# Exhibit U

# Availability of Public and Private Providers to Provide Services

**Nolin Hills Wind Power Project**
**January 2022**

**Prepared for**

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

**d/b/a Nolin Hills Wind, LLC**

**Prepared by**

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# Acronyms and Abbreviations

| | |
|---|---|
| ADT | average daily traffic |
| Applicant | Nolin Hills Wind, LLC |
| BESS | battery energy storage system |
| BMP | Best Management Practice |
| CR | County Road |
| DoD | Department of Defense |
| ESCP | Erosion and Sediment Control Plan |
| FAA | Federal Aviation Administration |
| FR | Federal Register |
| I-84 | Interstate Highway 84 |
| LOS | level of service |
| met towers | meteorological data collection towers |
| NPDES | National Pollutant Discharge Elimination System |
| O&M | operations and maintenance |
| OAR | Oregon Administrative Rules |
| ODA | Oregon Department of Aviation |
| ODOT | Oregon Department of Transportation |
| OHP | Oregon Highway Plan |
| ORS | Oregon Revised Statutes |
| Project | Nolin Hills Wind Power Project |
| RV | recreational vehicle |
| SGHAT | Solar Glare Hazard Analysis Tool |
| TSP | Transportation System Plan |
| UEC | Umatilla Electric Cooperative |
| US | United States |
| US-395 | US Highway 395 |
| V/C | volume to capacity |

# 1.0 Introduction

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

# 2.0 Applicable Rules and Standards

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

> ***345-022-0110 Public Services***
>
> *(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area described in the project order to provide: sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools.*
>
> *(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.*
>
> *(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.*

# 3.0 Analysis

## 3.1 Analysis Area

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

## 3.2 Information Required by OAR 345-021-0010(1)(u)

*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 must include:*

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

### *3.2.1 Assumptions Used to Evaluate Potential Impacts*

#### *3.2.1.1 Construction Employment*

During construction, an average of 140 workers will be present at the Project. An estimated maximum of 500 workers will be on-site at one time, as multiple disciplines of contractors complete their work simultaneously during periods of the highest activity. Most construction workers will be employees of construction and equipment manufacturing companies under contract to Nolin Hills Wind, LLC (the Applicant).

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

Workers in some positions, such as construction foremen and inspectors, will be employed for the entire 18-month duration of the Project, but many workers will be employed for 6 to 12 months and therefore will not be expected to bring families with them. The Applicant assumes very few workers will relocate their families.

Because most construction workers will not be in the area for more than 6 to 12 months, housing for most construction workers will primarily be provided by hotels and recreational vehicle (RV) parks. For purposes of analyzing potential impacts on housing availability, the Applicant assumes that workers will commute from up to 30 miles away from the Project. While not all of Umatilla and Morrow counties are located within the Analysis Area or within 30 miles of the Project, housing data were reviewed for both counties, because housing data are available at a countywide level.

#### *3.2.1.2 Operation and Maintenance Employment*

An estimated 10 to 15 operational personnel will be permanently employed by the Project at its full approximately 600-megawatt capacity. The operations and maintenance (O&M) staff will be hired locally, to the extent that skilled workers are available. As a conservative assumption, it is assumed that up to 10 workers may relocate from outside the area. Some outside contractors may also be required from time to time for specialized maintenance tasks, such as turbine inspections, or the repair of nacelles or meteorological equipment. The Applicant assumes that the Project will be in operation for at least 30 years.

#### *3.2.1.3 Facility Retirement Employment*

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

#### *3.2.1.4 Other Assumptions*

Other assumptions regarding public and private services include the use of water and the number of construction and individual trips taken to bring workers and materials to and from the Project. Approximately 71 million gallons of water will be needed during Project construction, primarily for dust control and making concrete for foundations. This water will be provided from a municipal supplier(s). Water use during operations, at the O&M Building, is estimated at 50-100 gallons per worker per day, for a total of less than 5,000 gallons per day. This water will be provided by an on-site well. An additional 1,120,000 gallons per year may be used to wash solar panels. Panel-washing water will be purchased from a local municipality as described in Exhibit O.

During construction, the Applicant assumes up to 234 one-way delivery truck trips per day, and up to 800 one-way private vehicle trips per day to bring workers to the Project. During operation, the Applicant assumes approximately 15 full-time workers will commute to and from the facility.

### *3.2.2 Affected Public and Private Service Providers and Potential Impacts*

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

### *3.2.2.1 Sewers and Sewage Treatment*

In the rural area surrounding the Project, there are no developed sewer systems that will be impacted by construction or operation of the Project, although sewer systems in Stanfield, Hermiston, Echo, and Pendleton are located within the Analysis Area. None would be impacted by the Project. Within the portion of the Project Site Boundary containing turbines and the solar array, sewage treatment is limited to on-site septic systems.

During construction, sanitary waste will be collected on-site in portable toilets, to be provided and maintained by a licensed subcontractor. During operations, sanitary waste will be limited to domestic wastewater from the Project's O&M Building, which will be discharged to a licensed on-site septic system. Due to the distance to the nearest developed sewer system from the O&M Building, the Applicant does not anticipate that connection to sewers or sewage treatment facilities will be required. Therefore, impacts to community sewer systems are not anticipated.

### *3.2.2.2 Water*

In the rural area surrounding the Project, there are no developed water systems that will be impacted by construction or operation of the Project. Water sources in the analysis area are limited to the water pipelines and water treatment and supply systems associated with the cities of Stanfield, Echo, and Hermiston, private landowners' wells, and Umatilla surface water rights.

As discussed in Exhibit O, potential water sources for use during construction include the City of Hermiston, City of Pendleton, and/or the City of Echo.

Because water for construction can be obtained from permitted sources with adequate water rights, public water systems will not be adversely affected by construction of the Project. The Public Works Departments of Hermiston, City of Pendleton, and the City of Echo have provided written correspondence (see Exhibit O, Attachment O-1) that adequate water is available for the construction of the Project. Construction of the Project will not affect the small number of private landowner wells already existing in the Analysis Area.

Water use during operation of the Project will include small amounts used at the O&M Building for sanitation and human consumption. The Applicant expects to rely on an exempt well allowed under Oregon Revised Statutes (ORS) 537.545 to provide water to the O&M Building, which will not require the Applicant to obtain a new water right. The limited amount of water that can be used from an exempt well is not expected to result in injury to other private water rights in the vicinity of the Project. Water for solar panel washing will be obtained from either the City of Hermiston, City of Pendleton, or the City of Echo. The cities have water capacity to supply up to 1.1 million gallons annually, for periodic solar array washing (see Exhibit O). Because water for operation can be obtained from permitted sources with adequate water rights, public water systems will not be adversely affected by operation of the Project.

### *3.2.2.3 Stormwater Drainage*

Stormwater infrastructure within the Site Boundary is limited to minimal facilities associated with public roads maintained by Umatilla County, state highways, and Interstate Highway 84 (I-84).

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

Stormwater runoff generated in areas disturbed by Project construction will be managed on-site, through the use of retention and infiltration systems as described in the Project's National Pollutant Discharge Elimination System (NPDES) 1200-C construction permit and accompanying Erosion and Sediment Control Plan (ESCP; Exhibit I, Attachment I-2). Most of the area within the Project Site Boundary is vegetated, which will serve as a buffer to promote infiltration and minimize erosion.

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

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

### *3.2.2.4 Solid Waste Management*

Umatilla County provides solid waste disposal and recycling services through franchise agreements with various private providers. Solid waste disposal for the Project during construction and operations will be provided through a private contract with a local commercial hauler (or haulers). The regional landfill closest to the Project Site Boundary is the Finley Buttes Regional Landfill, located approximately 12 miles south of Boardman, Oregon. The Columbia Ridge Landfill located near the town of Arlington in Gilliam County, Oregon, located approximately 50 miles from the Project, also accepts construction and municipal solid wastes.

Construction and operation of the Project will not have an adverse impact on solid waste management. Project construction will generate a variety of solid wastes, including concrete, scrap metal, and wood and plastics used to secure and protect components during shipping. All waste will be collected in a central location during construction, to be hauled away by a licensed waste disposal service for disposal or recycling. Excess soil from road construction and foundation excavation will be spread on site to the extent practicable, or hauled off-site to be disposed of in accordance with applicable regulations. Operation and maintenance of the Project will employ an estimated 10 to 15 people, which will result in little generation of solid waste. Exhibit V includes detailed information about types and quantities of solid waste and disposal.

The Applicant will recycle wastes to the extent practicable, and will coordinate with waste and recycling franchisees servicing the Project, in accordance with the Umatilla County Solid Waste Ordinance. Solid wastes are anticipated to be disposed at the Finley Buttes Landfill or the Columbia Ridge Landfill, which have adequate capacity to serve the Project. Correspondence with the Finley Buttes Landfill and Columbia Ridge Landfill confirms that both landfills will be able to easily handle construction waste generated by Project construction and operation (Attachment U-1).

#### *3.2.2.5 Housing*

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

While some construction contractors will be hired locally, many construction workers are expected to come from outside the Project vicinity and will require temporary housing. Assuming conservatively that only 30 percent of the construction workers will be local residents, an average of about 100 and a peak of about 350 new workers will be temporary residents (in-migrants) in the area in need of temporary housing. Typical housing options for temporary workers include hotels or motels, apartments, short-term rental homes, and campgrounds, or other areas where workers can park mobile housing (e.g., trailers or RVs).

Construction workers may commute daily from many communities within and beyond the immediate Project vicinity, including Echo, Stanfield, Hermiston, Pendleton, Pilot Rock, and Umatilla, Oregon. Because workers can spread out to many communities within a commutable distance, the impacts to housing in the immediate vicinity of the Project will be lessened.

Motels, hotels, and trailer or RV parking will be the most available housing option for temporary residents. An Internet search using Google Maps and travel websites such as Expedia.com and Kayak.com identified more than 30 hotel and motels and over 20 RV parks in Umatilla and Morrow counties (Google 2019; Expedia 2019; Kayak 2019). According to the American Hotel and Lodging Association, hotels in the Oregon 2nd Congressional District, which includes Umatilla and Morrow counties, have an average of 60 rooms per hotel (AHLA 2018). Using this average, Umatilla and Morrow counties have approximately 1,800 hotel and motel rooms. Most of these are found in Hermiston or Pendleton. Additional rooms may be available in establishments that do not have information on the Internet, or in communities located farther from the assumed commutable distance of 30 miles from the Project, but still roughly an hour away from the Project, such as in Kennewick, Washington. Although not all of these housing facilities will be available at any given time, adequate supplies are available in relation to the number of temporary workers.

The availability of temporary housing varies seasonally. Demand for temporary housing is generally greatest during the tourism season in the summer months. The average hotel and motel occupancy rate during the month of August 2019, the most recent data available from the Oregon Tourism Commission, was 80.8 percent statewide, and in Eastern Oregon (comprising 11 counties, including Umatilla and Morrow counties) the occupancy rate was 73 percent. Year-to-date occupancy rates

through the month of August 2019, which are more indicative of the low tourist season occupancy, were 67.8 percent statewide and 59.1 percent in Eastern Oregon (Oregon Tourism Commission 2019). Based on the higher of these two occupancy rates (i.e., month of May 2018 data and year-to-date through May 2018 data), it is likely that 686 rooms will be available for rent during the high tourism season and approximately 900 rooms will be available during the low tourism season.

Some construction workers, particularly those employed for the entire duration of construction, may rent a house or apartment during construction of the Project. Table U-1 presents the rental housing supply and availability data for Umatilla and Morrow counties, as reported in the 2017 United States (US) Census American Community Survey (US Census Bureau 2017). The estimated number of vacant rental units is calculated as a percentage of total vacant housing units; that percentage is based on the ratio of renter-occupied dwellings to owner-occupied dwellings. Using this method, an estimated 1,185 housing units will be available for rent in Umatilla County, and 181 housing units will be available for rent in Morrow County.

**Table U-1. Available Housing Estimates**

| Geographic Area | Total Housing Units | Vacant Housing Units | Of Occupied Housing, Percentage Occupied by Renter | Estimated Number of Vacant Rental Units |
|---|---|---|---|---|
| Umatilla County | 30,172 | 3,196 | 37.1 | 1,185 |
| Morrow County | 4,558 | 622 | 29.1 | 181 |
| Source: U.S. Census Bureau 2017. | | | | |

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

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

In the 2021 to 2023 timeframe, potential construction projects in the area include the Project, the Perennial Wind Chaser Station natural gas generating plant in Hermiston, the Boardman to Hemingway Transmission Line Project, and the Wheatridge Wind Energy Facility in Morrow County (currently under construction). See Figure C-3 in Exhibit C for known energy projects within 10 miles of the Project. In addition, other non-energy projects may be undertaken in the area around the Project.

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

Construction of the Project will require temporary housing for an estimated peak of about 350 workers who will be temporary residents (in-migrants) in the area. Based upon the publicly

available information in the Application for Site Certificate for the following energy projects, construction of the Boardman to Hemingway Transmission Line Project will require housing for up to approximately 243 workers during peak construction times, construction of the Perennial Wind Chaser Plant will require housing for approximately 225 workers during peak construction times, and the Wheatridge Wind Energy Facility will require housing for approximately 250 workers during peak construction times (Idaho Power 2017; Perennial-WindChaser LLC 2014; Wheatridge Wind Energy, LLC 2015). Because the Wheatridge Wind Energy Facility is already under construction, it may be complete or the peak construction work force for that project may be reduced by the time the Nolin Hills Project is constructed.

An adequate stock of temporary housing is available for construction workers building the Project. In the unlikely event that the large infrastructure projects identified above overlap such that their three workforces all require housing in the area at the same time, an adequate temporary housing stock appears to be available in Umatilla and Morrow counties.

### *3.2.2.6 Transportation and Traffic Safety*

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

The construction of the Project will result in a temporary increase in local traffic, including large trucks and construction equipment, as well as construction workers' vehicles. Primary transportation corridors and a few major county roads will carry the majority of construction-related truck and workforce traffic. The primary corridors are I-84, I-82, and US Highway 395 (US-395). Deliveries will generally follow County Road (CR) 1350 from US-395. CR-1350 (Coombs Canyon Road) will see increased traffic as it will be a primary delivery route. Other local county roads, such as CR-1361, CR-1362, CR-1363, and CR-1394, as well as some private roads on leased lands inside the Site Boundary, may also see increases in traffic. Additional private access roads will be developed within the Site Boundary to each of the proposed wind turbines, the solar array, and associated facilities. Figure U-1 identifies primary construction traffic routes to the Project.

The Applicant may also use the existing Union Pacific Railroad tracks to transport construction materials and equipment to Hermiston or another nearby rail/distribution center, then by truck to the site following the transportation route described above. The Applicant met with Union Pacific Railroad to discuss rail transport logistics to the site. Height restrictions (14 feet, 6 inches) on nearby bridges are too low to allow the passage of turbine tower bases and nacelles to be transported by rail as far as the Nolin siding. Other restrictions such as turning radii along the track would restrict delivery of other components. Therefore, in the immediate vicinity of the Project, all materials will arrive by road. If some materials are shipped by rail to Hermiston, this will reduce the amount of project related traffic on major roadways such as I-84 farther from the Project.

## Performance Standards and Existing Traffic

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

Transportation engineers have established various standards for measuring the traffic capacity of roadways or intersections. Each standard is associated with a particular LOS. The LOS concept requires the consideration of factors that include travel speed, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort and convenience, and operating costs. In the Umatilla County Transportation System Plan (TSP; Umatilla County 2002), LOS was defined by a letter grade from A to F, with each grade representing a range of volume to capacity (V/C) ratios. A V/C ratio is the peak hour traffic volume on a highway divided by the maximum volume that the highway can handle. If traffic volume entering a highway section exceeds the section's capacity, then disruptions in traffic flow will occur, reducing the LOS. LOS A represents free-flowing traffic and LOS F represents conditions where the road system is totally saturated with traffic and movement is very difficult.

The Oregon Highway Plan (OHP) guides state highway development and management for a 20-year planning horizon. In this plan, ODOT identified the performance standards in terms of V/C for state highways. Table U-2 lists applicable maximum V/C for peak hour operating conditions from the OHP (ODOT 2018a).

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

| Highway Category | Inside Urban Growth Boundary[1] | Unincorporated Communities | Rural Lands |
|---|---|---|---|
| Interstate Highways (I-84, I-82) | 0.80 to 0.85 | 0.70 | 0.70 |
| Statewide Expressways (US-395) | 0.80 to 0.85 | 0.70 | 0.70 |

Source: ODOT 2018a.

1. A small portion of I-84 and US-395 along the Project's primary transportation route is located within Pendleton's Urban Growth Boundary.

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

**Table U-3. Level of Service(LOS) to Volume to Capacity (V/C) Equivalencies**

| LOS | Equivalent V/C | Typical Traffic Flow Conditions for Two-Lane Highways |
|---|---|---|
| A | 0.00 to 0.48 | Motorists are able to drive at their desired speed which, without strict enforcement, would result in average speeds approaching 60 miles per hour (mph). Passing demand is well below passing capacity, and almost no platoons of three or more vehicles are observed. |
| B | 0.49 to 0.59 | Speeds of 55 mph or slightly higher are expected on level terrain. Passing demand needed to maintain desired speeds becomes significant and approximately equals the passing capacity. |
| C | 0.60 to 0.69 | Further increases in flow result in noticeable increases in platoon formation, platoon size, and frequency of passing impediment. Average speed still exceeds 52 mph on level terrain, even though unrestricted passing demand exceeds passing capacity. While traffic flow is stable, it is becoming susceptible to congestion due to turning traffic and slow-moving vehicles. |
| C-D | 0.70 to 0.73 | |
| D | 0.74 to 0.83 | Unstable traffic flow as passing demand is very high. Average platoon sizes of 5 to 10 vehicles are common, although speeds of 50 mph can still be maintained under ideal conditions. This is the highest flow rate that can be maintained for any length of time over an extended section of level terrain without a high probability of breakdown. |
| D-E | 0.84 to 0.87 | |
| E | 0.88 to 0.97 | Under ideal conditions, speeds will drop below 50 mph. Average travel speeds on highways with less than ideal conditions will be slower, as low as 25 mph on sustained upgrades. Passing is virtually impossible and platooning becomes intense when slower vehicles or other interruptions are encountered. |
| E-F | 0.98 to 0.99 | |
| F | 1.00 | Heavily congested flow with traffic demand exceeding capacity. |
| Source: Umatilla County 2002. | | |

According to the TSP (Umatilla County 2002)[1], all rural segments of freeways in Umatilla County operate at LOS A or better during average conditions, and at LOS B or better during peak summer conditions. All but one segment (on US 730, a road that would not carry Project traffic) of rural two-lane highways in Umatilla County operate at LOS C or better.

Average daily traffic (ADT) volumes along most local roads are less than 500. Collector roads are intended to carry between 1,200 and 10,000 ADT, and the TSP reports that most of these carry below 1,000 ADT (Umatilla County 2002). As assessed at the time of the TSP, all roads used for access to the Project operated at LOS A (<0.48 V/C). Access to and from "highly important" roads at

[1] A telephone conversion between Tetra Tech and the Umatilla County Department of Land Use Planning on August 3, 2018, confirmed that the 2002 TSP is the most current version, and no updates to the TSP have occurred. This remains the case as of September 24, 2020.

intersecting minor roads is also adequate, reaching an estimated LOS B, where peak hour minor road traffic volumes reach up to 150 vehicles per hour.

ODOT also assigns a federal functional class to state highway segments, as defined by the Federal Highway Administration (FHWA 2017; ODOT 2020). Table U-4 shows the current federal functional class assigned by ODOT for applicable segments of I-84 and US-395, and the associated ADT ranges.

**Table U-4. ODOT Federal Functional Classification for State Highway Segments**

| Highway Segment | Federal Functional Class[1] | ADT Range[2] |
|---|---|---|
| I-84 (MP 167.58 – MP 206.71) | Rural Interstate | 12,000 – 34,000 |
| I-84 (MP 206.71 – MP 212.58) | Urban Interstate | 35,000 – 129,000 |
| US-395 (MP 2.1 – MP 6.68[3]) | Urban Other Principal Arterial | 7,000 – 27,000 |
| US-395 (MP 6.68 – MP 15.68) | Rural Other Principal Arterial | 2,000 – 8,500 |

1. As assigned by ODOT (ODOT 2020) based on federal criteria (FHWA 2017).
2. FHWA (2017)
3. At intersection of US-395 and County Road-1350 (Coombs Canyon Road).

## Road Design Standards

State highways are designed and constructed to handle legal loads of 80,000 pounds. Some trucks that deliver large and heavy equipment (typically the base tower sections, nacelles, main transformers, and blades) will be required to obtain oversize/overweight permits. These permits allow travel on all unrestricted roads. I-84, I-82, and US-395 are constructed to standards that will safely allow the legally oversize/overweight trucks to pass with no adverse impact on the road surface. At this time, none of the state roads are restricted; nevertheless, at the time of construction, ODOT and the county transportation departments will be contacted by the transportation contractor to make certain that no roads are restricted at that time. As of the 2018 ODOT pavement conditions report, the pavement conditions are either very good, good, or fair, with one short segment of US-395 near Pilot Rock rated as poor (ODOT 2018b). No impairment to the quality of these roads is expected.

The condition of the existing county roads that will be used by the Project vary from improved gravel two-lane roads to two-track roads with minimal aggregate surfacing. Some of the private roads will require upgrading to accommodate the truck traffic associated with the wind farm construction. This may include widening, replacing cattle guards, replacing or adding covers to culverts, or adding road base aggregate to the existing roads. Improvements to county roads will be limited to temporary turning radius expansions with relevant permits from Umatilla County.

CR-1350, CR-1361, and CR-1363 are located within the Project Site Boundary and will be used during construction and operation of the Project. These roads are well-maintained gravel roads and are in good condition based upon recent field observations. Construction truck traffic should also not adversely impact these roads, because they are constructed for legal loads. These roads

frequently see fully loaded trucks carrying grain and other agricultural materials with similar loadouts to the construction-related trucks that will be associated with the Project.

The final category of roads are local roads that are not paved. These roads are either one or two lanes wide, have some to minimal aggregate on the surface, frequently have culvert pipes with inadequate covers, and have grades and corners that may require flattening or widening to accommodate the large and long construction trucks, in particular the turbine component and transformer delivery trucks. These roads may require the addition of more road base aggregate to support the loads, replacement or lengthening of culverts, grading, and replacement of cattle guards. At the design stage of the Project, a careful inspection of these roads will be required to determine where and what improvements will be needed to make these roads serviceable for construction traffic. It is expected that existing local unpaved roads will be upgraded from their current status to support construction.

## Project Trip Generation

*Truck Traffic*

The construction activities are anticipated to take approximately 18 months from mobilization until commercial operation. During construction, trucks will be using I-84, US-395, and local county roads to bring construction equipment, turbine components, solar components, substation equipment, and transmission line equipment to the various Project construction sites. Trucks will also be used to bring road base aggregate to improve existing roads and to construct new access roads; concrete for the turbine, substation, battery energy storage system (BESS), and O&M Building foundations; and water for dust control. As previously noted, the Project materials and equipment will arrive via I-84 and US-395. Figure U-1 identifies primary construction traffic routes to the Project.

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

- Civil construction and material (aggregate, culverts, etc.) supply for new roads and upgrades to existing roads, turbine erection pads and crane pads, solar inverter/transformer and BESS areas, substations, laydown areas, collector lines, transmission lines, and the O&M Building;
- Turbine and related component delivery, including towers, nacelles, hubs, blades, pad mount transformers, substation equipment and transformers, collector line components, transmission line towers and conductor, and O&M Building materials;
- Solar modules and related equipment delivery, including racking system structure, electrical wiring/cabling and equipment, steel posts, inverters, and transformers;
- BESS delivery, including containers, battery modules, and all related equipment based on the final technology selected;

- Material supply for turbine foundations and solar area foundations such as for posts and BESS containers (sand, aggregate, cement, and steel rebar);
    - The Applicant assumes concrete will be batched on-site in temporary plants; local suppliers may be used instead at the option of the construction contractor;
- Delivery of on-site construction equipment such as cranes, dozers, graders, compactors, forklifts, etc.; and
- Water truck traffic (assumes water comes from Hermiston, Stanfield, Echo, and Pendleton).

