74	0.012	0.7	0.23	0.74
-470	-143.26	0.75	0.012	0.71	0.23	0.75
-465	-141.73	0.76	0.012	0.72	0.23	0.76
-460	-140.21	0.77	0.011	0.73	0.24	0.77
-455	-138.68	0.78	0.011	0.75	0.24	0.78
-450	-137.16	0.8	0.011	0.76	0.24	0.8
-445	-135.64	0.81	0.011	0.77	0.25	0.81
-440	-134.11	0.82	0.011	0.78	0.25	0.82
-435	-132.59	0.84	0.011	0.8	0.26	0.84
-430	-131.06	0.85	0.011	0.81	0.26	0.85
-425	-129.54	0.87	0.011	0.82	0.27	0.87
-420	-128.02	0.88	0.011	0.84	0.27	0.88
-415	-126.49	0.9	0.011	0.85	0.28	0.9
-410	-124.97	0.91	0.01	0.87	0.28	0.91
-405	-123.44	0.93	0.01	0.88	0.29	0.93
-400	-121.92	0.95	0.01	0.9	0.29	0.95
-395	-120.4	0.96	0.01	0.92	0.3	0.96
-390	-118.87	0.98	0.01	0.93	0.3	0.98
-385	-117.35	1	0.01	0.95	0.31	1
-380	-115.82	1.02	0.01	0.97	0.32	1.02
-375	-114.3	1.04	0.01	0.99	0.32	1.04
-370	-112.78	1.06	0.01	1	0.33	1.06
-365	-111.25	1.08	0.01	1.02	0.34	1.08
-360	-109.73	1.1	0.01	1.04	0.35	1.1
-355	-108.2	1.12	0.01	1.06	0.35	1.12
-350	-106.68	1.14	0.01	1.08	0.36	1.14
-345	-105.16	1.17	0.01	1.11	0.37	1.17
-340	-103.63	1.19	0.01	1.13	0.38	1.19
-335	-102.11	1.22	0.009	1.15	0.39	1.22
-330	-100.58	1.24	0.009	1.18	0.4	1.24
-325	-99.06	1.27	0.009	1.2	0.41	1.27
-320	-97.54	1.3	0.009	1.23	0.42	1.3
-315	-96.01	1.32	0.009	1.25	0.43	1.32
-310	-94.49	1.35	0.009	1.28	0.44	1.35
-305	-92.96	1.38	0.009	1.31	0.46	1.38
-300	-91.44	1.41	0.009	1.33	0.47	1.42
-295	-89.92	1.45	0.009	1.36	0.48	1.45
-290	-88.39	1.48	0.009	1.4	0.5	1.48
-285	-86.87	1.52	0.009	1.43	0.51	1.52
-280	-85.34	1.55	0.009	1.46	0.53	1.55
-275	-83.82	1.59	0.009	1.49	0.55	1.59
-270	-82.3	1.63	0.008	1.53	0.56	1.63

-265	-80.77	1.67	0.008	1.57	0.58	1.67
-260	-79.25	1.71	0.008	1.6	0.6	1.71
-255	-77.72	1.76	0.008	1.64	0.62	1.76
-250	-76.2	1.8	0.008	1.68	0.64	1.8
-245	-74.68	1.85	0.008	1.73	0.67	1.85
-240	-73.15	1.9	0.008	1.77	0.69	1.9
-235	-71.63	1.95	0.008	1.82	0.72	1.95
-230	-70.1	2.01	0.008	1.86	0.75	2.01
-225	-68.58	2.06	0.007	1.91	0.78	2.06
-220	-67.06	2.12	0.007	1.96	0.81	2.12
-215	-65.53	2.18	0.007	2.02	0.84	2.18
-210	-64.01	2.25	0.007	2.07	0.87	2.25
-205	-62.48	2.32	0.007	2.13	0.91	2.32
-200	-60.96	2.39	0.007	2.19	0.95	2.39
-195	-59.44	2.46	0.006	2.25	1	2.46
-190	-57.91	2.54	0.006	2.32	1.04	2.54
-185	-56.39	2.62	0.006	2.38	1.09	2.62
-180	-54.86	2.71	0.006	2.45	1.15	2.71
-175	-53.34	2.8	0.006	2.53	1.2	2.8
-170	-51.82	2.89	0.005	2.6	1.26	2.89
-165	-50.29	2.99	0.005	2.68	1.33	2.99
-160	-48.77	3.1	0.005	2.76	1.4	3.1
-155	-47.24	3.21	0.005	2.85	1.48	3.21
-150	-45.72	3.33	0.004	2.94	1.57	3.33
-145	-44.2	3.46	0.004	3.03	1.66	3.46
-140	-42.67	3.59	0.004	3.13	1.76	3.59
-135	-41.15	3.74	0.003	3.23	1.87	3.74
-130	-39.62	3.89	0.003	3.34	2	3.89
-125	-38.1	4.05	0.003	3.45	2.13	4.05
-120	-36.58	4.23	0.002	3.56	2.28	4.23
-115	-35.05	4.42	0.002	3.68	2.45	4.42
-110	-33.53	4.62	0.002	3.8	2.63	4.62
-105	-32	4.84	0.001	3.93	2.84	4.84
-100	-30.48	5.09	0.001	4.05	3.08	5.09
-95	-28.96	5.35	0	4.18	3.34	5.35
-90	-27.43	5.65	0	4.31	3.65	5.65
-85	-25.91	5.97	0.001	4.44	4	5.97
-80	-24.38	6.35	0.002	4.56	4.41	6.35
-75	-22.86	6.77	0.003	4.68	4.89	6.77
-70	-21.34	7.26	0.005	4.78	5.47	7.26
-65	-19.81	7.84	0.007	4.85	6.16	7.84
-60	-18.29	8.54	0.01	4.88	7.01	8.54
-55	-16.76	9.4	0.015	4.83	8.07	9.4
-50	-15.24	10.48	0.021	4.65	9.4	10.48
-45	-13.72	11.87	0.03	4.25	11.09	11.87
-40	-12.19	13.67	0.043	3.48	13.24	13.69
-35	-10.67	16.05	0.061	2.18	15.93	16.08
-30	-9.14	19.16	0.085	1.76	19.15	19.23
-25	-7.62	23.2	0.116	5.8	22.63	23.36
-20	-6.1	28.24	0.159	12.97	25.49	28.6
-15	-4.57	34.11	0.216	23.24	26.04	34.9
-10	-3.05	40.17	0.296	35.19	22.73	41.89
-5	-1.52	45.22	0.407	44.71	19.62	48.83
0	0	47.79	0.559	46.88	28.31	54.76
5	1.52	46.82	0.76	42.84	40.27	58.8
10	3.05	43.33	0.971	42.24	43.16	60.39
15	4.57	47.43	0.768	46.66	37.44	59.82
20	6.1	49.53	0.614	49.53	30.43	58.13
25	7.62	50.44	0.501	49.52	27.04	56.42
30	9.14	51.26	0.414	48.24	27.39	55.47

