Glare Analysis Report for the Horse Heaven Wind Farm

Benton County, Washington

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EXECUTIVE SUMMARY

At the request of Scout Clean Energy, LLC (Scout), Tetra Tech, Inc. (Tetra Tech) conducted a glint and glare analysis of the proposed Horse Heaven Wind Farm (Project), which includes proposed solar energy generation in addition to wind. The analysis was conducted using the Solar Glare Hazard Analysis Tool (SGHAT) software through an online tool (GlareGauge) developed by Sandia National Laboratories and hosted by ForgeSolar. A total of eight glare analyses were conducted for the Project. 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 several representative observation points from the surrounding community and several segmented traffic routes chosen to represent the relative traffic routes around the array areas.

The results of the analyses indicate that the surrounding observation points and vehicle routes would not experience glare as a result of the Project. The lack in predicted glare could be a result of the parameters for the solar panels and the relative lack of representative points from the surrounding area. The predicted glare at these receptors is considered to be a conservative representation as the SGHAT does not consider obstacles (either man-made or natural) between the defined solar photovoltaic 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 these receptor locations.

Based on the results of the Federal Aviation Administration Notice Criteria Tool, the Project does not exceed notice criteria and a formal filing is not necessary.

1 INTRODUCTION

The Horse Heaven Wind Farm (Project) consists of a renewable energy generation facility, which is located in unincorporated Benton County, Washington, within the Horse Heaven Hills area, which is an anticline ridge of the Yakima Folds within the larger Columbia Plateau Ecoregion. At its closest point, the Project is located approximately 4 miles south/southwest of the city of Kennewick and the larger Tri-Cities urban area, along the Columbia River. In addition to proposed wind energy generation, the Project would include solar energy generation. Currently, Scout Clean Energy (Scout) is considering multiple areas for solar photovoltaic (PV) arrays for siting during final design (Attachment A). This analysis includes each potential set of solar arrays, divided into three areas for the purposes analysis: Solar Array County Well (West 1) near County Well Road, Solar Array Sellards (West 2) near Sellards Road, and Solar Array East on either side of Interstate-82 (Attachment B, Figure 1).

As an industry standard, the term "glint and glare" analysis is typically used to describe an analysis of potential ocular impacts to defined receptors. 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 PV 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; ForgeSolar 2020). 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 provided by Scout in November of 2020. Included as attachments are the Preliminary Project Layout that formed the basis of the analysis (Attachment A); Figure 1, "Solar Array Areas" and Figures 2a through 2c, "Glare Receptors" (Attachment B); and the raw glare analysis output reports generated through the use of the ForgeSolar tool (Attachment C).

2 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) (FAA 2010). The FAA Guidance recommends that glare analyses should be performed on a site-specific basis using the Sandia Laboratories SGHAT (FAA 2010). 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 Title 14 Code of Federal Regulations [CFR] Part 77.9, as discussed below), but is considered to be an industry best practice for solar facilities in general. 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 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 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 3-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 under 14 CFR Part 77.9 (Safe, Efficient Use, and Preservation of the Navigable Airspace) is recommended (FAA 2020). The NCT also identifies final approach flight paths that may be considered vulnerable to a proposed structure's impact on navigation signal reception. The NCT was utilized to determine if the proposed Project is located within an FAA-identified impact area based on the Project boundaries and height above ground surface. The FAA NCT Report stated that the Project does not exceed notice criteria.

3 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 (ForgeSolar 2020):

- 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 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 (i.e., intensity) and subtended angle (i.e., 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 (i.e., ocular hazards) that are shown by different colors in the model output:

- Red glare: glare predicted with a potential for permanent eye damage (i.e., 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 (i.e., the amount of radiation absorbed in the eye prior to reaching the retina), pupil diameter, and eye focal length (i.e., 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 (i.e., approximately 3 orders of magnitude less than direct viewing of the sun). Upon exposure to yellow glare, the observer may experience a spot in their vision temporarily lasting after the exposure. Upon exposure to green glare, the observer may experience a bright reflection but typically no spot lasting after exposure.

4 GLARE ANALYSIS INPUTS

The modules to be used for the proposed Project are smooth glass surface material with an anti-reflection coating (ARC), 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 (Sandia 2016).