The Applicant assumes that construction of the facilities associated with the wind and solar portions of the Project will take approximately 18 months, whereas the construction of the 230-kilovolt transmission lines will take approximately 9 months. An estimated total of 19,900 truck trips will be required for the wind farm construction, and the 230-kV transmission lines will require an estimated 2,120 trips. In addition, construction of the solar array and BESS will require an estimated 10,000 truck deliveries. Over the 18-month wind and solar facility construction period, and assuming an average of 24 working days per month, an average of 46 daily round trips will be generated by wind farm construction activities, approximately 24 round trips per day will be generated by transmission line construction, and approximately 23 round trips per day for the solar array and BESS. It is further assumed that construction of the transmission lines will occur concurrently with the wind farm and solar/BESS construction so that the combined average daily trips during the 9 months when both activities are underway will be approximately 93 round trips per day. Since construction vehicle traffic is not uniform, this number is increased by 25 percent to account for peak periods, yielding an estimated maximum of 117 round trips per day or 234 one-way trips per day.

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

*Private Vehicle Traffic*

Privately owned vehicles will be the primary means of transporting workers to and from the Project on a daily basis. During construction, an estimated average workforce of approximately 140 workers will be employed. During the peak months of construction activity, the estimated number of workers will increase to approximately 500. Most of the construction worker traffic will originate from the communities that are along I-84, stretching from Boardman to Pendleton; a small number may also live in the small communities of Pilot Rock (which is located east of the Project) or Heppner in Morrow County (which is located southwest of the Project). As such, the workforce will use the same roads to access the Project as the equipment transporters.

Conservatively, it is assumed that most workers will drive alone, and that the average vehicle will only have 1.25 occupants. This makes the estimated daily round-trip vehicle trips 400 for the peak period and 112 for the average workforce. These daily vehicle trips are doubled to account for each one-way trip, resulting in an estimated 800 peak or 224 average one-way trips per day. Private

vehicles will primarily travel mornings and evenings corresponding to the workday, whereas the construction truck traffic will be more uniformly distributed throughout the workday. As a result, the private traffic and the truck traffic will not overlap for the most part.

During operations, an estimated 10 to 15 employees will be hired for O&M. These employees will live in proximity to the Project and use the same roads that will be used by the construction workforce. Occasionally during operations, specialty contractors will be brought in to handle major repairs. Operational traffic generation will be minimal.

## Impacts to Existing Levels of Service

State, county, and local roads may be temporarily affected by construction related traffic but the impact is expected to be minimal. Table U-5 provides a summary of current traffic volumes and LOS conditions, as well as projected traffic volumes and service levels with Project construction traffic on the surrounding road network. Truck traffic will generally not coincide with morning and evening peak hours; rather, truck traffic will be dispersed throughout the working day. The private vehicle traffic will generally occur out of phase with the truck traffic, as the workers report earlier and leave later than most of the truck traffic. Given the early start times (7 a.m.) and late finish times (7 p.m.) common to wind farm construction, worker commuting traffic likely will overlap with peak traffic hours.

*Interstate 84*

Most Project traffic will travel on I-84 but will not cause a reduction in service levels on the highway (Table U-5). The highest traffic volume on I-84 in the Project Analysis Area is approximately 17,500 ADT (measured at automatic traffic recorder station 30-004 on I-84, west of Pendleton) for the most recent period of record of 2018 (ODOT 2018c). This ADT has remained steady over recent years and should be relatively stable in the future. Assuming that all Project traffic (both truck and personal vehicle traffic) will use I-84, the increase in traffic on I-84 that will be attributable to Project construction will be approximately 6 percent of total traffic volume on that highway. This is inconsequential, as the interstate is operating below its design capacity.

If the UEC Cottonwood route is selected for the 230-kV transmission line, it would cross I-84. To construct the line across I-84, structures would be placed on either side of I-84 and a helicopter would be used to fly the lines across. There would be five lines including the grounding wire, each flown over and secured individually. During construction, flaggers would control traffic using a rolling slowdown method when each line is flown across. No lanes would be closed, and the process would occur over a few hours in one day. As such, this would be a short-term, temporary disruption to the normal flow of traffic along I-84. This work would be coordinated with ODOT and conducted in accordance with provisions of the applicable Permit to Occupy or Perform Operations Upon a State Highway, discussed further below as part of the Project's impact minimization measures.

*US-395*

The segment of US-395 immediately south of I-84 to CR-1350 will carry most of the Project construction traffic. The traffic counts on US-395 along that segment steadily decrease from north

to south, ranging from 25,900 ADT just south of I-84 to 4,300 ADT a little over one mile north of the CR-1350 turnoff (Table U-5). Adjacent to the CR-1350 intersection with US-395, the most recent traffic estimate was 3,600 ADT (Table U-5). Project construction will add an estimated 1,034 peak trips per day on this road segment. Although this is an approximately 4 to 29 percent increase in total traffic volume on this highway, with the relative percent change increasing from north to south as existing traffic diminishes, this number of additional trips for construction traffic will not cause a significant decrease in LOS on this highway segment. Within the short portion of US-395 within Pendleton's city limits, the Project could heighten existing traffic congestion and would be controlled through minimization measures discussed below. However, this urban portion of US-395 is a signalized, four-lane highway with a maximum speed limit of 35 miles per hour, and is not expected to have the typical flow conditions described in Table U-3.

There may be some Project traffic along US-395 south of the CR-1350 turnoff; however, it is not the primary transportation route and Project-related traffic is expected to be low and well within existing capacity.

*County Roads*

Project construction traffic will have lesser impacts on county roads in Umatilla County. Traffic count data collected by the county are limited, but most rural county roads see little traffic currently, typically less than 500 vehicles per day. As reported in the TSP (Umatilla County 2002):

> "Since the observed traffic flows along many of the rural county roads are less than 1,000 vpd, peak hour traffic operations along these roads and at lower volume intersecting roads, are at excellent levels (LOS A, <0.48 v/c). Even where daily traffic volumes range between 1,000 and 6,000 vpd, roadway traffic operations are still at excellent levels (LOS A, <0.48 v/c)."[2]

Consequently, the traffic generated by the Project is not anticipated to result in total traffic volume that will decrease the service level on any Umatilla County road.

[2] The TSP uses "vpd," or "vehicles per day," as its metric. This is equivalent to ADT.

**Table U-5. Project Construction Traffic Impacts to Area Highways**

| Location | Existing ADT (2018[1]) | Estimated Current LOS[2] | Estimated Existing V/C[3,4] | Project Construction Traffic[5] | | | ADT with Project Traffic | Projected V/C with Peak Construction Traffic[4] | Projected LOS with Peak Construction Traffic |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total Peak Trips per day, one-way | Worker Traffic, peak trips per day, one-way | Truck Traffic, peak trips per day, one-way | | | |
| I-84 – Pendleton Station 30-004 | 17,500 | B | 0.51 | 1,034 | 800 | 234 | 18,534 | 0.55 | B (no change) |
| US-395 – South Pendleton Station 30-008 | 25,900 | E | 0.96 | 1,034 | 800 | 234 | 26,934 | 0.99 | E-F |
| US-395 – 0.1 mile south of SW Gateway Avenue | 4,300 | A | 0.16 | 1,034 | 800 | 234 | 5,334 | 0.2 | A (no change) |
| US-395 – 0.02 mile south of Coombs Canyon Rd (CR-1350) | 3,600 | A | 0.42 | 1,034 | 800 | 234 | 4,634 | 0.55 | B |

1. Data from ODOT (2018c).
2. Based on estimated volume to capacity (V/C) and equivalent level of service (LOS) as presented in Table U-3.
3. Estimated by dividing existing average daily traffic (ADT) by the maximum ADT of the federal functional class for the applicable highway segment (from Table U-4).
4. Except for US-395 within Pendleton urban growth boundary (existing and with Project traffic), segments below maximum ODOT V/C ratios in Table U-2.
5. One-way trips are counted to tally both the inbound and outbound trips for Project traffic (i.e., round-trip count would be half of total one-way trips).

## Impact Minimization Measures

*Agency Coordination*

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

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

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

The Applicant will cooperate with the Public Works Department in Umatilla County with respect to obtaining permits to improve the roads and also to make repairs to roads that might result from construction traffic. In addition, the Applicant expects to enter into road use agreements with Umatilla County, to ensure that public roads impacted by construction will be left in 'as good or better' condition than that which existed prior to the start of construction. A component of road use agreements will be a traffic management plan. The traffic management plan will address such issues as flagging, signage, and traffic flow around work sites on public roads; timing of oversize/overweight truck loads to avoid impacts to school bus schedules or during peak travel hours; and other mitigation measures if deemed necessary. These measures will help to prevent any construction-related traffic safety issues and will facilitate the free movement of traffic through the Project's vicinity. While the movement of heavy or oversized loads of construction materials or equipment may cause some localized traffic delays, these disruptions will be intermittent and temporary.

*Transportation BMPs*

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

In addition, the Applicant's construction contractor will implement the following BMPs:

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

## Air Transportation

The Applicant submitted Federal Aviation Administration (FAA) form 7460-1 to the FAA on March 6, 2020, in accordance with ORS 836.535(2)(a) requesting a Determination of No Hazard to Air Navigation in order to allow the agency to evaluate the effect of the proposed construction on air safety and navigable airspace. This evaluation process is currently underway and begins with a determination of whether the proposed structure represents an obstruction. Obstructions are defined in 14 Code of Federal Regulations 77, Subpart C (Sections 77.13 through 77.23), which

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

The Project meets the first threshold to notify the FAA for evaluation of the proposed wind turbines for their potential hazard to air traffic. The Applicant is required to submit notice to the FAA and Oregon Department of Aviation (ODA) due to the overall height of the considered wind turbine models exceeding 200 feet above ground level. No public airports are located within 5 miles of the Project[3]. The closest airport to the Project area is the Eastern Oregon Regional Airfield at Pendleton, which is approximately 7.8 miles northeast of the Site Boundary. Therefore, the second threshold for notifying the FAA and ODA is not exceeded.

Following the submittal of the Project's notice to FAA, FAA will conduct an aeronautical study in coordination with the DoD "clearing house" process. The DoD conducts formal reviews of projects for which the FAA conducts aeronautical analyses. The DoD provides information regarding FAA analyses to potentially affected military departments and DoD components, and reports back to FAA and the project proponents if unacceptable impacts to national security could occur as a result of implementation of a project. Proponents then have the opportunity to explore potential mitigation options that ensure continued DoD operations, testing, and training as well as energy development.[4]

A Determination of No Hazard to Air Navigation will be issued when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard but will not have a substantial aeronautical impact to air navigation. A Determination of No Hazard to Air Navigation may include conditional provisions, limitations to minimize potential problems,

[3] The West Buttercreek Airport is a private field that the FAA does not evaluate. It is located approximately 3.7 miles from an existing, operating commercial wind power project, with multiple turbines located west of the airport. The nearest proposed Project facilities would be transmission line structures whose height would be substantially less than the 200 feet elevation above ground level that triggers FAA review. The nearest transmission structures would be approximately 3.4 miles northeast of the airport, near the UEC Buttercreek substation. The nearest Project turbine would be over 9.9 miles to the east of the airport.

[4] The DoD Siting Clearinghouse acts as a single point of contact for Federal agencies; State, Indian tribal, and local governments; developers; and landowners, and provides a central forum for internal staffing. This website is a central location to provide information and act as a resource to assist interested individuals and organizations understand the mission impacts of proposed energy projects near military activities, and the Department's MCE process, procedures, and mitigation opportunities. The Clearing House process is defined in Part 211 of Title 32 of the Code of Federal Regulations.

supplemental notice requirements, or requirements for marking and lighting, as appropriate. The Applicant will provide a record of all correspondence with FAA and ODA to the Oregon Energy Facility Siting Council no less than 30 days prior to construction.

The Project's solar energy facilities do not meet the notice criteria based on FAA-identified impact areas, and therefore formal submission of a Form 7460-1 to the FAA under Code of Federal Regulations Title 14 Part 77.9 (Safe, Efficient Use, and Preservation of the Navigable Airspace) is not required. However, the FAA has developed *Technical Guidance for Evaluating Selected Solar Technologies on Airports* (FAA 2018), in addition to FAA regulatory guidance under 78 Federal Register (FR) 63276 Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (collectively referred to as FAA Guidance). The FAA Guidance recommends that glare analyses should be performed on a site-specific basis using the Sandia Laboratories Solar Glare Hazard Analysis Tool (SGHAT). This guidance applies to solar facilities located on federally obligated airport property; it is not mandatory for a proposed solar installation that is not on an airport, such as the proposed Project, but is considered to be an industry best practice for solar facilities in general. The SGHAT is the standard for measuring potential ocular impact as a result of solar facilities (78 FR 63276). To conservatively assess the potential for glare impacts on nearby airports, a glare analysis utilizing the recommended SGHAT was conducted for the proposed Project, provided in Attachment U-4, Glare Analysis Report. As detailed in the report, no glare impacts are predicted from the Project's solar arrays at nearby airports, including the West Buttercreek Airport (private) and Eastern Oregon Regional Airport at Pendleton (public) (Attachment U-4).

#### *3.2.2.7 Law Enforcement*

Police service in the analysis area is primarily provided by county police departments; the cities of Hermiston and Stanfield have their own police departments, but only small segments of the Project Site Boundary and the Analysis Area are within their cities. As necessary, the Applicant will seek assistance from the nearest of the Umatilla County Sheriff's offices, which are located in Hermiston and Pendleton, Oregon. Additional law enforcement service is available through the Oregon State Police, which also has offices in Hermiston and Pendleton.

Construction and operation of the Project will not have a substantial, adverse impact on the provision of law enforcement services in the Analysis Area. The Applicant has contacted Umatilla County Sheriff Terry Rowan, the law enforcement service provider in the Site Boundary. Sheriff Rowan indicated that he did not foresee any significant impact to law enforcement services (Attachment U-2).

Any impacts to law enforcement caused by construction of the Project will be intermittent and temporary, as construction workers will remain in any one location for approximately 6 to 18 months and will not be expected to stay in the area beyond the end of construction. The construction contractor will be responsible for providing on-site security in the Project. The small number of permanent-resident employees is not anticipated to place significant, new demands on law enforcement agencies in the area.

### *3.2.2.8 Fire Protection*

Fire protection service in the analysis area is provided by a number of agencies, including the Echo Rural Fire Protection District, Pilot Rock Rural Fire Protection District, Oregon Department of Forestry Pendleton Unit, Umatilla County Fire District #1, the Stanfield Fire District, the City of Pendleton Fire Department, and the Heppner Rural Fire District in Morrow County. The Applicant will provide construction plans, phasing information, and locational information for all Project facilities, including Project access, to all involved fire departments.

Attachment U-3 is a record of correspondence with the Umatilla County Fire District #1 and the Echo Rural Fire Protection District confirming that the construction and operation of the Project, including all proposed wind and solar energy facilities, will not impede their abilities to provide emergency services. The Project is also within the Pilot Rock Rural Fire Protection District which, as of July 2018, merged with the Umatilla County Fire District #1. As the majority of the Project is outside of city boundaries and is within the rural fire protection districts of Echo and Pilot Rock, any emergency fire response will likely be by one of these two districts, and any assistance by another fire department will be in the service of one of these districts.

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

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

The following list provides a summary of typical fire prevention BMPs that will be implemented during Project construction:

- Employee Awareness Training on all of the topics below
- Fire Prevention
    - During periods of high fire danger, potential sources of fire ignition (vehicle exhaust systems, cigarettes, matches, propane torches, sparks from various hot work operations, etc.) must be used with extra precaution.
    - During construction, a water truck will be on-site to keep the ground and vegetation moist during extreme fire conditions.
    - Maintain open communication with local fire district personnel to identify and address fire hazards.

- Vehicles
    - Plan and manage the work and the movement of vehicles. No off-road driving is to be done while working alone.
    - The general contractor will be responsible for identifying and marking the path for all off-road vehicle travel.
    - All off-road vehicle travel is to stay on the identified path.
    - In the event a vehicle gets stuck, shut the engine off. Periodically inspect the area adjacent to the exhaust system for evidence of ignition of vegetation. Do not "rock" the vehicle to free it; rather, pull it out. Inspect the area after the vehicle has been moved.
    - In tall grass (i.e., tall or taller than the exhaust system of the vehicle[s]), pre-wet the area with water prior to driving on it with vehicles.
- Fueling
    - The general contractor will designate a location for field fueling operations at each construction yard. Any fueling of generators, pumps, etc., shall take place at this location only.
    - Fuel containers, if used, shall remain in a vehicle or equipment trailer, parked at a designated location alongside county rights-of-way. No fuel containers shall be in the vehicles that exit the right-of-way except for one 5-gallon container that is required for the water truck pump.
- Smoking
    - Smoking shall only be allowed in the designated smoking areas on the Project.
- Fire Suppression and Emergency Preparedness
    - Each vehicle used on-site shall have a fire extinguisher of sufficient type and capacity to suppress small fires around vehicles. Vehicle occupants shall be familiar with the location of these fire extinguishers. All employees who may have a need to use a fire extinguisher shall be current in their training on the general principles of fire extinguisher use and the hazards involved with incipient stage firefighting.
    - Prior to start of construction work activities, contact the local fire department and advise them of work type, location, and probable duration.
    - Prior to performing hot work (anything that creates a spark or an open flame is considered hot work), fire suppression equipment must be immediately available, hot work must only be done on road or turbine pad surfaces cleared of vegetation, and the on-site Safety Supervisor must be notified.

    - A fire watch, equipped with a suitable fire extinguisher, shall be maintained for a period of 60 minutes after completion of work in a specific area, and at the end of each day's activities.

- Emergency Notification and Follow Up
    - The following course of action should be taken if an emergency situation develops:
        - Evacuate as necessary. Maintain site security and control if possible. If crews are working at different areas of the site, a designated meeting location will be created for all people to gather.
        - Notify proper emergency services (fire, ambulance, etc.) for assistance.
        - Notify site management of any possible fires.
        - Prepare a summary report of the incident as soon as possible after the incident.

During the O&M phase of the Project, fire danger will be low. Wind turbines contain a number of safety features designed to provide increased fire protection; for example, fully independent braking systems and emergency shutoff devices. In addition, the turbine models considered will be equipped with internal fire suppression systems in the nacelles. Depending on the final BESS technology selected, the BESS may also introduce a flammability hazard and require a cooling and fire suppression system. Additional fire and safety measures related to the BESS are listed in Section 5.0 of Exhibit B. The O&M Building will be equipped with fire protection equipment in accordance with the Oregon Fire Code, and the substations, collector lines, and other electrical connections will be built to National Electrical Safety Code standards. Typical maintenance activities will not carry a significant fire risk, as maintenance vehicles will drive and park on maintained gravel roads and turbine pads, avoiding hazards associated with driving or parking in tall dry grass. Given the inherent fire-safety features of Project components and the relatively small number of new temporary and permanent residents, significant new demands on fire protection forces are not anticipated.

Both Fire Chief Merle Gehrke of the Echo Rural Fire District and Operations Chief Jim Forquer of the Umatilla County Fire District #1 have indicated that the construction and operation of the Project will not impact their ability to provide fire protection services to their respective districts. Additionally, Fire Chief Merle Gehrke stated that they do not provide high angle or confined space rescues (Attachment U-3).

### *3.2.2.9 Health Care*

There are a number of health care service providers in the Analysis Area. The nearest hospitals are the St. Anthony Hospital located in Pendleton, the Good Shepherd Medical Center in Hermiston, and Pioneer Memorial Hospital located in Heppner, in Morrow County. The nearest Level III trauma center is the Good Shepard Medical Center (OHA 2019). The nearest Level I trauma centers are located in the city of Portland: Oregon Health & Science University Hospital and Legacy Emmanuel

Medical Center. Ambulance service in the area is provided by the Umatilla County Fire District #1 (UCFD 2019). Some of the nearby fire districts also have First Response Vehicles, with equipment and crew trained to stabilize a patient until the arrival of an ambulance for transport.

Although the small number of temporary workers and permanent resident employees are not expected to place significant, new demands on the routine health care services in the Project's Analysis Area, impacts on health care could occur if Project construction activities result in an unexpected increase in emergency services to such a degree that it overwhelms local providers. Construction and operation of the Project will not have an adverse impact on area health care providers. Impacts on local health care services during both construction and operation will be minimized by implementation of a robust safety program that will minimize health and safety risks. Should any worker suffer an injury that requires immediate medical attention, such injured workers would be transported using one of the local ambulance services. Any worker suffering minor injuries will be transported and treated at any of the three local hospitals, while workers suffering more serious injuries will be taken to the Good Shepherd Medical Center in Hermiston, which is a Level III trauma center, or will be flown by helicopter (operated by Life Flight) to one of the two Level I hospitals located in Portland.

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

### *3.2.2.10 Schools*

The Project Analysis Area falls within the Hermiston, Stanfield, Pendleton, Echo, Umatilla, Pilot Rock, and Morrow County school districts. According to the Umatilla County Coordinated Human Services Public Transportation Plan, the Mid-Columbia Bus Service provides school bus service to all county public schools on a contract basis in Umatilla County (Umatilla County 2016). No school districts outside the Analysis Area are anticipated to experience increased enrollment as a result of the Project.

No significant adverse impacts to schools are anticipated during construction and operation of the Project. No schools are located within the Site Boundary, and therefore none will be directly affected by Project construction or operations. Construction will be temporary and short-term, and much of the peak work period will occur during the summer months, when school is not in session. The trend in construction projects of this nature is that only a small percentage of workers hired from outside the area bring their families and school-age children for a short-term relocation, so the number of additional students will be minimal (USDE 2019). The number of new permanent resident employees will also be small, and new families with school-age children will be welcomed at local area schools. Impacts on school services will depend on the housing choices of the new residents with children, which cannot be predicted; however, given the number of schools in the locations where new residents are likely to settle, and the small number of new school children

expected, it is unlikely that any one school will receive more new students than it can accommodate.

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

### *3.2.3 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.*

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

## 4.0 Conclusions

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

## 5.0 References

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# Figures

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# Nolin Hills Wind Power Project

**Figure U-1**
**Transportation Routes**

**UMATILLA COUNTY, OREGON**

Paterson
Plymouth
Umatilla
Irrigon
Boardman
Hermiston
Stanfield
Echo
Nolin
Rieth
Pendleton
Mission
Helix
Pilot Rock
Lexington
Benton County
Umatilla County
Morrow County
Boardman Bombing Range
Umatilla National Wildlife Refuge
Umatilla Ordnance Depot
Columbia River
Cold Springs National Wildlife Refuge
Juniper Canyon
Finley Buttes
Little Butter Creek
Hinton Creek
McKay Creek
East Birch Creek
CR-1362
CR-1350
CR-1361
CR-1363
CR-1394
82
84
730
395

- Proposed Site Boundary
- Analysis Area (10-mile Buffer)
- County and Local Roads Transportation Route
- City/Town
- Interstate Highway
- Secondary Highway
- Secondary Road
- Local Road
- Railroad
- State Boundary
- County Boundary

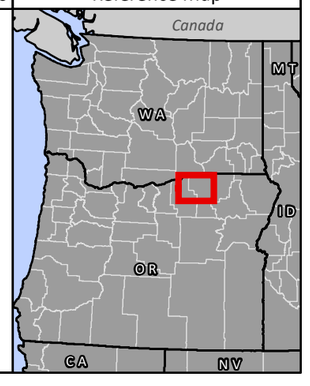
TETRA TECH

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

**Data Sources**

Capital Power-Project Infrastructure; USDA-Aerial Imagery; ESRI-Roads; Ventyx-Railroads; ESRI-Counties, States, Cities

**Reference Map**




1:255,000 WGS 1984 UTM Zone 11N

0 2.5 5 10 15 20 Miles

NOT FOR CONSTRUCTION

P:\GIS_PROJECTS\CapitalPower\NolinHills\MXDs_pASC_Supplement\Exhibit_U\CP_NolinHills_Exhibit_U-1_TransportationRoute_11\7_20200929.mxd

# Attachment U-1. Landfill Communications

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## Cavanagh, Suzy

**From:** McNown, Keith <KMcNown@wm.com>
**Sent:** Tuesday, September 18, 2018 4:55 PM
**To:** Jay Shukin
**Cc:** Cyrus Tingley
**Subject:** RE: Construction Debris Disposal

**Notice: External Email**

Yes sir
We can handle it. We have a tipper that could be used for that 100 yard box.

Happy to help.

**Keith McNown**
Manager-3rd Party Sales-Oregon
Pacific NW/BC Market Area
kmcnown@wm.com

**Waste Management**
3205 SE Minter Bridge Road
Hillsboro, OR 97123
Tel (503) 640-9427
Cell (503) 575-8133
Fax (503) 648-3942

*Waste Management renewable energy projects create enough energy to power more than one million homes. Learn more at www.wm.com .*

---

**From:** Jay Shukin [mailto:jshukin@capitalpower.com]
**Sent:** Tuesday, September 18, 2018 3:53 PM
**To:** McNown, Keith <KMcNown@wm.com>
**Cc:** Cyrus Tingley <ctingley@capitalpower.com>
**Subject:** [EXTERNAL] RE: Construction Debris Disposal

Hi Keith – thanks for your note and attention. Just to clarify, we are still in the regulatory approval stage in terms of project development. My intent in making contact with you was just to inquire whether you could handle the waste volumes that we're expecting to generate once project construction begins. It sounds like you would be able to – correct?