35	10.67	52.7	0.344	47.03	29.88	55.72
40	12.19	55.19	0.287	46.49	33.69	57.41
45	13.72	59.04	0.241	46.74	38.77	60.73
50	15.24	64.51	0.206	47.66	45.47	65.87
55	16.76	71.92	0.181	48.88	54.34	73.09
60	18.29	81.66	0.164	49.79	66.1	82.75
65	19.81	94.2	0.156	49.35	81.57	95.34
70	21.34	110.06	0.155	45.94	101.46	111.38
75	22.86	129.59	0.163	37.75	125.75	131.3
80	24.38	152.57	0.179	28.71	152.32	155.01
85	25.91	177.57	0.205	46.61	175.18	181.28
90	27.43	201.43	0.243	94.52	184.48	207.28
95	28.96	220.11	0.292	151.02	172.58	229.33
100	30.48	230.9	0.353	197.71	144.49	244.88
105	32	234.25	0.417	223.93	119.39	253.77
110	33.53	233.46	0.461	232.32	110.16	257.11
115	35.05	232.39	0.46	231.77	108.33	255.83
120	36.58	231.14	0.413	222.7	113.76	250.07
125	38.1	226.02	0.345	196.53	136.18	239.1
130	39.62	213.76	0.279	150.21	163.33	221.9
135	41.15	193.95	0.222	93.7	175.21	198.69
140	42.67	169.31	0.177	44	166.22	171.95
145	44.2	143.8	0.142	20.93	143.72	145.24
150	45.72	120.43	0.114	30.06	117.43	121.22
155	47.24	100.53	0.093	38.6	93.3	100.96
160	48.77	84.22	0.076	41.74	73.42	84.46
165	50.29	71.04	0.062	41.48	57.85	71.18
170	51.82	60.45	0.051	39.47	45.88	60.53
175	53.34	51.89	0.043	36.72	36.72	51.94
180	54.86	44.93	0.036	33.76	29.69	44.96
185	56.39	39.22	0.03	30.85	24.25	39.24
190	57.91	34.5	0.025	28.12	20	34.51
195	59.44	30.56	0.021	25.63	16.65	30.57
200	60.96	27.24	0.018	23.38	13.98	27.24
205	62.48	24.42	0.015	21.37	11.82	24.42
210	64.01	22.01	0.013	19.57	10.08	22.01
215	65.53	19.93	0.011	17.96	8.64	19.93
220	67.06	18.13	0.009	16.53	7.46	18.13
225	68.58	16.56	0.008	15.24	6.47	16.56
230	70.1	15.18	0.007	14.1	5.65	15.18
235	71.63	13.97	0.006	13.06	4.95	13.97
240	73.15	12.89	0.005	12.14	4.36	12.89
245	74.68	11.94	0.004	11.3	3.85	11.94
250	76.2	11.08	0.004	10.54	3.42	11.08
255	77.72	10.31	0.004	9.85	3.04	10.31
260	79.25	9.62	0.003	9.23	2.72	9.62
265	80.77	9	0.003	8.66	2.43	9
270	82.3	8.43	0.003	8.14	2.18	8.43
275	83.82	7.91	0.003	7.67	1.97	7.91
280	85.34	7.44	0.003	7.23	1.78	7.44
285	86.87	7.01	0.003	6.83	1.61	7.01
290	88.39	6.62	0.003	6.46	1.46	6.62
295	89.92	6.26	0.003	6.12	1.32	6.26
300	91.44	5.93	0.003	5.8	1.2	5.93
305	92.96	5.62	0.004	5.51	1.1	5.62
310	94.49	5.34	0.004	5.24	1	5.34
315	96.01	5.07	0.004	4.99	0.91	5.07
320	97.54	4.83	0.004	4.75	0.84	4.83
325	99.06	4.6	0.005	4.54	0.77	4.6
330	100.58	4.39	0.005	4.33	0.7	4.39