Due to capacity constraints in the SGHAT, which limits the number of drawn photovoltaic (PV) array areas to 20 per analysis, Tetra Tech performed eight separate glare analyses: two for Solar Array County Well (West 1) (Analysis 1 and 2), two for Solar Array Sellards (West 2) (Analysis 3 and 4), four for Solar Array East (Analyses 5 through 8). Each analysis evaluated separate "PV Array Areas," which are segmented polygons within each of the three larger solar array areas generally representative of the proposed Project layout as of November 2020 (Attachment A). Analysis 1 and 2 consisted of 12 PV Array Areas, Analysis 3 and 4 consisted of 18 PV Array Areas, Analysis 5 and 6 consisted of 17 PV Array Areas, and Analysis 7 and 8 consisted of 13 PV Array Areas (Attachment B). Segmentation of the Project layout allows GlareGauge to more accurately represent potential ocular impacts as a result of the Project.

Each analysis run included proximal segmented vehicular traffic routes, as well as several residential receptors (also referred to as observation points [OPs]). The vehicular route and residential receptors were selected to provide a representation of proximal areas surrounding the Project that could experience glare. The route segment extents were based on the results of Tetra Tech's preliminary viewshed analysis for the Project. The residential receptors are a subset of the noise sensitive receptors analyzed for the

Project as part of the acoustic assessment (see Section 4.1.1 and Appendix O in the Application for Site Certification), and retain the associated identification numbers for cross-reference in addition to the simplified OP numbering needed for the SGHAT. The analyses for each array area were run first from the point of view from an average first floor (6 feet) and typical commuter car height (5 feet), followed by an analysis from the point of view from an average second floor residential structure (16 feet) and commercial truck height above the road surface (9 feet). The additional input features used in the analyses are summarized in Table 1.

Table 1. Glare Analyses Input Features

Analysis No.	Racking Type	Module Orientation[1]	Tilt[2] (degrees)	Resting Angle (degrees)[3]	Module Height[4] (feet)	OP Height[5] (feet)	Route Height[6] (feet)
1	Single Axis Tracking	East-to-West-facing	Variable	10	8	6	5
2	Single Axis Tracking	East-to-West-facing	Variable	10	8	16	9
3	Single Axis Tracking	East-to-West-facing	Variable	10	8	6	5
4	Single Axis Tracking	East-to-West-facing	Variable	10	8	16	9
5	Single Axis Tracking	East-to-West-facing	Variable	10	8	6	5
6	Single Axis Tracking	East-to-West-facing	Variable	10	8	16	9
7	Single Axis Tracking	East-to-West-facing	Variable	10	8	6	5
8	Single Axis Tracking	East-to-West-facing	Variable	10	8	16	9

Notes:
OP = observation point; PV = photovoltaic
[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 ±50˚.
[3] The resting angle is used to model module backtracking when the sun is outside of the module rotation range. A resting angle of 10 assumes that the modules immediately revert back to 10˚ (backtrack) when the sun is outside of the rotation range.
[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 views and 9 feet represents typical semi-tractor-trailer truck views.

5 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. Because 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 nearest 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 because 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 GLARE ANALYSIS RESULTS

Tetra Tech performed eight different analyses covering four groupings of PV arrays 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: Solar Array County Well (West 1) PV Array Areas - First Story and Commuter Car View Results

Analysis 1 consisted of 12 PV Arrays (1-1 through 1-12), as viewed from four OPs at 6 feet above ground surface (i.e., typical first story receptor height), and seven segmented vehicular traffic routes at 5 feet above ground surface (i.e., typical commuter vehicle receptor height) (Attachment B, Figure 2a).

Table 2 represents the glare summary in annual minutes of glare for Analysis 1. Based on the SGHAT results, no amounts of glare are predicted at any of the OPs or at the segmented vehicular routes.

Table 2. Analysis 1 Annual Minutes of Glare Summary – Solar Array County Well

Receptor ID	Green Glare	Yellow Glare	Red Glare
185 (OP-1)	0	0	0
737 (OP-2)	0	0	0
715 (OP-3)	0	0	0
743 (OP-4)	0	0	0
Country Well Rd	0	0	0
Sellards Road-1	0	0	0
Sellards Road-2	0	0	0
S Travis Road-1	0	0	0
WA-221-1	0	0	0
WA-221-2	0	0	0
WA-221-3	0	0	0

6.2 Analysis 2: Solar Array County Well (West 1) PV Array Areas - Second Story and Commercial Truck View Results

Analysis 2 included the same PV Arrays and the same receptor locations as Analysis 1, with the OP viewing height raised to 16 feet above ground surface (i.e., typical second story receptor height) and the segmented vehicular traffic route viewing height raised to 9 feet above ground surface (i.e., typical commercial truck receptor height) (Attachment B, Figure 2a).