Thanks very much for reaching out. We will continue to keep you posted as we move along with the Nolin Hills Wind Energy Project.

Best,

Jay

_____

**Jay Shukin**
Manager, Stakeholder Engagement

Capital Power
www.capitalpower.com
250-882-5188

**From:** McNown, Keith <KMcNown@wm.com>
**Sent:** Tuesday, September 18, 2018 3:47 PM
**To:** Jay Shukin <jshukin@capitalpower.com>
**Cc:** Cyrus Tingley <ctingley@capitalpower.com>
**Subject:** Construction Debris Disposal

**Notice: External Email**

Gents
I can help you with the construction debris waste. Sounds like a big job and I will get you quotes from the drop box rep. However, I can quote this 100 yard intermodal too.

It holds 25 tons and is quoted flat rate.

If you went with 40 yard roll off's, how many do you need at one time onsite?

**Keith McNown**
Manager-3rd Party Sales-Oregon
Pacific NW/BC Market Area
kmcnown@wm.com

**Waste Management**
3205 SE Minter Bridge Road
Hillsboro, OR 97123
Tel (503) 640-9427
Cell (503) 575-8133
Fax (503) 648-3942

*Waste Management renewable energy projects create enough energy to power more than one million homes. Learn more at www.wm.com .*

**From:** McNown, Keith
**Sent:** Tuesday, September 18, 2018 3:43 PM
**Cc:** 'jshukin@capitalpower.com' <jshukin@capitalpower.com>
**Subject:**

Gents

**Keith McNown**
Manager-3rd Party Sales-Oregon
Pacific NW/BC Market Area
kmcnown@wm.com

**Waste Management**
3205 SE Minter Bridge Road

Hillsboro, OR 97123
Tel (503) 640-9427
Cell (503) 575-8133
Fax (503) 648-3942

*Waste Management renewable energy projects create enough energy to power more than one million homes. Learn more at www.wm.com .*

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**Recycling is a good thing. Please recycle any printed emails.**

## Cavanagh, Suzy

**From:** Dean Large <Dean.Large@WasteConnections.com>
**Sent:** Wednesday, August 1, 2018 9:50 AM
**To:** Jay Shukin
**Cc:** Jocelyn Jones; Kevin Green
**Subject:** Re: Nolin Hills Wind Energy Project – Consulting re. Impacts to Services

Notice: External Email

Thank you for the update.
Finley Buttes Landfill has more than 100 years of remaining life and can receive any non hazardous waste. Some wastes require prior approvals through our Special Waste process, but that should not impact our ability to accept your waste. I am asking Jocelyn Jones to follow up with you regarding this project Thanks

Sent from my iPhone

> On Aug 1, 2018, at 8:44 AM, Jay Shukin <jshukin@capitalpower.com> wrote:
>
> Hi Dean - I'm following on our discussion last week about the Nolin Hills Wind Energy Project, which Capital Power has proposed in Umatilla County. The Project is located on land owned by the Cunningham Sheep, Pendleton, Hoke, and Mud Springs Ranches. We anticipate it will generate 350 megawatts from as many as 130 turbines. A map of the Project boundary is attached.
>
> I'm gathering information about the possible volumes of waste that the project could generate during construction. This would be general construction materials (i.e. no hazardous substances). I'll get back to you asap.
>
> As noted, Capital Power (www.capitalpower.com<https://urldefense.proofpoint.com/v2/url?u=http-3A__www.capitalpower.com&d=DwMF-g&c=9g49JK_oyOnGoB_QNpFjmMtJm41Yy-9dAZtUwi7WKVQ&r=5X6ijVIw_pKuiiqTF9sa30orBRL2mj3DOpMKtdNZ-o4&m=1drp5gBFNVctc3rzQlnHzYf4YUr1ywpqNi5W-1tRbAY&s=fFd-bDkmDuxn7sflsrhL-tcvtKz2hberdyJNQ9sXpt8&e=>) is moving the Project through the state's regulatory process (the Energy Facility Siting Council process). As part of this, required seek a letter from you indicating that our project will not affect your facility's ability to provide services to the area.
>
> Capital Power is an experienced power generation company with over 4,500 megawatts in operation at 24 facilities throughout North America. Building and operating wind projects is one of the company's core skill areas, with six projects built over the last seven years, ranging from 140 to 270 megawatts.
>
> I'll get back to you with more as soon as possible.
>
> Regards,
>
> Jay
> _____
> Jay Shukin
> Manager, Indigenous and Stakeholder Engagement Capital Power
> 250-882-5188
>

> This email message, including any attachments, is for the intended recipient(s) only, and contains confidential and proprietary information. Unauthorized distribution, copying or disclosure is strictly prohibited. If you have received this message in error, or are obviously not one of the intended recipients, please immediately notify the sender by reply email and delete this email message, including any attachments. Thank you.
> <Nolin Hills Wind Project (vicinity map) - July 2018.pdf>

# Attachment U-2. Police Communications

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# UMATILLA COUNTY SHERIFF'S OFFICE

*"Conservators of the Peace"*

Sheriff Terry L. Rowan

Undersheriff Jim Littlefield

TO: Jay Shukin

FROM: Sheriff Terry L. Rowan

RE: Nolin Hills Wind Energy Project.

Date: 9-7-18

Dear Sir,

I have reviewed the material you provided including the site map. The area indicated in the site map falls within the Law Enforcement Jurisdiction of the Umatilla County Sheriff's Office. This area is comprised mostly of farm/ranch land and is sparsely populated.

After my review of the material, I do not see any significant impact to Law Enforcement services in the outline area.

**Respectfully,**

**Terry L. Rowan/Sheriff**

*4700 Pioneer Place*
*Pendleton, OR 97801*

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

# Attachment U-3. Fire District Communications

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# Echo Rural

# Fire Protection District

**PO Box 59**

**Echo OR 97826**

**4/13/2021**

## To Whom It May Concern:

**The Echo Rural Fire Protection District does not have any concerns with the Nolin Hills Wind Energy Project with the notations that Echo RFPD does not provide high angle rescues nor confined space rescues. We will respond to any fires or provide initial emergency medical responses if required. Capital Power has committed to undertaking a site orientation session prior to or as soon as possible once operations begin.**

**Echo RFPD also requests that if any structures are required for the project that a 100 foot vegetation free zone be maintained around the structures. Capital Power has indicated that a vegetation management program around structures would be added to their overall site management processes. The project is in a high risk zone for wildland fires.**

**Sincerely,**

**Chief Delbert Gehrke**

**Echo Rural Fire Protection District**

# UMATILLA COUNTY FIRE DISTRICT #1

Date: March 8, 2021

To: Jay Shukin – Capital Power

From: Jim Forquer – Admin Deputy Chief

Subject: Nolin Hills Wind Power Project

---

In response to your request, I have reviewed the documents you sent regarding the Nolin Hills Wind Power Project.

As we discussed in the past, UCFD #1 is the Ambulance Service Area (ASA) provider for West Umatilla County. We provide the ambulance transport service for approximately the western half of your project. We also have automatic and mutual aid agreements for emergency response with all the surrounding fire districts.

Based on the updated information you provided, I would expect the "daily operations" of your project to have minimal impact to UCFD #1.

Thanks for the updated information and please continue to include us in your distribution of any site safety and emergency response plans when those are updated/developed and implemented.

If you need anything else please don't hesitate to ask.

# Attachment U-4. Glare Analysis Report

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# Glare Analysis Report for the Nolin Hills Wind Power Project

**Umatilla County, Oregon**

**Prepared for:**

Capital Power
RESPONSIBLE ENERGY FOR TOMORROW

**d/b/a Nolin Hills Wind, LLC**

**Prepared by:**

TETRA TECH

**Tetra Tech, Inc.**

**May 2021**

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# Table of Contents



# List of Tables



# List of Appendices

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# EXECUTIVE SUMMARY

At the request of Nolin Hills Wind, LLC, Tetra Tech, Inc. (Tetra Tech) conducted a glare analysis of the proposed Nolin Hills Wind Power Project (Project). The analysis was conducted using the Solar Glare Hazard Analysis Tool software through an online tool (GlareGauge) developed by Sandia National Laboratories and hosted by ForgeSolar. A total of three glare analyses were conducted for the Project. Two of the analyses modeled the points of view from an average first- and second-floor structure, as well as those from a typical commuter car and commercial truck. These analyses included 12 representative observation points (OPs) and four segmented traffic routes from representative locations in proximal areas surrounding the Project.

The results of the analyses indicate that all of the representative OPs and traffic routes, except one route (CR-1350-1), would experience no glare as a result of the Project. The third analysis included six final approach flight paths associated with Eastern Oregon Regional Airport at Pendleton and West Buttercreek Airport. The analyses did not predict glare at the modeled 2-mile final approach paths for any of the reviewed airports.

Based on the results of the Federal Aviation Administration (FAA) Notice Criteria Tool, the Project does not exceed notice criteria; therefore, formally filing the Project with the FAA Obstruction Evaluation Group is not recommended.

# 1.0 Introduction

Nolin Hills Wind, LLC (the Applicant) proposes to construct the Nolin Hills Wind Power Project (Project), a wind and solar energy project with nominal generating capacity of approximately 600 megawatts (MW) (preliminarily 340 MW from wind and 260 MW from solar). Average electrical generating capacity would be approximately 373.3 MW (113.3 MW from wind generation plus 260 MW from solar generation, totaling 373.3 average MW). The proposed property is located southwest of Pendleton, Oregon and south of the Umatilla River. It is bordered by County 1350 Road to the west and south, County 1361 to the east, and County 1362 Road to the north. The majority of the Project includes uncultivated land primarily composed of grasslands, including some areas of Conservation Reserve Program lands. The Project is located in north-central Oregon, an area of rolling hills covered in grasslands and desert vegetation. The major topographic features in the area are controlled by the structure of the Columbia River Basalt. Elevations at the Project range from approximately 502 feet to 2,711 feet. The basin as a whole is a westward-plunging syclinorium bounded on the southeast by the northeastward-trending anticlinal crest of the Blue Mountains, and on the northeast by the northwestward-trending crest of the Horse Heaven anticlinal ridge.

The solar array will include up to approximately 1,117,591 solar modules, depending on the final technology and layout selected. The Project will interconnect to the regional grid via either a transmission line leading from the northern Project substation northwest to the Umatilla Electric Cooperative Cottonwood Substation in Hermiston, or a new 230-kilovolt transmission line to the proposed Bonneville Power Administration Stanfield Substation, north of the town of Nolin. Other Project components include electrical collection lines, substations, a battery energy storage system (BESS), site access roads, one operations and maintenance building, meteorological data collection towers, and temporary construction yards.

As an industry standard, the term “glint and glare” analysis is typically used to describe an analysis of potential ocular impacts to defined receptors. As a point of clarification, ForgeSolar defines glint and glare in the following statement:

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

Based on the ForgeSolar definitions of glint and glare and the stationary nature of the Project solar photovoltaic modules related to the sun, the potential reflectance from the Project modeled throughout this report will be referred to as glare.

Tetra Tech completed a glare analysis using the Solar Glare Hazard Analysis Tool (SGHAT) software, developed by Sandia Laboratories, now hosted by ForgeSolar (as discussed further

below). The SGHAT software is considered an industry best practice and conservative model that effectively models the potential for glare at defined receptors from defined solar energy generating facilities. As discussed further below, the model is conservative in that it does not account for potential screening such as existing or proposed vegetation, topography outside of the defined areas, buildings, walls, or fences.

This report summarizes the glare analysis conducted based on the preliminary Project layout as described in the Application for Site Certificate submitted to the Oregon Department of Energy in November 2020. Included as appendices are Figure 1: PV Array Areas, Figure 2: Receptors, and Figure 3: Airport Receptors (Appendix A); and the glare analysis reports generated through the use of the ForgeSolar tool (Appendix B).

# 2.0 Federal Aviation Administration Notice Criteria Consultation

The Federal Aviation Administration (FAA) developed *Technical Guidance for Evaluating Selected Solar Technologies on Airports* in 2010, in addition to FAA regulatory guidance under 78 Federal Register (FR) 63276 Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (collectively referred to as FAA Guidance). The FAA Guidance recommends that glare analyses should be performed on a site-specific basis using the Sandia Laboratories SGHAT. This guidance applies to solar facilities located on federally-obligated airport property; it is not mandatory for a proposed solar installation that is not on an airport (and for which a Form 7460-1 is filed with FAA pursuant to CFR Title 14 Part 77.9, as discussed below), but is considered to be an industry best practice for solar facilities in general. The SGHAT is the standard for measuring potential ocular impact as a result of solar facilities (78 FR 63276).

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

- No potential for glint or glare in the existing or planned air traffic control tower (ATCT) cab; and
- No potential for glare or "low potential for after-image" along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved Airport Layout Plan (ALP). The final approach path is defined as 2 miles from 50 feet above the landing threshold using a standard three-degree glidepath.

The online FAA Notice Criteria Tool (NCT) reports whether a proposed structure is in proximity to a jurisdictional air navigation facility and if formal submission to the FAA Obstruction Evaluation Group (OEG) under Code of Federal Regulations (CFR) Title 14 Part 77.9 (Safe, Efficient Use, and

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

# 3.0 Glare Analysis Method

The SGHAT is considered to be an industry best practice for analysis of glare related to solar energy generating facilities. Tetra Tech utilized the SGHAT technology as part of an online tool (GlareGauge) developed by Sandia National Laboratories and hosted by ForgeSolar. GlareGauge provides a quantitative assessment of the following:

- When and where glare has the potential to occur throughout the year for a defined solar array polygon; and
- Potential effects on the human eye at locations where glare is predicted.

The following statement was issued by Sandia Laboratories regarding the SGHAT technology:

> *Sandia developed SGHAT v. 3.0, a web-based tool and methodology to evaluate potential glint/glare associated with solar energy installations. The validated tool provides a quantified assessment of when and where glare will occur, as well as information about potential ocular impacts. The calculations and methods are based on analyses, test data, a database of different photovoltaic module surfaces (e.g. anti-reflective coating, texturing), and models developed over several years at Sandia. The results are presented in a simple easy-to-interpret plot that specifies when glare will occur throughout the year, with color indicating the potential ocular hazard.* (Sandia National Laboratories 2016)

Note, however, that technology changes continue to occur to address issues such as reflectivity. The model, therefore, presents a conservative assessment based upon simplifying assumptions inherent in the model as well as industry improvements since the most recent update of such assumptions.

Based on the predicted retinal irradiance (intensity) and subtended angle (size/distance) of the glare source to receptor, the GlareGauge categorizes potential glare where it is predicted by the model to occur in accordance with three tiers of severity (ocular hazards) that are shown by different colors in the model output:

- Red glare: glare predicted with a potential for permanent eye damage (retinal burn)
- Yellow glare: glare predicted with a potential for temporary after-image
- Green glare: glare predicted with a low potential for temporary after-image

These categories of glare are calculated using a typical observer's blink response time, ocular transmission coefficient (the amount of radiation absorbed in the eye prior to reaching the retina), pupil diameter, and eye focal length (the distance between where rays intersect in the eye and the retina). As a point of comparison, direct viewing of the sun without a filter is considered to be on the border between yellow glare and red glare, while typical camera flashes are considered to be lower tier yellow glare (approximately three orders of magnitude less than direct viewing of the sun). Upon exposure to yellow glare, the observer may experience a temporary spot in their vision after the exposure. Upon exposure to green glare, the observer may experience a bright reflection but typically no spot lasting after exposure.

# 4.0 Glare Analysis Inputs

The modules to be used for the proposed Project are smooth glass surface material with an anti-reflection coating, which are parameters selected in the glare analyses. Values associated with panel reflectivity and reflective scatter were not altered from the GlareGauge standard input averaged from various module reflectance profiles produced from module research concluded in 2016; therefore, as previously noted, the model does not incorporate further advances in anti-reflective coatings since that time.

Tetra Tech performed three separate glare analyses: the first two analyses included four proximal segmented vehicular traffic routes and 12 observation points (OPs). The vehicular route receptors and OPs were selected to provide a more comprehensive representation of proximal areas in geographic locations surrounding the Project. Analysis 1 and 2 differ in the heights assumed for the OP and vehicular routes; Analysis 1 represents the point of view from an average first floor residential/commercial structure and typical commuter car, while Analysis 2 represents the point of view from an average second floor residential/ commercial structure and typical semi-tractor-trailer truck. Analysis 3 is focused on modeling the airport receptors referenced in the NCT results; the four 2-mile final approach flight paths associated with Eastern Oregon Regional Airport at Pendleton (PDT); and the requested two 2-mile final approach flight paths associated with West Buttercreek Airport (OLO2). In Analysis 3, a typical 30-degree maximum downward viewing angle and 50-degree maximum azimuthal viewing angle from the aircraft cockpit were included among other parameters presented in Table 2. For all three analyses, the Project Area consisted of 18 separate "PV Array Areas," which are segmented polygons generally representative of the proposed Project layout (Figure 1). Segmentation of the Project layout allows GlareGauge to represent potential ocular impacts more accurately as a result of the Project. The additional input features used in the analyses are summarized in Table 1 and Table 2.

**Table 1. Glare Analyses Input Features**

| Analysis No. | Racking Type | Module Orientation[1] | Tracking Maximum[2] (degrees) | Resting Angle[3] (degrees) | Module Height[4] (feet) | OP Height[5] (feet) | Route Height[6] (feet) | ATCT | Flight Paths |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Tracking | East-facing | ±52 | 5 | 14.6 | 6 | 5 | - | - |
| 2 | Tracking | East-facing | ±52 | 5 | 14.6 | 16 | 9 | - | - |
| 3 | Tracking | East-facing | ±52 | 5 | 14.6 | - | - | - | 6 |

1. PV Array Areas modeled as single axis tracking modules from east-facing in the morning hours to west-facing in the evening hours.
2. The module tilt varies through the day as they track the sun, the maximum tracking angle tilt is ±52˚ east/west
3. Angle of rotation of panels when sun is outside tracking range. Used to model backtracking. Panels will revert to the position described by this rotation angle at all times when the sun is outside the rotation range defined by the tracking maximum.
4. Average module centroid height above ground surface.
5. Height of observation point receptor: 6 feet represents an average first floor residential/commercial point of view and 16 feet represents an average second floor residential/commercial point of view.
6. Height of vehicular route receptor: 5 feet represents typical commuter car height and 9 feet represents typical semi-tractor-trailer truck views.

**Table 2. Analysis 3 Input Features**

| Flight Path/ ATCT Name | Associated Airport | True Direction (degrees) | Threshold Crossing Height (feet) | Glide Path[1] (degrees) |
|---|---|---|---|---|
| OLO2-01 | West Buttercreek Airport | 34[2] | 40[4] | 3[3] |
| OLO2-19 | West Buttercreek Airport | 212[2] | 40[4] | 3[3] |
| PDT RWY 11 | Eastern Oregon Regional Airport at Pendleton | 128 | 43 | 3 |
| PDT RWY 25 | Eastern Oregon Regional Airport at Pendleton | 270 | 48 | 3 |
| PDT RWY 29 | Eastern Oregon Regional Airport at Pendleton | 308 | 84 | 3 |
| PDT RWY 7 | Eastern Oregon Regional Airport at Pendleton | 90 | 35 | 3 |

1. Angle of descent along final approach flight path.
2. Unable to be confirmed based on public information. Estimated angle based on runway direction was used.
3. Unable to be confirmed based on public information. Default parameters in the SGHAT software which references the FAA criteria found in Section 2.0 were used.
4. Unable to be confirmed based on public information. A conservative height of 40 feet was used based on aerial photography and Google street views.

# 5.0 Glare Analysis Assumptions

The GlareGauge model is bound by conservative limitations. The following assumptions provide a level of conservatism to the GlareGauge model:

- The GlareGauge model simulates PV arrays as infinitesimally small modules within planar convex polygons exemplifying the tilt and orientation characteristics defined by the user. Gaps between modules, variable heights of the PV array within the polygons, and supporting structures are not considered in the analysis. Given the actual module rows will be separated by open space, this model assumption could result in indication of glare in locations where panels will not be located. In addition, the supporting structures are considered to have reflectivity values that are negligible relative to the module surfaces included in the model.
- The GlareGauge model utilizes a simplified model of backtracking which assumes panels instantaneously revert to the resting angle whenever the sun is outside the rotation range.
- The GlareGauge model assumes that the observation point receptor can view the entire PV array segment when predicting glare minutes. However, it may be that the receptor at the observation point may only be able to view a small portion (typically the most proximal edge) of the PV array segment. Therefore, the predicted glare minutes and intensity from a specific PV array to a specific observation point are conservative as the observer will likely not experience glare from the entire PV array segment at once.
- The GlareGauge model does not consider obstacles (either man-made or natural) between the defined PV arrays and the receptors such as vegetative screening (existing or planted), buildings, topography, etc. Where such features exist, they would screen views of the Project and, thus, minimize or eliminate glare from those locations.
- The GlareGauge model does not consider the potential effect of shading from existing topography between the sun and the Project outside of the defined areas.
- The direct normal irradiance (DNI) is defined as variable using a typical clear day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum of 1,000 Watts per square meter ($W/m^2$) at solar noon. The irradiance profile uses the coordinates from Google Maps and a sun position algorithm to scale the DNI throughout the year. The actual daily DNI would be affected by precipitation, cloud cover, atmospheric attenuation (radiation intensity affected by gaseous constituents), and other environmental factors not considered in the GlareGauge model. This may result in modeled predicted glare occurrences when in fact the glare is not actually occurring due to cloud cover, rain, or other atmospheric conditions.

Note that hazard zone boundaries shown in the Glare Hazard plots are an approximation; actual ocular impacts encompass a continuous, not discrete, spectrum.

# 6.0 Glare Analysis Results

Tetra Tech performed three separate glare analyses to provide a quantitative assessment of the potential for glare from the Project based on different receptor characteristics. The GlareGauge model's predicted results for the Project are summarized in the following sections partitioned according to the receptor parameters.

## 6.1 Analysis 1: First Story and Commuter Car View Results

Analysis 1 included 12 OPs at 6 feet above ground surface (typical first story receptor height) and four segmented vehicular traffic routes at 5 feet above ground surface (typical commuter vehicle receptor height). Table 3 represents the glare summary in annual minutes of glare for Analysis 1. Based on the SGHAT results, limited amounts (less than 5 percent of annual daylight minutes) of yellow glare are predicted at CR-1350-1. No green or red glare is predicted at the defined receptors.

**Table 3. Analysis 1 Annual Minutes of Glare Summary**

| Receptor | Green Glare | Yellow Glare | Red Glare |
|---|---|---|---|
| OP 1 | 0 | 0 | 0 |
| OP 2 | 0 | 0 | 0 |
| OP 3 | 0 | 0 | 0 |
| OP 4 | 0 | 0 | 0 |
| OP 5 | 0 | 0 | 0 |
| OP 6 | 0 | 0 | 0 |
| OP 7 | 0 | 0 | 0 |
| OP 8 | 0 | 0 | 0 |
| OP 9 | 0 | 0 | 0 |
| OP 10 | 0 | 0 | 0 |
| OP 11 | 0 | 0 | 0 |
| OP 12 | 0 | 0 | 0 |
| CR-1361 | 0 | 0 | 0 |
| Cunningham Rd | 0 | 0 | 0 |
| CR-1350-1 | 0 | 1,967 | 0 |
| CR-1350-2 | 0 | 0 | 0 |

## 6.2 Analysis 2: Second Story and Tractor-Trailer View Results

Analysis 2 included all of the same OP locations as Analysis 1 at 16 feet above ground surface (typical second story receptor height) and the same segmented vehicular traffic routes at 9 feet above ground surface (typical tractor-trailer receptor height). Table 4 represents the glare summary in annual minutes of glare for Analysis 2. Similar to Analysis 1, limited amounts (less than

5 percent of annual daylight minutes) of yellow glare are predicted at CR-1350-1. No green or red glare is predicted at the defined receptors.