335	102.11	4.19	0.006	4.14	0.65	4.19
340	103.63	4.01	0.006	3.96	0.59	4.01
345	105.16	3.83	0.006	3.79	0.55	3.83
350	106.68	3.67	0.007	3.64	0.5	3.67
355	108.2	3.52	0.007	3.49	0.46	3.52
360	109.73	3.38	0.008	3.35	0.43	3.38
365	111.25	3.24	0.008	3.22	0.4	3.24
370	112.78	3.12	0.009	3.1	0.37	3.12
375	114.3	3	0.009	2.98	0.34	3
380	115.82	2.89	0.01	2.87	0.31	2.89
385	117.35	2.78	0.011	2.77	0.29	2.78
390	118.87	2.68	0.011	2.67	0.27	2.68
395	120.4	2.58	0.012	2.57	0.25	2.58
400	121.92	2.49	0.012	2.48	0.23	2.49
405	123.44	2.41	0.013	2.4	0.21	2.41
410	124.97	2.33	0.014	2.32	0.2	2.33
415	126.49	2.25	0.014	2.24	0.18	2.25
420	128.02	2.18	0.015	2.17	0.17	2.18
425	129.54	2.11	0.016	2.1	0.16	2.11
430	131.06	2.04	0.016	2.04	0.15	2.04
435	132.59	1.98	0.017	1.97	0.13	1.98
440	134.11	1.92	0.018	1.91	0.12	1.92
445	135.64	1.86	0.018	1.86	0.12	1.86
450	137.16	1.8	0.019	1.8	0.11	1.81
455	138.68	1.75	0.02	1.75	0.1	1.75
460	140.21	1.7	0.021	1.7	0.09	1.7
465	141.73	1.65	0.021	1.65	0.09	1.65
470	143.26	1.61	0.022	1.61	0.08	1.61
475	144.78	1.56	0.023	1.56	0.07	1.56
480	146.3	1.52	0.024	1.52	0.07	1.52
485	147.83	1.48	0.024	1.48	0.07	1.48
490	149.35	1.44	0.025	1.44	0.06	1.44
495	150.88	1.4	0.026	1.4	0.06	1.4
500	152.4	1.37	0.027	1.37	0.05	1.37

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*          *
*          AUDIBLE   NOISE      *
*          GENERATE ACOUSTIC POWER    *
*          (dB       above      1uW/m)   *
*          *
*********************************

L5         L50
BNDL       #         Type       Summer    Fair         RAIN        RAIN
------     --------  ----------  ----------  -------------
         2 AC        ******         -90.96 ******
         3 AC        ******         -91.55 ******
         4 AC        ******         -89.27 ******
         7 AC             -81.08     -58.94      -70.37
         8 AC             -75.55     -55.49      -65.57
         9 AC             -80.88     -58.81      -70.19
         1 Ground    Wire       ******    ******    ******
         5 Ground    Wire       ******    ******    ******
         6 Ground    Wire       ******    ******    ******