Table 3 represents the glare summary in annual minutes of glare for Analysis 2. Based on the SGHAT results, no amounts of glare were predicted at any of the defined receptors.

Table 3. Analysis 2 Annual Minutes of Glare Summary – Solar Array County Well

Receptor ID	Green Glare	Yellow Glare	Red Glare
185 (OP-1)	0	0	0
737 (OP-2)	0	0	0
715 (OP-3)	0	0	0
743 (OP-4)	0	0	0
Country Well Rd	0	0	0
Sellards Road-1	0	0	0
Sellards Road-2	0	0	0
S Travis Road-1	0	0	0
WA-221-1	0	0	0
WA-221-2	0	0	0
WA-221-3	0	0	0

6.3 Analysis 3: Solar Array Sellards (West 2) PV Array Areas - First Story and Commuter Car View Results

Analysis 3 consisted of 18 PV Arrays (2-1 through 2-18), as viewed from five OPs at 6 feet above ground surface and seven segmented vehicular traffic routes at 5 feet above ground surface (Attachment B, Figure 2b).

Table 4 represents the glare summary in annual minutes of glare for Analysis 3. Based on the SGHAT results, no amounts of glare were predicted at the defined receptors.

Table 4. Analysis 3 Annual Minutes of Glare Summary – Solar Array Sellards

Receptor ID	Green Glare	Yellow Glare	Red Glare
141 (OP-1)	0	0	0
185 (OP-2)	0	0	0
737 (OP-3)	0	0	0
744 (OP-4)	0	0	0
195 (OP-5)	0	0	0
Sellards Road-1	0	0	0
Sellards Road-2	0	0	0
Sellards Road-3	0	0	0
S Travis Road-1	0	0	0
S Travis Road-2	0	0	0
WA-221-1	0	0	0
WA-221-2	0	0	0

6.4 Analysis 4: Solar Array Sellards (West 2) PV Array Areas - Second Story and Commercial Truck View Results

Analysis 4 included the same PV Arrays and the same receptor locations as Analysis 3, with the OP viewing height raised to 16 feet above ground surface and the segmented vehicular traffic route viewing height raised to 9 feet above ground surface (Attachment B, Figure 2b).

Table 5 represents the glare summary in annual minutes of glare for Analysis 4. Based on the SGHAT results, no amounts of glare were predicted at the defined receptors.

Table 5. Analysis 4 Annual Minutes of Glare Summary – Solar Array Sellards

Receptor ID	Green Glare	Yellow Glare	Red Glare
141 (OP-1)	0	0	0
185 (OP-2)	0	0	0
737 (OP-3)	0	0	0
744 (OP-4)	0	0	0
195 (OP-5)	0	0	0
Sellards Road-1	0	0	0
Sellards Road-2	0	0	0
Sellards Road-3	0	0	0
S Travis Road-1	0	0	0
S Travis Road-2	0	0	0
WA-221-`1	0	0	0
WA-221-2	0	0	0

6.5 Analyses 5 and 7: Solar Array East PV Array Areas - First Story and Commuter Car View Results

As noted in Section 4, the SGHAT constrains the number of drawn PV array areas to a maximum of 20 per analysis; thus, the Solar Array East area had to be divided two sets of PV arrays with two analyses each for the height variations, resulting in Analyses 5 through 8. Analysis 5 consisted of 17 PV Arrays (3-1 through 3-17), as viewed from six OPs at 6 feet above ground surface and seven segmented vehicular traffic routes at 5 feet above ground surface (Attachment B, Figure 2c). Analysis 7 consisted of 13 PV Arrays (4-1 through 4-13) as viewed from the same receptors at the same heights as Analysis 5 (Attachment B, Figure 2c).

Table 6 represents the glare summary in combined annual minutes of glare for Analysis 5 and 7. Based on the SGHAT results, no amounts of glare are predicted at any of the OPs or at the segmented vehicular routes.