**Table 4. Analysis 2 Annual Minutes of Glare Summary**

| Receptor | Green Glare | Yellow Glare | Red Glare |
|---|---|---|---|
| OP 1 | 0 | 0 | 0 |
| OP 2 | 0 | 0 | 0 |
| OP 3 | 0 | 0 | 0 |
| OP 4 | 0 | 0 | 0 |
| OP 5 | 0 | 0 | 0 |
| OP 6 | 0 | 0 | 0 |
| OP 7 | 0 | 0 | 0 |
| OP 8 | 0 | 0 | 0 |
| OP 9 | 0 | 0 | 0 |
| OP 10 | 0 | 0 | 0 |
| OP 11 | 0 | 0 | 0 |
| OP 12 | 0 | 0 | 0 |
| CR-1361 | 0 | 0 | 0 |
| Cunningham Rd | 0 | 0 | 0 |
| CR-1350-1 | 0 | 2,136 | 0 |
| CR-1350-2 | 0 | 0 | 0 |

Table 5 represents the detailed glare summary for Analyses 1 and 2. None of the OPs or CR-1361, Cunningham Rd, or CR-1350-2 have any glare predicted. In general, the predicted yellow glare at theCR-1350-1 is in the early morning hours (5:00 to 6:00 a.m.). The PV Arrays contributing to predicted glare at the receptors was PV Array 7, with the analyses predicting glare at the bend in the road when a vehicle would be facing PV Array 7.

**Table 5. Analyses 1 and 2 Detailed Glare Summary**

| Receptor | Green Glare Time of Day Range | Green Glare Time of Year Range | Yellow Glare Time of Day Range | Yellow Glare Time of Year Range | Contributing PV Array Areas |
|---|---|---|---|---|---|
| CR-1350-1 | N/A | N/A | 5:00 - 6:00 a.m. | May - August | 7 |

Note: Times are depicted in Pacific Standard Time; for Daylight Savings Time, add one hour. Contributing PV Array Areas are listed that are greater than 30 annual glare minutes.

N/A = Not applicable

## 6.3 Analysis 3: Flight Path and ATCT Results

Analysis 3 included six proximal 2-mile final approach flight paths. The final approach flight paths that were modeled are located at the airports referenced in the NCT results: PDT and the requested OLO2 located to the west. Table 6 represents the glare summary in annual minutes of glare for Analysis 3.

**Table 6. Analysis 3 Annual Minutes of Glare Summary**

| Receptor | Green Glare | Yellow Glare | Red Glare |
|---|---|---|---|
| OLO2-01 | 0 | 0 | 0 |
| OLO2-19 | 0 | 0 | 0 |
| PDT RWY 11 | 0 | 0 | 0 |
| PDT RWY 25 | 0 | 0 | 0 |
| PDT RWY 29 | 0 | 0 | 0 |
| PDT RWY 7 | 0 | 0 | 0 |

# 7.0 Summary

The preliminary Project Area layout was modeled using GlareGauge to evaluate the potential extent of glare the Project may cause to receptors at 12 OPs and four segmented traffic routes representing proximal areas surrounding the Project, as well as six proximal 2-mile final approach flight paths associated with PDT and OLO2.

In order to better analyze the potential for glare as a result of sunlight reflectance from the Project and accommodate GlareGauge conservatisms noted in Section 4.0, 18 solar array segments were modeled within the Project Area. Three separate glare analyses (Analyses 1, 2, and 3) were performed to provide a quantitative assessment of the potential for glare as a result of the Project, based on views from first- and second-story structures, commuter vehicles and semi-tractor-trailer trucks, and proximal 2-mile final approach flight paths at the airports referenced in the FAA NCT results. A summary of total glare predicted based on the analyses is presented in Table 7.

**Table 7. Project Glare Summary**

| Analysis No. | OP Height (feet) | Route Height (feet) | Total Green Glare Predicted (annual minutes)[1] | Total Yellow Glare Predicted (annual minutes) | Total Red Glare Predicted (annual minutes) | Total Glare Predicted (annual minutes) | Total Potential Glare Percentage of Annual Daylight Hours[2] |
|---|---|---|---|---|---|---|---|
| 1 | 6 | 5 | 0 | 1967 | 0 | 1967 | 0.75 |
| 2 | 16 | 9 | 0 | 2136 | 0 | 2136 | 0.81 |
| 3 | - | Variable (flight paths) | 0 | 0 | 0 | 0 | 0 |

1. Total annual daylight minutes equal approximately 262,800.
2. Total annual daylight hours equal approximately 4,380.

Analyses 1 and 2 predicted glare at the modeled receptor CR-1350-1. No red glare was predicted at any of the receptors and the yellow glare that was predicted at the receptors was nearly three orders of magnitude less than the glare intensity of an unfiltered view of the sun.

As previously noted, the GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation); atmospheric attenuation; screening due to existing topography not located within the defined array layouts; or existing vegetation or structures (including fences or walls); nor does the tool allow proposed landscaping to be included; therefore, the predicted results are considered to be conservative.

In addition, the Project was modeled with backtracking; the modules reverted back to the 5 degree position (resting angle) when the sun is outside of the tracking range. The sun is outside of the 52 degree maximum tracking range in the early morning (until approximately 5:00 a.m.) hours and in the late evening hours of the day (beginning at approximately 7:00 p.m.). The GlareGauge model assumes that backtracking to the resting angle will be instantaneous, when in fact the process will be slower, resulting in less glare experienced than predicted. The module backtracking program that will be implemented on the Project detects the rising sun light and begins to tilt the modules out of the resting position until they reach the maximum tracking angle (52 degrees) facing east around 5:00 to 6:00 a.m. Subsequently, as the modules track to the east, western receptors will experience less glare prior to 5:00 a.m. because the receptor will be observing the back of the modules. Likewise, in the evening hours, the eastern receptors will experience less glare from approximately 6:00 p.m. to 8:00 p.m. as the modules slowly backtrack to the resting angle. In general, tracking and backtracking at a slower pace than assumed by GlareGauge will result in significantly less glare experienced than predicted. Therefore, the representation of backtracking using an immediate 5° revert position is also a conservative approach to predicting glare at the surrounding receptors.

As noted in Section 2.0, the FAA has developed the following criteria (78 FR 63276) for analysis of solar energy projects located on jurisdictional airports:

- No potential for glint or glare in the existing or planned ATCT cab; and
- No potential for glare or "low potential for after-image" along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved ALP.

Analysis 3 did not predict glare at any of the 2-mile final approach paths of either airport. The FAA NCT was utilized to determine if the Project was recommended to formally file with the FAA OEG; based on the FAA NCT, the Project does not exceed notice criteria and formal filing is not recommended.

# 8.0 References

FAA (Federal Aviation Administration). 2010a. Federal Aviation Administration. CFR Title 14 Part 77.9 Notice of Proposed Construction or Alteration Requiring Notice. 2010.

FAA. 2018. Technical Guidance for Evaluating Selected Solar Technologies on Airports. Version 1.1. Washington, DC: Office of Airports, Office of Airport Planning and Programming Airport Planning and Environmental Division. April. https://www.faa.gov/airports/environmental/policy_guidance/media/FAA-Airport-Solar-Guide-2018.pdf

Ho et al. 2015. Sandia National Laboratories, Solar Glare Hazard Analysis Tool (SGHAT) Technical Reference Manual. March.

Sandia Solar Glare Hazard Analysis Tool, GlareGauge hosted by ForgeSolar. Accessed online https://www.forgesolar.com/.

Sandia National Laboratories. 2016. Sandia National Laboratories, Solar Glare Hazard Analysis Tool (SGHAT) User's Manual v. 3.0. December 6, 2016.

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# Appendix A. Figures

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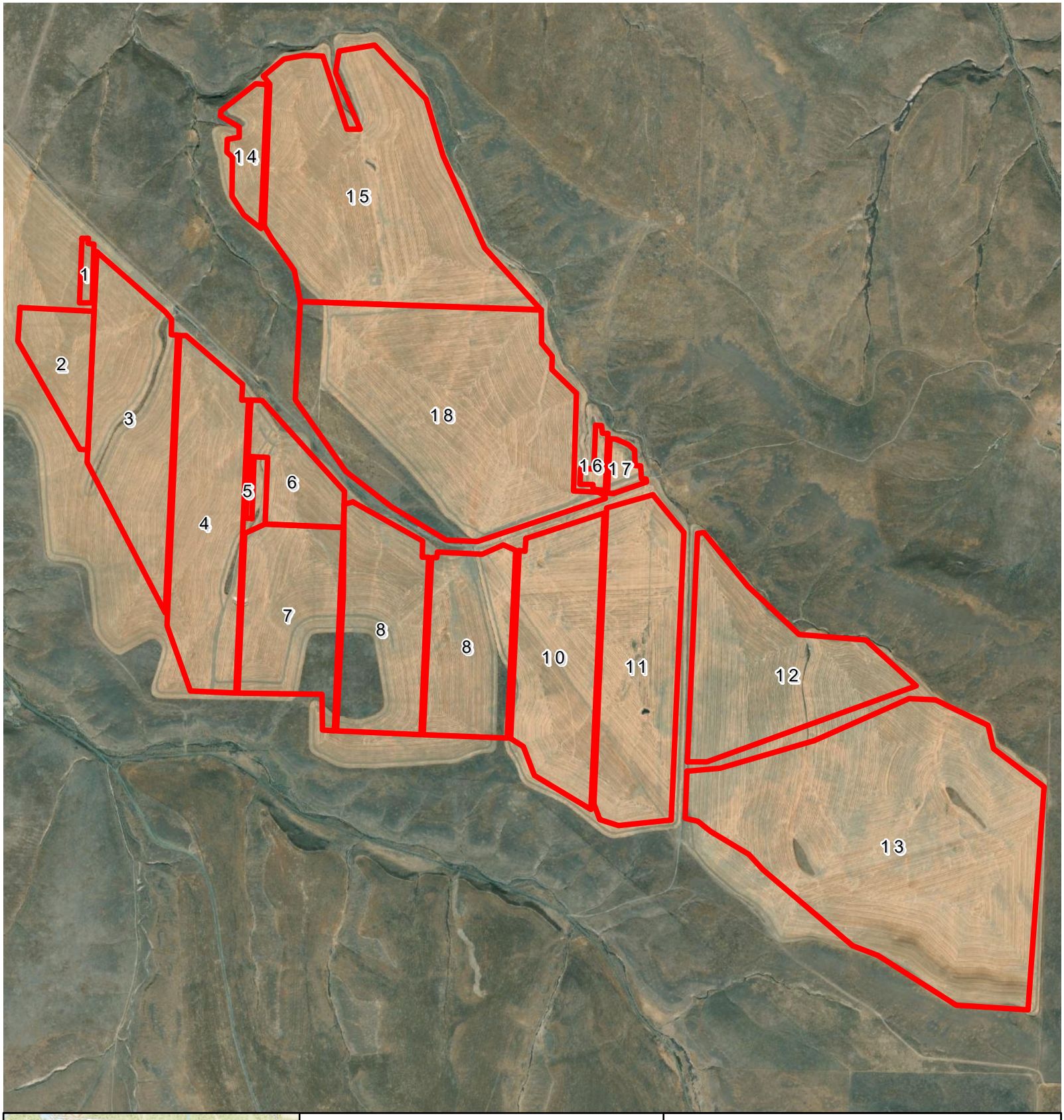




## Legend

Project Layout (PV Array Areas)

*Locations are approximate

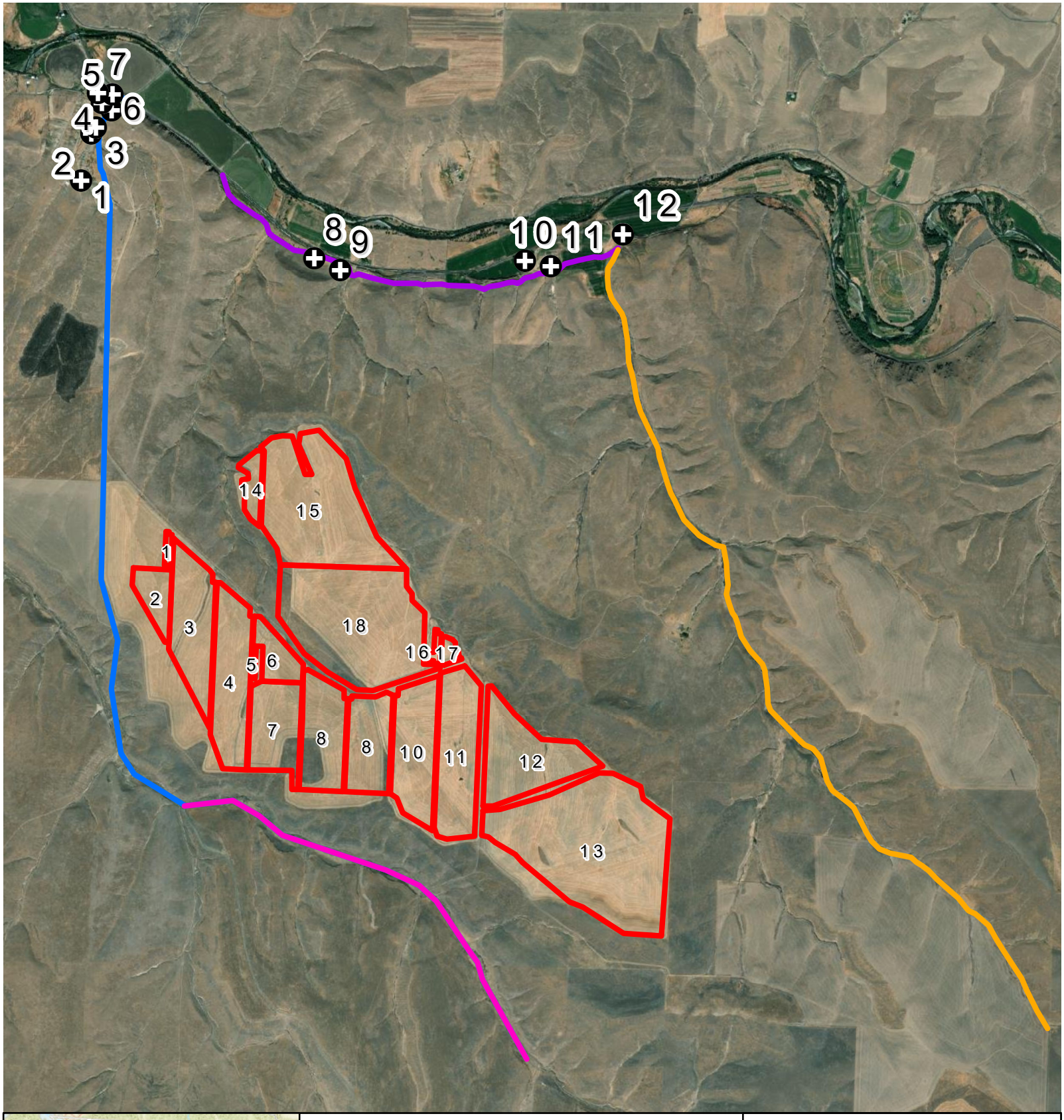
N

0 0.1250.25 0.5 Miles

TETRA TECH

**Figure 1**
**PV Array Areas**

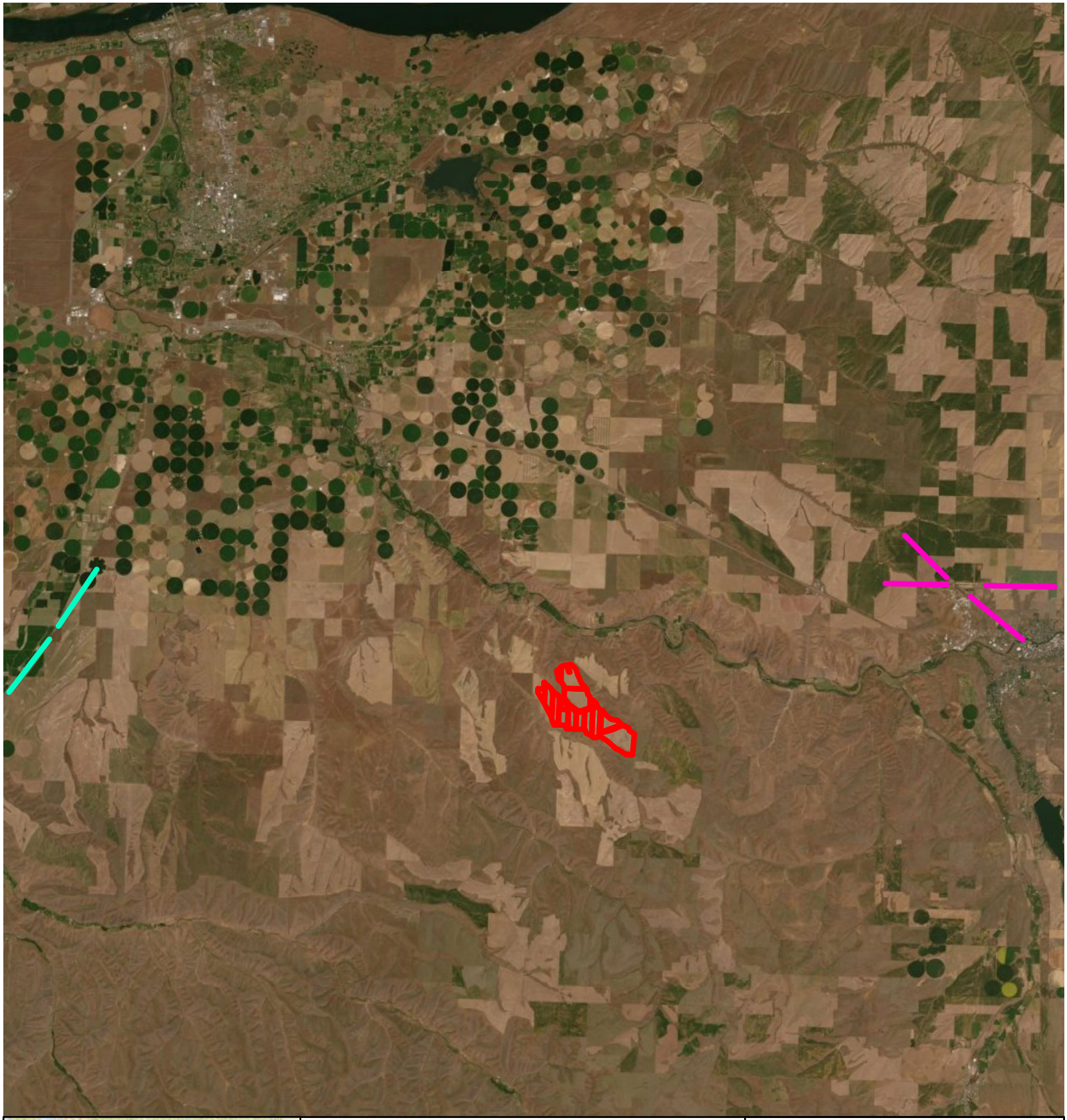
**Nolin Hills Solar**
**Umatilla County, Oregon**




TETRA TECH

**Figure 2**
**Receptors**

**Nolin Hills Solar**
**Umatilla County, Oregon**




## Legend

- PDT 2-Mile Final Approach
- OLO2 2-Mile Final Approach
- Project Layout (PV Array Areas)

*Locations are approximate

Miles
0 1.25 2.5 5

TETRA TECH

**Figure 3**
**Airport Receptors**

**Nolin Hills Solar**
**Umatilla County, Oregon**

# Appendix B. ForgeSolar Glare Analysis Reports

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# Appendix B. ForgeSolar Glare Analysis Reports

# FORGESOLAR GLARE ANALYSIS

Project: **Nolin Hills Wind/Solar**
Site configuration: **Nolin Hills - Analysis 1**
Analysis conducted by Drew Timmis (drew.timmis@tetratech.com) at 13:56 on 07 May, 2021.

## U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

| COMPONENT | STATUS | DESCRIPTION |
|---|---|---|
| Analysis parameters | PASS | Analysis time interval and eye characteristics used are acceptable |
| 2-mile flight path(s) | N/A | No flight paths analyzed |
| ATCT(s) | N/A | No ATCT receptors designated |

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at https://www.federalregister.gov/d/2013-24729

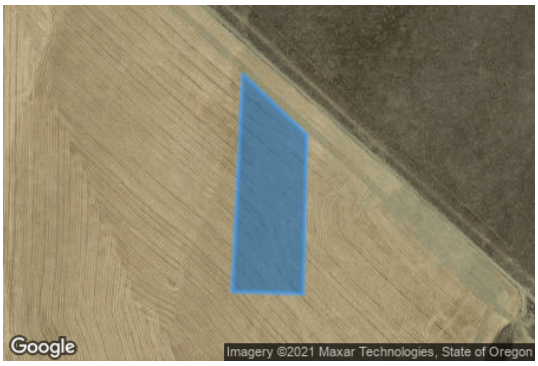
# SITE CONFIGURATION

## Analysis Parameters

DNI: peaks at 1,000.0 W/m^2
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 53044.9517

## PV Array(s)

**Name**: PV array 1
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.650334 | -119.092946 | 1184.05 | 14.60 | 1198.65 |
| 2 | 45.647589 | -119.093139 | 1229.49 | 14.60 | 1244.10 |
| 3 | 45.647559 | -119.091852 | 1219.66 | 14.60 | 1234.26 |
| 4 | 45.649569 | -119.091787 | 1193.87 | 14.60 | 1208.47 |

**Name**: PV array 10
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630585 | -119.068264 | 1555.94 | 14.60 | 1570.54 |
| 2 | 45.630547 | -119.067438 | 1560.04 | 14.60 | 1574.64 |
| 3 | 45.629152 | -119.066536 | 1558.23 | 14.60 | 1572.83 |
| 4 | 45.628297 | -119.064090 | 1532.93 | 14.60 | 1547.53 |
| 5 | 45.640285 | -119.063390 | 1324.26 | 14.60 | 1338.86 |
| 6 | 45.640018 | -119.063852 | 1318.23 | 14.60 | 1332.83 |
| 7 | 45.639885 | -119.064379 | 1317.87 | 14.60 | 1332.47 |
| 8 | 45.639606 | -119.065434 | 1323.70 | 14.60 | 1338.31 |
| 9 | 45.639002 | -119.067477 | 1337.53 | 14.60 | 1352.13 |
| 10 | 45.638597 | -119.067493 | 1345.48 | 14.60 | 1360.08 |
| 11 | 45.638597 | -119.067729 | 1345.77 | 14.60 | 1360.37 |
| 12 | 45.636598 | -119.067875 | 1369.01 | 14.60 | 1383.61 |
| 13 | 45.634576 | -119.068015 | 1428.70 | 14.60 | 1443.30 |
| 14 | 45.632607 | -119.068199 | 1501.50 | 14.60 | 1516.10 |

**Name**: PV array 11
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.628315 | -119.063937 | 1532.04 | 14.60 | 1546.64 |
| 2 | 45.627400 | -119.062370 | 1534.48 | 14.60 | 1549.08 |
| 3 | 45.627835 | -119.058873 | 1548.37 | 14.60 | 1562.98 |
| 4 | 45.629561 | -119.058830 | 1509.01 | 14.60 | 1523.61 |
| 5 | 45.632862 | -119.058787 | 1463.21 | 14.60 | 1477.81 |
| 6 | 45.636193 | -119.058830 | 1380.40 | 14.60 | 1395.00 |
| 7 | 45.638953 | -119.058830 | 1349.77 | 14.60 | 1364.37 |
| 8 | 45.640754 | -119.060611 | 1318.93 | 14.60 | 1333.54 |
| 9 | 45.640964 | -119.060868 | 1315.66 | 14.60 | 1330.26 |
| 10 | 45.640319 | -119.063250 | 1325.35 | 14.60 | 1339.95 |
| 11 | 45.638218 | -119.063347 | 1346.16 | 14.60 | 1360.76 |
| 12 | 45.635240 | -119.063508 | 1392.97 | 14.60 | 1407.57 |
| 13 | 45.632202 | -119.063722 | 1460.77 | 14.60 | 1475.37 |