*****************************************
*          *
*          AUDIBLE   NOISE      *
*          *
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* Microphor is 5 feet above ground *
* Altitude 0 ft *
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<------ LATERAL DISTANCE (feet)	BPA FAIR WEATHER (meters)	METHOD L5 RAIN dB(A)	-------> L50 RAIN dB(A)	<- AVERAGE Ldn dB(A)	CRIEPI L5 FAIR dB(A)	--> L5 RAIN dB(A)	EdF L5 RAIN dB(A)	ENEL L5 RAIN dB(A)	IREQ RAIN dB(A)	dB(A)
-500	-152.4	3.4	31.9	28.4	0	0	0	33	33.9	0
-495	-150.88	3.4	31.9	28.4	0	0	0	33.1	34	0
-490	-149.35	3.4	31.9	28.4	0	0	0	33.1	34	0
-485	-147.83	3.5	32	28.5	0	0	0	33.1	34.1	0
-480	-146.3	3.5	32	28.5	0	0	0	33.2	34.1	0
-475	-144.78	3.6	32.1	28.6	0	0	0	33.2	34.1	0
-470	-143.26	3.6	32.1	28.6	0	0	0	33.2	34.2	0
-465	-141.73	3.6	32.1	28.6	0	0	0	33.3	34.2	0
-460	-140.21	3.7	32.2	28.7	0	0	0	33.3	34.2	0
-455	-138.68	3.7	32.2	28.7	0	0	0	33.4	34.3	0
-450	-137.16	3.8	32.3	28.8	0	0	0	33.4	34.3	0
-445	-135.64	3.8	32.3	28.8	0	0	0	33.4	34.4	0
-440	-134.11	3.9	32.4	28.9	0	0	0	33.5	34.4	0
-435	-132.59	3.9	32.4	28.9	0	0	0	33.5	34.4	0
-430	-131.06	4	32.5	29	0	0	0	33.5	34.5	0
-425	-129.54	4	32.5	29	0	0	0	33.6	34.5	0
-420	-128.02	4	32.5	29	0	0	0	33.6	34.6	0
-415	-126.49	4.1	32.6	29.1	0	0	0	33.7	34.6	0
-410	-124.97	4.1	32.6	29.1	0	0	0	33.7	34.6	0
-405	-123.44	4.2	32.7	29.2	0	0	0	33.8	34.7	0
-400	-121.92	4.2	32.7	29.2	0	0	0	33.8	34.7	0
-395	-120.4	4.3	32.8	29.3	0	0	0	33.8	34.8	0
-390	-118.87	4.3	32.8	29.3	0	0	0	33.9	34.8	0
-385	-117.35	4.4	32.9	29.4	0	0	0	33.9	34.9	0
-380	-115.82	4.4	32.9	29.4	0	0	0	34	34.9	0
-375	-114.3	4.5	33	29.5	0	0	0	34	34.9	0
-370	-112.78	4.5	33	29.5	0	0	0	34.1	35	0
-365	-111.25	4.6	33.1	29.6	0	0	0	34.1	35	0
-360	-109.73	4.6	33.1	29.6	0	0	0	34.2	35.1	0
-355	-108.2	4.7	33.2	29.7	0	0	0	34.2	35.1	0
-350	-106.68	4.7	33.2	29.7	0	0	0	34.2	35.2	0
-345	-105.16	4.8	33.3	29.8	0	0	0	34.3	35.2	0
-340	-103.63	4.9	33.4	29.9	0	0	0	34.3	35.3	0
-335	-102.11	4.9	33.4	29.9	0	0	0	34.4	35.3	0
-330	-100.58	5	33.5	30	0	0	0	34.4	35.4	0
-325	-99.06	5	33.5	30	0	0	0	34.5	35.4	0
-320	-97.54	5.1	33.6	30.1	0	0	0	34.5	35.5	0
-315	-96.01	5.1	33.6	30.1	0	0	0	34.6	35.5	0
-310	-94.49	5.2	33.7	30.2	0	0	0	34.6	35.6	0
-305	-92.96	5.3	33.8	30.3	0	0	0	34.7	35.6	0
-300	-91.44	5.3	33.8	30.3	0	0	0	34.7	35.7	0
-295	-89.92	5.4	33.9	30.4	0	0	0	34.8	35.7	0
-290	-88.39	5.4	33.9	30.4	0	0	0	34.9	35.8	0
-285	-86.87	5.5	34	30.5	0	0	0	34.9	35.8	0
-280	-85.34	5.6	34.1	30.6	0	0	0	35	35.9	0
-275	-83.82	5.6	34.1	30.6	0	0	0	35	35.9	0
-270	-82.3	5.7	34.2	30.7	0	0	0	35.1	36	0
-265	-80.77	5.8	34.3	30.8	0	0	0	35.1	36.1	0
-260	-79.25	5.8	34.3	30.8	0	0	0	35.2	36.1	0