Table 6. Analyses 5 and 7 Annual Minutes of Glare Summary – Solar Array East

Receptor	Green Glare	Yellow Glare	Red Glare
192 (OP-1)	0	0	0
215 (OP-2)	0	0	0
187 (OP-3)	0	0	0
178 (OP-4)	0	0	0
745 (OP-5)	0	0	0
195 (OP-6)	0	0	0
Beck Rd-1	0	0	0
Beck Rd-2	0	0	0
Beck Rd-3	0	0	0
US HWY 395-1	0	0	0
US HWY 395-2	0	0	0
US HWY 395-3	0	0	0
US HWY 395-4	0	0	0

6.6 Analyses 6 and 8: Solar Array East PV Array Areas - Second Story and Commercial Truck View Results

Analysis 6 included the same PV Arrays as Analysis 5 (3-1 through 3-17), and Analysis 8 included the same PV Arrays as Analysis 7 (4-1 through 4-13). The receptor locations remain the same across all four analyses. For both Analysis 6 and 8, the OP viewing height was raised to 16 feet above ground surface and the segmented vehicular traffic route viewing height was raised to 9 feet above ground surface (Attachment B, Figure 2c).

Table 7 represents the glare summary in combined annual minutes of glare for Analyses 6 and 8. Based on the SGHAT results, no amounts of glare were predicted at any of the defined receptors.

Table 7. Analyses 6 and 8 Annual Minutes of Glare Summary – Solar Array East

Receptor	Green Glare	Yellow Glare	Red Glare
192 (OP-1)	0	0	0
215 (OP-2)	0	0	0
187 (OP-3)	0	0	0
178 (OP-4)	0	0	0
745 (OP-5)	0	0	0
195 (OP-6)	0	0	0
Beck Rd-1	0	0	0
Beck Rd-2	0	0	0
Beck Rd-3	0	0	0
US HWY 395-1	0	0	0
US HWY 395-2	0	0	0
US HWY 395-3	0	0	0
US HWY 395-4	0	0	0

7 SUMMARY

The preliminary Project layout for the solar PV arrays was modeled using GlareGauge to evaluate the potential extent of glare the Project may cause to receptors at several OPs and segmented traffic routes representing proximal areas surrounding the Project.

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, 60 PV Array Areas were modeled within the Project layout, which was broken down into three separate areas (i.e., Solar Array County Well [West 1], Solar Array Sellards [West 2], and Solar Array East). Eight separate glare analyses (i.e., Analysis 1 through Analysis 8) 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, and commuter and commercial vehicles.

Based on the SGHAT results, all of the modeled receptors (OPs and vehicular routes) are predicted to not experience glare as a result of the Project. 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. This means that the existing vegetation (crops) and topography of the surrounding area are not accounted for with the GlareGauge model and will most likely have a significant impact on glare reduction from receptors. In addition, the Project was modeled with backtracking (i.e., the modules reverted back to 10-degree position [resting angle] when the sun is outside of the tracking range). The sun is outside of the 50-degree maximum tracking range in the early morning hours (until approximately 8:00 AM) and in the late evening hours of the day (beginning at approximately 7:00 PM). 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 (50 degrees) facing east around 8:00 to 8:30 AM. Subsequently, as the modules track to the east, western receptors will experience less glare prior to 8:00 AM 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

PM to 8:00 PM 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 10 degree 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 Air Traffic Control Tower 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.

Based on the results of the FAA NCT, the Project does not exceed notice criteria and a formal filing is not necessary.

8 REFERENCES

FAA (Federal Aviation Administration). 2010. Technical Guidance for Evaluating Selected Solar Technologies on Airports. Office of Airports, Office of Airport Planning and Programming, Airport Planning and Environmental Division (APP-400). November.

FAA. 2020. Notice Criteria Tool hosted by Federal Aviation Administration. Accessed online https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm

ForgeSolar. 2020. Sandia Solar Glare Hazard Analysis Tool, GlareGauge hosted by ForgeSolar. Accessed online https://www.forgesolar.com/.

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

ATTACHMENT A
PRELIMINARY SITE PLAN

ATTACHMENT B
FIGURES

ATTACHMENT C
FORGESOLAR GLARE ANALYSIS REPORTS