**Name**: PV array 12
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.639225 | -119.058206 | 1343.67 | 14.60 | 1358.27 |
| 2 | 45.636030 | -119.058099 | 1389.23 | 14.60 | 1403.83 |
| 3 | 45.631949 | -119.057992 | 1485.39 | 14.60 | 1499.99 |
| 4 | 45.629188 | -119.058078 | 1519.45 | 14.60 | 1534.05 |
| 5 | 45.632944 | -119.044802 | 1474.28 | 14.60 | 1488.88 |
| 6 | 45.633784 | -119.045961 | 1457.89 | 14.60 | 1472.49 |
| 7 | 45.634504 | -119.047334 | 1443.95 | 14.60 | 1458.55 |
| 8 | 45.634812 | -119.048128 | 1434.31 | 14.60 | 1448.91 |
| 9 | 45.635074 | -119.048965 | 1422.61 | 14.60 | 1437.21 |
| 10 | 45.634985 | -119.050090 | 1413.95 | 14.60 | 1428.55 |
| 11 | 45.635256 | -119.051215 | 1403.78 | 14.60 | 1418.38 |
| 12 | 45.635185 | -119.051691 | 1400.46 | 14.60 | 1415.06 |
| 13 | 45.635309 | -119.052339 | 1396.08 | 14.60 | 1410.68 |
| 14 | 45.635767 | -119.053464 | 1387.70 | 14.60 | 1402.30 |
| 15 | 45.636090 | -119.053977 | 1381.78 | 14.60 | 1396.38 |
| 16 | 45.636504 | -119.054405 | 1378.92 | 14.60 | 1393.52 |
| 17 | 45.637360 | -119.055216 | 1361.79 | 14.60 | 1376.39 |
| 18 | 45.638210 | -119.056808 | 1362.13 | 14.60 | 1376.73 |
| 19 | 45.638875 | -119.057325 | 1350.00 | 14.60 | 1364.60 |
| 20 | 45.639140 | -119.057744 | 1346.36 | 14.60 | 1360.96 |
| 21 | 45.639303 | -119.057997 | 1341.62 | 14.60 | 1356.22 |

**Name**: PV array 13
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.620750 | -119.038612 | 1811.35 | 14.60 | 1825.95 |
| 2 | 45.629634 | -119.038440 | 1560.97 | 14.60 | 1575.57 |
| 3 | 45.630084 | -119.039513 | 1547.27 | 14.60 | 1561.87 |
| 4 | 45.630955 | -119.041187 | 1525.30 | 14.60 | 1539.90 |
| 5 | 45.631855 | -119.041530 | 1503.33 | 14.60 | 1517.93 |
| 6 | 45.632485 | -119.043933 | 1475.14 | 14.60 | 1489.74 |
| 7 | 45.628494 | -119.058052 | 1536.20 | 14.60 | 1550.80 |
| 8 | 45.627413 | -119.058052 | 1567.11 | 14.60 | 1581.71 |
| 9 | 45.623151 | -119.049598 | 1689.97 | 14.60 | 1704.57 |
| 10 | 45.622941 | -119.047967 | 1712.79 | 14.60 | 1727.39 |
| 11 | 45.622221 | -119.045435 | 1769.71 | 14.60 | 1784.31 |
| 12 | 45.621080 | -119.043418 | 1789.27 | 14.60 | 1803.87 |
| 13 | 45.621005 | -119.042217 | 1801.17 | 14.60 | 1815.77 |
| 14 | 45.620960 | -119.040972 | 1807.19 | 14.60 | 1821.80 |
| 15 | 45.620975 | -119.039685 | 1821.74 | 14.60 | 1836.34 |

**Name**: PV array 14
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.656584 | -119.083289 | 1073.95 | 14.60 | 1088.55 |
| 2 | 45.655129 | -119.083890 | 1107.47 | 14.60 | 1122.07 |
| 3 | 45.655114 | -119.085178 | 1101.16 | 14.60 | 1115.76 |
| 4 | 45.654545 | -119.084577 | 1096.59 | 14.60 | 1111.19 |
| 5 | 45.654035 | -119.084491 | 1115.62 | 14.60 | 1130.22 |
| 6 | 45.654035 | -119.085178 | 1110.82 | 14.60 | 1125.42 |
| 7 | 45.652175 | -119.084920 | 1162.65 | 14.60 | 1177.25 |
| 8 | 45.651065 | -119.083461 | 1183.24 | 14.60 | 1197.84 |

**Name**: PV array 15
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.647705 | -119.080929 | 1198.99 | 14.60 | 1213.59 |
| 2 | 45.648695 | -119.067840 | 1207.64 | 14.60 | 1222.24 |
| 3 | 45.649385 | -119.068655 | 1192.38 | 14.60 | 1206.98 |
| 4 | 45.649745 | -119.069642 | 1183.77 | 14.60 | 1198.37 |
| 5 | 45.650225 | -119.070415 | 1185.49 | 14.60 | 1200.09 |
| 6 | 45.651185 | -119.071187 | 1177.77 | 14.60 | 1192.37 |
| 7 | 45.652505 | -119.071917 | 1158.10 | 14.60 | 1172.70 |
| 8 | 45.653495 | -119.072818 | 1153.71 | 14.60 | 1168.31 |
| 9 | 45.654785 | -119.073505 | 1139.45 | 14.60 | 1154.05 |
| 10 | 45.656164 | -119.074191 | 1132.01 | 14.60 | 1146.61 |
| 11 | 45.656914 | -119.074964 | 1119.51 | 14.60 | 1134.11 |
| 12 | 45.658084 | -119.076723 | 1103.86 | 14.60 | 1118.46 |
| 13 | 45.657664 | -119.078998 | 1096.93 | 14.60 | 1111.53 |
| 14 | 45.655294 | -119.077839 | 1121.51 | 14.60 | 1136.11 |
| 15 | 45.654844 | -119.077496 | 1128.97 | 14.60 | 1143.57 |
| 16 | 45.654485 | -119.077324 | 1135.21 | 14.60 | 1149.81 |
| 17 | 45.654365 | -119.077882 | 1128.50 | 14.60 | 1143.10 |
| 18 | 45.654785 | -119.078483 | 1126.85 | 14.60 | 1141.45 |
| 19 | 45.655264 | -119.078912 | 1119.32 | 14.60 | 1133.92 |
| 20 | 45.655744 | -119.079084 | 1108.11 | 14.60 | 1122.71 |
| 21 | 45.656644 | -119.079341 | 1105.59 | 14.60 | 1120.19 |
| 22 | 45.657604 | -119.079770 | 1088.06 | 14.60 | 1102.66 |
| 23 | 45.657529 | -119.080450 | 1096.65 | 14.60 | 1111.25 |
| 24 | 45.657424 | -119.081802 | 1090.48 | 14.60 | 1105.09 |
| 25 | 45.656659 | -119.083196 | 1073.96 | 14.60 | 1088.56 |
| 26 | 45.653825 | -119.083261 | 1136.02 | 14.60 | 1150.62 |
| 27 | 45.650975 | -119.083347 | 1184.64 | 14.60 | 1199.24 |
| 28 | 45.649760 | -119.081559 | 1207.83 | 14.60 | 1222.43 |
| 29 | 45.648732 | -119.081158 | 1216.35 | 14.60 | 1230.95 |

**Name**: PV array 16
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.643332 | -119.063917 | 1276.80 | 14.60 | 1291.40 |
| 2 | 45.641532 | -119.064013 | 1299.74 | 14.60 | 1314.34 |
| 3 | 45.641554 | -119.064679 | 1297.19 | 14.60 | 1311.79 |
| 4 | 45.640789 | -119.064679 | 1304.51 | 14.60 | 1319.11 |
| 5 | 45.640782 | -119.064539 | 1304.39 | 14.60 | 1318.99 |
| 6 | 45.640789 | -119.064078 | 1310.01 | 14.60 | 1324.62 |
| 7 | 45.640617 | -119.064088 | 1311.35 | 14.60 | 1325.95 |
| 8 | 45.640647 | -119.063359 | 1320.48 | 14.60 | 1335.08 |
| 9 | 45.642979 | -119.063252 | 1284.03 | 14.60 | 1298.63 |

**Name**: PV array 17
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.640677 | -119.063252 | 1321.31 | 14.60 | 1335.91 |
| 2 | 45.641307 | -119.060870 | 1313.78 | 14.60 | 1328.38 |
| 3 | 45.641397 | -119.061145 | 1312.78 | 14.60 | 1327.38 |
| 4 | 45.641774 | -119.061286 | 1304.80 | 14.60 | 1319.41 |
| 5 | 45.642037 | -119.061308 | 1300.82 | 14.60 | 1315.42 |
| 6 | 45.642241 | -119.061352 | 1298.18 | 14.60 | 1312.78 |
| 7 | 45.642664 | -119.061763 | 1290.05 | 14.60 | 1304.65 |
| 8 | 45.642781 | -119.062517 | 1284.37 | 14.60 | 1298.97 |
| 9 | 45.642934 | -119.063142 | 1284.37 | 14.60 | 1298.97 |

**Name**: PV array 18
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.640609 | -119.063398 | 1320.31 | 14.60 | 1334.91 |
| 2 | 45.640564 | -119.064049 | 1312.68 | 14.60 | 1327.28 |
| 3 | 45.640538 | -119.064718 | 1308.48 | 14.60 | 1323.09 |
| 4 | 45.640557 | -119.065140 | 1311.06 | 14.60 | 1325.66 |
| 5 | 45.644465 | -119.065108 | 1254.72 | 14.60 | 1269.32 |
| 6 | 45.648710 | -119.067876 | 1207.82 | 14.60 | 1222.42 |
| 7 | 45.648155 | -119.074442 | 1228.20 | 14.60 | 1242.80 |
| 8 | 45.647645 | -119.080965 | 1194.98 | 14.60 | 1209.58 |
| 9 | 45.644735 | -119.081094 | 1243.60 | 14.60 | 1258.20 |
| 10 | 45.643259 | -119.079869 | 1256.60 | 14.60 | 1271.20 |
| 11 | 45.642173 | -119.078086 | 1267.98 | 14.60 | 1282.58 |
| 12 | 45.640712 | -119.076818 | 1294.74 | 14.60 | 1309.34 |
| 13 | 45.639852 | -119.074778 | 1322.17 | 14.60 | 1336.77 |
| 14 | 45.638676 | -119.072030 | 1366.57 | 14.60 | 1381.17 |
| 15 | 45.638658 | -119.070441 | 1364.10 | 14.60 | 1378.70 |
| 16 | 45.639015 | -119.069217 | 1337.97 | 14.60 | 1352.57 |
| 17 | 45.639737 | -119.066350 | 1326.14 | 14.60 | 1340.74 |
| 18 | 45.640061 | -119.064767 | 1316.44 | 14.60 | 1331.04 |
| 19 | 45.640282 | -119.063975 | 1315.42 | 14.60 | 1330.02 |
| 20 | 45.640468 | -119.063354 | 1323.08 | 14.60 | 1337.68 |

**Name**: PV array 2
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.646951 | -119.091824 | 1225.66 | 14.60 | 1240.26 |
| 2 | 45.647011 | -119.097188 | 1237.39 | 14.60 | 1251.99 |
| 3 | 45.645106 | -119.095557 | 1278.02 | 14.60 | 1292.62 |
| 4 | 45.643426 | -119.093388 | 1284.15 | 14.60 | 1298.75 |
| 5 | 45.643029 | -119.091893 | 1267.74 | 14.60 | 1282.34 |

**Name**: PV array 3
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.649427 | -119.091624 | 1193.33 | 14.60 | 1207.93 |
| 2 | 45.647207 | -119.088191 | 1186.98 | 14.60 | 1201.58 |
| 3 | 45.646577 | -119.087268 | 1197.04 | 14.60 | 1211.64 |
| 4 | 45.635160 | -119.087683 | 1370.77 | 14.60 | 1385.38 |
| 5 | 45.641071 | -119.091674 | 1267.67 | 14.60 | 1282.27 |
| 6 | 45.642331 | -119.091796 | 1265.85 | 14.60 | 1280.45 |

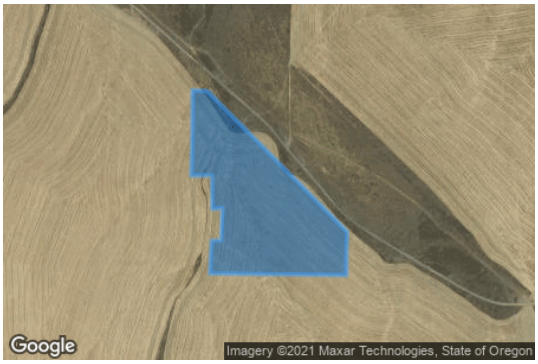
**Name**: PV array 4
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.635152 | -119.087542 | 1367.54 | 14.60 | 1382.14 |
| 2 | 45.632211 | -119.086829 | 1370.45 | 14.60 | 1385.05 |
| 3 | 45.632269 | -119.083532 | 1378.75 | 14.60 | 1393.35 |
| 4 | 45.643855 | -119.083103 | 1230.24 | 14.60 | 1244.84 |
| 5 | 45.646406 | -119.087087 | 1199.14 | 14.60 | 1213.74 |
| 6 | 45.645400 | -119.087171 | 1211.08 | 14.60 | 1225.68 |
| 7 | 45.644214 | -119.087213 | 1230.96 | 14.60 | 1245.56 |
| 8 | 45.642037 | -119.087253 | 1258.67 | 14.60 | 1273.27 |
| 9 | 45.637743 | -119.087420 | 1321.42 | 14.60 | 1336.02 |

**Name**: PV array 5
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material

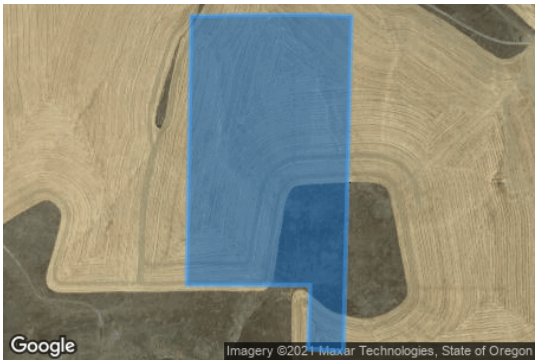

| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.641590 | -119.082814 | 1249.48 | 14.60 | 1264.08 |
| 2 | 45.641590 | -119.083126 | 1252.54 | 14.60 | 1267.14 |
| 3 | 45.639115 | -119.083211 | 1270.43 | 14.60 | 1285.03 |
| 4 | 45.639100 | -119.082911 | 1264.09 | 14.60 | 1278.69 |
| 5 | 45.640371 | -119.082916 | 1263.44 | 14.60 | 1278.04 |

**Name**: PV array 6
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.643804 | -119.083004 | 1230.23 | 14.60 | 1244.84 |
| 2 | 45.643782 | -119.082467 | 1224.76 | 14.60 | 1239.36 |
| 3 | 45.640222 | -119.077393 | 1280.88 | 14.60 | 1295.48 |
| 4 | 45.639969 | -119.077403 | 1285.82 | 14.60 | 1300.42 |
| 5 | 45.639689 | -119.077416 | 1287.57 | 14.60 | 1302.17 |
| 6 | 45.639125 | -119.077420 | 1295.10 | 14.60 | 1309.70 |
| 7 | 45.639169 | -119.082374 | 1268.47 | 14.60 | 1283.07 |
| 8 | 45.639994 | -119.082310 | 1260.28 | 14.60 | 1274.89 |
| 9 | 45.640009 | -119.081966 | 1258.97 | 14.60 | 1273.57 |
| 10 | 45.640819 | -119.081923 | 1251.57 | 14.60 | 1266.17 |
| 11 | 45.640804 | -119.082288 | 1252.57 | 14.60 | 1267.17 |
| 12 | 45.641651 | -119.082295 | 1245.28 | 14.60 | 1259.89 |
| 13 | 45.641646 | -119.083052 | 1252.22 | 14.60 | 1266.82 |
| 14 | 45.642690 | -119.083014 | 1239.13 | 14.60 | 1253.73 |

**Name**: PV array 7
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material

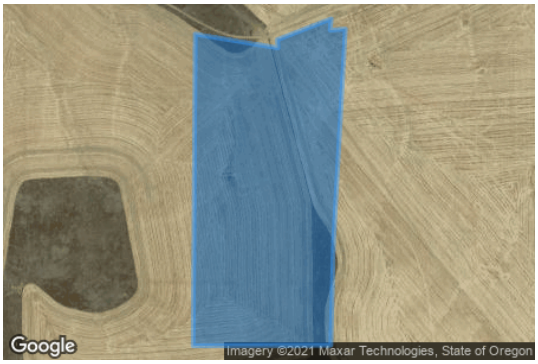



| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.639080 | -119.077408 | 1296.23 | 14.60 | 1310.83 |
| 2 | 45.630595 | -119.077698 | 1425.00 | 14.60 | 1439.60 |
| 3 | 45.630655 | -119.078985 | 1418.41 | 14.60 | 1433.01 |
| 4 | 45.632275 | -119.078910 | 1394.21 | 14.60 | 1408.81 |
| 5 | 45.632283 | -119.083388 | 1380.19 | 14.60 | 1394.79 |
| 6 | 45.639084 | -119.083224 | 1270.50 | 14.60 | 1285.10 |
| 7 | 45.639081 | -119.082852 | 1265.46 | 14.60 | 1280.06 |
| 8 | 45.639086 | -119.082481 | 1269.74 | 14.60 | 1284.34 |
| 9 | 45.639103 | -119.081776 | 1274.26 | 14.60 | 1288.86 |
| 10 | 45.639108 | -119.080292 | 1288.96 | 14.60 | 1303.57 |
| 11 | 45.639116 | -119.078845 | 1293.89 | 14.60 | 1308.49 |

**Name**: PV array 8
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630590 | -119.077643 | 1425.47 | 14.60 | 1440.07 |
| 2 | 45.630582 | -119.075578 | 1439.70 | 14.60 | 1454.30 |
| 3 | 45.630605 | -119.073531 | 1464.05 | 14.60 | 1478.65 |
| 4 | 45.638546 | -119.073467 | 1332.00 | 14.60 | 1346.60 |
| 5 | 45.640211 | -119.077356 | 1280.97 | 14.60 | 1295.57 |
| 6 | 45.635410 | -119.077482 | 1381.01 | 14.60 | 1395.61 |

**Name**: PV array 9
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630589 | -119.073371 | 1465.16 | 14.60 | 1479.76 |
| 2 | 45.630604 | -119.068372 | 1554.05 | 14.60 | 1568.65 |
| 3 | 45.633250 | -119.068274 | 1472.83 | 14.60 | 1487.43 |
| 4 | 45.638599 | -119.067845 | 1345.38 | 14.60 | 1359.98 |
| 5 | 45.638569 | -119.068403 | 1344.81 | 14.60 | 1359.41 |
| 6 | 45.638855 | -119.068360 | 1338.14 | 14.60 | 1352.74 |
| 7 | 45.638329 | -119.070313 | 1364.87 | 14.60 | 1379.48 |
| 8 | 45.638119 | -119.070292 | 1365.66 | 14.60 | 1380.26 |
| 9 | 45.638472 | -119.073296 | 1334.29 | 14.60 | 1348.89 |

## Discrete Observation Receptors

| Name | ID | Latitude (°) | Longitude (°) | Elevation (ft) | Height (ft) |
|---|---|---|---|---|---|
| OP 1 | 1 | 45.676425 | -119.103016 | 865.86 | 6.00 |
| OP 2 | 2 | 45.679974 | -119.102131 | 776.79 | 6.00 |
| OP 3 | 3 | 45.680559 | -119.101616 | 766.77 | 6.00 |
| OP 4 | 4 | 45.681845 | -119.099974 | 783.97 | 6.00 |
| OP 5 | 5 | 45.682313 | -119.101090 | 746.32 | 6.00 |
| OP 6 | 6 | 45.682871 | -119.099556 | 742.24 | 6.00 |
| OP 7 | 7 | 45.683089 | -119.101374 | 741.40 | 6.00 |
| OP 8 | 8 | 45.670964 | -119.077906 | 802.22 | 6.00 |
| OP 9 | 9 | 45.670165 | -119.075020 | 826.29 | 6.00 |
| OP 10 | 10 | 45.671245 | -119.055302 | 771.26 | 6.00 |
| OP 11 | 11 | 45.670862 | -119.052555 | 857.28 | 6.00 |
| OP 12 | 12 | 45.673494 | -119.044691 | 810.06 | 6.00 |

## Route Receptor(s)

**Name**: CR-1350 -1
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.629553 | -119.090046 | 1286.57 | 5.00 | 1291.57 |
| 2 | 45.629943 | -119.085111 | 1313.25 | 5.00 | 1318.25 |
| 3 | 45.629583 | -119.083738 | 1324.87 | 5.00 | 1329.87 |
| 4 | 45.628863 | -119.082236 | 1338.14 | 5.00 | 1343.14 |
| 5 | 45.628188 | -119.081013 | 1341.78 | 5.00 | 1346.78 |
| 6 | 45.627602 | -119.079790 | 1350.72 | 5.00 | 1355.72 |
| 7 | 45.625577 | -119.070735 | 1408.62 | 5.00 | 1413.62 |
| 8 | 45.623881 | -119.064621 | 1437.63 | 5.00 | 1442.63 |
| 9 | 45.623521 | -119.064253 | 1443.85 | 5.00 | 1448.85 |
| 10 | 45.622725 | -119.062891 | 1453.06 | 5.00 | 1458.06 |
| 11 | 45.620857 | -119.061249 | 1471.34 | 5.00 | 1476.34 |
| 12 | 45.619604 | -119.059922 | 1480.34 | 5.00 | 1485.34 |
| 13 | 45.618703 | -119.058592 | 1490.49 | 5.00 | 1495.49 |
| 14 | 45.614171 | -119.055373 | 1537.60 | 5.00 | 1542.60 |

**Name**: CR-1350-2
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.629658 | -119.090392 | 1283.08 | 5.00 | 1288.08 |
| 2 | 45.629628 | -119.090950 | 1282.13 | 5.00 | 1287.13 |
| 3 | 45.631729 | -119.095714 | 1253.54 | 5.00 | 1258.54 |
| 4 | 45.633589 | -119.097344 | 1237.43 | 5.00 | 1242.43 |
| 5 | 45.637730 | -119.098460 | 1220.25 | 5.00 | 1225.25 |
| 6 | 45.640491 | -119.098289 | 1256.24 | 5.00 | 1261.24 |
| 7 | 45.640746 | -119.098115 | 1275.33 | 5.00 | 1280.33 |
| 8 | 45.641931 | -119.097943 | 1308.53 | 5.00 | 1313.53 |
| 9 | 45.643146 | -119.098372 | 1314.73 | 5.00 | 1319.73 |
| 10 | 45.646237 | -119.099960 | 1263.62 | 5.00 | 1268.62 |
| 11 | 45.646822 | -119.100153 | 1254.50 | 5.00 | 1259.50 |
| 12 | 45.652162 | -119.100089 | 1170.01 | 5.00 | 1175.01 |
| 13 | 45.659976 | -119.100005 | 1096.95 | 5.00 | 1101.95 |
| 14 | 45.665884 | -119.099919 | 1083.56 | 5.00 | 1088.56 |
| 15 | 45.670802 | -119.099919 | 1030.32 | 5.00 | 1035.32 |
| 16 | 45.674311 | -119.099924 | 926.14 | 5.00 | 931.14 |
| 17 | 45.677654 | -119.101093 | 857.17 | 5.00 | 862.17 |
| 18 | 45.678269 | -119.101245 | 825.94 | 5.00 | 830.94 |
| 19 | 45.678891 | -119.101332 | 796.07 | 5.00 | 801.07 |
| 20 | 45.680061 | -119.101303 | 764.20 | 5.00 | 769.20 |
| 21 | 45.681987 | -119.101040 | 746.68 | 5.00 | 751.68 |
| 22 | 45.683306 | -119.099666 | 741.19 | 5.00 | 746.19 |

**Name**: CR-1361
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.614418 | -118.996881 | 1884.82 | 5.00 | 1889.82 |
| 2 | 45.621652 | -119.003233 | 1708.32 | 5.00 | 1713.32 |
| 3 | 45.622943 | -119.004907 | 1676.93 | 5.00 | 1681.93 |
| 4 | 45.623213 | -119.005937 | 1668.17 | 5.00 | 1673.17 |
| 5 | 45.627055 | -119.012031 | 1577.95 | 5.00 | 1582.95 |
| 6 | 45.627595 | -119.015335 | 1537.28 | 5.00 | 1542.28 |
| 7 | 45.629066 | -119.017095 | 1511.13 | 5.00 | 1516.13 |
| 8 | 45.630392 | -119.018253 | 1486.91 | 5.00 | 1491.91 |
| 9 | 45.631598 | -119.019884 | 1441.58 | 5.00 | 1446.58 |
| 10 | 45.632278 | -119.021107 | 1424.82 | 5.00 | 1429.82 |
| 11 | 45.633819 | -119.021815 | 1399.14 | 5.00 | 1404.14 |
| 12 | 45.634820 | -119.022695 | 1370.74 | 5.00 | 1375.74 |
| 13 | 45.636166 | -119.025324 | 1316.37 | 5.00 | 1321.37 |
| 14 | 45.637813 | -119.027652 | 1272.24 | 5.00 | 1277.24 |
| 15 | 45.641102 | -119.028553 | 1226.82 | 5.00 | 1231.82 |
| 16 | 45.643311 | -119.030870 | 1184.74 | 5.00 | 1189.74 |
| 17 | 45.646420 | -119.032608 | 1132.38 | 5.00 | 1137.38 |
| 18 | 45.650127 | -119.033091 | 1068.11 | 5.00 | 1073.11 |
| 19 | 45.650362 | -119.034418 | 1054.86 | 5.00 | 1059.86 |
| 20 | 45.650896 | -119.035701 | 1045.43 | 5.00 | 1050.43 |
| 21 | 45.652776 | -119.037925 | 1019.53 | 5.00 | 1024.53 |
| 22 | 45.655000 | -119.039440 | 1002.65 | 5.00 | 1007.65 |
| 23 | 45.657805 | -119.040768 | 962.79 | 5.00 | 967.79 |
| 24 | 45.660431 | -119.042569 | 950.33 | 5.00 | 955.33 |
| 25 | 45.663566 | -119.043618 | 905.22 | 5.00 | 910.22 |
| 26 | 45.665311 | -119.043975 | 896.35 | 5.00 | 901.35 |
| 27 | 45.667117 | -119.044503 | 870.31 | 5.00 | 875.31 |
| 28 | 45.668472 | -119.045675 | 856.55 | 5.00 | 861.55 |
| 29 | 45.669947 | -119.046332 | 832.14 | 5.00 | 837.14 |
| 30 | 45.670978 | -119.046100 | 825.29 | 5.00 | 830.29 |
| 31 | 45.672159 | -119.045354 | 831.48 | 5.00 | 836.48 |