-255	-77.72	5.9	34.4	30.9	0	0	0	35.2	36.2	0
-250	-76.2	6	34.5	31	0	0	0	35.3	36.2	0
-245	-74.68	6	34.5	31	0	0	0	35.4	36.3	0
-240	-73.15	6.1	34.6	31.1	0	0	0	35.4	36.4	0
-235	-71.63	6.2	34.7	31.2	0	0	0	35.5	36.4	0
-230	-70.1	6.2	34.7	31.2	0	0	0	35.6	36.5	0
-225	-68.58	6.3	34.8	31.3	0	0	0	35.6	36.5	0
-220	-67.06	6.4	34.9	31.4	0	0	0	35.7	36.6	0
-215	-65.53	6.5	35	31.5	0	0	0	35.8	36.7	0
-210	-64.01	6.5	35	31.5	0	0	0	35.8	36.7	0
-205	-62.48	6.6	35.1	31.6	0	0	0	35.9	36.8	0
-200	-60.96	6.7	35.2	31.7	0	0	0	36	36.9	0
-195	-59.44	6.8	35.3	31.8	0	0	0	36	36.9	0
-190	-57.91	6.8	35.3	31.8	0	0	0	36.1	37	0
-185	-56.39	6.9	35.4	31.9	0	0	0	36.2	37.1	0
-180	-54.86	7	35.5	32	0	0	0	36.2	37.2	0
-175	-53.34	7.1	35.6	32.1	0	0	0	36.3	37.2	0
-170	-51.82	7.2	35.7	32.2	0	0	0	36.4	37.3	0
-165	-50.29	7.3	35.8	32.3	0	0	0	36.5	37.4	0
-160	-48.77	7.4	35.9	32.4	0	0	0	36.6	37.5	0
-155	-47.24	7.5	36	32.5	0	0	0	36.6	37.6	0
-150	-45.72	7.6	36.1	32.6	0	0	0	36.7	37.6	0
-145	-44.2	7.6	36.1	32.6	0	0	0	36.8	37.7	0
-140	-42.67	7.7	36.2	32.7	0	0	0	36.9	37.8	0
-135	-41.15	7.8	36.3	32.8	0	0	0	37	37.9	0
-130	-39.62	7.9	36.4	32.9	0	0	0	37.1	38	0
-125	-38.1	8	36.5	33	0	0	0	37.2	38.1	0
-120	-36.58	8.2	36.7	33.2	0	0	0	37.3	38.2	0
-115	-35.05	8.3	36.8	33.3	0	0	0	37.4	38.3	0
-110	-33.53	8.4	36.9	33.4	0	0	0	37.5	38.4	0
-105	-32	8.5	37	33.5	0	0	0	37.6	38.5	0
-100	-30.48	8.6	37.1	33.6	0	0	0	37.7	38.6	0
-95	-28.96	8.7	37.2	33.7	0	0	0	37.8	38.7	0
-90	-27.43	8.8	37.3	33.8	0	0	0	37.9	38.8	0
-85	-25.91	9	37.5	34	0	0	0	38	38.9	0
-80	-24.38	9.1	37.6	34.1	0	0	0	38.1	39	0
-75	-22.86	9.2	37.7	34.2	0	0	0	38.2	39.1	0
-70	-21.34	9.3	37.8	34.3	0	0	0	38.3	39.2	0
-65	-19.81	9.5	38	34.5	0	0	0	38.5	39.4	0
-60	-18.29	9.6	38.1	34.6	0	0	0	38.6	39.5	0
-55	-16.76	9.8	38.3	34.8	0	0	0	38.7	39.6	0
-50	-15.24	9.9	38.4	34.9	0	0	0	38.9	39.8	0
-45	-13.72	10.1	38.6	35.1	0	0	0	39	39.9	0
-40	-12.19	10.2	38.7	35.2	0	0	0	39.2	40	0
-35	-10.67	10.4	38.9	35.4	0	0	0	39.3	40.2	0
-30	-9.14	10.6	39.1	35.6	0	0	0	39.5	40.4	0
-25	-7.62	10.8	39.3	35.8	0	0	0	39.6	40.5	0
-20	-6.1	10.9	39.4	35.9	0	0	0	39.8	40.7	0
-15	-4.57	11.1	39.6	36.1	0	0	0	40	40.9	0
-10	-3.05	11.3	39.8	36.3	0	0	0	40.2	41	0
-5	-1.52	11.5	40	36.5	0	0	0	40.4	41.2	0
0	0	11.7	40.2	36.7	0	0	0	40.6	41.4	0
5	1.52	12	40.5	37	0	0	0	40.7	41.6	0
10	3.05	12.2	40.7	37.2	0	0	0	40.9	41.8	0
15	4.57	12.4	40.9	37.4	0	0	0	41.1	42	0
20	6.1	12.7	41.2	37.7	0	0	0	41.3	42.2	0
25	7.62	13	41.5	38	0	0	0	41.5	42.4	0
30	9.14	13.2	41.7	38.2	0	0	0	41.7	42.6	0
35	10.67	13.5	42	38.5	0	0	0	42	42.9	0
40	12.19	13.8	42.3	38.8	0	0	0	42.3	43.2	0

45	13.72	14.2	42.7	39.2	0	0	0	42.5	43.5	0
50	15.24	14.5	43	39.5	0	0	0	42.8	43.8	0
55	16.76	14.9	43.4	39.9	0	0	0	43.2	44.1	0
60	18.29	15.3	43.8	40.3	0	0	0	43.5	44.5	0
65	19.81	15.8	44.3	40.8	0	0	0	43.9	44.8	0
70	21.34	16.2	44.7	41.2	0	0	0	44.3	45.2	0
75	22.86	16.7	45.2	41.7	0	0	0	44.7	45.7	0
80	24.38	17.2	45.7	42.2	0	0	0	45.2	46.1	0
85	25.91	17.7	46.2	42.7	0	0	0	45.6	46.5	0
90	27.43	18.2	46.7	43.2	0	0	0	45.9	46.9	0
95	28.96	18.5	47	43.5	0	0	0	46.3	47.2	0
100	30.48	18.8	47.3	43.8	0	0	0	46.5	47.5	0
105	32	19.1	47.6	44.1	0	0	0	46.7	47.6	0
110	33.53	19.2	47.7	44.2	0	0	0	46.8	47.7	0
115	35.05	19.2	47.7	44.2	0	0	0	46.8	47.7	0
120	36.58	19.1	47.6	44.1	0	0	0	46.7	47.6	0
125	38.1	18.9	47.4	43.9	0	0	0	46.5	47.5	0
130	39.62	18.5	47	43.5	0	0	0	46.3	47.2	0
135	41.15	18.2	46.7	43.2	0	0	0	46	46.9	0
140	42.67	17.7	46.2	42.7	0	0	0	45.6	46.5	0
145	44.2	17.3	45.8	42.3	0	0	0	45.2	46.1	0
150	45.72	16.8	45.3	41.8	0	0	0	44.7	45.7	0
155	47.24	16.3	44.8	41.3	0	0	0	44.3	45.3	0
160	48.77	15.8	44.3	40.8	0	0	0	43.9	44.8	0
165	50.29	15.4	43.9	40.4	0	0	0	43.5	44.5	0
170	51.82	14.9	43.4	39.9	0	0	0	43.1	44.1	0
175	53.34	14.6	43.1	39.6	0	0	0	42.8	43.8	0
180	54.86	14.2	42.7	39.2	0	0	0	42.5	43.4	0
185	56.39	13.9	42.4	38.9	0	0	0	42.2	43.1	0
190	57.91	13.5	42	38.5	0	0	0	41.9	42.9	0
195	59.44	13.2	41.7	38.2	0	0	0	41.7	42.6	0
200	60.96	13	41.5	38	0	0	0	41.4	42.3	0
205	62.48	12.7	41.2	37.7	0	0	0	41.2	42.1	0
210	64.01	12.4	40.9	37.4	0	0	0	40.9	41.9	0
215	65.53	12.2	40.7	37.2	0	0	0	40.7	41.7	0
220	67.06	11.9	40.4	36.9	0	0	0	40.5	41.5	0
225	68.58	11.7	40.2	36.7	0	0	0	40.3	41.3	0
230	70.1	11.5	40	36.5	0	0	0	40.1	41.1	0
235	71.63	11.3	39.8	36.3	0	0	0	40	40.9	0
240	73.15	11.1	39.6	36.1	0	0	0	39.8	40.7	0
245	74.68	10.9	39.4	35.9	0	0	0	39.6	40.6	0
250	76.2	10.7	39.2	35.7	0	0	0	39.5	40.4	0
255	77.72	10.6	39.1	35.6	0	0	0	39.3	40.3	0
260	79.25	10.4	38.9	35.4	0	0	0	39.2	40.1	0
265	80.77	10.2	38.7	35.2	0	0	0	39	40	0
270	82.3	10.1	38.6	35.1	0	0	0	38.9	39.8	0
275	83.82	9.9	38.4	34.9	0	0	0	38.7	39.7	0
280	85.34	9.8	38.3	34.8	0	0	0	38.6	39.6	0
285	86.87	9.6	38.1	34.6	0	0	0	38.5	39.4	0
290	88.39	9.5	38	34.5	0	0	0	38.4	39.3	0
295	89.92	9.3	37.8	34.3	0	0	0	38.2	39.2	0
300	91.44	9.2	37.7	34.2	0	0	0	38.1	39.1	0
305	92.96	9.1	37.6	34.1	0	0	0	38	39	0
310	94.49	9	37.5	34	0	0	0	37.9	38.8	0
315	96.01	8.8	37.3	33.8	0	0	0	37.8	38.7	0
320	97.54	8.7	37.2	33.7	0	0	0	37.7	38.6	0
325	99.06	8.6	37.1	33.6	0	0	0	37.6	38.5	0
330	100.58	8.5	37	33.5	0	0	0	37.5	38.4	0
335	102.11	8.4	36.9	33.4	0	0	0	37.4	38.3	0
340	103.63	8.3	36.8	33.3	0	0	0	37.3	38.2	0

345	105.16	8.1	36.6	33.1	0	0	0	37.2	38.1	0
350	106.68	8	36.5	33	0	0	0	37.1	38	0
355	108.2	7.9	36.4	32.9	0	0	0	37	38	0
360	109.73	7.8	36.3	32.8	0	0	0	36.9	37.9	0
365	111.25	7.7	36.2	32.7	0	0	0	36.8	37.8	0
370	112.78	7.6	36.1	32.6	0	0	0	36.8	37.7	0
375	114.3	7.5	36	32.5	0	0	0	36.7	37.6	0
380	115.82	7.5	36	32.5	0	0	0	36.6	37.5	0
385	117.35	7.4	35.9	32.4	0	0	0	36.5	37.4	0
390	118.87	7.3	35.8	32.3	0	0	0	36.4	37.4	0
395	120.4	7.2	35.7	32.2	0	0	0	36.4	37.3	0
400	121.92	7.1	35.6	32.1	0	0	0	36.3	37.2	0
405	123.44	7	35.5	32	0	0	0	36.2	37.1	0
410	124.97	6.9	35.4	31.9	0	0	0	36.1	37.1	0
415	126.49	6.8	35.3	31.8	0	0	0	36.1	37	0
420	128.02	6.8	35.3	31.8	0	0	0	36	36.9	0
425	129.54	6.7	35.2	31.7	0	0	0	35.9	36.9	0
430	131.06	6.6	35.1	31.6	0	0	0	35.8	36.8	0
435	132.59	6.5	35	31.5	0	0	0	35.8	36.7	0
440	134.11	6.5	35	31.5	0	0	0	35.7	36.7	0
445	135.64	6.4	34.9	31.4	0	0	0	35.6	36.6	0
450	137.16	6.3	34.8	31.3	0	0	0	35.6	36.5	0
455	138.68	6.2	34.7	31.2	0	0	0	35.5	36.5	0
460	140.21	6.2	34.7	31.2	0	0	0	35.5	36.4	0
465	141.73	6.1	34.6	31.1	0	0	0	35.4	36.3	0
470	143.26	6	34.5	31	0	0	0	35.3	36.3	0
475	144.78	6	34.5	31	0	0	0	35.3	36.2	0
480	146.3	5.9	34.4	30.9	0	0	0	35.2	36.2	0
485	147.83	5.8	34.3	30.8	0	0	0	35.2	36.1	0
490	149.35	5.8	34.3	30.8	0	0	0	35.1	36	0
495	150.88	5.7	34.2	30.7	0	0	0	35	36	0
500	152.4	5.6	34.1	30.6	0	0	0	35	35.9	0