**Name**: Cunningham Rd
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.672429 | -119.045335 | 823.68 | 5.00 | 828.68 |
| 2 | 45.671964 | -119.046043 | 814.41 | 5.00 | 819.41 |
| 3 | 45.671814 | -119.046494 | 809.90 | 5.00 | 814.90 |
| 4 | 45.671695 | -119.047052 | 811.94 | 5.00 | 816.94 |
| 5 | 45.671650 | -119.047846 | 831.25 | 5.00 | 836.25 |
| 6 | 45.671035 | -119.051000 | 847.03 | 5.00 | 852.03 |
| 7 | 45.670420 | -119.051987 | 853.44 | 5.00 | 858.44 |
| 8 | 45.670315 | -119.053146 | 864.17 | 5.00 | 869.17 |
| 9 | 45.670255 | -119.053854 | 855.94 | 5.00 | 860.94 |
| 10 | 45.670060 | -119.054240 | 855.50 | 5.00 | 860.50 |
| 11 | 45.670045 | -119.054948 | 854.42 | 5.00 | 859.42 |
| 12 | 45.669595 | -119.055721 | 850.79 | 5.00 | 855.79 |
| 13 | 45.669625 | -119.056515 | 865.51 | 5.00 | 870.51 |
| 14 | 45.669254 | -119.058843 | 854.77 | 5.00 | 859.77 |
| 15 | 45.669039 | -119.059664 | 846.15 | 5.00 | 851.15 |
| 16 | 45.669243 | -119.061386 | 830.02 | 5.00 | 835.02 |
| 17 | 45.669215 | -119.066010 | 823.26 | 5.00 | 828.26 |
| 18 | 45.669367 | -119.067115 | 836.72 | 5.00 | 841.72 |
| 19 | 45.669278 | -119.068880 | 829.98 | 5.00 | 834.98 |
| 20 | 45.669459 | -119.070130 | 827.61 | 5.00 | 832.61 |
| 21 | 45.669894 | -119.072967 | 812.47 | 5.00 | 817.47 |
| 22 | 45.669782 | -119.073742 | 789.85 | 5.00 | 794.86 |
| 23 | 45.670027 | -119.074027 | 792.49 | 5.00 | 797.49 |
| 24 | 45.670527 | -119.074247 | 792.27 | 5.00 | 797.27 |
| 25 | 45.670673 | -119.074902 | 790.73 | 5.00 | 795.73 |
| 26 | 45.671083 | -119.076683 | 789.11 | 5.00 | 794.11 |
| 27 | 45.671326 | -119.077494 | 784.56 | 5.00 | 789.56 |
| 28 | 45.671404 | -119.078347 | 783.99 | 5.00 | 788.99 |
| 29 | 45.671489 | -119.079662 | 781.92 | 5.00 | 786.92 |
| 30 | 45.671600 | -119.080124 | 779.93 | 5.00 | 784.93 |
| 31 | 45.671741 | -119.080586 | 778.85 | 5.00 | 783.85 |
| 32 | 45.672128 | -119.081360 | 773.20 | 5.00 | 778.20 |
| 33 | 45.672899 | -119.082699 | 761.99 | 5.00 | 766.99 |
| 34 | 45.673464 | -119.083132 | 771.58 | 5.00 | 776.58 |
| 35 | 45.673939 | -119.083695 | 769.89 | 5.00 | 774.89 |
| 36 | 45.674687 | -119.085538 | 763.18 | 5.00 | 768.18 |
| 37 | 45.675789 | -119.087302 | 759.56 | 5.00 | 764.56 |
| 38 | 45.677145 | -119.088079 | 751.28 | 5.00 | 756.28 |

# GLARE ANALYSIS RESULTS

## Summary of Glare

| PV Array Name | Tilt (°) | Orient (°) | "Green" Glare min | "Yellow" Glare min | Energy kWh |
|---|---|---|---|---|---|
| PV array 1 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 10 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 11 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 12 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 13 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 14 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 15 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 16 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 17 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 18 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 2 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 3 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 4 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 5 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 6 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 7 | SA tracking | SA tracking | 0 | 1,967 | - |
| PV array 8 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 9 | SA tracking | SA tracking | 0 | 0 | - |

*Total annual glare received by each receptor*

| Receptor | Annual Green Glare (min) | Annual Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 1967 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

# Results for: PV array 1

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 10

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

## Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 11

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare

0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 12

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 13

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 14

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 15

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare

0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

## Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 16

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare

0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 17

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 18

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 2

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 3

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare

0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

## Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 4

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare

0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 5

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 6

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 7

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 1967 |
| CR-1350-2 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare

0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

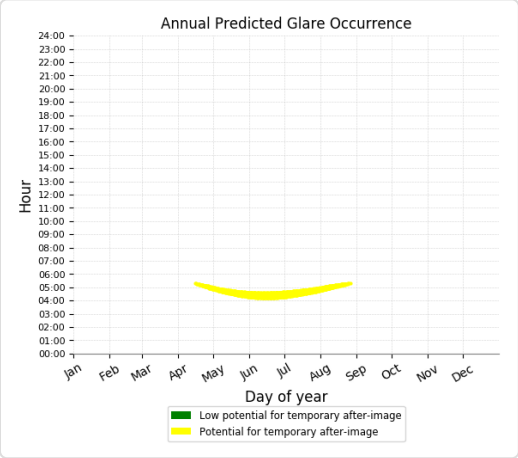
0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

1967 minutes of yellow glare
0 minutes of green glare




## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 8

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 9

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350 -1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350 -1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

# FORGESOLAR GLARE ANALYSIS

Project: **Nolin Hills Wind/Solar**
Site configuration: **Nolin Hills - Analysis 2**
Analysis conducted by Drew Timmis (drew.timmis@tetratech.com) at 13:57 on 07 May, 2021.

## U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

| COMPONENT | STATUS | DESCRIPTION |
|---|---|---|
| Analysis parameters | PASS | Analysis time interval and eye characteristics used are acceptable |
| 2-mile flight path(s) | N/A | No flight paths analyzed |
| ATCT(s) | N/A | No ATCT receptors designated |

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at https://www.federalregister.gov/d/2013-24729

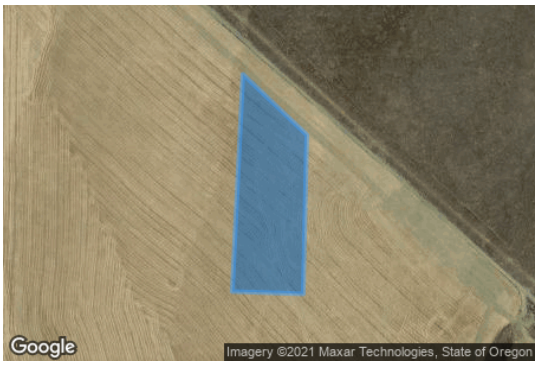
# SITE CONFIGURATION

## Analysis Parameters

DNI: peaks at 1,000.0 W/m^2
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 53175.9517

## PV Array(s)

**Name**: PV array 1
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.650334 | -119.092946 | 1184.05 | 14.60 | 1198.65 |
| 2 | 45.647589 | -119.093139 | 1229.49 | 14.60 | 1244.10 |
| 3 | 45.647559 | -119.091852 | 1219.66 | 14.60 | 1234.26 |
| 4 | 45.649569 | -119.091787 | 1193.87 | 14.60 | 1208.47 |

**Name**: PV array 10
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630585 | -119.068264 | 1555.94 | 14.60 | 1570.54 |
| 2 | 45.630547 | -119.067438 | 1560.04 | 14.60 | 1574.64 |
| 3 | 45.629152 | -119.066536 | 1558.23 | 14.60 | 1572.83 |
| 4 | 45.628297 | -119.064090 | 1532.93 | 14.60 | 1547.53 |
| 5 | 45.640285 | -119.063390 | 1324.26 | 14.60 | 1338.86 |
| 6 | 45.640018 | -119.063852 | 1318.23 | 14.60 | 1332.83 |
| 7 | 45.639885 | -119.064379 | 1317.87 | 14.60 | 1332.47 |
| 8 | 45.639606 | -119.065434 | 1323.70 | 14.60 | 1338.31 |
| 9 | 45.639002 | -119.067477 | 1337.53 | 14.60 | 1352.13 |
| 10 | 45.638597 | -119.067493 | 1345.48 | 14.60 | 1360.08 |
| 11 | 45.638597 | -119.067729 | 1345.77 | 14.60 | 1360.37 |
| 12 | 45.636598 | -119.067875 | 1369.01 | 14.60 | 1383.61 |
| 13 | 45.634576 | -119.068015 | 1428.70 | 14.60 | 1443.30 |
| 14 | 45.632607 | -119.068199 | 1501.50 | 14.60 | 1516.10 |

**Name**: PV array 11
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.628315 | -119.063937 | 1532.04 | 14.60 | 1546.64 |
| 2 | 45.627400 | -119.062370 | 1534.48 | 14.60 | 1549.08 |
| 3 | 45.627835 | -119.058873 | 1548.37 | 14.60 | 1562.98 |
| 4 | 45.629561 | -119.058830 | 1509.01 | 14.60 | 1523.61 |
| 5 | 45.632862 | -119.058787 | 1463.21 | 14.60 | 1477.81 |
| 6 | 45.636193 | -119.058830 | 1380.40 | 14.60 | 1395.00 |
| 7 | 45.638953 | -119.058830 | 1349.77 | 14.60 | 1364.37 |
| 8 | 45.640754 | -119.060611 | 1318.93 | 14.60 | 1333.54 |
| 9 | 45.640964 | -119.060868 | 1315.66 | 14.60 | 1330.26 |
| 10 | 45.640319 | -119.063250 | 1325.35 | 14.60 | 1339.95 |
| 11 | 45.638218 | -119.063347 | 1346.16 | 14.60 | 1360.76 |
| 12 | 45.635240 | -119.063508 | 1392.97 | 14.60 | 1407.57 |
| 13 | 45.632202 | -119.063722 | 1460.77 | 14.60 | 1475.37 |

**Name**: PV array 12
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.639225 | -119.058206 | 1343.67 | 14.60 | 1358.27 |
| 2 | 45.636030 | -119.058099 | 1389.23 | 14.60 | 1403.83 |
| 3 | 45.631949 | -119.057992 | 1485.39 | 14.60 | 1499.99 |
| 4 | 45.629188 | -119.058078 | 1519.45 | 14.60 | 1534.05 |
| 5 | 45.632944 | -119.044802 | 1474.28 | 14.60 | 1488.88 |
| 6 | 45.633784 | -119.045961 | 1457.89 | 14.60 | 1472.49 |
| 7 | 45.634504 | -119.047334 | 1443.95 | 14.60 | 1458.55 |
| 8 | 45.634812 | -119.048128 | 1434.31 | 14.60 | 1448.91 |
| 9 | 45.635074 | -119.048965 | 1422.61 | 14.60 | 1437.21 |
| 10 | 45.634985 | -119.050090 | 1413.95 | 14.60 | 1428.55 |
| 11 | 45.635256 | -119.051215 | 1403.78 | 14.60 | 1418.38 |
| 12 | 45.635185 | -119.051691 | 1400.46 | 14.60 | 1415.06 |
| 13 | 45.635309 | -119.052339 | 1396.08 | 14.60 | 1410.68 |
| 14 | 45.635767 | -119.053464 | 1387.70 | 14.60 | 1402.30 |
| 15 | 45.636090 | -119.053977 | 1381.78 | 14.60 | 1396.38 |
| 16 | 45.636504 | -119.054405 | 1378.92 | 14.60 | 1393.52 |
| 17 | 45.637360 | -119.055216 | 1361.79 | 14.60 | 1376.39 |
| 18 | 45.638210 | -119.056808 | 1362.13 | 14.60 | 1376.73 |
| 19 | 45.638875 | -119.057325 | 1350.00 | 14.60 | 1364.60 |
| 20 | 45.639140 | -119.057744 | 1346.36 | 14.60 | 1360.96 |
| 21 | 45.639303 | -119.057997 | 1341.62 | 14.60 | 1356.22 |

**Name**: PV array 13
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.620750 | -119.038612 | 1811.35 | 14.60 | 1825.95 |
| 2 | 45.629634 | -119.038440 | 1560.97 | 14.60 | 1575.57 |
| 3 | 45.630084 | -119.039513 | 1547.27 | 14.60 | 1561.87 |
| 4 | 45.630955 | -119.041187 | 1525.30 | 14.60 | 1539.90 |
| 5 | 45.631855 | -119.041530 | 1503.33 | 14.60 | 1517.93 |
| 6 | 45.632485 | -119.043933 | 1475.14 | 14.60 | 1489.74 |
| 7 | 45.628494 | -119.058052 | 1536.20 | 14.60 | 1550.80 |
| 8 | 45.627413 | -119.058052 | 1567.11 | 14.60 | 1581.71 |
| 9 | 45.623151 | -119.049598 | 1689.97 | 14.60 | 1704.57 |
| 10 | 45.622941 | -119.047967 | 1712.79 | 14.60 | 1727.39 |
| 11 | 45.622221 | -119.045435 | 1769.71 | 14.60 | 1784.31 |
| 12 | 45.621080 | -119.043418 | 1789.27 | 14.60 | 1803.87 |
| 13 | 45.621005 | -119.042217 | 1801.17 | 14.60 | 1815.77 |
| 14 | 45.620960 | -119.040972 | 1807.19 | 14.60 | 1821.80 |
| 15 | 45.620975 | -119.039685 | 1821.74 | 14.60 | 1836.34 |

**Name**: PV array 14
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.656584 | -119.083289 | 1073.95 | 14.60 | 1088.55 |
| 2 | 45.655129 | -119.083890 | 1107.47 | 14.60 | 1122.07 |
| 3 | 45.655114 | -119.085178 | 1101.16 | 14.60 | 1115.76 |
| 4 | 45.654545 | -119.084577 | 1096.59 | 14.60 | 1111.19 |
| 5 | 45.654035 | -119.084491 | 1115.62 | 14.60 | 1130.22 |
| 6 | 45.654035 | -119.085178 | 1110.82 | 14.60 | 1125.42 |
| 7 | 45.652175 | -119.084920 | 1162.65 | 14.60 | 1177.25 |
| 8 | 45.651065 | -119.083461 | 1183.24 | 14.60 | 1197.84 |

**Name**: PV array 15
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.647705 | -119.080929 | 1198.99 | 14.60 | 1213.59 |
| 2 | 45.648695 | -119.067840 | 1207.64 | 14.60 | 1222.24 |
| 3 | 45.649385 | -119.068655 | 1192.38 | 14.60 | 1206.98 |
| 4 | 45.649745 | -119.069642 | 1183.77 | 14.60 | 1198.37 |
| 5 | 45.650225 | -119.070415 | 1185.49 | 14.60 | 1200.09 |
| 6 | 45.651185 | -119.071187 | 1177.77 | 14.60 | 1192.37 |
| 7 | 45.652505 | -119.071917 | 1158.10 | 14.60 | 1172.70 |
| 8 | 45.653495 | -119.072818 | 1153.71 | 14.60 | 1168.31 |
| 9 | 45.654785 | -119.073505 | 1139.45 | 14.60 | 1154.05 |
| 10 | 45.656164 | -119.074191 | 1132.01 | 14.60 | 1146.61 |
| 11 | 45.656914 | -119.074964 | 1119.51 | 14.60 | 1134.11 |
| 12 | 45.658084 | -119.076723 | 1103.86 | 14.60 | 1118.46 |
| 13 | 45.657664 | -119.078998 | 1096.93 | 14.60 | 1111.53 |
| 14 | 45.655294 | -119.077839 | 1121.51 | 14.60 | 1136.11 |
| 15 | 45.654844 | -119.077496 | 1128.97 | 14.60 | 1143.57 |
| 16 | 45.654485 | -119.077324 | 1135.21 | 14.60 | 1149.81 |
| 17 | 45.654365 | -119.077882 | 1128.50 | 14.60 | 1143.10 |
| 18 | 45.654785 | -119.078483 | 1126.85 | 14.60 | 1141.45 |
| 19 | 45.655264 | -119.078912 | 1119.32 | 14.60 | 1133.92 |
| 20 | 45.655744 | -119.079084 | 1108.11 | 14.60 | 1122.71 |
| 21 | 45.656644 | -119.079341 | 1105.59 | 14.60 | 1120.19 |
| 22 | 45.657604 | -119.079770 | 1088.06 | 14.60 | 1102.66 |
| 23 | 45.657529 | -119.080450 | 1096.65 | 14.60 | 1111.25 |
| 24 | 45.657424 | -119.081802 | 1090.48 | 14.60 | 1105.09 |
| 25 | 45.656659 | -119.083196 | 1073.96 | 14.60 | 1088.56 |
| 26 | 45.653825 | -119.083261 | 1136.02 | 14.60 | 1150.62 |
| 27 | 45.650975 | -119.083347 | 1184.64 | 14.60 | 1199.24 |
| 28 | 45.649760 | -119.081559 | 1207.83 | 14.60 | 1222.43 |
| 29 | 45.648732 | -119.081158 | 1216.35 | 14.60 | 1230.95 |

**Name**: PV array 16
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.643332 | -119.063917 | 1276.80 | 14.60 | 1291.40 |
| 2 | 45.641532 | -119.064013 | 1299.74 | 14.60 | 1314.34 |
| 3 | 45.641554 | -119.064679 | 1297.19 | 14.60 | 1311.79 |
| 4 | 45.640789 | -119.064679 | 1304.51 | 14.60 | 1319.11 |
| 5 | 45.640782 | -119.064539 | 1304.39 | 14.60 | 1318.99 |
| 6 | 45.640789 | -119.064078 | 1310.01 | 14.60 | 1324.62 |
| 7 | 45.640617 | -119.064088 | 1311.35 | 14.60 | 1325.95 |
| 8 | 45.640647 | -119.063359 | 1320.48 | 14.60 | 1335.08 |
| 9 | 45.642979 | -119.063252 | 1284.03 | 14.60 | 1298.63 |

**Name**: PV array 17
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.640677 | -119.063252 | 1321.31 | 14.60 | 1335.91 |
| 2 | 45.641307 | -119.060870 | 1313.78 | 14.60 | 1328.38 |
| 3 | 45.641397 | -119.061145 | 1312.78 | 14.60 | 1327.38 |
| 4 | 45.641774 | -119.061286 | 1304.80 | 14.60 | 1319.41 |
| 5 | 45.642037 | -119.061308 | 1300.82 | 14.60 | 1315.42 |
| 6 | 45.642241 | -119.061352 | 1298.18 | 14.60 | 1312.78 |
| 7 | 45.642664 | -119.061763 | 1290.05 | 14.60 | 1304.65 |
| 8 | 45.642781 | -119.062517 | 1284.37 | 14.60 | 1298.97 |
| 9 | 45.642934 | -119.063142 | 1284.37 | 14.60 | 1298.97 |

**Name**: PV array 18
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.640609 | -119.063398 | 1320.31 | 14.60 | 1334.91 |
| 2 | 45.640564 | -119.064049 | 1312.68 | 14.60 | 1327.28 |
| 3 | 45.640538 | -119.064718 | 1308.48 | 14.60 | 1323.09 |
| 4 | 45.640557 | -119.065140 | 1311.06 | 14.60 | 1325.66 |
| 5 | 45.644465 | -119.065108 | 1254.72 | 14.60 | 1269.32 |
| 6 | 45.648710 | -119.067876 | 1207.82 | 14.60 | 1222.42 |
| 7 | 45.648155 | -119.074442 | 1228.20 | 14.60 | 1242.80 |
| 8 | 45.647645 | -119.080965 | 1194.98 | 14.60 | 1209.58 |
| 9 | 45.644735 | -119.081094 | 1243.60 | 14.60 | 1258.20 |
| 10 | 45.643259 | -119.079869 | 1256.60 | 14.60 | 1271.20 |
| 11 | 45.642173 | -119.078086 | 1267.98 | 14.60 | 1282.58 |
| 12 | 45.640712 | -119.076818 | 1294.74 | 14.60 | 1309.34 |
| 13 | 45.639852 | -119.074778 | 1322.17 | 14.60 | 1336.77 |
| 14 | 45.638676 | -119.072030 | 1366.57 | 14.60 | 1381.17 |
| 15 | 45.638658 | -119.070441 | 1364.10 | 14.60 | 1378.70 |
| 16 | 45.639015 | -119.069217 | 1337.97 | 14.60 | 1352.57 |
| 17 | 45.639737 | -119.066350 | 1326.14 | 14.60 | 1340.74 |
| 18 | 45.640061 | -119.064767 | 1316.44 | 14.60 | 1331.04 |
| 19 | 45.640282 | -119.063975 | 1315.42 | 14.60 | 1330.02 |
| 20 | 45.640468 | -119.063354 | 1323.08 | 14.60 | 1337.68 |

**Name**: PV array 2
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.646951 | -119.091824 | 1225.66 | 14.60 | 1240.26 |
| 2 | 45.647011 | -119.097188 | 1237.39 | 14.60 | 1251.99 |
| 3 | 45.645106 | -119.095557 | 1278.02 | 14.60 | 1292.62 |
| 4 | 45.643426 | -119.093388 | 1284.15 | 14.60 | 1298.75 |
| 5 | 45.643029 | -119.091893 | 1267.74 | 14.60 | 1282.34 |

**Name**: PV array 3
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.649427 | -119.091624 | 1193.33 | 14.60 | 1207.93 |
| 2 | 45.647207 | -119.088191 | 1186.98 | 14.60 | 1201.58 |
| 3 | 45.646577 | -119.087268 | 1197.04 | 14.60 | 1211.64 |
| 4 | 45.635160 | -119.087683 | 1370.77 | 14.60 | 1385.38 |
| 5 | 45.641071 | -119.091674 | 1267.67 | 14.60 | 1282.27 |
| 6 | 45.642331 | -119.091796 | 1265.85 | 14.60 | 1280.45 |

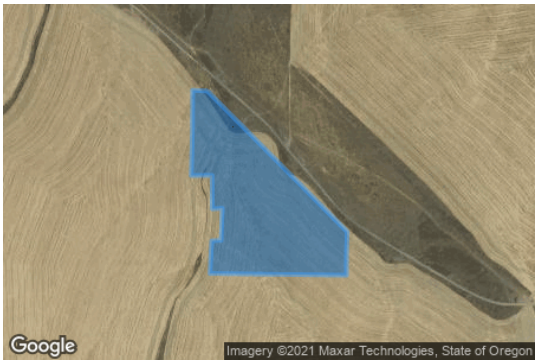
**Name**: PV array 4
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.635152 | -119.087542 | 1367.54 | 14.60 | 1382.14 |
| 2 | 45.632211 | -119.086829 | 1370.45 | 14.60 | 1385.05 |
| 3 | 45.632269 | -119.083532 | 1378.75 | 14.60 | 1393.35 |
| 4 | 45.643855 | -119.083103 | 1230.24 | 14.60 | 1244.84 |
| 5 | 45.646406 | -119.087087 | 1199.14 | 14.60 | 1213.74 |
| 6 | 45.645400 | -119.087171 | 1211.08 | 14.60 | 1225.68 |
| 7 | 45.644214 | -119.087213 | 1230.96 | 14.60 | 1245.56 |
| 8 | 45.642037 | -119.087253 | 1258.67 | 14.60 | 1273.27 |
| 9 | 45.637743 | -119.087420 | 1321.42 | 14.60 | 1336.02 |