Audible noise prediction methods do not apply to all line geometries, voltages, or weather conditions If a prediction method does not apply, the appropriat output data column will be zeros.

EXHIBIT BB
OTHER INFORMATION

OAR 345-021-0010(1)(bb)

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BB.1 INFORMATION REQUESTED IN PROJECT ORDER BB-1

BB.1 INFORMATION REQUESTED IN PROJECT ORDER

OAR 345-021-0010(1)(bb) *Any other information that the Department requests in the project order or in a notification regarding expedited review.*

Response: The Department approved the Boardman Solar Energy Facility (Facility) for expedited review as a small-capacity facility in a letter dated August 26, 2016. The approval letter did not request any other information that should be included and addressed in Exhibit BB. Per OAR 345-015-300(3) regarding requests for expedited review, the Department will issue a project order for the Facility following submission of the preliminary Application for Site Certificate. Boardman Solar Energy LLC (Applicant) will provide other information as requested in the project order.

EXHIBIT CC
ADDITIONAL STATUTES, RULES, AND ORDINANCES

OAR 345-021-0010(1)(cc)

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CC.1 OVERVIEW.....CC-1

CC.2 ADDITIONAL STATUTES, RULES, AND ORDINANCES.....CC-1

TABLE

CC-1 State Statutes, Rules, and Ordinances Referenced in Other Exhibits.....CC-1

CC.1 OVERVIEW

Response: Exhibit CC identifies "all state statutes and administrative rules and local government ordinances containing standards or criteria" that the proposed Boardman Solar Facility (Facility) must meet for the Energy Facility Siting Council to issue a site certificate, other than statutes, rules, and ordinances identified in Exhibit E.

CC.2 ADDITIONAL STATUTES, RULES, AND ORDINANCES

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.*

Response: Table CC-1 identifies by relevant administering agency and legal citation the state statutes and administrative rules and local government ordinances referenced in other Exhibits, with the exception of those presented in Exhibit E. The identified statutes, rules, and ordinances contain standards or criteria that the proposed Facility must meet for the Council to issue a site certificate.

Table CC-1. State Statutes, Rules, and Ordinances Referenced in Other Exhibits

Administering Agency	Agency Address	Legal Citation	Relevant Exhibit
Oregon Department of Agriculture	Oregon Department of Agriculture 635 Capitol Street, N.E. Salem, OR 97301-2532 (503) 986-4550	Plant Conservation Biology Program—ORS 564; OAR Chapter 603, Division 73	**Exhibit Q** discusses plant species in the Facility analysis area that are threatened or endangered.
Oregon Parks and Recreation Department—Archaeological	State Historic Preservation Office 725 Summer St. NE, Suite C Salem, OR 97301 (503) 986-0671	Native American Graves and Protected Objects—ORS 97.740-97.760 Archaeological Objects and Sites—ORS 358.905-358.961	**Exhibit S** provides information about historic, cultural, and archaeological resources in the Facility analysis area.
Oregon Department of Environmental Quality—Water Quality	Oregon Department of Environmental Quality 475 NE Bellevue Dr., Suite 110 Bend, OR 97701 (541) 388-6146	Water Quality—ORS 468 and 468B; OAR Chapter 340, Divisions 41, 45, 52, and 55	**Exhibit O** discusses water requirements, sources, permits, transfers, and mitigation measures**.**
Oregon Department of Environmental Quality—Noise	Oregon Department of Environmental Quality 811 SW 6th Avenue Portland, OR 97204-1390 (503) 229-5696	Noise Control Regulations—ORS 467; OAR Chapter 340, Division 35	**Exhibit X** provides an analysis of noise impacts from the Facility and compliance with required thresholds.
Oregon Department of Environmental Quality—Hazardous Waste Management	Oregon Department of Environmental Quality 811 SW 6th Avenue Portland, OR 97204-1390 (503) 229-5696	Hazardous Waste Management—ORS 465 and 466; OAR Chapter 340, Divisions 100-113	**Exhibit G** describes proposed measures for managing hazardous waste generated by the Facility.

Table CC-1. State Statutes, Rules, and Ordinances Referenced in Other Exhibits

Administering Agency	Agency Address	Legal Citation	Relevant Exhibit
Oregon Department of Environmental Quality—Solid Waste	Oregon Department of Environmental Quality 811 SW 6th Avenue Portland, OR 97204-1390 (503) 229-5696	Solid Waste—RS 459; OAR Chapter 340, Division 93	**Exhibit V** describes proposed measures for managing solid waste generated by the Facility.
Oregon Department of Fish and Wildlife—Habitat Conservation Division	Oregon Department of Fish and Wildlife 3406 Cherry Avenue N.E. Salem, OR 97303-4924 (503) 947-6000	Habitat Conservation—ORS 496; OAR Chapter 635, Divisions 100 and 415	**Exhibits J**, **P**, **and Q** address Facility impacts on wetlands, fish and wildlife habitat, and threatened or endangered species, respectively. Proposed mitigation measures are described.
Oregon Biodiversity Information Center (formerly the Oregon Natural Heritage Information Center)	Oregon Biodiversity Information Center Oregon State University Institute for Natural Resources University Center Building, Suite 335 527 SW Hall Street Portland, OR 97201 503-725-9950	Threatened or Endangered Plants—ORS 564.105; OAR 603, Division 73 and 345-022-0070	**Exhibit Q** addresses Facility impacts on threatened or endangered plant species. Proposed mitigation measures are described.
Oregon Department of Geology and Mineral Industries	Oregon Department of Geology and Mineral Industries 800 NE Oregon Street, Suite 965 Portland, OR 97232 (971) 673-1555	Department of Geology and Mineral Industries Administrative Rules—OAR Chapter 632	**Exhibits H and I** address geologic and soil stability and soil conditions, respectively.
Oregon Office of State Fire Marshal—Emergency Planning and Community Right-to-Know Act (EPCRA)	Oregon Office of State Fire Marshal 4760 Portland Rd NE Salem, OR 97305-1760 (503) 378-3473	Radiation Sources; Hazardous Substances—ORS 453; OAR Chapter 837, Divisions 85 and 95	**Exhibit G** describes proposed measures for managing hazardous waste generated by the Facility.
Oregon Water Resources Department—Water Rights Division	Department of Water Resources Commerce Building 158 12th NE Salem, OR 97301-4172 (503) 378-8455	Appropriation of Water Generally—ORS Chapter 537 Distribution of Water; Watermasters; Change in Use; Transfer or Forfeiture of Water Rights—ORS Chapter 540 Water Resources Administrative Rules—OAR Chapter 690	**Exhibit O** discusses water requirements, sources, permits, transfers, and mitigation measures**.**
Oregon Department of State Lands—Land Ownership	Oregon Department of State Lands 775 Summer Street NE, Suite 100 Salem, OR 97301-1279 (503) 378-3805	Department of State Lands—OAR Chapter 141	**Exhibit F** provides information related to the land ownership notification requirements for this ASC.

Table CC-1. State Statutes, Rules, and Ordinances Referenced in Other Exhibits

Administering Agency	Agency Address	Legal Citation	Relevant Exhibit
Department of Land Conservation and Development	Department of Land Conservation and Development 635 Capitol Street NE, Suite 150 Salem, OR 97301-2540 (503) 373-0050	Comprehensive Land Use Planning Coordination—ORS Chapter 197, ORS 215.274 Oregon Department of Land Conservation and Development Administrative Rules—OAR Chapter 660	**Exhibit K** addresses Facility adherence to Oregon state and local land conservation and development laws and requirements.

EXHIBIT DD
OTHER SPECIFIC STANDARDS

OAR 345-021-0010(1)(dd)

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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:*

DD.1 WIND ENERGY FACILITIES

OAR 345-021-0010(1)(dd)(A) *For wind energy facilities, OAR 345-024-0010 and 0015.*

Response: Boardman Solar Energy LLC (Applicant) is not proposing to build a wind energy facility. Therefore, OAR 345-021-0010(1)(dd)(A) does not apply.

DD.2 GAS FACILITIES

OAR 345-021-0010(1)(dd)(B) *For surface facilities related to underground gas storage reservoirs, OAR 345-024-0030, including information required by OAR 345-021-0020.*

Response: The proposed Boardman Solar Energy Facility (Facility) does not include underground gas storage reservoirs. Therefore, OAR 345-021-0010(1)(dd)(B) does not apply.

DD.3 TRANSMISSION LINES UNDER COUNCIL JURISDICTION

OAR 345-021-0010(1)(dd)(C) *For any transmission line under Council jurisdiction, OAR 345-024-0090.*

Response: The Facility does not include a transmission line that meets the definition of an energy facility under Energy Facility Siting Council jurisdiction. However, the proposed 115-kilovolt transmission line is a related or supporting facility. Exhibit AA contains information regarding compliance with OAR 345-024-0090 for this related or supporting facility.