**Name**: PV array 5
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material

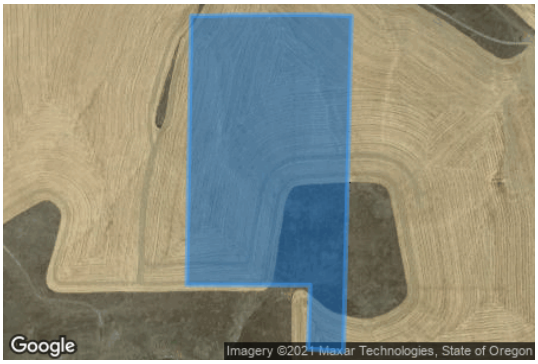

| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.641590 | -119.082814 | 1249.48 | 14.60 | 1264.08 |
| 2 | 45.641590 | -119.083126 | 1252.54 | 14.60 | 1267.14 |
| 3 | 45.639115 | -119.083211 | 1270.43 | 14.60 | 1285.03 |
| 4 | 45.639100 | -119.082911 | 1264.09 | 14.60 | 1278.69 |
| 5 | 45.640371 | -119.082916 | 1263.44 | 14.60 | 1278.04 |

**Name**: PV array 6
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.643804 | -119.083004 | 1230.23 | 14.60 | 1244.84 |
| 2 | 45.643782 | -119.082467 | 1224.76 | 14.60 | 1239.36 |
| 3 | 45.640222 | -119.077393 | 1280.88 | 14.60 | 1295.48 |
| 4 | 45.639969 | -119.077403 | 1285.82 | 14.60 | 1300.42 |
| 5 | 45.639689 | -119.077416 | 1287.57 | 14.60 | 1302.17 |
| 6 | 45.639125 | -119.077420 | 1295.10 | 14.60 | 1309.70 |
| 7 | 45.639169 | -119.082374 | 1268.47 | 14.60 | 1283.07 |
| 8 | 45.639994 | -119.082310 | 1260.28 | 14.60 | 1274.89 |
| 9 | 45.640009 | -119.081966 | 1258.97 | 14.60 | 1273.57 |
| 10 | 45.640819 | -119.081923 | 1251.57 | 14.60 | 1266.17 |
| 11 | 45.640804 | -119.082288 | 1252.57 | 14.60 | 1267.17 |
| 12 | 45.641651 | -119.082295 | 1245.28 | 14.60 | 1259.89 |
| 13 | 45.641646 | -119.083052 | 1252.22 | 14.60 | 1266.82 |
| 14 | 45.642690 | -119.083014 | 1239.13 | 14.60 | 1253.73 |

**Name**: PV array 7
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material

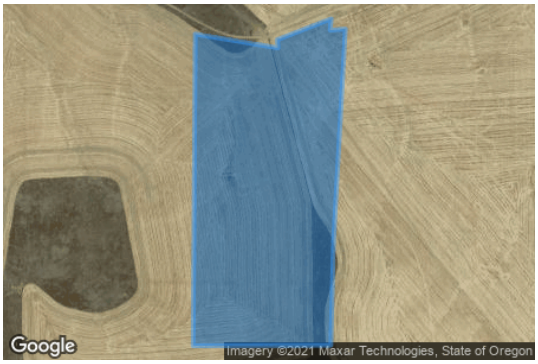



| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.639080 | -119.077408 | 1296.23 | 14.60 | 1310.83 |
| 2 | 45.630595 | -119.077698 | 1425.00 | 14.60 | 1439.60 |
| 3 | 45.630655 | -119.078985 | 1418.41 | 14.60 | 1433.01 |
| 4 | 45.632275 | -119.078910 | 1394.21 | 14.60 | 1408.81 |
| 5 | 45.632283 | -119.083388 | 1380.19 | 14.60 | 1394.79 |
| 6 | 45.639084 | -119.083224 | 1270.50 | 14.60 | 1285.10 |
| 7 | 45.639081 | -119.082852 | 1265.46 | 14.60 | 1280.06 |
| 8 | 45.639086 | -119.082481 | 1269.74 | 14.60 | 1284.34 |
| 9 | 45.639103 | -119.081776 | 1274.26 | 14.60 | 1288.86 |
| 10 | 45.639108 | -119.080292 | 1288.96 | 14.60 | 1303.57 |
| 11 | 45.639116 | -119.078845 | 1293.89 | 14.60 | 1308.49 |

**Name**: PV array 8
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630590 | -119.077643 | 1425.47 | 14.60 | 1440.07 |
| 2 | 45.630582 | -119.075578 | 1439.70 | 14.60 | 1454.30 |
| 3 | 45.630605 | -119.073531 | 1464.05 | 14.60 | 1478.65 |
| 4 | 45.638546 | -119.073467 | 1332.00 | 14.60 | 1346.60 |
| 5 | 45.640211 | -119.077356 | 1280.97 | 14.60 | 1295.57 |
| 6 | 45.635410 | -119.077482 | 1381.01 | 14.60 | 1395.61 |

**Name**: PV array 9
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630589 | -119.073371 | 1465.16 | 14.60 | 1479.76 |
| 2 | 45.630604 | -119.068372 | 1554.05 | 14.60 | 1568.65 |
| 3 | 45.633250 | -119.068274 | 1472.83 | 14.60 | 1487.43 |
| 4 | 45.638599 | -119.067845 | 1345.38 | 14.60 | 1359.98 |
| 5 | 45.638569 | -119.068403 | 1344.81 | 14.60 | 1359.41 |
| 6 | 45.638855 | -119.068360 | 1338.14 | 14.60 | 1352.74 |
| 7 | 45.638329 | -119.070313 | 1364.87 | 14.60 | 1379.48 |
| 8 | 45.638119 | -119.070292 | 1365.66 | 14.60 | 1380.26 |
| 9 | 45.638472 | -119.073296 | 1334.29 | 14.60 | 1348.89 |

## Discrete Observation Receptors

| Name | ID | Latitude (°) | Longitude (°) | Elevation (ft) | Height (ft) |
|---|---|---|---|---|---|
| OP 1 | 1 | 45.676425 | -119.103016 | 865.86 | 16.00 |
| OP 2 | 2 | 45.679974 | -119.102131 | 776.79 | 16.00 |
| OP 3 | 3 | 45.680559 | -119.101616 | 766.77 | 16.00 |
| OP 4 | 4 | 45.681845 | -119.099974 | 783.97 | 16.00 |
| OP 5 | 5 | 45.682313 | -119.101090 | 746.32 | 16.00 |
| OP 6 | 6 | 45.682871 | -119.099556 | 742.24 | 16.00 |
| OP 7 | 7 | 45.683089 | -119.101374 | 741.40 | 16.00 |
| OP 8 | 8 | 45.670964 | -119.077906 | 802.22 | 16.00 |
| OP 9 | 9 | 45.670165 | -119.075020 | 826.29 | 16.00 |
| OP 10 | 10 | 45.671245 | -119.055302 | 771.26 | 16.00 |
| OP 11 | 11 | 45.670862 | -119.052555 | 857.28 | 16.00 |
| OP 12 | 12 | 45.673494 | -119.044691 | 810.06 | 16.00 |

## Route Receptor(s)

**Name**: CR-1350-1
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.629553 | -119.090046 | 1286.57 | 9.00 | 1295.57 |
| 2 | 45.629943 | -119.085111 | 1313.25 | 9.00 | 1322.25 |
| 3 | 45.629583 | -119.083738 | 1324.87 | 9.00 | 1333.87 |
| 4 | 45.628863 | -119.082236 | 1338.14 | 9.00 | 1347.14 |
| 5 | 45.628188 | -119.081013 | 1341.78 | 9.00 | 1350.78 |
| 6 | 45.627602 | -119.079790 | 1350.72 | 9.00 | 1359.72 |
| 7 | 45.625577 | -119.070735 | 1408.62 | 9.00 | 1417.62 |
| 8 | 45.623881 | -119.064621 | 1437.63 | 9.00 | 1446.63 |
| 9 | 45.623521 | -119.064253 | 1443.85 | 9.00 | 1452.85 |
| 10 | 45.622725 | -119.062891 | 1453.06 | 9.00 | 1462.06 |
| 11 | 45.620857 | -119.061249 | 1471.34 | 9.00 | 1480.35 |
| 12 | 45.619604 | -119.059922 | 1480.34 | 9.00 | 1489.34 |
| 13 | 45.618703 | -119.058592 | 1490.49 | 9.00 | 1499.49 |
| 14 | 45.614171 | -119.055373 | 1537.60 | 9.00 | 1546.60 |

**Name**: CR-1350-2
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.629658 | -119.090392 | 1283.08 | 9.00 | 1292.08 |
| 2 | 45.629628 | -119.090950 | 1282.13 | 9.00 | 1291.13 |
| 3 | 45.631729 | -119.095714 | 1253.54 | 9.00 | 1262.54 |
| 4 | 45.633589 | -119.097344 | 1237.43 | 9.00 | 1246.43 |
| 5 | 45.637730 | -119.098460 | 1220.25 | 9.00 | 1229.25 |
| 6 | 45.640491 | -119.098289 | 1256.24 | 9.00 | 1265.24 |
| 7 | 45.640746 | -119.098115 | 1275.33 | 9.00 | 1284.33 |
| 8 | 45.641931 | -119.097943 | 1308.53 | 9.00 | 1317.53 |
| 9 | 45.643146 | -119.098372 | 1314.73 | 9.00 | 1323.73 |
| 10 | 45.646237 | -119.099960 | 1263.62 | 9.00 | 1272.62 |
| 11 | 45.646822 | -119.100153 | 1254.50 | 9.00 | 1263.50 |
| 12 | 45.652162 | -119.100089 | 1170.01 | 9.00 | 1179.01 |
| 13 | 45.659976 | -119.100005 | 1096.95 | 9.00 | 1105.95 |
| 14 | 45.665884 | -119.099919 | 1083.56 | 9.00 | 1092.56 |
| 15 | 45.670802 | -119.099919 | 1030.32 | 9.00 | 1039.32 |
| 16 | 45.674311 | -119.099924 | 926.14 | 9.00 | 935.14 |
| 17 | 45.677654 | -119.101093 | 857.17 | 9.00 | 866.17 |
| 18 | 45.678269 | -119.101245 | 825.94 | 9.00 | 834.94 |
| 19 | 45.678891 | -119.101332 | 796.07 | 9.00 | 805.07 |
| 20 | 45.680061 | -119.101303 | 764.20 | 9.00 | 773.20 |
| 21 | 45.681987 | -119.101040 | 746.68 | 9.00 | 755.68 |
| 22 | 45.683306 | -119.099666 | 741.19 | 9.00 | 750.19 |

**Name**: CR-1361
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.614418 | -118.996881 | 1884.82 | 9.00 | 1893.82 |
| 2 | 45.621652 | -119.003233 | 1708.32 | 9.00 | 1717.32 |
| 3 | 45.622943 | -119.004907 | 1676.93 | 9.00 | 1685.93 |
| 4 | 45.623213 | -119.005937 | 1668.17 | 9.00 | 1677.17 |
| 5 | 45.627055 | -119.012031 | 1577.95 | 9.00 | 1586.95 |
| 6 | 45.627595 | -119.015335 | 1537.28 | 9.00 | 1546.28 |
| 7 | 45.629066 | -119.017095 | 1511.13 | 9.00 | 1520.13 |
| 8 | 45.630392 | -119.018253 | 1486.91 | 9.00 | 1495.91 |
| 9 | 45.631598 | -119.019884 | 1441.58 | 9.00 | 1450.58 |
| 10 | 45.632278 | -119.021107 | 1424.82 | 9.00 | 1433.82 |
| 11 | 45.633819 | -119.021815 | 1399.14 | 9.00 | 1408.14 |
| 12 | 45.634820 | -119.022695 | 1370.74 | 9.00 | 1379.74 |
| 13 | 45.636166 | -119.025324 | 1316.37 | 9.00 | 1325.37 |
| 14 | 45.637813 | -119.027652 | 1272.24 | 9.00 | 1281.24 |
| 15 | 45.641102 | -119.028553 | 1226.82 | 9.00 | 1235.82 |
| 16 | 45.643311 | -119.030870 | 1184.74 | 9.00 | 1193.74 |
| 17 | 45.646420 | -119.032608 | 1132.38 | 9.00 | 1141.38 |
| 18 | 45.650127 | -119.033091 | 1068.11 | 9.00 | 1077.11 |
| 19 | 45.650362 | -119.034418 | 1054.86 | 9.00 | 1063.86 |
| 20 | 45.650896 | -119.035701 | 1045.43 | 9.00 | 1054.43 |
| 21 | 45.652776 | -119.037925 | 1019.53 | 9.00 | 1028.53 |
| 22 | 45.655000 | -119.039440 | 1002.65 | 9.00 | 1011.65 |
| 23 | 45.657805 | -119.040768 | 962.79 | 9.00 | 971.79 |
| 24 | 45.660431 | -119.042569 | 950.33 | 9.00 | 959.33 |
| 25 | 45.663566 | -119.043618 | 905.22 | 9.00 | 914.22 |
| 26 | 45.665311 | -119.043975 | 896.35 | 9.00 | 905.35 |
| 27 | 45.667117 | -119.044503 | 870.31 | 9.00 | 879.32 |
| 28 | 45.668472 | -119.045675 | 856.55 | 9.00 | 865.55 |
| 29 | 45.669947 | -119.046332 | 832.14 | 9.00 | 841.14 |
| 30 | 45.670978 | -119.046100 | 825.29 | 9.00 | 834.29 |
| 31 | 45.672159 | -119.045354 | 831.48 | 9.00 | 840.48 |

**Name**: Cunningham Rd
**Path type**: Two-way
**Observer view angle**: 50.0°

**Note:** Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.672429 | -119.045335 | 823.68 | 9.00 | 832.68 |
| 2 | 45.671964 | -119.046043 | 814.41 | 9.00 | 823.41 |
| 3 | 45.671814 | -119.046494 | 809.90 | 9.00 | 818.90 |
| 4 | 45.671695 | -119.047052 | 811.94 | 9.00 | 820.94 |
| 5 | 45.671650 | -119.047846 | 831.25 | 9.00 | 840.25 |
| 6 | 45.671035 | -119.051000 | 847.03 | 9.00 | 856.03 |
| 7 | 45.670420 | -119.051987 | 853.44 | 9.00 | 862.44 |
| 8 | 45.670315 | -119.053146 | 864.17 | 9.00 | 873.17 |
| 9 | 45.670255 | -119.053854 | 855.94 | 9.00 | 864.95 |
| 10 | 45.670060 | -119.054240 | 855.50 | 9.00 | 864.50 |
| 11 | 45.670045 | -119.054948 | 854.42 | 9.00 | 863.42 |
| 12 | 45.669595 | -119.055721 | 850.79 | 9.00 | 859.79 |
| 13 | 45.669625 | -119.056515 | 865.51 | 9.00 | 874.51 |
| 14 | 45.669254 | -119.058843 | 854.77 | 9.00 | 863.77 |
| 15 | 45.669039 | -119.059664 | 846.15 | 9.00 | 855.15 |
| 16 | 45.669243 | -119.061386 | 830.02 | 9.00 | 839.02 |
| 17 | 45.669215 | -119.066010 | 823.26 | 9.00 | 832.26 |
| 18 | 45.669367 | -119.067115 | 836.72 | 9.00 | 845.72 |
| 19 | 45.669278 | -119.068880 | 829.98 | 9.00 | 838.98 |
| 20 | 45.669459 | -119.070130 | 827.61 | 9.00 | 836.61 |
| 21 | 45.669894 | -119.072967 | 812.47 | 9.00 | 821.47 |
| 22 | 45.669782 | -119.073742 | 789.85 | 9.00 | 798.86 |
| 23 | 45.670027 | -119.074027 | 792.49 | 9.00 | 801.49 |
| 24 | 45.670527 | -119.074247 | 792.27 | 9.00 | 801.27 |
| 25 | 45.670673 | -119.074902 | 790.73 | 9.00 | 799.73 |
| 26 | 45.671083 | -119.076683 | 789.11 | 9.00 | 798.11 |
| 27 | 45.671326 | -119.077494 | 784.56 | 9.00 | 793.56 |
| 28 | 45.671404 | -119.078347 | 783.99 | 9.00 | 792.99 |
| 29 | 45.671489 | -119.079662 | 781.92 | 9.00 | 790.92 |
| 30 | 45.671600 | -119.080124 | 779.93 | 9.00 | 788.93 |
| 31 | 45.671741 | -119.080586 | 778.85 | 9.00 | 787.85 |
| 32 | 45.672128 | -119.081360 | 773.20 | 9.00 | 782.20 |
| 33 | 45.672899 | -119.082699 | 761.99 | 9.00 | 770.99 |
| 34 | 45.673464 | -119.083132 | 771.58 | 9.00 | 780.58 |
| 35 | 45.673939 | -119.083695 | 769.89 | 9.00 | 778.89 |
| 36 | 45.674687 | -119.085538 | 763.18 | 9.00 | 772.18 |
| 37 | 45.675789 | -119.087302 | 759.56 | 9.00 | 768.56 |
| 38 | 45.677145 | -119.088079 | 751.28 | 9.00 | 760.28 |

# GLARE ANALYSIS RESULTS

## Summary of Glare

| PV Array Name | Tilt (°) | Orient (°) | "Green" Glare min | "Yellow" Glare min | Energy kWh |
|---|---|---|---|---|---|
| PV array 1 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 10 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 11 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 12 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 13 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 14 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 15 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 16 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 17 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 18 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 2 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 3 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 4 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 5 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 6 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 7 | SA tracking | SA tracking | 0 | 2,109 | - |
| PV array 8 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 9 | SA tracking | SA tracking | 0 | 0 | - |

*Total annual glare received by each receptor*

| Receptor | Annual Green Glare (min) | Annual Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 2109 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

# Results for: PV array 1

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 10

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

## Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 11

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare

0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 12

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 13

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 14

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 15

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare

0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

## Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 16

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare

0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 17

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 18

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 2

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 3

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare

0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

## Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 4

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare

0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 5

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 6

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 7

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 2109 |
| CR-1350-2 | 0 | 0 |

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

## Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare

0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

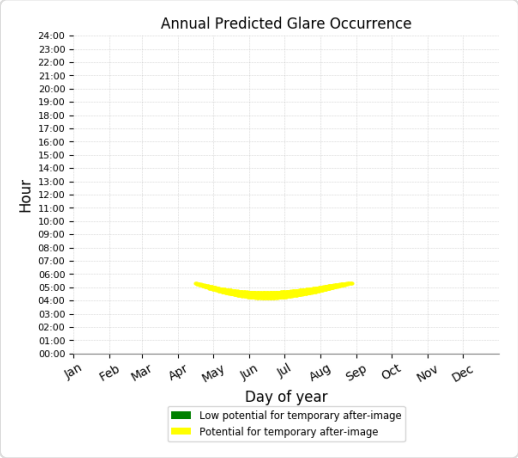
0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

2109 minutes of yellow glare
0 minutes of green glare




## Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 8

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

## Route: CR-1350-2

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 9

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OP 1 | 0 | 0 |
| OP 2 | 0 | 0 |
| OP 3 | 0 | 0 |
| OP 4 | 0 | 0 |
| OP 5 | 0 | 0 |
| OP 6 | 0 | 0 |
| OP 7 | 0 | 0 |
| OP 8 | 0 | 0 |
| OP 9 | 0 | 0 |
| OP 10 | 0 | 0 |
| OP 11 | 0 | 0 |
| OP 12 | 0 | 0 |
| CR-1350-1 | 0 | 0 |
| CR-1350-2 | 0 | 0 |
| CR-1361 | 0 | 0 |
| Cunningham Rd | 0 | 0 |

### Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

### Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

## Point Receptor: OP 12

0 minutes of yellow glare

0 minutes of green glare

### Route: CR-1350-1

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1350-2

0 minutes of yellow glare
0 minutes of green glare

### Route: CR-1361

0 minutes of yellow glare
0 minutes of green glare

### Route: Cunningham Rd

0 minutes of yellow glare
0 minutes of green glare

# Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

# FORGESOLAR GLARE ANALYSIS

Project: **Nolin Hills Wind/Solar**
Site configuration: **Nolin Hills - Analysis 3**
Analysis conducted by Drew Timmis (drew.timmis@tetratech.com) at 00:46 on 04 May, 2021.

## U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

| COMPONENT | STATUS | DESCRIPTION |
|---|---|---|
| Analysis parameters | PASS | Analysis time interval and eye characteristics used are acceptable |
| 2-mile flight path(s) | PASS | Flight path receptor(s) do not receive yellow glare |
| ATCT(s) | N/A | No ATCT receptors designated |

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at https://www.federalregister.gov/d/2013-24729

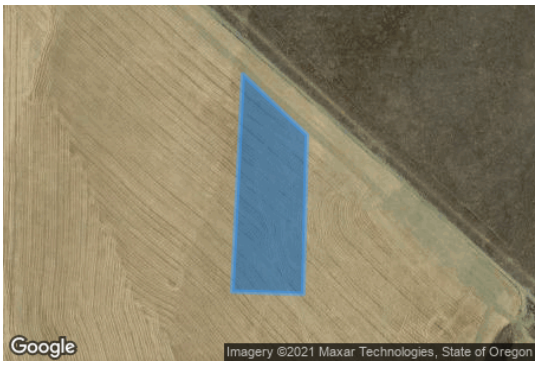
# SITE CONFIGURATION

## Analysis Parameters

DNI: peaks at 1,000.0 W/m^2
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 53079.9517

## PV Array(s)

**Name**: PV array 1
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.650334 | -119.092946 | 1184.05 | 14.60 | 1198.65 |
| 2 | 45.647589 | -119.093139 | 1229.49 | 14.60 | 1244.10 |
| 3 | 45.647559 | -119.091852 | 1219.66 | 14.60 | 1234.26 |
| 4 | 45.649569 | -119.091787 | 1193.87 | 14.60 | 1208.47 |

**Name**: PV array 10
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630585 | -119.068264 | 1555.94 | 14.60 | 1570.54 |
| 2 | 45.630547 | -119.067438 | 1560.04 | 14.60 | 1574.64 |
| 3 | 45.629152 | -119.066536 | 1558.23 | 14.60 | 1572.83 |
| 4 | 45.628297 | -119.064090 | 1532.93 | 14.60 | 1547.53 |
| 5 | 45.640285 | -119.063390 | 1324.26 | 14.60 | 1338.86 |
| 6 | 45.640018 | -119.063852 | 1318.23 | 14.60 | 1332.83 |
| 7 | 45.639885 | -119.064379 | 1317.87 | 14.60 | 1332.47 |
| 8 | 45.639606 | -119.065434 | 1323.70 | 14.60 | 1338.31 |
| 9 | 45.639002 | -119.067477 | 1337.53 | 14.60 | 1352.13 |
| 10 | 45.638597 | -119.067493 | 1345.48 | 14.60 | 1360.08 |
| 11 | 45.638597 | -119.067729 | 1345.77 | 14.60 | 1360.37 |
| 12 | 45.636598 | -119.067875 | 1369.01 | 14.60 | 1383.61 |
| 13 | 45.634576 | -119.068015 | 1428.70 | 14.60 | 1443.30 |
| 14 | 45.632607 | -119.068199 | 1501.50 | 14.60 | 1516.10 |

**Name**: PV array 11
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.628315 | -119.063937 | 1532.04 | 14.60 | 1546.64 |
| 2 | 45.627400 | -119.062370 | 1534.48 | 14.60 | 1549.08 |
| 3 | 45.627835 | -119.058873 | 1548.37 | 14.60 | 1562.98 |
| 4 | 45.629561 | -119.058830 | 1509.01 | 14.60 | 1523.61 |
| 5 | 45.632862 | -119.058787 | 1463.21 | 14.60 | 1477.81 |
| 6 | 45.636193 | -119.058830 | 1380.40 | 14.60 | 1395.00 |
| 7 | 45.638953 | -119.058830 | 1349.77 | 14.60 | 1364.37 |
| 8 | 45.640754 | -119.060611 | 1318.93 | 14.60 | 1333.54 |
| 9 | 45.640964 | -119.060868 | 1315.66 | 14.60 | 1330.26 |
| 10 | 45.640319 | -119.063250 | 1325.35 | 14.60 | 1339.95 |
| 11 | 45.638218 | -119.063347 | 1346.16 | 14.60 | 1360.76 |
| 12 | 45.635240 | -119.063508 | 1392.97 | 14.60 | 1407.57 |
| 13 | 45.632202 | -119.063722 | 1460.77 | 14.60 | 1475.37 |

**Name**: PV array 12
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.639225 | -119.058206 | 1343.67 | 14.60 | 1358.27 |
| 2 | 45.636030 | -119.058099 | 1389.23 | 14.60 | 1403.83 |
| 3 | 45.631949 | -119.057992 | 1485.39 | 14.60 | 1499.99 |
| 4 | 45.629188 | -119.058078 | 1519.45 | 14.60 | 1534.05 |
| 5 | 45.632944 | -119.044802 | 1474.28 | 14.60 | 1488.88 |
| 6 | 45.633784 | -119.045961 | 1457.89 | 14.60 | 1472.49 |
| 7 | 45.634504 | -119.047334 | 1443.95 | 14.60 | 1458.55 |
| 8 | 45.634812 | -119.048128 | 1434.31 | 14.60 | 1448.91 |
| 9 | 45.635074 | -119.048965 | 1422.61 | 14.60 | 1437.21 |
| 10 | 45.634985 | -119.050090 | 1413.95 | 14.60 | 1428.55 |
| 11 | 45.635256 | -119.051215 | 1403.78 | 14.60 | 1418.38 |
| 12 | 45.635185 | -119.051691 | 1400.46 | 14.60 | 1415.06 |
| 13 | 45.635309 | -119.052339 | 1396.08 | 14.60 | 1410.68 |
| 14 | 45.635767 | -119.053464 | 1387.70 | 14.60 | 1402.30 |
| 15 | 45.636090 | -119.053977 | 1381.78 | 14.60 | 1396.38 |
| 16 | 45.636504 | -119.054405 | 1378.92 | 14.60 | 1393.52 |
| 17 | 45.637360 | -119.055216 | 1361.79 | 14.60 | 1376.39 |
| 18 | 45.638210 | -119.056808 | 1362.13 | 14.60 | 1376.73 |
| 19 | 45.638875 | -119.057325 | 1350.00 | 14.60 | 1364.60 |
| 20 | 45.639140 | -119.057744 | 1346.36 | 14.60 | 1360.96 |
| 21 | 45.639303 | -119.057997 | 1341.62 | 14.60 | 1356.22 |

**Name**: PV array 13
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.620750 | -119.038612 | 1811.35 | 14.60 | 1825.95 |
| 2 | 45.629634 | -119.038440 | 1560.97 | 14.60 | 1575.57 |
| 3 | 45.630084 | -119.039513 | 1547.27 | 14.60 | 1561.87 |
| 4 | 45.630955 | -119.041187 | 1525.30 | 14.60 | 1539.90 |
| 5 | 45.631855 | -119.041530 | 1503.33 | 14.60 | 1517.93 |
| 6 | 45.632485 | -119.043933 | 1475.14 | 14.60 | 1489.74 |
| 7 | 45.628494 | -119.058052 | 1536.20 | 14.60 | 1550.80 |
| 8 | 45.627413 | -119.058052 | 1567.11 | 14.60 | 1581.71 |
| 9 | 45.623151 | -119.049598 | 1689.97 | 14.60 | 1704.57 |
| 10 | 45.622941 | -119.047967 | 1712.79 | 14.60 | 1727.39 |
| 11 | 45.622221 | -119.045435 | 1769.71 | 14.60 | 1784.31 |
| 12 | 45.621080 | -119.043418 | 1789.27 | 14.60 | 1803.87 |
| 13 | 45.621005 | -119.042217 | 1801.17 | 14.60 | 1815.77 |
| 14 | 45.620960 | -119.040972 | 1807.19 | 14.60 | 1821.80 |
| 15 | 45.620975 | -119.039685 | 1821.74 | 14.60 | 1836.34 |

**Name**: PV array 14
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.656584 | -119.083289 | 1073.95 | 14.60 | 1088.55 |
| 2 | 45.655129 | -119.083890 | 1107.47 | 14.60 | 1122.07 |
| 3 | 45.655114 | -119.085178 | 1101.16 | 14.60 | 1115.76 |
| 4 | 45.654545 | -119.084577 | 1096.59 | 14.60 | 1111.19 |
| 5 | 45.654035 | -119.084491 | 1115.62 | 14.60 | 1130.22 |
| 6 | 45.654035 | -119.085178 | 1110.82 | 14.60 | 1125.42 |
| 7 | 45.652175 | -119.084920 | 1162.65 | 14.60 | 1177.25 |
| 8 | 45.651065 | -119.083461 | 1183.24 | 14.60 | 1197.84 |

**Name**: PV array 15
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.647705 | -119.080929 | 1198.99 | 14.60 | 1213.59 |
| 2 | 45.648695 | -119.067840 | 1207.64 | 14.60 | 1222.24 |
| 3 | 45.649385 | -119.068655 | 1192.38 | 14.60 | 1206.98 |
| 4 | 45.649745 | -119.069642 | 1183.77 | 14.60 | 1198.37 |
| 5 | 45.650225 | -119.070415 | 1185.49 | 14.60 | 1200.09 |
| 6 | 45.651185 | -119.071187 | 1177.77 | 14.60 | 1192.37 |
| 7 | 45.652505 | -119.071917 | 1158.10 | 14.60 | 1172.70 |
| 8 | 45.653495 | -119.072818 | 1153.71 | 14.60 | 1168.31 |
| 9 | 45.654785 | -119.073505 | 1139.45 | 14.60 | 1154.05 |
| 10 | 45.656164 | -119.074191 | 1132.01 | 14.60 | 1146.61 |
| 11 | 45.656914 | -119.074964 | 1119.51 | 14.60 | 1134.11 |
| 12 | 45.658084 | -119.076723 | 1103.86 | 14.60 | 1118.46 |
| 13 | 45.657664 | -119.078998 | 1096.93 | 14.60 | 1111.53 |
| 14 | 45.655294 | -119.077839 | 1121.51 | 14.60 | 1136.11 |
| 15 | 45.654844 | -119.077496 | 1128.97 | 14.60 | 1143.57 |
| 16 | 45.654485 | -119.077324 | 1135.21 | 14.60 | 1149.81 |
| 17 | 45.654365 | -119.077882 | 1128.50 | 14.60 | 1143.10 |
| 18 | 45.654785 | -119.078483 | 1126.85 | 14.60 | 1141.45 |
| 19 | 45.655264 | -119.078912 | 1119.32 | 14.60 | 1133.92 |
| 20 | 45.655744 | -119.079084 | 1108.11 | 14.60 | 1122.71 |
| 21 | 45.656644 | -119.079341 | 1105.59 | 14.60 | 1120.19 |
| 22 | 45.657604 | -119.079770 | 1088.06 | 14.60 | 1102.66 |
| 23 | 45.657529 | -119.080450 | 1096.65 | 14.60 | 1111.25 |
| 24 | 45.657424 | -119.081802 | 1090.48 | 14.60 | 1105.09 |
| 25 | 45.656659 | -119.083196 | 1073.96 | 14.60 | 1088.56 |
| 26 | 45.653825 | -119.083261 | 1136.02 | 14.60 | 1150.62 |
| 27 | 45.650975 | -119.083347 | 1184.64 | 14.60 | 1199.24 |
| 28 | 45.649760 | -119.081559 | 1207.83 | 14.60 | 1222.43 |
| 29 | 45.648732 | -119.081158 | 1216.35 | 14.60 | 1230.95 |

**Name**: PV array 16
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.643332 | -119.063917 | 1276.80 | 14.60 | 1291.40 |
| 2 | 45.641532 | -119.064013 | 1299.74 | 14.60 | 1314.34 |
| 3 | 45.641554 | -119.064679 | 1297.19 | 14.60 | 1311.79 |
| 4 | 45.640789 | -119.064679 | 1304.51 | 14.60 | 1319.11 |
| 5 | 45.640782 | -119.064539 | 1304.39 | 14.60 | 1318.99 |
| 6 | 45.640789 | -119.064078 | 1310.01 | 14.60 | 1324.62 |
| 7 | 45.640617 | -119.064088 | 1311.35 | 14.60 | 1325.95 |
| 8 | 45.640647 | -119.063359 | 1320.48 | 14.60 | 1335.08 |
| 9 | 45.642979 | -119.063252 | 1284.03 | 14.60 | 1298.63 |

**Name**: PV array 17
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.640677 | -119.063252 | 1321.31 | 14.60 | 1335.91 |
| 2 | 45.641307 | -119.060870 | 1313.78 | 14.60 | 1328.38 |
| 3 | 45.641397 | -119.061145 | 1312.78 | 14.60 | 1327.38 |
| 4 | 45.641774 | -119.061286 | 1304.80 | 14.60 | 1319.41 |
| 5 | 45.642037 | -119.061308 | 1300.82 | 14.60 | 1315.42 |
| 6 | 45.642241 | -119.061352 | 1298.18 | 14.60 | 1312.78 |
| 7 | 45.642664 | -119.061763 | 1290.05 | 14.60 | 1304.65 |
| 8 | 45.642781 | -119.062517 | 1284.37 | 14.60 | 1298.97 |
| 9 | 45.642934 | -119.063142 | 1284.37 | 14.60 | 1298.97 |

**Name**: PV array 18
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.640609 | -119.063398 | 1320.31 | 14.60 | 1334.91 |
| 2 | 45.640564 | -119.064049 | 1312.68 | 14.60 | 1327.28 |
| 3 | 45.640538 | -119.064718 | 1308.48 | 14.60 | 1323.09 |
| 4 | 45.640557 | -119.065140 | 1311.06 | 14.60 | 1325.66 |
| 5 | 45.644465 | -119.065108 | 1254.72 | 14.60 | 1269.32 |
| 6 | 45.648710 | -119.067876 | 1207.82 | 14.60 | 1222.42 |
| 7 | 45.648155 | -119.074442 | 1228.20 | 14.60 | 1242.80 |
| 8 | 45.647645 | -119.080965 | 1194.98 | 14.60 | 1209.58 |
| 9 | 45.644735 | -119.081094 | 1243.60 | 14.60 | 1258.20 |
| 10 | 45.643259 | -119.079869 | 1256.60 | 14.60 | 1271.20 |
| 11 | 45.642173 | -119.078086 | 1267.98 | 14.60 | 1282.58 |
| 12 | 45.640712 | -119.076818 | 1294.74 | 14.60 | 1309.34 |
| 13 | 45.639852 | -119.074778 | 1322.17 | 14.60 | 1336.77 |
| 14 | 45.638676 | -119.072030 | 1366.57 | 14.60 | 1381.17 |
| 15 | 45.638658 | -119.070441 | 1364.10 | 14.60 | 1378.70 |
| 16 | 45.639015 | -119.069217 | 1337.97 | 14.60 | 1352.57 |
| 17 | 45.639737 | -119.066350 | 1326.14 | 14.60 | 1340.74 |
| 18 | 45.640061 | -119.064767 | 1316.44 | 14.60 | 1331.04 |
| 19 | 45.640282 | -119.063975 | 1315.42 | 14.60 | 1330.02 |
| 20 | 45.640468 | -119.063354 | 1323.08 | 14.60 | 1337.68 |

**Name**: PV array 2
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.646951 | -119.091824 | 1225.66 | 14.60 | 1240.26 |
| 2 | 45.647011 | -119.097188 | 1237.39 | 14.60 | 1251.99 |
| 3 | 45.645106 | -119.095557 | 1278.02 | 14.60 | 1292.62 |
| 4 | 45.643426 | -119.093388 | 1284.15 | 14.60 | 1298.75 |
| 5 | 45.643029 | -119.091893 | 1267.74 | 14.60 | 1282.34 |

**Name**: PV array 3
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.649427 | -119.091624 | 1193.33 | 14.60 | 1207.93 |
| 2 | 45.647207 | -119.088191 | 1186.98 | 14.60 | 1201.58 |
| 3 | 45.646577 | -119.087268 | 1197.04 | 14.60 | 1211.64 |
| 4 | 45.635160 | -119.087683 | 1370.77 | 14.60 | 1385.38 |
| 5 | 45.641071 | -119.091674 | 1267.67 | 14.60 | 1282.27 |
| 6 | 45.642331 | -119.091796 | 1265.85 | 14.60 | 1280.45 |

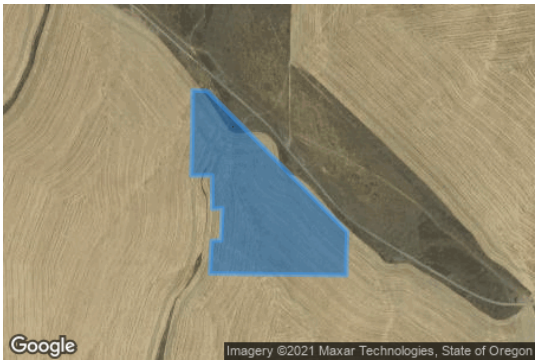
**Name**: PV array 4
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.635152 | -119.087542 | 1367.54 | 14.60 | 1382.14 |
| 2 | 45.632211 | -119.086829 | 1370.45 | 14.60 | 1385.05 |
| 3 | 45.632269 | -119.083532 | 1378.75 | 14.60 | 1393.35 |
| 4 | 45.643855 | -119.083103 | 1230.24 | 14.60 | 1244.84 |
| 5 | 45.646406 | -119.087087 | 1199.14 | 14.60 | 1213.74 |
| 6 | 45.645400 | -119.087171 | 1211.08 | 14.60 | 1225.68 |
| 7 | 45.644214 | -119.087213 | 1230.96 | 14.60 | 1245.56 |
| 8 | 45.642037 | -119.087253 | 1258.67 | 14.60 | 1273.27 |
| 9 | 45.637743 | -119.087420 | 1321.42 | 14.60 | 1336.02 |

**Name**: PV array 5
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material

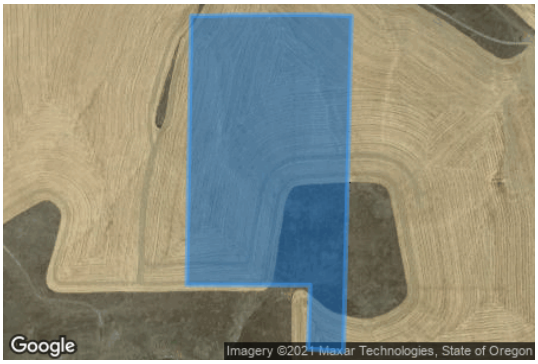

| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.641590 | -119.082814 | 1249.48 | 14.60 | 1264.08 |
| 2 | 45.641590 | -119.083126 | 1252.54 | 14.60 | 1267.14 |
| 3 | 45.639115 | -119.083211 | 1270.43 | 14.60 | 1285.03 |
| 4 | 45.639100 | -119.082911 | 1264.09 | 14.60 | 1278.69 |
| 5 | 45.640371 | -119.082916 | 1263.44 | 14.60 | 1278.04 |

**Name**: PV array 6
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.643804 | -119.083004 | 1230.23 | 14.60 | 1244.84 |
| 2 | 45.643782 | -119.082467 | 1224.76 | 14.60 | 1239.36 |
| 3 | 45.640222 | -119.077393 | 1280.88 | 14.60 | 1295.48 |
| 4 | 45.639969 | -119.077403 | 1285.82 | 14.60 | 1300.42 |
| 5 | 45.639689 | -119.077416 | 1287.57 | 14.60 | 1302.17 |
| 6 | 45.639125 | -119.077420 | 1295.10 | 14.60 | 1309.70 |
| 7 | 45.639169 | -119.082374 | 1268.47 | 14.60 | 1283.07 |
| 8 | 45.639994 | -119.082310 | 1260.28 | 14.60 | 1274.89 |
| 9 | 45.640009 | -119.081966 | 1258.97 | 14.60 | 1273.57 |
| 10 | 45.640819 | -119.081923 | 1251.57 | 14.60 | 1266.17 |
| 11 | 45.640804 | -119.082288 | 1252.57 | 14.60 | 1267.17 |
| 12 | 45.641651 | -119.082295 | 1245.28 | 14.60 | 1259.89 |
| 13 | 45.641646 | -119.083052 | 1252.22 | 14.60 | 1266.82 |
| 14 | 45.642690 | -119.083014 | 1239.13 | 14.60 | 1253.73 |

**Name**: PV array 7
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material

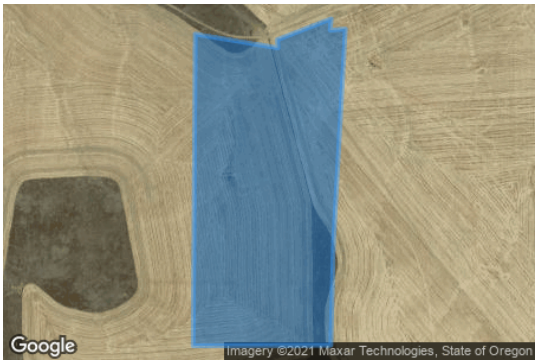



| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.639080 | -119.077408 | 1296.23 | 14.60 | 1310.83 |
| 2 | 45.630595 | -119.077698 | 1425.00 | 14.60 | 1439.60 |
| 3 | 45.630655 | -119.078985 | 1418.41 | 14.60 | 1433.01 |
| 4 | 45.632275 | -119.078910 | 1394.21 | 14.60 | 1408.81 |
| 5 | 45.632283 | -119.083388 | 1380.19 | 14.60 | 1394.79 |
| 6 | 45.639084 | -119.083224 | 1270.50 | 14.60 | 1285.10 |
| 7 | 45.639081 | -119.082852 | 1265.46 | 14.60 | 1280.06 |
| 8 | 45.639086 | -119.082481 | 1269.74 | 14.60 | 1284.34 |
| 9 | 45.639103 | -119.081776 | 1274.26 | 14.60 | 1288.86 |
| 10 | 45.639108 | -119.080292 | 1288.96 | 14.60 | 1303.57 |
| 11 | 45.639116 | -119.078845 | 1293.89 | 14.60 | 1308.49 |

**Name**: PV array 8
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material


| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630590 | -119.077643 | 1425.47 | 14.60 | 1440.07 |
| 2 | 45.630582 | -119.075578 | 1439.70 | 14.60 | 1454.30 |
| 3 | 45.630605 | -119.073531 | 1464.05 | 14.60 | 1478.65 |
| 4 | 45.638546 | -119.073467 | 1332.00 | 14.60 | 1346.60 |
| 5 | 45.640211 | -119.077356 | 1280.97 | 14.60 | 1295.57 |
| 6 | 45.635410 | -119.077482 | 1381.01 | 14.60 | 1395.61 |

**Name**: PV array 9
**Axis tracking**: Single-axis rotation
**Tracking axis orientation**: 180.0°
**Tracking axis tilt**: 0.0°
**Tracking axis panel offset**: 0.0°
**Max tracking angle**: 52.0°
**Resting angle**: 5.0°
**Rated power**: -
**Panel material**: Smooth glass with AR coating
**Reflectivity**: Vary with sun
**Slope error**: correlate with material




| Vertex | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| 1 | 45.630589 | -119.073371 | 1465.16 | 14.60 | 1479.76 |
| 2 | 45.630604 | -119.068372 | 1554.05 | 14.60 | 1568.65 |
| 3 | 45.633250 | -119.068274 | 1472.83 | 14.60 | 1487.43 |
| 4 | 45.638599 | -119.067845 | 1345.38 | 14.60 | 1359.98 |
| 5 | 45.638569 | -119.068403 | 1344.81 | 14.60 | 1359.41 |
| 6 | 45.638855 | -119.068360 | 1338.14 | 14.60 | 1352.74 |
| 7 | 45.638329 | -119.070313 | 1364.87 | 14.60 | 1379.48 |
| 8 | 45.638119 | -119.070292 | 1365.66 | 14.60 | 1380.26 |
| 9 | 45.638472 | -119.073296 | 1334.29 | 14.60 | 1348.89 |

## Flight Path Receptor(s)

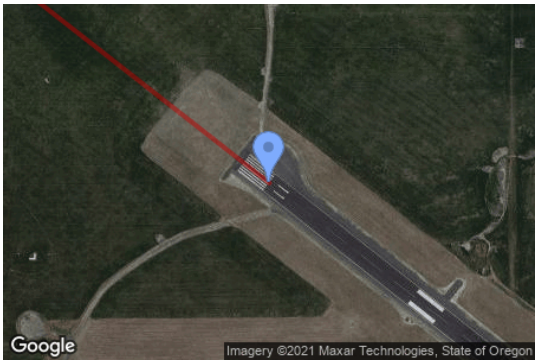
**Name**: OLO2-01
**Description**:
**Threshold height**: 40 ft
**Direction**: 34.0°
**Glide slope**: 3.0°
**Pilot view restricted?** Yes
**Vertical view**: 30.0°
**Azimuthal view**: 50.0°


| Point | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| Threshold | 45.662483 | -119.389884 | 912.84 | 40.00 | 952.84 |
| Two-mile | 45.638513 | -119.413044 | 973.78 | 532.52 | 1506.30 |

**Name**: OLO2-19
**Description**:
**Threshold height**: 40 ft
**Direction**: 212.0°
**Glide slope**: 3.0°
**Pilot view restricted?** Yes
**Vertical view**: 30.0°
**Azimuthal view**: 50.0°


| Point | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| Threshold | 45.668039 | -119.384672 | 901.86 | 40.00 | 941.86 |
| Two-mile | 45.692559 | -119.362722 | 772.63 | 722.69 | 1495.32 |

**Name**: PDT RWY 11
**Description**:
**Threshold height**: 43 ft
**Direction**: 128.0°
**Glide slope**: 3.0°
**Pilot view restricted?** Yes
**Vertical view**: 30.0°
**Azimuthal view**: 50.0°




| Point | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| Threshold | 45.698530 | -118.853317 | 1486.77 | 43.00 | 1529.77 |
| Two-mile | 45.716330 | -118.885976 | 1354.49 | 728.74 | 2083.23 |

**Name**: PDT RWY 25
**Description**:
**Threshold height**: 48 ft
**Direction**: 270.0°
**Glide slope**: 3.0°
**Pilot view restricted?** Yes
**Vertical view**: 30.0°
**Azimuthal view**: 50.0°


| Point | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| Threshold | 45.695386 | -118.829412 | 1486.57 | 48.00 | 1534.57 |
| Two-mile | 45.695386 | -118.787969 | 1470.88 | 617.15 | 2088.03 |

**Name**: PDT RWY 29
**Description**:
**Threshold height**: 84 ft
**Direction**: 308.0°
**Glide slope**: 3.0°
**Pilot view restricted?** Yes
**Vertical view**: 30.0°
**Azimuthal view**: 50.0°


| Point | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| Threshold | 45.690429 | -118.838594 | 1495.07 | 84.00 | 1579.08 |
| Two-mile | 45.672629 | -118.805939 | 1042.49 | 1090.04 | 2132.53 |

**Name**: PDT RWY 7
**Description**:
**Threshold height**: 35 ft
**Direction**: 90.0°
**Glide slope**: 3.0°
**Pilot view restricted?** Yes
**Vertical view**: 30.0°
**Azimuthal view**: 50.0°


| Point | Latitude (°) | Longitude (°) | Ground elevation (ft) | Height above ground (ft) | Total elevation (ft) |
|---|---|---|---|---|---|
| Threshold | 45.695341 | -118.852715 | 1486.27 | 35.00 | 1521.27 |
| Two-mile | 45.695341 | -118.894157 | 1466.97 | 607.76 | 2074.73 |

# GLARE ANALYSIS RESULTS

## Summary of Glare

| PV Array Name | Tilt (°) | Orient (°) | "Green" Glare min | "Yellow" Glare min | Energy kWh |
|---|---|---|---|---|---|
| PV array 1 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 10 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 11 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 12 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 13 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 14 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 15 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 16 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 17 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 18 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 2 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 3 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 4 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 5 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 6 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 7 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 8 | SA tracking | SA tracking | 0 | 0 | - |
| PV array 9 | SA tracking | SA tracking | 0 | 0 | - |

*Total annual glare received by each receptor*

| Receptor | Annual Green Glare (min) | Annual Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

# Results for: PV array 1

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

### Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

## Results for: PV array 10

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

### Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

### Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

### Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

### Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

### Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

### Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 11

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 12

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 13

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 14

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 15

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 16

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 17

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 18

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 2

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 3

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 4

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 5

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 6

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 7

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 8

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Results for: PV array 9

| Receptor | Green Glare (min) | Yellow Glare (min) |
|---|---|---|
| OLO2-01 | 0 | 0 |
| OLO2-19 | 0 | 0 |
| PDT RWY 11 | 0 | 0 |
| PDT RWY 25 | 0 | 0 |
| PDT RWY 29 | 0 | 0 |
| PDT RWY 7 | 0 | 0 |

## Flight Path: OLO2-01

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: OLO2-19

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 11

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 25

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 29

0 minutes of yellow glare
0 minutes of green glare

## Flight Path: PDT RWY 7

0 minutes of yellow glare
0 minutes of green glare

# Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.